

Empirical Evidence of the relation between ESG performance and Financial Returns

How to include ESG criteria in the investment decision process
Research done in the context of an internship at Mercer - Investments

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- Investor's interest in Environmental, Social and Governance (ESG) factors has been increasing in recent years. However, if at first many investors and companies seek to be aligned with such principles only to show they were, nowadays more and more see the potential financial benefits of taking ESG criteria into consideration. The idea that companies' efforts to become more sustainable reduce the future prospects of growth is based on mainly unjustified assumptions.
- In this sense, the aim of the present research is to enlighten investors about the financial gains that may arise from including ESG criteria in the investment decision process.
- Since this is a significantly new topic among financial studies, an introduction to the asset class is of foremost importance. Then, based on former literature review and driven by historical performance analysis and portfolio evidence, empirical results were computed.
- Based on MSCI data, and making a separation between Emerging and Developed countries, portfolios of stocks that perform good (best-in-class) and bad (worst-in-class) in terms of ESG were built and analyzed against both their respective benchmarks and the Fama-French (FF) three factor model. The aforementioned portfolios of stocks that have high and low ESG ratings were quarterly rebalanced so that each quarter the companies integrating the portfolios are the best ESG performers.
- The best-in-class portfolios yielded an annualized return (from 2007 to 2017) of 11.7% for EM and 5.4% for DM, outperforming the benchmarks that returned 2.6% and 1.9% respectively. Throughout the analysis, the results for EM were always more significant.
- Regarding the regressions against the FF three factor model, and with the goal of finding abnormal returns, the best-in-class portfolios generated a positive alpha (significant for EM) while for the worst-in-class this variable was negative (as one was expecting). Also, it was considered to be important to include the Momentum factor in order to see if there was a part of the portfolios' returns that could be explained by this extra factor. The results achieved were ambiguous and more useful for Developed Markets portfolios.
- Finally, and as a supplement analysis, an long/short strategy that buys the best ESG performers and sells the worst ESG performers was analyzed. It yielded positive significant abnormal returns.

Direct Research Internship Context

- This research was done in the context of an internship at Mercer - Investments. As an Investment Consultant company, Mercer's clients are mainly composed by company's and government Pension Funds (that are in turn supervised by a Board of Trustees).
- The role of finance in endorsing social good has been a widely discussed theme in the industry and therefore Mercer's fiduciary duty takes into consideration this kind of impact and behavior.
- Often asked by the clients themselves, Mercer consultants must present new asset classes to the company. In this sense, the present research comes as a tool for possible presentations required. Knowing this, the analysis conducted was done bearing in mind the possible target.
- Therefore, limitations regarding econometric or statistical background are due to the fact that its target will not take them as valuable and can even find them confusing.

Table of Contents

1	Introduction
2	Literature Review
3	Drivers and Motivations
4	Methodology, Data and Empirical Results
5	Conclusion
6	References
7	Annexes

Introduction

Introduction (1/4)

What is ESG?

Investors take into consideration a vast range of factors when determining the present and future prospects of a company. Usually, this information is sourced from financial statements and reports. However, as this data starts to be available to almost anyone, investors start to look into new information that may give them some comparative advantage. Social oriented investing has emerged in recent years as one of the most dynamic and popular investment strategies. It can be described as an investments that **intentionally targets companies, funds and organizations not only because of the potential financial returns, but also to generate social and environmental impact**. As this comes a widespread topic, it is important to highlight some key terms that might be misinterpreted among each other.

Ethical Investment

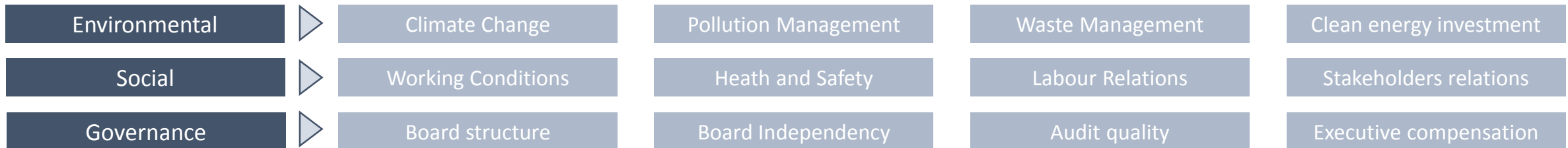
Ethical Investment can be described as one an investment philosophy that is driven by moral religious or ethical values . In order to include this into the investment process, the rationale is to exclude from the portfolio the so called “sin-stocks” that go against certain parameters. This process leaves out companies that were related to products such as alcohol, tobacco or firearms.

Social Responsible Investment

SRI is another approach in which investors seek to balance the trade-off between ideal performance strategies and their social impact. In this context, investment managers may try not only to negative screen “bad stocks”, but also to choose among companies that are aligned with theirs.

Responsible Investment

Responsible Investment comes, in this context, as the integration of Environmental, Social and Corporate Governance (ESG) factors into the investment management process with the underlying assumption that these factors can have an empirical impact on financial performance. These factors have been given much attention lately because they enable impact to be measured and tracked .



*See Annex 1

Social oriented investment strategies have become popular in recent years. In this research one will focus on Responsible Investing that fully integrates ESG factors.

There are several options for investors to incorporate RI, EI or SRI. However, in order to give a broad insight on the topic the five main approaches will be described here. Each one of them can be incorporated on their own or as a combination.

Moreover, a robust approach to RI would include most of the approaches mentioned bellow.

ESG Integrated Approach

This approach is at the forefront of recent developments in the field. Fund managers actively take into consideration ESG factors when choosing among investments. They believe that, by not considering these factors, one is ignoring significant extra-financial factors that can expose companies to a range of risks.

Screening

Screening usually comes as a negative and positive screening, one, or a combination of both. While the former represents the exclusion/underweighting of stocks that are involved in sectors that are perceived to have a negative impact on society (tobacco, alcohol, etc.), the latter encourages the inclusion/overweighting based on whether the company has a positive impact on society through their ESG policies.

Impact Investing

Impact Investing refers mostly to investments in private equity, private debt and other alternatives. A common approach is to use investors' capital to support small businesses in emerging or underserved markets.

Active Ownership

This is an approach whereby investors seek to use their influence as shareholders to change corporate behavior. It ranges from using voting rights to verbal and written communications (shareholder advocacy).

Theme Funds

Investment in funds that only target very specific gaps within sustainability, for example a fund that only invests in companies providing solutions to sustainability challenges in health and waste.

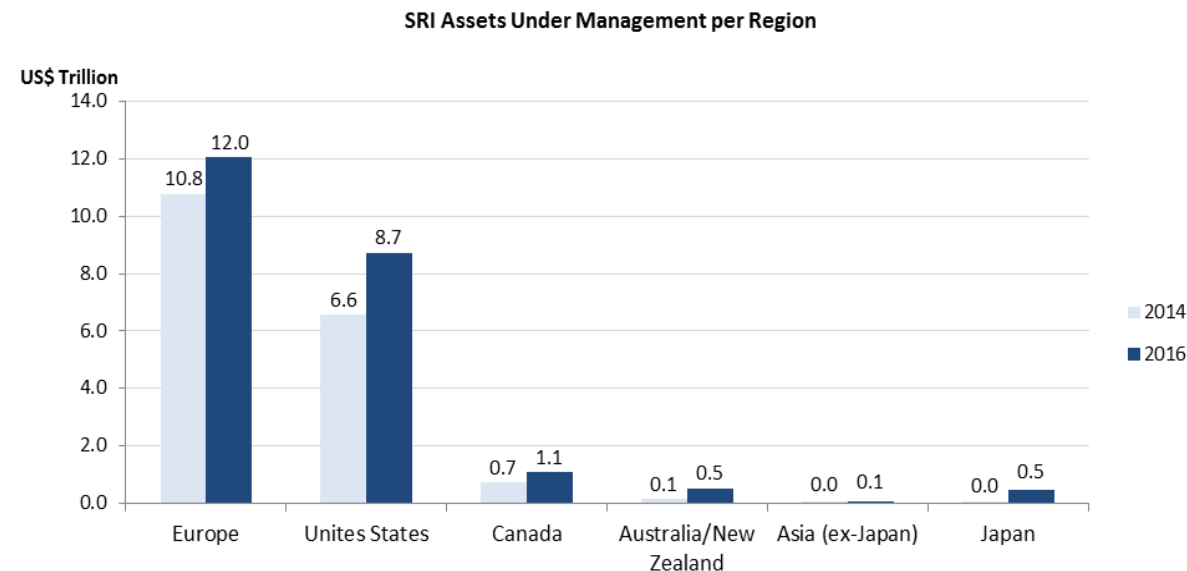
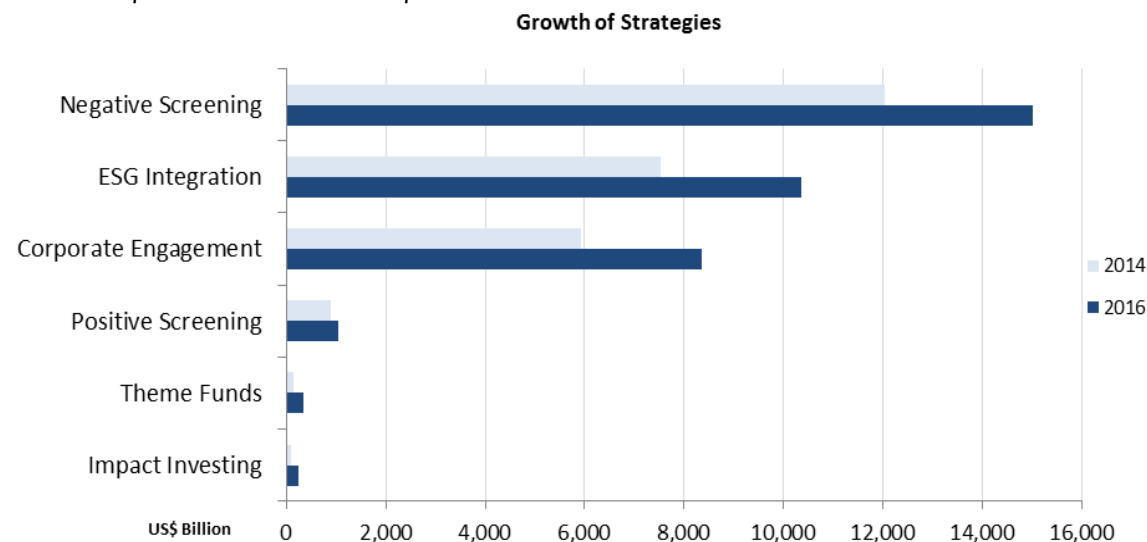
A robust Responsible investment strategy must include one or a combination of different approaches. By doing so, managers can incorporate these factors in the decision process.

Introduction (3/4)

ESG in Numbers

ESG factors comprise a range of issues such as the level of carbon emissions, labour rights and corporate governance structure. If the public in general find it attractive because it comes as mean to promote sustainability, company and asset owners see it as an indicator of financial strength and efficient management. One of the key questions when considering any factor is if it can differentiate a company from its peers.

ESG integration has been increasing a lot not only geographically, but also among asset classes. This reflects investors willingness to take into consideration other metrics rather than only financial ones into their investment decision. Also, the benefits in terms of long term value creation and risk mitigation start to become clear, namely, climate change, pollution footprint and natural resources shortage. Only between 2014 to 2016, total Social Responsible Investment AUM increased from US\$ 18.3 trillion to US\$ 22.9 trillion.



If at first responsible investment came as a way for funds and managers to increase their reputation, nowadays more and more see the financial benefits of this asset class. However, this is not as common as one would like. Therefore, this research main goal is to raise awareness among investors for the possible financial benefits that may arise, and to refute the idea that Responsible Investment is almost a synonym of weak performance and returns.

ESG Investment has been growing in the past few years both in terms of assets under management as well as among each approach.

The six principles proposed by PRI

1. Incorporate ESG issues into investment decision process

By encouraging academic research, support development of ESG metrics and tools



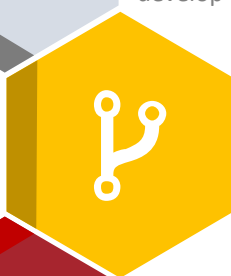
2. To be active owners and incorporate ESG issues into our ownership policies and practices.

Engage with companies on ESG matters, develop policy regulations



3. Seek appropriate disclosure on ESG issues by the entities we invest in.

Ask for standardized reporting on ESG issues and companies' information (integrate ESG in 10-K), supporting shareholders in ESG related matters.



4. Promote acceptance and implementation of the Principles within the investment industry.

Support regulatory or policy developments that enable implementation of the principles.



5. Work together to enhance our effectiveness in implementing the Principles.

Share tools and pool resources.



6. Report on our activities and progress towards implement the Principles.

Disclose information that can be useful for investors on ESG and determine the Principles' impact.



ESG Credit Rating Initiative

The ESG in Credit Ratings initiative is of particular interest since it aims to enhance transparency and systemic integration of ESG factors. As global bonds hit records as one of the largest asset classes worldwide, it is importance that CRA's take into account ESG factors when evaluating their risk. This is a clear example of increasing concern about ESG factors throughout asset classes. For now the Environmental dimension has taken most of the attention when referring to fixed income instruments.

- Principles for Responsible Investing (PRI), supported by the United Nations, is the world's leading proponent of RI. It supports an international network of investors in incorporating these factors into the decision making process. "PRI acts in the long-term interest of its signatories, of the financial markets and economies in which they operate and ultimately of the environment and society as a whole."
- Since 2006 more than 1,800 asset managers have committed to their principles and collectively they now manage roughly \$ 34 trillion. The simple act of investment managers asking their investees about the impact they are creating in society is , alone, a great achievement. PRI is funded by an annual fee paid by all signatories.
- This initiative has contributed for a wider acceptance of ESG related themes among investors as it stands almost as an entity to ensure credibility and support.

The Principles for Responsible Investing play a crucial role in providing investors with confidence and motivations to pursue responsible investments

Literature Review

ESG Integration and the Investment Management Process: Fundamental Investing Reinvented, Emiel van Duuren, Auke Plantinga and Bert Scholtens, 2014

- This research paper looks into how professionals account for ESG factors in their investment process. Also, they are specially interested in how “ordinary” managers (and not green or ethical fund managers) take into account or are keen on including this thematic into their portfolios. In order to do so, they surveyed 251 fund managers. The first important take away refers to “What is important in ESG Integration?”. They found out that the amount of **money spent on ESG research is not as relevant as other studies had concluded** (the results were a 2.46 relevance in a five-point scale).
- In addition, a majority of managers that actively take into consideration such factors sell or reduce their position due to poor ESG performance, while a minority of the same group admit to have bought additional shares due to ESG related information. As one was expecting, most respondents stated that they expected both short and long-term risk-adjusted outperformance from ESG inclusion. Following, they tried to access what type of information ESG managers really need.
- A purely fundamental analyst may want all the raw data referring to a company’s performance, however, investors are time constrained. In this sense, they found that, on average, the respondents **favor ESG ratings at a company level over raw data (and also over a more aggregated level of information such as country and sector)**.
- Thus, it gives strong evidence that ESG integration is much like traditional active management based on fundamentals, because it is characterized by a strong need of company level information.
- Finally, the study addresses the question of country bias, concluding that there is a remarkable difference in perceptions of U.S and European domicile portfolio managers. **The ones in the U.S, on average, do not share the strong belief that there is a positive relationship between SRI and performance as their European counterparties.**

Main takeaways

- Investment managers take into consideration ESG factors that are analyzed at a company level more carefully than if they are described on an aggregate basis. In this sense, the motivation to gather this type of information comes as a consequence of such findings.
- Also, the difference between countries and regions stated in this research motivated a deeper analysis about the geographical split of the sample.

The importance of analyzing ESG data at a company level is clear. Also, one became aware of the importance of geographically split the sample.

E.S.G. Risk Factors in a Portfolio Context Integrated Modeling of Environmental, Social and Governance Risk Factors, RiskLab 2010

- Risklab ESG study main goals were to integrate the modelling of ESG risk factors into portfolio context - analyzing the long-term risks over a 20-year horizon, assuming that ESG risks do not have an impact on expected returns. Specifically, it aimed at determining to what degree ESG factors influence equity investment risk.
- Their motivations were to develop a way of quantifying Responsible Investing impact, following the demand by investment manager. In order to so, they first try to identify suitable data to model ESG dimensions as risk factors and then, based on an optimization framework, make portfolio analysis.
- Driven by data availability and experts input they defined certain risk drivers for each of ESG dimension: for Environmental Risk they choose carbon footprint data, for Social Risk both sick rates and relative staff costs/sales and for Governance Risk relative sector governance ratings.
- Regarding the environmental risk modelling, they assess how risk sensitive equity investments are to changes in the emission rights spot price and how that impacts their tail risk. The approach used to the other risk factors was similar.
- After, and starting from a portfolio of 30% global equities and 70% conservative assets, they built two more portfolios were global equities where replaced by positive (where companies actively tried to minimize the ESG risk) and negative (whereby the risks are ignored) ESG equity. The results stated that in the long term ESG factors are expected to have significant risk impact on equity investments.
- In numbers, the portfolio that takes into consideration ESG risk factors can achieve the same level of return with less risk (CVaR 95% decrease of about 30%) or higher return for the same level of risk (0.3% increase).

Main takeaways

- From RiskLab study it was possible to see the importance of ESG equities in a portfolio context. This also came as motivation for creating the portfolios that will be presented throughout the report.
- Also, the fact that this is a purely quantitative study in a field where most research are qualitative encouraged this research to follow this trend and increase the amount of literature regarding the topic.

ESG integration in a portfolio and respective benefits of it were driven by the presented study.

Literature Review (3/3)

Previous Methods and Conclusions

ESG scores and investment Performance, Nomura Equity Quantitative Research, 2012

- Through a series of three research papers, Nomura analysts tried to assess whether ESG scores influence equity returns. They created portfolios for three separate regions (Global, Industrialized Countries and Emerging Countries) and for each region high and low ranked portfolios were built for each ESG dimension (Environmental, Social and Governance).
- In the first paper companies were selected based on their ESG ratings and regressed against the Fama-French three factor model in order to see if there was a statistically significant alpha. Portfolios were formed based on ECPI data with a seven years time frame (and four years for emerging countries). They found no contribution to excess returns.
- In the second paper, they stopped relying in absolute ESG ratings and tried to draw a correlation between the downgrading/upgrading of companies and their performance afterwards. This time, more solid conclusions were drawn. There is evidence that upgraded stocks (particularly from global and industrialized regions) tend to underperform the market as a whole after the upgrade. Regarding downgraded stocks they underperform the market both prior and after the downgrade.
- From this last evidence they went a step further and discovered that downgraded stocks produced negative alpha. There was no particular trend in upgrades. Therefore, they state that a negative screening approach of stocks upon the downgrade can enhance portfolio returns.



Main takeaways

- Nomura's quantitative research enlightened a great percentage of the methodology applied in the report. First of all, and in addition to the first paper presented, the fact that the geographical split was of upmost importance.
- Then, the use of the Fama-French three factor model over other possible asset pricing models.

Can ESG add alpha? *An Analysis of ESG Tilt and Momentum Strategies*, Zoltán Nagy, Altaf Kassam and Linda-Eling Lee, 2015

- This research paper targets a specific concern of investment managers: does inclusion of ESG factors comes at a cost of weaker risk-adjusted returns? They find that this performance trade-off does not necessarily occur. Using MSCI's ESG data, and ESG Tilt portfolio and an ESG Momentum portfolio are constructed.
- The former overweights stocks with higher ESG rankings, while the latter does the same for stocks that have improved their ESG rating over recent time periods. They found that both strategies outperform the global benchmark over the last eight years. Furthermore, a significant part of the returns were not explained by style factors and thus may be attributed to ESG factors. This point was more clear under the momentum strategy.



Main takeaways

- The last and most recent research indicated that could be interesting to build a momentum strategy and rebalancing the portfolios according to ESG ratings.

The methodology for building portfolios based on ESG criteria was derived, and then extended, from previous quantitative studies.

Drivers and Motivations

MSCI ESG Leaders Index

These benchmarks target the highest ESG-rated companies making up 50% of the adjusted market capitalization in each sector of the underlying index. They are designed for investors seeking exposure to companies with strong sustainability profiles with relatively low tracking error to the underlying equity market and are reconstituted annually.

Coverage

Since 2010, when MSCI ESG Research was launched as part of MSCI Inc. it has increased its coverage of companies from 2,000 to 6,500 companies and 11,000 fixed income issuers. Moreover, it started with a team of 90 people, which in 2016 had increased to more than 250.

Data

MSCI collects and standardizes public data from Governments and NGO databases, company disclosure documents (10-K, sustainability reports) and more than 2,100 media resources.

Metrics

Standardized methodology to access company Risk Exposure and Risk Management relative to its peers. Also, ESG teams work with each company to verify and control all the data.

Evaluation

Industry Specific key issues are scored on a 1-10 scale in addition to a daily monitoring and weekly update of controversial issues and events.

ESG Ratings

Key ESG Issue Score and weights are taken into consideration to create an overall ESG Rating (AAA-CCC) and normalize relative to industry peers.

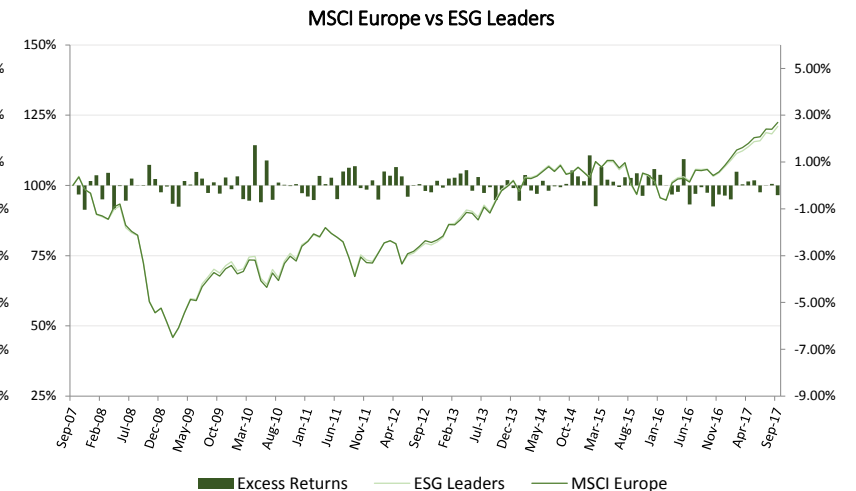
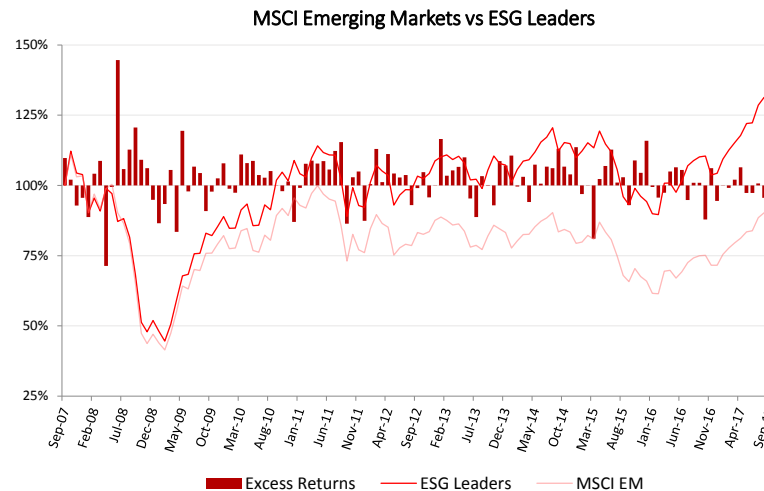
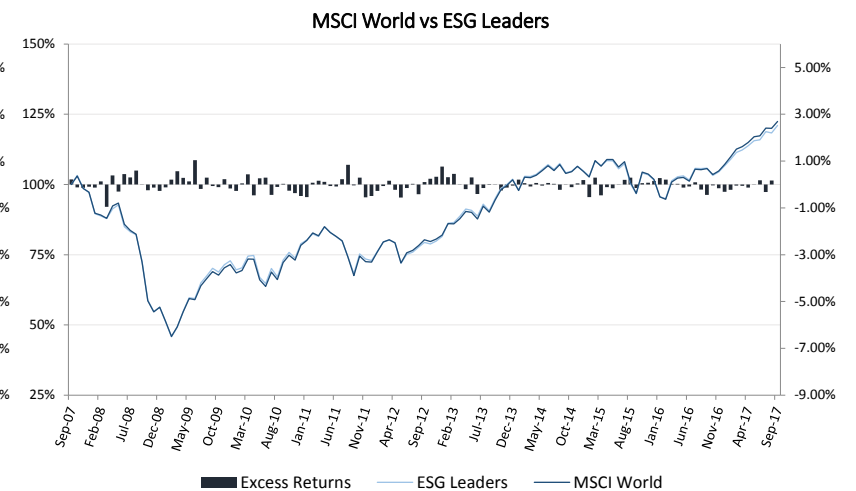
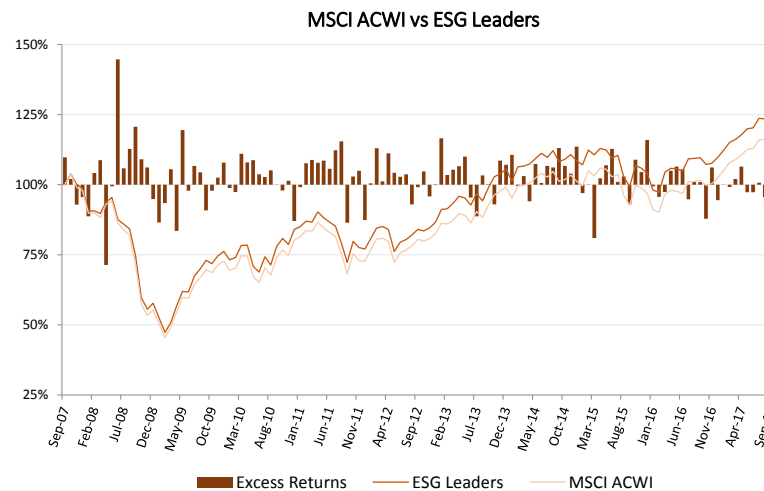


MSCI Indexes were used throughout the report due to their transparent and complete methodology and worldwide acceptance.

Performance

Historical Analysis

- After the brief introduction to the topic, one must ask what is the historical evidence of considering ESG factors and what are the main points to keep in mind. Therefore, looking at historical returns can be enlightening in terms of where to begin this analysis.
- As a point of start for further analysis, the MSCI Index universe was chosen as a base point. A geographical slip was considered to be important so that one can have a more broad view on the topic. In this sense, four regions were considered: Emerging Markets, Developed Markets, Europe and World.
- In the graphs presented, there is evidence that in Emerging Markets the inclusion of ESG factors can lead to outperformance of an investment. For the past ten years the companies that are considered to have better ESG standards have been clearly above the others. This trend is less marked in both Developed Markets and Europe alone. Mainly due to the similarity between this two regions, the latter will be dropped for future analysis.

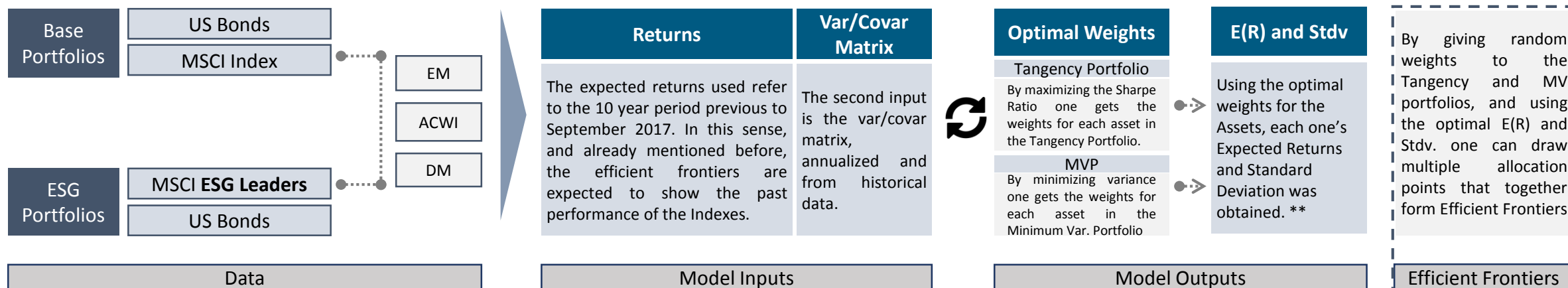


When comparing the MSCI standard indexes with their ESG Leaders counterparts one can see that in both EM and ACWI the outperformance is clear.

Portfolio Analysis (1/2)

Methodology

- In order to corroborate the idea that ESG factors can enhance performance, as one depict in the previous historical analysis, a more descriptive and robust analysis was conducted. For each of the regions, two portfolios were built: a **base portfolio**, formed by each region's MSCI Index and an Index of Bonds (Bloomberg Barclays Aggregate Index), and an **ESG portfolio**, where the standard MSCI Indexes were replaced by their ESG Leaders peers.
- Mean-Variance optimization was conducted and the efficient frontiers drawn. It is also important to mention that the efficient frontiers are only presented to show a more deep view on the historical performance of the indexes. Therefore, it was considered not to be relevant the use of forward looking measures regarding returns. To conclude about the possible benefits of ESG integration in portfolio construction, the results should state that for the same level of risk one can get higher returns, or that for the same level of return there should be less risk. Graphically this means that efficient frontiers for the ESG portfolios must shift to the left in comparison with the base portfolios.



*See Annexes 4 to 6.

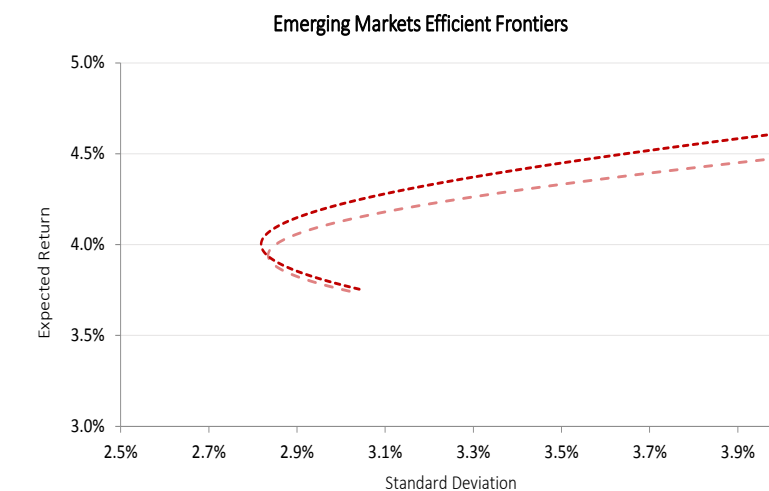
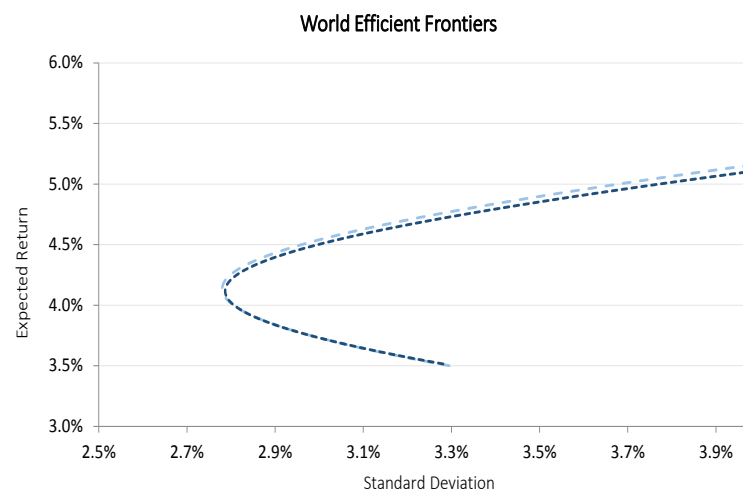
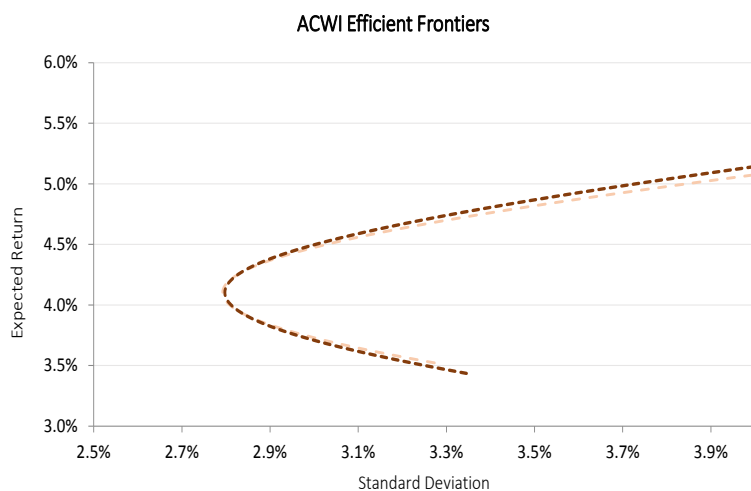
Mean-Variance Optimization was conducted in order to have a more robust insight on the possible benefits of ESG inclusion.

Portfolio Analysis (2/2)

Efficient Frontiers

Region	Portfolio	E(R)	Std. Deviation	Sharpe Ratio	Weight
ACWI	Standard	4.4%	2.9%	1.16	8.9%
	ESG Leaders	4.4%	2.9%	1.17	9.3%
World	Standard	4.5%	2.9%	1.18	9.7%
	ESG Leaders	4.4%	2.9%	1.17	9.3%
Emerging	Standard	4.0%	2.9%	1.05	2.8%
	ESG Leaders	4.1%	2.9%	1.09	4.0%

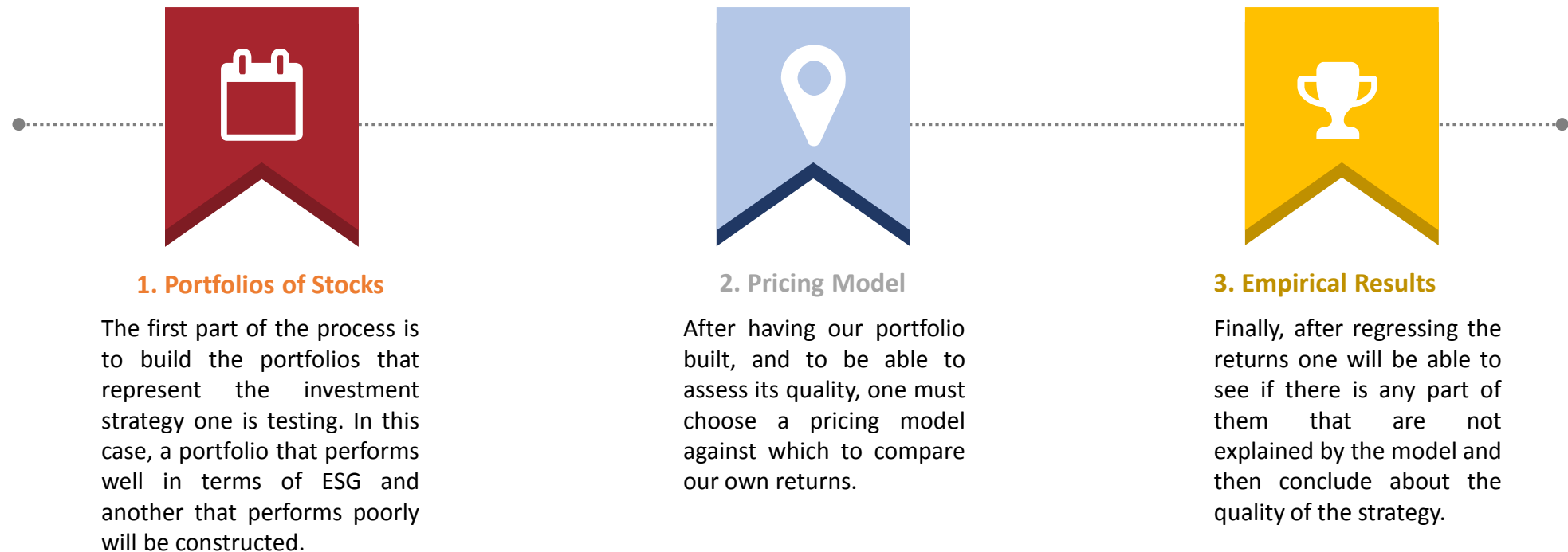
- Indeed, this happens for both ACWI and Emerging Markets Regions. However, one can not extend this conclusion for Developed Markets. Also, the optimization yields higher weights for the Index when they reflect ESG concerns both in EM and ACWI. Regarding the Sharpe Ratio it stays (mostly) in line from all the base portfolios to the ESG ones.
- Ultimately, it can be said that the present analysis shows that the inclusion of ESG factors would leave an investor as good in terms of performance but with the plus of creating a positive impact on society.



When replacing standard global equity by good ESG one in a portfolio of bonds and stocks, the diversification effects are evident for both EM and ACWI.

Methodology, Data and Empirical Results

With the goal of concluding if there is evidence that ESG ratings can enhance performance, and that these factors should be included in an investment strategy that aims to achieve abnormal returns, the following process must be completed.



The key steps will be to first build a portfolio of stocks, then choosing and building a pricing model and finally draw and interpret the main results.

ESG Portfolios Construction

Data collection

1

The data was provided by MSCI ESG Team and includes all companies that put together the MSCI ACWI Index and correspondents ESG ratings since 2007.

Stock picking

2

Then, from the companies available, they were divided according to two categories: region and ESG Rating. Regarding the geographical split the regions considered were Developed Markets and Emerging Markets (Annex 2). In terms of ESG ratings only the best (AAA) and worst (C).

Portfolio Rebalancing

3

Each quarter from 2007 to 2017 the top and bottom ten companies were chosen to build the best in class and worst in class portfolios, respectively. Therefore, each quarter start the portfolios are rebalanced to include the ten best and worst performers in terms of ESG for the next full quarter.

Weighting

4

Each company was given an equal weight in the portfolios, regardless of their individual size and sector. By using this methodology, the portfolios were controlled for sector and size factors so that performance is not skewed.



Region	ESG Rating	Number of Companies
Emerging Markets	High ESG	74
	Low ESG	110
Developed Markets	High ESG	80
	Low ESG	117

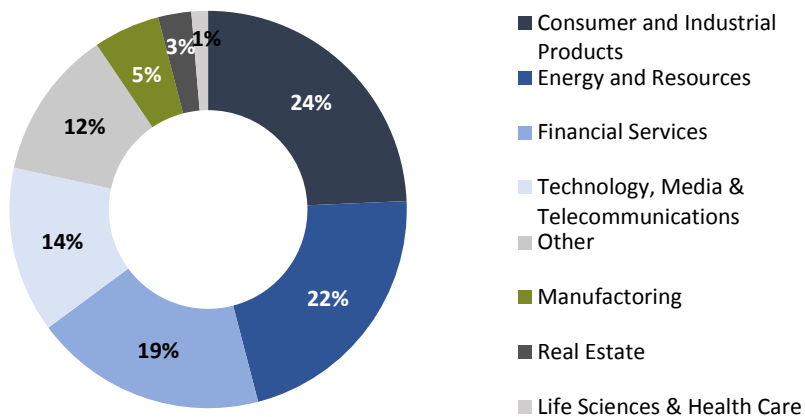


Based on data provided by MSCI four portfolios of stocks were built: for each of the regions (EM and DM), a portfolio of good and bad ESG stocks was considered.

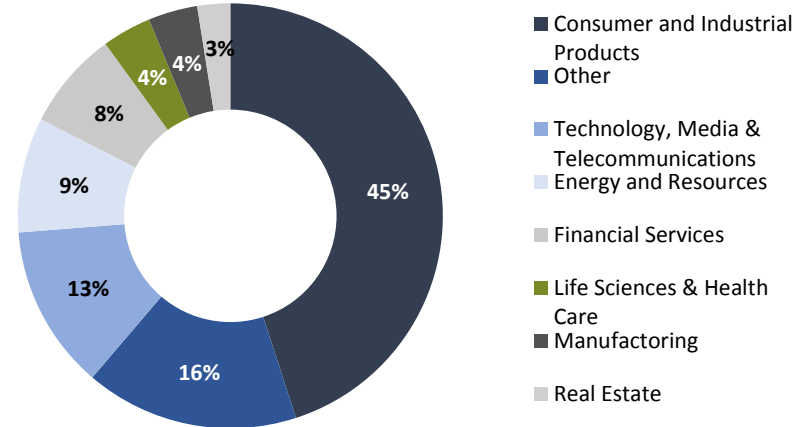
Portfolio of stocks (2/4)

Industry Split

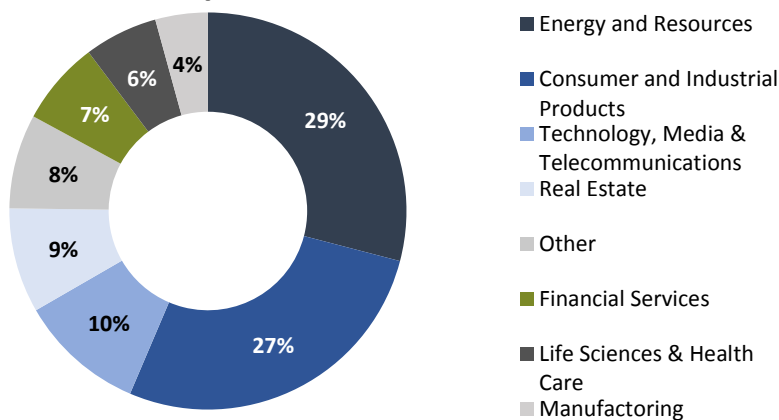
Emerging Markets - High ESG Rated



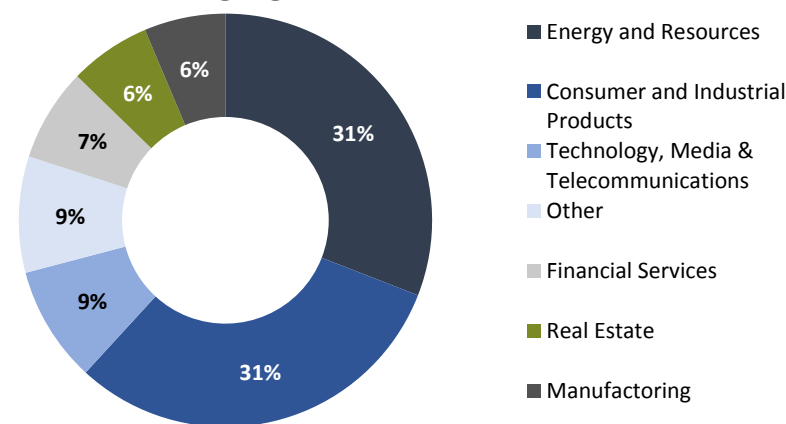
Developed Markets - High ESG Rated



Developed Markets - Low ESG Rated



Emerging Markets - Low ESG Rated



- If one analyzes the industry split of the companies considered in the sample it is possible to draw some conclusions.
- First, that in both regions the highest percentage of companies that perform better and worst in terms of ESG are the ones belonging to the Energy and Resources and Consumer and Industrial Products sectors. This may pose some questions, however it is important to notice that the ratings take into consideration the industry factor and are adjusted to it.
- Second, the fact that the sample comprises this amount of industries is a good indicator that there will not be any industry bias in the conclusions.

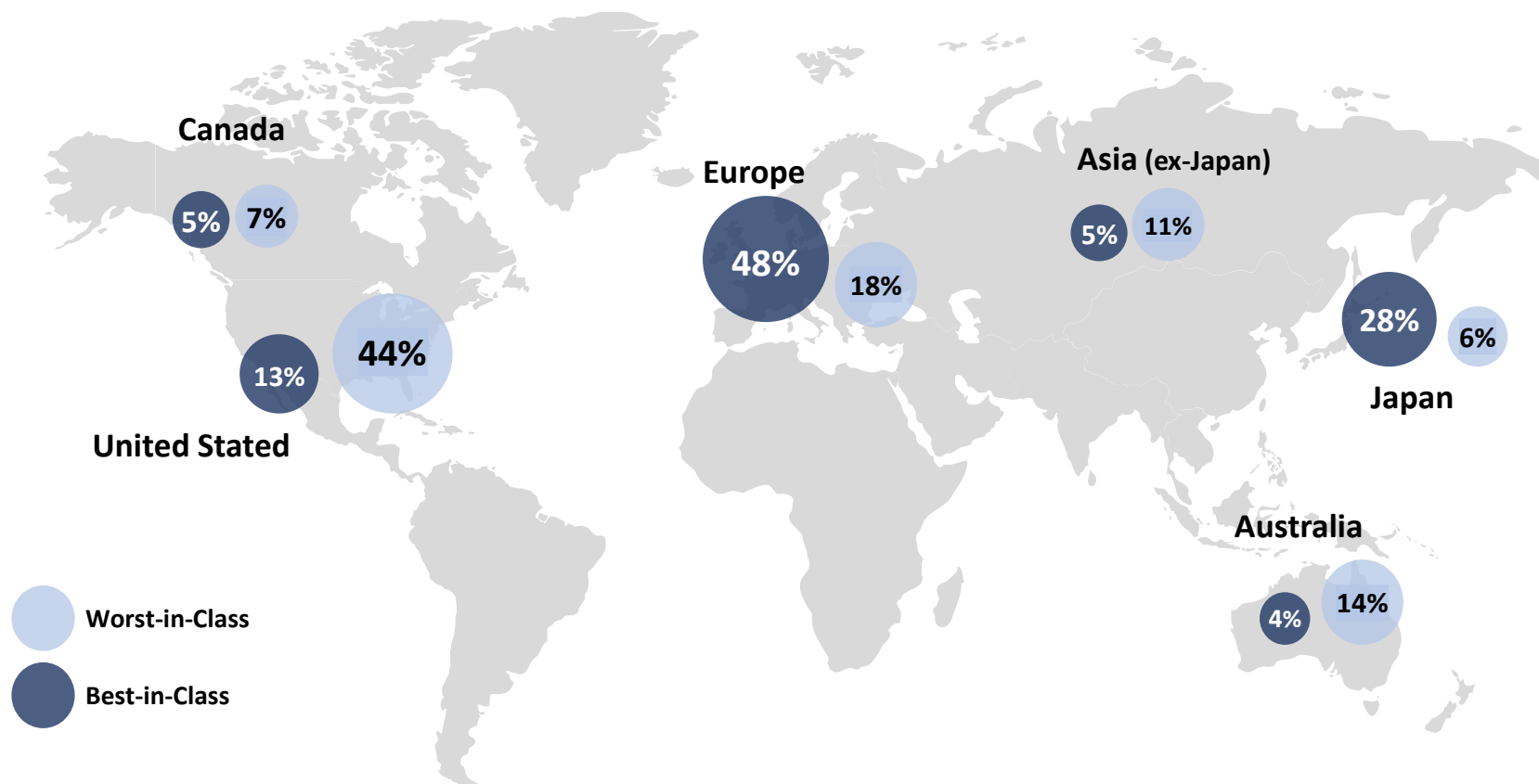
*Industry split according to Deloitte.

There is a clear trend regarding industry split. Both in EM and DM the good and bad ESG companies come mainly from the Energy and Consumer and Industrial Products industries.

Portfolio of stocks (3/4)

Geographical Split - Developed Countries

Developed Countries' companies geographical split



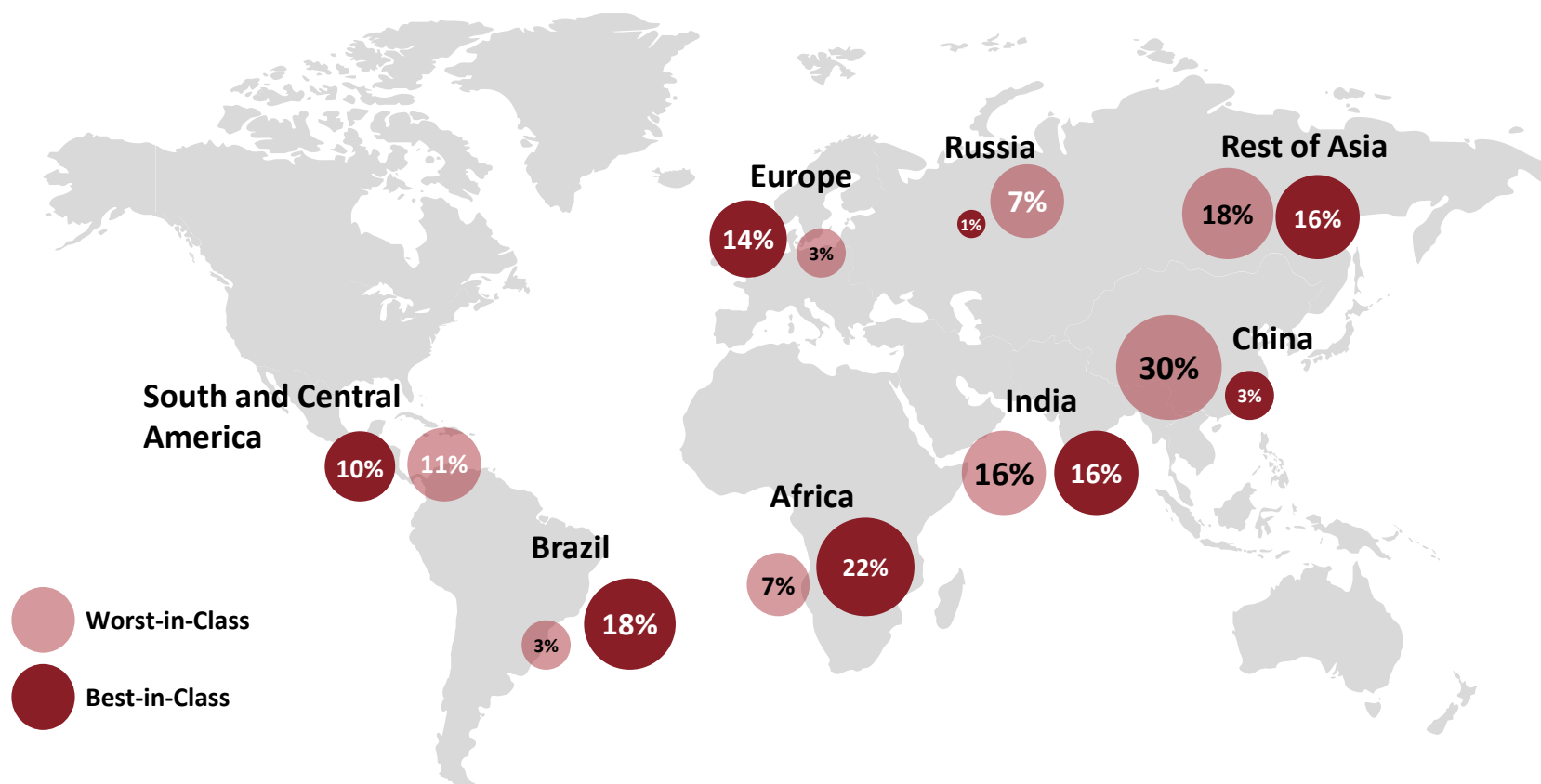
- One of the main evidences is the difference between Europe and the United States.
- The fact that a big percentage of good ESG companies can be found in Europe against the US can be explained by two main reasons (and corroborate the findings from Emiel van Duuren, Auke Plantinga and Bert Scholtens, 2014): the concept of ESG has longer history and is more present in European investors than in American ones.
- Europe's corporate environment is more transparent, allowing for a deeper analysis from investors and regulators in terms of ESG.
- On the other hand, US companies see the implementation and compliance with such factors as an opportunity cost and shareholders tend to forego these initiatives at the expense of growth.

The geographical split for the Developed Markets portfolios corroborates previous findings that Europe is more open to this asset class than the US.

Portfolio of stocks (4/4)

Geographical Split - Emerging Countries

Emerging Countries' companies geographical split



- Regarding Emerging Markets, there are some key points to stand out.
- First, the 22% of best-in-class companies in Africa (against the 7% of worst) can come as a surprise. However, this may be attributed to the integration of the Integrated Reporting Standards in Johannesburg's Stock Exchange. As corporations start to disclose more information, their rating might be positively influenced.
- The results regarding South Africa and Brazil with those found by NN Investment Partners (Annex 2).

The geographical split of the EM portfolios are also in line with previous studies and with recent developments in legislation in certain regions.

Pricing Model

Fama-French Three Factor Model

The Fama-French three factor model is an asset pricing model that is used to explain/measure returns. One will attempt to prove that by investing in companies based on their ESG rating one can achieve abnormal returns – meaning that these are not explained by the FF asset pricing model. If so, and being this alpha statistically significant, the argument for a momentum strategy based on ESG becomes more plausible.

Fama-French Factors

Regional Factors

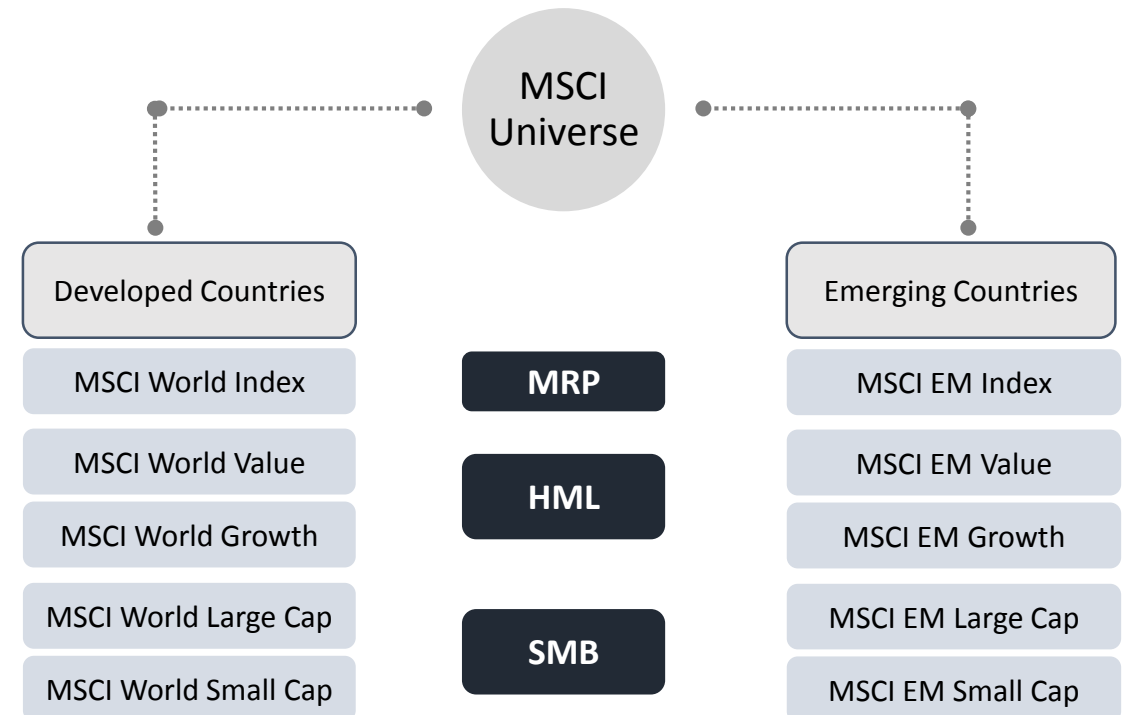
1

As one chose to separate the analysis in two regions (EM and DM) using the FF traditional factors based on US data did not seem the wright approach. Hence, the three factors were built for each of the regions in order to better capture the returns' nature.

Data choice

2

For each region the correspondent MSCI Indexes were used to build the factors. For the HML the Value and Growth factor Indexes were used, while for the SMB were the Large and Small cap ones. For the MRP, the “basic” regional factors and the 3-month T-Bills were used. All data used is for all quarters starting in 2007 and ending in 2017.

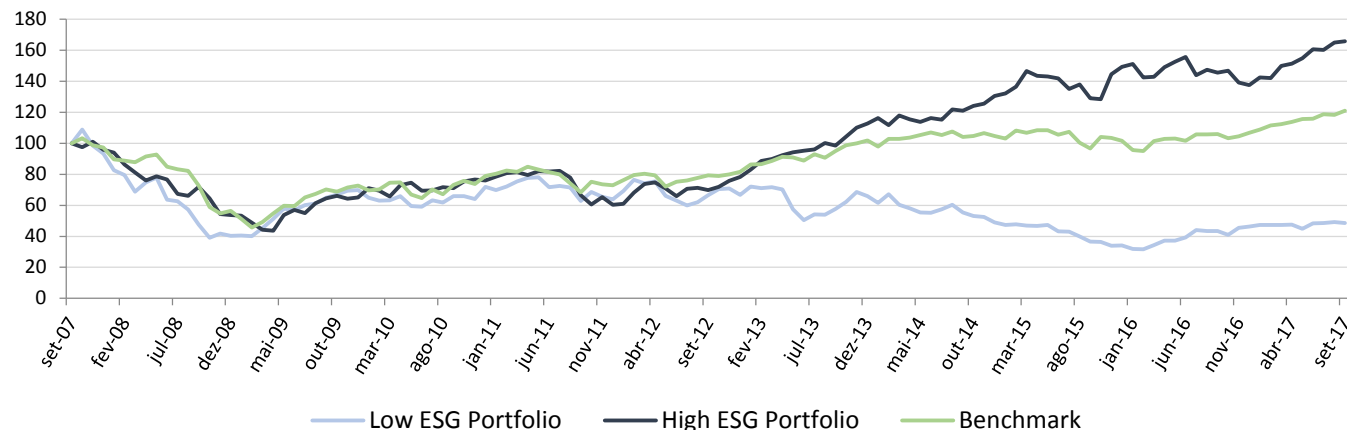


The Fama French factors were built for each of the regions since the US market was not considered to be a good comparable asset for the portfolios presented.

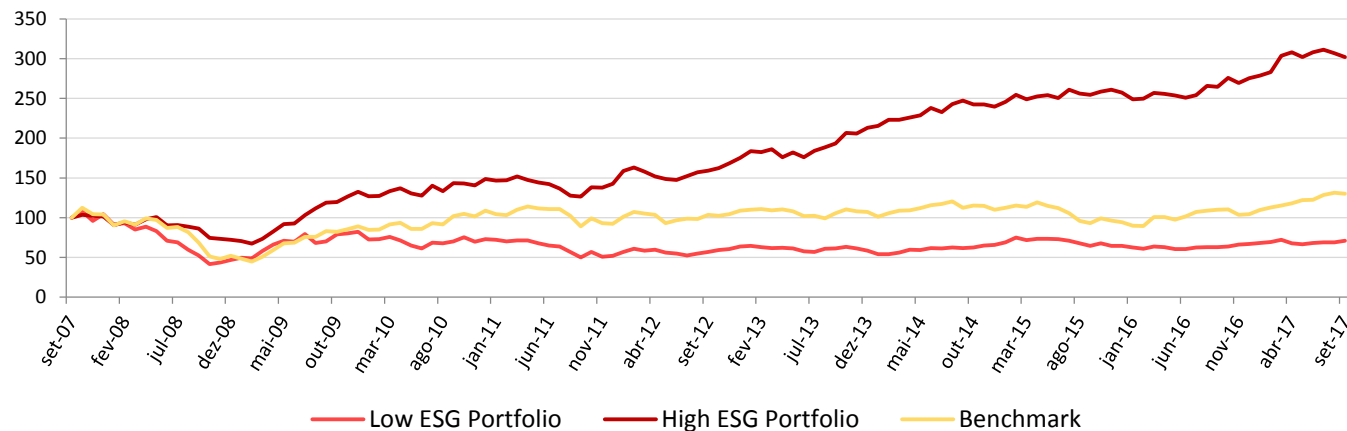
Empirical Results (1/3)

Best-in-class and Worst-in-class Portfolios

Developed Markets High ESG Companies vs Low ESG Companies



Emerging Markets High ESG Companies vs Low ESG Companies



- As one can depict from the graphics, in Developed Markets both the high and low rated companies performed mostly in line with the benchmark (taken as the MSCI World) in the beginning of the period. However, since 2012 the best-in-class portfolio clearly outperforms the benchmark, while the worst-in-class portfolio underperform for the following years. Regarding Emerging Markets, the previous evidences extend almost to the all period.
- The same conclusions can be drawn for Emerging Markets countries. However, it can be extended for almost the whole sample period. Also, as time goes by, the gap between the best in class companies and the benchmark increases.
- One way of taking advantage of the clear trend in both markets could be to include good ESG Companies in a portfolio and exclude the low rated ones. By doing so, investors can combine an ESG integrated approach with the screening technique.
- Furthermore, it could motivate a less risk averse investor to pursue a long short strategy where he would buy high ESG Companies and sell low ESG ones.

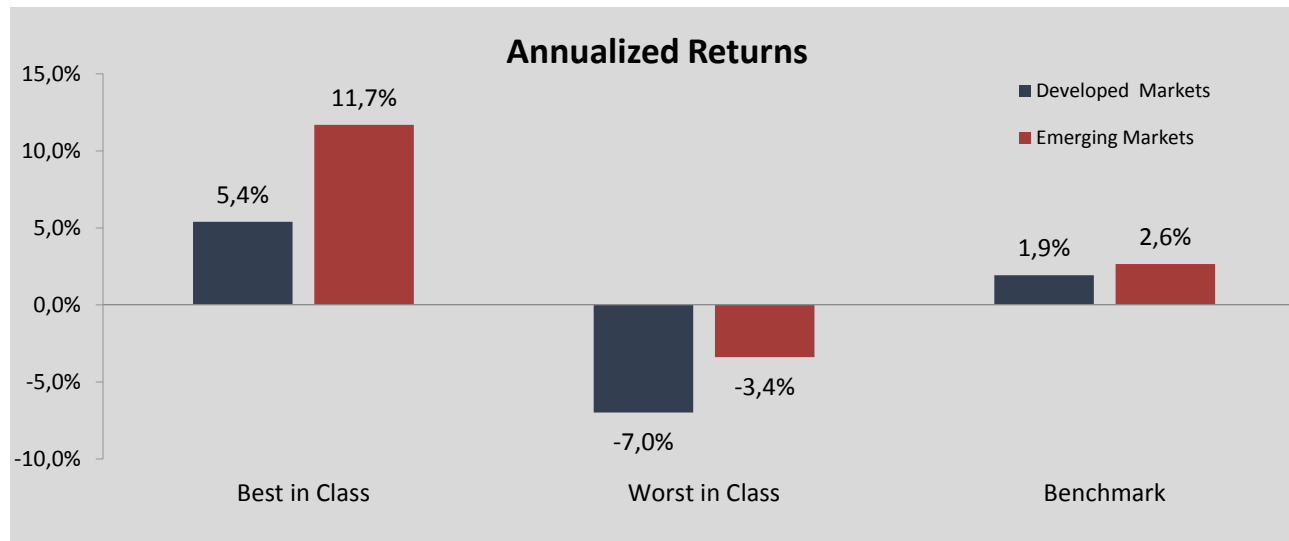
In both regions the best-in-class portfolio outperforms the benchmark while the worst-in-class underperforms it. This is more significant for EM companies.

Empirical Results (2/3)

Seeking Alpha

Region	ESG Rating	α	β	SMB	HML	Adj. R ²
Developed Markets	High - AAA	0.34%	0.94*	0.08	0.03	64%
	Low - C	-0.70%	1.05*	0.10	-0.36*	47%
Emerging Markets	High - AAA	0.96%*	0.48*	0.00	0.22*	57%
	Low - C	-0.20%	0.76*	-0.13	-0.14	58%

* Significance at 5% confidence level.



1

From the regressions one is able to conclude that for both regions the signs of the alpha were as predicted: negative for the worst in class and positive for the best in class. Also, the abnormal returns for the portfolio composed by high emerging markets ESG companies was statistically significant.

2

Although not substantial, the research shows that there is some evidence of positive ESG alpha (specially in emerging markets). The results also support the exclusion of bad ESG companies from portfolio construction.

3

Once we put together the annualized returns for the four portfolios, the same conclusions regarding performance stand out. In Developed Countries the good ESG portfolio outperforms the benchmark by 3.5% annually, while the bad ESG one underperforms the benchmark by 8.9%. For EM the results are 9.1% and 6.0%, respectively.

It was possible to find positive abnormal returns (significant for EM) for the portfolio composed by good ESG companies while for the bad ESG one the alpha is negative.

Momentum Factor

- Momentum strategy links asset returns and investment decision to relative performance history. In practice, one following the momentum strategy would rank assets by past performance relative to its peers, and then take a long position in the winners and a short position in the losers.
- Momentum comes as an anomaly that refutes the premise of efficient markets. According to literature, the inclusion of the momentum factor in the asset pricing model would result in explanatory improvement. However, this conclusion is not consensual.

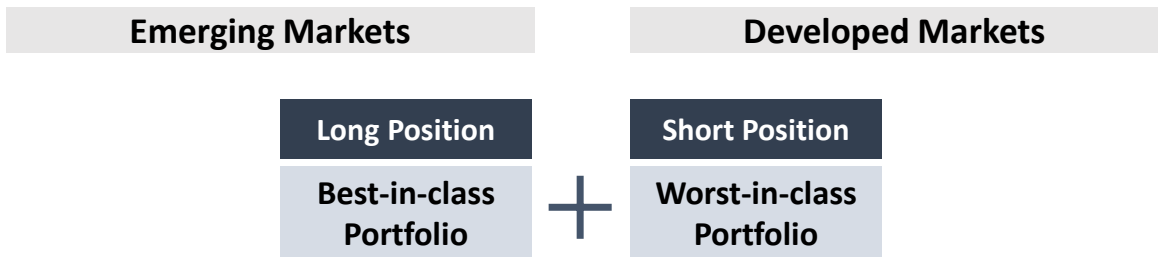
Include Momentum in the model and analyze the results

Developed Markets	Emerging Markets
The Adjusted R-squared increased both in the best in class and worst in class portfolio (around 2%).	As for Emerging Markets, the Adjusted R-squared decreased, event though by really small amount, in both portfolios.
In both portfolios the momentum factor is negative and statistically significant.	All the conclusions regarding alphas continue to be drawn.

The inclusion of the Momentum factor was more conclusive for Developed Markets.

Are the differences in alphas significant?

- As it was mentioned before, the results achieved can lead one to say that taking a long position in a best-in-class and a short position in a worst-in-class portfolio can be profitable.



- In order to evaluate the quality of such strategy, one should look at the alpha that it produces, and whether it is statistically significant.
- In order to do so, for both regions, a portfolio that buys the “good” stocks and sells the “bad” ones was conducted.

For EM the portfolio yielded an alpha of 1% (monthly) significant at 5% While for DM the alpha was the same, it is only significant at 10%.

The long-short strategy yielded positive alphas for both regions.

Conclusion

- For most investors achieving superior returns is no longer enough. More often asset managers are being required to incorporate responsible stewards into consideration when building their strategies. “Simply put, ESG is no longer a niche are of investment – it is becoming a basic requirement”*. This has been specially discussed within the pension fund industry.
- The presented analysis allows one to conclude about the performance impacts of the inclusion of ESG factors in the investment decision process. By choosing randomly the top and bottom ten companies regarding ESG for both Developed and Emerging Markets it was possible to find positive abnormal returns for the Best in Class Portfolio and negative Alpha for the Worst in Class Portfolio.
- This conclusion comes as both a corroboration of former studies but also as a supplement in ESG research, either for the use of most up to date data, and due to the fact that this area of study was more filled by qualitative studies rather than quantitative ones.
- Being so, the study will hopefully allow for the recognition of ESG as an investment strategy that will not deteriorate returns of a portfolio but can even increase them. Moreover, one could argue that it would be enough for such strategy not to reduce returns, since the social return one would achieve could compensate for the lack of abnormal returns. However, this is not the case and it leaves few reasons not to include this asset class in a diversified portfolio.
- Finally, this research paper will allow investors to take into account ESG criteria without the implemented idea that they would be sacrificing risk-adjusted returns.

* Pictet Asset Management

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Annexes

Annex 1

Examples of ESG factors taken into consideration by MSCI Research Team (by field)

Environmental	Social	Governance
Carbon Emissions	Labour Management	Corruption and Instability
Energy Efficiency	Access to Health and Safety	Business Ethics
Water Stree	Communication Management	Anticompetitive practices
Raw Material Sourcing		Compensations
Product Packaging		Board Structure
Waste Treatment		
Chemical Safety Exposure		

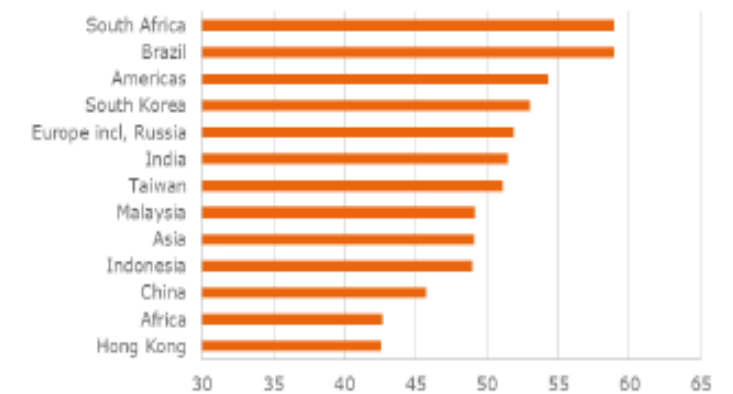
Annex 2

MSCI ACWI INDEX MARKET ALLOCATION

MSCI ACWI INDEX					
MSCI WORLD INDEX			MSCI EMERGING MARKETS INDEX		
DEVELOPED MARKETS			EMERGING MARKETS		
Americas	Europe & Middle East	Pacific	Americas	Europe, Middle East & Africa	Asia
Canada United States	Austria Belgium Denmark Finland France Germany Ireland Israel Italy Netherlands Norway Portugal Spain Sweden Switzerland United Kingdom	Australia Hong Kong Japan New Zealand Singapore	Brazil Chile Colombia Mexico Peru	Czech Republic Egypt Greece Hungary Poland Qatar Russia South Africa Turkey United Arab Emirates	China India Indonesia Korea Malaysia Pakistan Philippines Taiwan Thailand

Annex 3

Figure 2: ESG ratings differ significantly by country



Source: ECCE & NN IP Research, Sustainalytics, Datastream

Annex 4

ACWI

Base Portfolio			
Tangency Portfolio			
	Annualized Returns		Risk Free
MSCI ACWI	9.07%		1.00%
Bloomberg Barclays	3.94%		
Omega	MSCI ACWI	Bloomberg Barclays	
MSCI ACWI	2.22%	0.01%	
Bloomberg Barclays	0.01%	0.08%	
Omega Inverse	MSCI ACWI	Bloomberg Barclays	
MSCI ACWI	45.03194026	-3.665889814	
Bloomberg Barclays	-3.665889814	1244.905399	
	Excess Return	Weights	Weights Rescaled
MSCI ACWI	8.07%	3.528625327	8.9%
Bloomberg Barclays	2.94%	36.25625602	91.1%
		39.78488135	100%
Portfolio Return	4.4%		
Portfolio Variance	0.09%		
Portfolio Standard Deviation	2.9%		
Portfolio Sharpe Ratio	1.16		

Minimum Variance Portfolio			
	Annualized Returns		Column of Ones
MSCI ACWI	9.07%		1.00
Bloomberg Barclays	3.94%		1.00
	Excess Return		
MSCI ACWI	8.07%		
Bloomberg Barclays	2.94%		
	Excess Return	Weights	Weights Rescaled
MSCI ACWI	8.07%	41.36605045	3.23%
Bloomberg Barclays	2.94%	1241.239509	96.77%
		1282.605559	100%
Portfolio Return	4.10%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.79%		
Portfolio Sharpe Ratio	1.1109		

ESG Portfolio

Tangency Portfolio			
	Annualized Returns		Risk Free
MSCI ACWI ESG	9.31%		1.00%
Bloomberg Barclays	3.94%		
Omega	MSCI ACWI ESG	Bloomberg Barclays	
MSCI ACWI ESG	2.13%	0.01%	
Bloomberg Barclays	0.01%	0.08%	
Omega Inverse	MSCI ACWI ESG	Bloomberg Barclays	
MSCI ACWI ESG	46.96477072	-7.429878994	
Bloomberg Barclays	-7.429878994	1245.782387	
	Excess Return	Weights	Weights Rescaled
MSCI ACWI ESG	8.31%	3.686737705	9.3%
Bloomberg Barclays	2.94%	35.96026283	90.7%
		39.64700053	100%
Portfolio Return	4.4%		
Portfolio Variance	0.09%		
Portfolio Standard Deviation	2.9%		
Portfolio Sharpe Ratio	1.17		

Minimum Variance Portfolio			
	Annualized Returns		Column of Ones
MSCI ACWI	9.31%		1.00
Bloomberg Barclays	3.94%		1.00
	Excess Return		
MSCI ACWI	8.31%		
Bloomberg Barclays	2.94%		
	Excess Return	Weights	Weights Rescaled
MSCI ACWI	8.31%	39.53489173	3.09%
Bloomberg Barclays	2.94%	1238.352508	96.91%
		1277.887399	100%
Portfolio Return	4.10%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.80%		
Portfolio Sharpe Ratio	1.1091		

The table above shows the key features of the efficient frontiers construction process, as well as Annexes 5 and 6.

Annex 5

World

Base Portfolio			
Tangency Portfolio			
	Annualized Returns		Risk Free
MSCI World	9.28%		1.00%
Bloomberg Barclays	3.94%		
Omega	MSCI World	Bloomberg Barclays	
MSCI World	2.13%	0.00%	
Bloomberg Barclays	0.00%	0.08%	
Omega Inverse	MSCI ACWI	Bloomberg Barclays	
MSCI ACWI	46.87027909	1.255946296	
Bloomberg Barclays	1.255946296	1244.640626	
	Excess Return	Weights	Weights Rescaled
MSCI ACWI	8.28%	3.918032322	9.7%
Bloomberg Barclays	2.94%	36.64849729	90.3%
		40.56652961	100%
Portfolio Return	4.5%		
Portfolio Variance	0.09%		
Portfolio Standard Deviation	2.9%		
Portfolio Sharpe Ratio	1.18		

ESG Portfolio			
Tangency Portfolio			
	Annualized Returns		Risk Free
MSCI World ESG	9.13%		1.00%
Bloomberg Barclays	3.94%		
Omega	MSCI World ESG	Bloomberg Barclays	
MSCI World ESG	2.16%	0.00%	
Bloomberg Barclays	0.00%	0.08%	
Omega Inverse	MSCI World ESG	Bloomberg Barclays	
MSCI World ESG	46.35622359	-1.634956134	
Bloomberg Barclays	-1.634956134	1244.664635	
	Excess Return	Weights	Weights Rescaled
MSCI World ESG	8.13%	3.720186061	9.3%
Bloomberg Barclays	2.94%	36.41230011	90.7%
		40.13248617	100%
Portfolio Return	4.4%		
Portfolio Variance	0.09%		
Portfolio Standard Deviation	2.9%		
Portfolio Sharpe Ratio	1.17		

Minimum Variance Portfolio			
	Annualized Returns		Column of Ones
MSCI World	9.28%		1.00
Bloomberg Barclays	3.94%		1.00
	Excess Return		
MSCI World	8.28%		
Bloomberg Barclays	2.94%		
	Excess Return	Weights	Weights Rescaled
MSCI World	8.28%	48.12622539	3.72%
Bloomberg Barclays	2.94%	1245.896572	96.28%
		1294.022798	100%
Portfolio Return	4.13%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.78%		
Portfolio Sharpe Ratio	1.1277		

Minimum Variance Portfolio			
	Annualized Returns		Column of Ones
MSCI World ESG	9.13%		1.00
Bloomberg Barclays	3.94%		1.00
	Excess Return		
MSCI World ESG	8.13%		
Bloomberg Barclays	2.94%		
	Excess Return	Weights	Weights Rescaled
MSCI World ESG	8.13%	44.72126745	3.47%
Bloomberg Barclays	2.94%	1243.029679	96.53%
		1287.750947	100%
Portfolio Return	4.12%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.79%		
Portfolio Sharpe Ratio	1.1184		

The table above shows the key features of the efficient frontiers construction process, as well as Annexes 5 and 6.

Annex 6

Emerging Markets

Base Portfolio			
Tangency Portfolio			
	Annualized Returns		Risk Free
MSCI EM	7.66%		1.00%
Bloomberg Barclays	3.94%		
Omega	MSCI EM	Bloomberg Barclays	
MSCI EM	3.90%	0.08%	
Bloomberg Barclays	0.08%	0.08%	
Omega Inverse	MSCI ACWI	Bloomberg Barclays	
MSCI ACWI	26.09593963	-24.41577765	
Bloomberg Barclays	-24.41577765	1267.450763	
	Excess Return	Weights	Weights Rescaled
MSCI ACWI	6.66%	1.02129372	2.8%
Bloomberg Barclays	2.94%	35.58797013	97.2%
		36.60926385	100%
Portfolio Return	4.0%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.9%		
Portfolio Sharpe Ratio	1.05		

Minimum Variance Portfolio			
	Annualized Returns		Column of Ones
MSCI EM	7.66%		1.00
Bloomberg Barclays	3.94%		1.00
	Excess Return		
MSCI EM	6.66%		
Bloomberg Barclays	2.94%		
	Excess Return	Weights	Weights Rescaled
MSCI EM	6.66%	1.680161983	0.13%
Bloomberg Barclays	2.94%	1243.034985	99.87%
		1244.715147	100%
Portfolio Return	3.94%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.83%		
Portfolio Sharpe Ratio	1.0377		

ESG Portfolio			
Tangency Portfolio			
	Annualized Returns		Risk Free
MSCI EM ESG	8.70%		1.00%
Bloomberg Barclays	3.94%		
Omega	MSCI EM ESG	Bloomberg Barclays	
MSCI EM ESG	4.82%	0.01%	
Bloomberg Barclays	0.01%	0.08%	
Omega Inverse	MSCI EM ESG	Bloomberg Barclays	
MSCI EM ESG	20.74834443	-3.605602028	
Bloomberg Barclays	-3.605602028	1245.233545	
	Excess Return	Weights	Weights Rescaled
MSCI EM ESG	7.70%	1.49220428	4.0%
Bloomberg Barclays	2.94%	36.28419683	96.0%
		37.77640111	100%
Portfolio Return	4.1%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.9%		
Portfolio Sharpe Ratio	1.09		

Minimum Variance Portfolio			
	Annualized Returns		Column of Ones
MSCI EM ESG	8.70%		1.00
Bloomberg Barclays	3.94%		1.00
	Excess Return		
MSCI EM ESG	7.70%		
Bloomberg Barclays	2.94%		
	Excess Return	Weights	Weights Rescaled
MSCI EM ESG	7.70%	17.1427424	1.36%
Bloomberg Barclays	2.94%	1241.627943	98.64%
		1258.770686	100%
Portfolio Return	4.00%		
Portfolio Variance	0.08%		
Portfolio Standard Deviation	2.82%		
Portfolio Sharpe Ratio	1.0647		

The table above shows the key features of the efficient frontiers construction process, as well as Annexes 5 and 6.

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