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The relation between ESG adoption and financial returns in the Latin American equity markets.

Master's Thesis

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ABSTRACT

This study explores the relationship between companies' ESG adoption levels and their stock performance in the Latin American equity markets. This relation is studied for the combined ESG score and for each individual component of the ESG measure, which are the environmental, social, and governance pillars. Academic literature on this field exhibits conflicting results and a widespread disagreement in their findings, in addition to the little screening of markets like the Latin American one. To address this gap and empirically investigate this relationship, this study uses ESG and performance data for 354 listed companies in the Latin American market from 2007 to 2022. Additionally, the study implements a methodology in which best-in-class and worst-in-class portfolios are created based on companies' relative ESG adoption levels. Those portfolios are tested using the Fama and French 3-factor model, the Carhart four-factor model, and a six-factor model, looking for sources of excess return related to the difference in levels of ESG adoption. The findings reveal a positive relationship between high combined ESG and high environmental pillar scores with excess return generation. On the other hand, the findings on the social pillar suggest a positive relation between low social pillar scores and stock returns. For the governance factor, no clear relationship was found.

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1. INTRODUCTION

Environmental, Social, and Governance (ESG) investing is a major topic in the current financial markets, where investors have incorporated ESG-related approaches in the investment decision processes at an increasing rate year by year. This imply taking into consideration the maximization of financial returns for investors, while considering ESG factors to better assess the attractiveness in terms of risks and returns of investment opportunities (Boffo and R. Patalano, 2020).

As a broad topic, ESG investing, and its idea of "doing good while doing well" has become increasingly attractive, popular, and relevant for investors during the last years (CFA Institute Research Foundation, 2022), as it represents a useful tool to align financial analysis with long-term value that includes climate-related risks and opportunities (OECD, 2021). This has led to a continuously increasing allocation of resources to projects and businesses with responsible and sustainable approaches, reaching the level of representing more than 36% of global professionally managed and invested assets by 2020 (CFA Institute Research Foundation, 2022) delivering different levels of outcomes in numerous aspects, such as differences in financial performance and social or environmental effects (Krüger, 2015).

Additionally, ESG adoption differs across regions as a business and investment approach, bringing certain variations in ESG development levels. For instance, there are sizeable differences among developed markets in the adoption of ESG frameworks and policies. Such variability is even more substantial when comparing developed and emerging markets. This divergence arises because of various social, political, and economic characteristics across regions, which ultimately affects the path and speed of ESG adoption.

The level of ESG adoption is usually measured by the ESG rating of each company. Such ratings try to indicate the level of ESG quality of the company and are produced by specific rating providers. However, homogeneity among different ESG providers is hard to find as there is not in place a common and established ESG framework. This situation that creates a

hurdle in the evaluation of sustainability characteristics of companies as their assessment of ESG criteria is subject to great variation (Larcker, Pomorski, Tayan, & Watts, 2022).

The scope to which ESG-related investments have been tailored is broad, ranging from initiatives in the Fixed Income field with the introduction of green bonds, blue bonds, or sustainability-linked bonds, in the stock market with screenings made based on ESG criteria, or Private Equity initiatives focused on water treatment programs. Regardless of the specific instrument to get access to ESG-related alternatives, this is a topic that has grown at incredible rates in recent years.

Having that in mind, I wanted to explore the effects on return generation that this novel investment approach trend has had in the capital markets, and considering the constraints in availability of data, the clear research area was on the equity markets.

Furthermore, literature regarding the relationship between ESG adoption and financial returns is extended, with positions in favor of a positive relationship between those variables, like presented in Sherwood and Pollard (2018) and Nagy et al (2015). Contrary, Boffo et al (2020) and Hereijgers (2022) found a negative relationship, and even no significant relation at all was found in Halbritter & Dorfleitner (2015), and Przychodzka (2021). Considering the ambiguity in results found in the literature, further study on this topic is relevant and useful.

Nonetheless, most of studies available are intended to explore the aforementioned relationship focusing on data of companies based in developed markets, and just a fraction of them assesses the relationship characteristics in emerging markets. Among the emerging markets, very few investigate this interesting relation in specific markets, such as Latin American, and therefore additional contribution could be made by performing research on this specific region.

In this matter, Arias Fogliano de Souza Cunha et al. (2013) and Cherkasova & Nenuzhenko (2022) studied the ESG adoption relationship with financial returns in the Latin American markets, finding a negative relationship between the variables. However, different approaches and sets of data can be implemented in order to test their findings. For instance, by taking advantage of availability of more updated data compared to the one used in Arias

Fogliano de Souza Cunha et al. (2013), and by using a pure stock return focus, unlike Cherkasova & Nenuzhenko (2022). For these reasons, I decided to center the attention of my research and limit the scope of it into the interesting and complex region of Latin America.

Having in mind the widespread disagreement in the available literature on the results when exploring the exitance of a relationship between ESG adoption and financial returns, this research is intended to investigate such relation by further narrowing the scope to explore its presence in the Latin American markets. The ESG rating will be used as a measure of the level of ESG adoption. Specifically, the main question to be addressed is the following:

- **Is there evidence of a relationship between the ESG adoption levels taken by companies and their stock prices in the Latin American equity markets?**

By exploring this topic, the research will potentially bring an idea of the effect that ESG measures taken by companies in Latin American markets have had on investors' views related to the financial future such companies. Positive or negative stock return effects related to ESG adoption could potentially represent a screening by the market on such measures, and an optimistic or pessimistic view of the companies' future financial performance.

Particular characteristics of these types of markets might play a relevant role in determining the final relation between ESG adoption and financial stock returns. Some of those characteristics are the lower levels of credibility on financial data, weaker regulations, and lower stages of development in ESG frameworks compared to the ones present in more developed markets (Natalucci, Gautam, & Goel, 2022).

Additionally, and embedded in the same research question, this study will explore whether specific ESG characteristics have shown a relevant relation with price movements or returns for companies' stocks in the Latin American markets, referring here to the environmental, social, or governmental pillars.

Just like happens with the general ESG adoption relationship with financial performance in the stock market, the available literature is divided and inconclusive when assessing the relationship by each individual component of the ESG measure. Positive relations have been

found in Halbritter and Dorfleitner (2015), Lindsey, Pruitt, & Schiller (2023), Lins et al, (2017), Crook et al, (2011), and Eisenhofer (2014), while contrary results were found in Bolton and Kacperczyk (2021) and Borgers et al (2015). No effect was found in Ertugrul and Hegde (2009), and Auer (2016). As it becomes evident, additional research exploring the specific pillars of the ESG measure is going to contribute to the available literature as well.

Therefore, this research aims to explore the relation between ESG level adoption by different types of companies within the Latin American markets and the value that the overall market sees in such companies and strategies, which ultimately is translated into financial returns for investors. The analysis this research proposes brings relevant and useful information related to the effects of ESG measures implemented as part of the companies' policies in Latin America.

To investigate the presence of this relationship, this research uses company specific return and ESG information retrieved from DataStream from 2007 to 2022. This data is afterwards used to construct portfolios based on ESG measures, following the methodology used by Ertugrul and Hegde (2009), Halbritter and Dorfleitner (2015), Boffo et al (2020), Przychodzka (2021), and by Hereijgers (2022). Those portfolios are regressed using different asset pricing models to test the presence of a significant relationship between excess return generation and ESG adoption levels, which ultimately allows to perform the hypothesis testing.

After conducting the research proposed methodology, the study brought some interesting findings related to the relationship between ESG adoption levels and stocks performance in the Latin American equity markets. For the combined ESG score, a positive relationship was found between high combined ESG scores companies, and the returns of their stocks in the market. Regarding the environmental pillar, there was found a positive relation of high Environmental pillar rated companies and excess return generation in the Latin American markets. On the other hand, the study found a positive relation of low scores in the social pillar with excess return generation, opposite to what was found in the combined ESG and Environmental criteria. Lastly, no evidence was found of any type of significant relationship between high or low Governance pillar scored companies with excess return generation in the Latin American markets.

The rest of this document will be organized as follows. In section 2, I present relevant literature related to the main topics discussed in the thesis and hypotheses to be tested are presented. Section 3 contains descriptive information regarding the data set used in this research document, as well as the methodology proposed and implemented to test the central hypotheses. Next, in section 4 the empirical results are presented, having the opportunity to observe how the theoretical framework translates into quantitative results. In section 5, I am presenting the discussion based on the results obtained, as well as I identify the limitations of this study and give some suggestions for future research. Finally, in section 6 conclusions are presented, translating the research findings into the final ideas of the document.

2. LITERATURE REVIEW

2.1 ESG Investment Challenges

Despite the great popularity of ESG investments, there are some challenges for investors when trying to include ESG topics in their investment approach. Relevant information is shown in the Capital Group ESG Global Study (2022), extensive research that gathered the views of 1,130 global investors, divided into 565 global institutional investors, and 565 global wholesale investors between February and March 2022, and the investors were based in 19 countries across Europe, North America, and Asia-Pacific. The study indicates that the main hurdles preventing investors from adopting or including ESG measures in their investment approach are the concerns regarding having to sacrifice return in order to obtain ESG exposure, and the lack of robust data.

Regarding the first one, the research showed that the proportion of investors that assume or perceive that ESG investing has negative return effects is as high as one-third of the total, however, the proportion has decreased compared to the previous year (35% in 2022 vs 49% in 2021). This generalized perception is in line with the findings of the study conducted by Brammer et al. (2006), using several data regarding companies in the UK. As part of the main findings of their research, they conclude that firms with higher social performance tend to generate lower returns. On the other hand, companies with the lowest social scores tend to outperform the market. Moreover, Schuhmacher and Auer, (2016) analyzed the effect of ESG-related investments and on the assets' financial performance. After implementing a variety of portfolio screens on the industry level, they found that regardless of the geographical region, industry or ESG criteria, an active selection of high or low ESG-rated stocks does not provide any superior risk-adjusted performance compared to likewise passive strategies. This relationship is further explored in section 2.4, as it is the main focus of this study.

With respect to the lack of robust data, the research conducted by Capital Group shows that more than 40% of global investors perceive this as an important hurdle to adopt ESG

investment approaches. As the report by EBA (2021) shows, this can be better understood from a risk management perspective. The scarcity of relevant, reliable, and comparable data is a major challenge that limits the assessment of the potential impacts of ESG risks on the performance of financial assets. Whereas ESG data for large corporations is usually readily available, such information for medium and small companies, or companies from emerging markets, are scarcer.

2.2 ESG Ratings

Just as explained by Larcker et al. (2022), firms' ESG ratings provide valuable information to market participants about the relation of corporations and non-investor stakeholders interests. Taking this into account, investors use such information as an input in the investment decision process, while corporation use ratings to gain third-party feedback on the outcome quality of their sustainability initiatives.

Larcker et al. (2022) also explain that ESG ratings are intended to measure the level of ESG quality that a company presents, but such assessment is not always simple to perform since there is not a single agreed definition or a defined common framework to be based. There are in fact two main approaches of ESG impact assessment. The first one focuses on the impact the company has on the general welfare of its stakeholders (customers, employees, suppliers, etc), promoting the company to withdraw from activities that result harmful to stakeholders. The second one, however, tries to assess the impact of ESG societal and environmental factors on the company, and its financial materiality. This is more of an ESG risk factor approach.

Moreover, the fact that ESG data is usually available on an annual basis can further complicate an accurate assessment of ESG risks, as it is based on companies' annual sustainability reports. Such risks can potentially vary over a one-year time horizon and that has sizeable consequences from a risk management perspective (EBA , 2021).

ESG ratings present an additional challenge, as presented in Chatterji et al. (2014), data and scores generated by different providers, tend to diverge in their assessment of the ESG

quality of companies' sustainable initiatives. This was later confirmed by Berg et al. (2022) who after comparing data from 6 different data-rating providers, confirmed that the correlation in ESG scores ranged from only 0.38 to 0.71. Such values show a high degree of divergence between ESG assessment by different ESG information providers, ultimately being reflected in a less likely incorporation of ESG measures in investment decisions. This will therefore cause divergence in conclusions derived from empirical results based on such ratings.

This problem is also addressed by Boffo et al. (2020), highlighting that, due to the differences in scoring methodologies by different providers, certain biases are presented in ratings and therefore in the ESG assessment analysis. Some of these factors are the geographical location of the company and the market in which it operates, the size of the company, the industry of which the company is part of, among others. Such differences might potentially affect the ESG score assessment, leading to a certain degree of variance on ESG ratings from different providers.

As a consequence, lack of comparability of ESG metrics, ratings, reporting standards, and investing approaches makes it difficult for investors to assess the materiality of ESG risks within their investment mandates, which ultimately make it harder to develop sound investment programs that generate acceptable financial performance. These considerations are certainly relevant since awareness of the limitations inherent of using ESG scores for comparison purposes is indeed important.

2.3 ESG Investments in Emerging Markets - Latin America

As the focus of this research is the effect of ESG-related investments in developing markets, particularly in the Latin American market, it is, therefore, relevant to have a deeper understanding of such markets and what are the key differences between developed and emerging markets. Such differences might influence the dynamics of investment flows to emerging market regions, and therefore could potentially generate relevant differences in stock market performance for ESG-related investments.

As Duttagupta et al. (2021) indicate, there is not a unique formal definition of what emerging markets are, however, they are commonly identified based on attributes like sustained market access, progress in reaching middle-income levels, and greater global economic relevance. On the other hand, independent assessments and classifications based on market characteristics are a common rule in financial markets. Examples of this would be the MSCI Emerging Markets Classification, the S&P Dow Jones Market Classification, or the International Monetary Fund Classification.

Moreover, emerging markets are not necessarily equal or similar in terms of their institutional and financial market development. China and South Korea for instance have done much better economically than say Pakistan or Indonesia, and that is reflected in their annual GDP per capita growth, their relevance in the global economy, and in the evolution of their financial markets (Witt, et al., 2017). Therefore, it is important to be aware of the sizeable and relevant differences between economic characteristics among countries cataloged as "emerging".

Furthermore, Bruner et al. (2003) also highlight the lower levels of GNP per capita and investable market capitalization, as compared to such levels for developed countries. Added to this, even though liquidity varies across all markets, emerging countries present a tendency towards illiquidity in their financial markets, which is one of the key differentiator characteristics from developed markets. It is certainly a source of major concern for global investors, since it represents a risk when trying to get in and out of their investments, as they might not be able to do it in a quick and non-costly manner. On top of that, characteristics

such as transparency, competitiveness, and corruption are usually used as risk factors in emerging markets, and their relevance is based on the influence they have on investors' ability to obtain information and develop their investment expectations.

Despite the challenges that emerging markets investments could represent, there are certain aspects that strike the attention of global investors, which subsequently encourages them to get exposure to such markets. Some of them are the low correlation that emerging markets have with global markets, ultimately bringing diversification benefits for global investors, as well as the higher return potential that comes from a subsequent higher risk faced by investors (Bruner et al. 2003). From a portfolio management perspective, including exposure to emerging markets in a global portfolio is a sensible decision, since such investments it could potentially represent a return enhancer and a risk reducer for the overall portfolio.

Castro Martins (2022) mentions that considering the fact that emerging countries represent a huge portion of global economy as measured by GDP, it is evident the relevance and influence that these markets have on the global outcomes of the global ESG adoption. In the specific case of Latin American markets, as discussed by the International Bar Association (2022), the level of ESG investments is naturally related to the level of ESG adoption. Without making any statement of causality. However, a problem present in the region is that the ESG discussion and framework-creating process is directly related and reactive to the developments in such matters in the European Union and in North America, creating a lagged regulation and various other problems to overcome.

Additionally, derived from the survey released by the IBA in 2022, there is evidence of tilted attention towards the environmental factor of ESG in the Latin American markets, as sustainability has gained relevance for business leaders in the region, and companies are proactively working on creating more sustainable supply chains for their businesses. After COVID-19 pandemic, the social factor gained increased importance as well.

2.4 ESG and Financial Performance

As the main center of attention of this study, it is important to examine the literature that explores the relation between the level of ESG adoption, measured as the ESG score of each company, and the effect on stock returns. In this matter, Nagy et al (2015) found that ESG tilted portfolios generate alpha by outperforming relevant benchmarks. Lodders (2021) found that during market turbulence, such as the one caused by the COVID-19 pandemic, high ESG-rated stocks outperformed low ESG-rated ones, but at the same time didn't find any evidence of ESG adoption being a factor to outperform the broad stock market. Sherwood and Pollard (2018) studied such a relationship in emerging markets and found a significant outperformance of stocks based on ESG-related factors.

On the other hand, Halbritter & Dorfleitner (2015) found that there is not a clear relationship between ESG and returns, meaning that no significant return difference was found between high and low ESG-rated portfolios. Along the same line, Przychodzka (2021) discovered that companies with high ESG scores do not present a significant outperformance or underperformance over their lower-rated counterparties, even controlling for developed and developing countries, in a scenario with uniformity in market conditions. Nevertheless, the study noticed that there is evidence that ESG stock return turns significant when tested under different market scenarios: bull, bear, and normal.

Furthermore, research work has been done on the effects of ESG score levels on the financial performance of stocks. Particularly, this is addressed by Hereijgers (2022), who found that portfolios consisting of companies with high ESG ratings have lower expected returns than portfolios composed of companies with low ESG ratings. The explanation given for this relation is that low ESG-rated companies are in general more exposed to carbon transition risk, and therefore investors demand a higher return on their investments in such companies.

Additionally, Hereijgers (2022) studied the effect of ESG score changes on stock prices, without finding any significant relation between upgrades (downgrades) in ESG scores and stock outperformance (underperformance). The study showed, however, that companies in emerging markets have a greater degree of sensitivity to ESG rating changes than companies in developed markets.

Another relevant study exploring the relationship between ESG adoption and financial performance is the one presented by Boffo et al (2020), which by using data from different providers, tested the performance of portfolios based on high ESG attributes within the United States stock market. The research was based on the Fama and French 5 factors model, allowing them to account for risk factors such as systematic market risk, companies' size, and book-to-market ratio. They run a series of regressions, extracting the values of risk-adjusted alphas, which ultimately measures the level of excess return on the portfolio over a certain benchmark. Their findings indicate that low ESG-scored companies outperformed high ESG-scored ones.

Further, related to sustainable investments in the Latin American market, Arias Fogliano de Souza Cunha et al. (2013) studied the impact of ESG-related investments in the Brazilian stock market for the period between 2005 and 2010. In his study, he used an evaluation based on seven 'sustainable factors[1]', alongside with financial returns of companies' stocks, finding that such type of investments did not achieve any satisfactory financial performance for the period studied, leading to the conclusion that sustainable-related investments imposed certain constraints that at the end might hurt portfolios' risk and return characteristics, that in the context of the Brazilian stock market.

In addition, Cherkasova & Nenuzhenko (2022) studied the relationship between investing in environmental, social and governance projects with the corporate financial performance of companies. They performed their study for various regions, including Latin America. Their findings suggest that ESG projects for companies in Latin America are negatively related to corporate financial performance. They argue that the reason for this negative relationship is that firms in the Latin American region suffer from a scarcity of financial resources, which becomes a hurdle when investing in ESG-related projects.

Even though there are certain differences in characteristics between this study and the ones presented in the available literature, such as the longer timeframe studied, the specific markets in which the research is based, or the specific ESG data used, this research will test if the findings in the literature are also present in the dataset proposed for the Latin American

[1] The factors used were: Environmental, Social, Economic, Nature of the Product, Corporate Governance, Climate change, and General.

markets. Therefore, the present study will test whether the level of ESG score of a company has a negative relationship with its financial performance. That leads to the following hypotheses.

Hypothesis 1:

- Portfolios with high levels of combined ESG scores have lower expected excess returns than portfolios with low levels of combined ESG scores.

There is an additional approach in the literature to explore the relationship between ESG and financial performance, which is to examine the relation by each individual component or pillar of ESG. Auer (2016) studied this relationship using a dataset of ESG ratings for European companies from 2004 and 2012, finding evidence that strategies based on environmental do not have any significant effect on the financial performance of stocks.

Furthermore, the paper by Bolton and Kacperczyk (2021) investigates the carbon premium presence in the US stock market. Their findings suggest that companies with higher levels of carbon dioxide emissions tend to earn higher returns in their stock prices, once controlling for size, book-to-market, momentum, and other return explanatory factors, as well as firm-specific characteristics, such as value of property, plant and equipment, and investments over assets. The explanation they found for this relation is a higher demand for return by investors when considering an exposure carbon emission risk.

Conversely, there are opposite views in the literature regarding this relation. For instance, Halbritter and Dorfleitner (2015) presented their study in which, after conducting an analysis of best-in-class ESG stocks in the North American market, between 2002 and 2011, they found that companies with a high environmental rating achieve a significant outperformance up to almost 3% per year over the risk-free rate. Additionally, the meta-analysis of 52 studies performed by Albertini (2013) confirmed the presence of a positive relationship between environmental performance and financial performance. Moreover, Lindsey, Pruitt, & Schiller (2023) argue that after using an instrumented principal component to analyze the “E-factor”, they found evidence in favor of a positive relationship between environmental measures and

prices, and consequently returns. This is consistent with the increased investor demand for environmentally friendly assets.

As observed, the finding across the literature varies regarding the relationship between the environmental pillar and financial returns on stocks, obtaining studies with completely opposite results. Taking that into account, this study will try to find evidence of a positive relation between the E-pillar and financial performance within the Latin American markets, and therefore the following hypothesis is going to be tested.

Hypothesis 2:

- Portfolios with higher levels of Environmental-pillar scores have higher expected excess returns than portfolios with lower levels of Environmental-pillar scores.

In relation to the social pillar, Borgers et al (2015) studied the relation of social dimensions in investment decisions for equity mutual funds in the U.S. market, over the period 2004 and 2012. Their results show that a positive relation was found between so-called "sin" stocks (or low-rated social pillar companies) and return generation. This would imply a negative relation between social pillar levels, and financial performance. Additionally, and as mentioned previously in section 2.1, by using several data regarding companies in the UK, Brammer et al. (2006) conclude that firms with higher social performance tend to generate lower returns.

On the other hand, a sizeable part of the available literature supports the opposite view. For instance, Lins et al, (2017) investigated the effect on companies' stock prices by having high levels of corporate social responsibility (CSR). They found that during periods of crisis, such as the global financial crisis of 2008 – 2009, highly socially responsible companies generated a stock return of 4% to 7% higher than companies with low levels of social capital. This as a consequence of high social capital companies experiencing higher profitability and higher growth, compared to low social capital firms.

Additionally, Crook et al, (2011) conducted research focused on the relationship between human capital and the financial performance of companies. After completing their meta-analysis, they found that human capital relates strongly to the financial performance of firms, therefore by investing in developing their human capital, companies would become more profitable, and that would be translated into higher stock prices. Carlini et al (2019) also explore the aforementioned relationship, finding that favorable corporate social responsibility measures benefit the firms as it increases their attractiveness for employees, and subsequently attracting the best talent in the market. The consequence of this would be a more reputable company due to the signaling effect of such measures.

Based on the literature available on the relation of social factors with the financial performance of companies' stock, this study will explore the presence of a positive relationship between social aspects and financial returns, and therefore the following hypothesis will be tested.

Hypothesis 3:

- Portfolios with higher levels of Social-pillar scores have higher expected returns than portfolios with lower levels of S-pillar scores.

Moreover, there is plenty of industry research that supports the positive effect that comes from governance characteristics and the financial performance of stocks. Usually, companies with high levels of governance quality tend to outperform those with low levels. Eisenhofer (2014) mentions that experience in the financial markets has shown that investing in companies with sound corporate governance programs and practices makes good economic sense and that good corporate governance fosters long-term profitability of companies, which then translates into better stock returns. In the same line, Auer (2016) indicates that his study on the European stock market suggests that governance factors can significantly increase portfolio performance under similar circumstances, which indicates a positive relation between the governance factor and financial performance.

Another relevant study is the one presented by Ertugrul and Hegde (2009), which examines corporate governance ratings relation with companies' stock returns. After conducting a G-pillar-based portfolio model, and regressing stock returns using the Fama-French (1995) factors, and the Carhart, (1997) momentum factor, they did not find any significance in the alpha value, which would represent the effect of high or low corporate governance structures in the companies' stock performance. However, the limitation of the stock-return analysis is the limited timeframe of the data used, since it covered only 2 years.

Even though Ertugrul and Hegde (2009) did not prove a significant relationship between corporate governance measures and stock performance, most of the rest of the literature supports the positive relation. That taken into account, in this study, I will test such positive relation with the following hypothesis.

Hypothesis 4:

- Portfolios with higher levels of Governance pillar scores have lower expected returns than portfolios with lower levels of Governance pillar scores.

Overview of main related papers

Author	Paper	Market	Time Period	Data	Hypothesis	Main finding
Boffo, R., & R. Patalano. (2020)	ESG Investing: Practices, Progress and Challenges. OECD	United States	2009 - 2019	Stock returns and ESG scores from different providers	High ESG scoring stocks outperform low ESG scoring stocks	Low ESG scored companies outperformed high ESG scored ones.
Auer, B. R. (2016)	Do Socially Responsible Investment Policies Add or Destroy European Stock Portfolio Value?	Europe	2004 - 2012	Stock returns and ESG scores	Portfolios with high ESG ratings promise superior performance.	E and S based strategies do not have any significant effect on financial performance of stocks. However, governance factors can potentially increase portfolio performance under similar circumstances.
Lodders, P. (2021)	Effect of ESG factors on stock performance during COVID-19	Europe	2019 - 2020	Stock returns and ESG scores from different providers	High ESG firms outperform low ESG firms during periods of crisis.	During COVID-19 market crash, high ESG rated firms outperformed low ESG firms based on CAPM-adjusted daily abnormal returns. However, during market recovery, the daily price volatility of high ESG firms was higher than that of low ESG firms.
Arias Fogliano de Souza Cunha, F., & Samanez, C. P. (2013)	Performance Analysis of Sustainable Investments in the Brazilian Stock Market: A Study About the Corporate Sustainability Index (ISE)	Brazil	2005 - 2010	Stock returns and sustainability scores	NA	Sustainable investments have presented interesting characteristics, such as increasing liquidity and low diversifiable risk, but they did not achieve satisfactory financial performance.
Bolton, P., & Kacperczyk, M. (2021)	Do investors care about carbon risk?	United States	2005 - 2017	Stock returns, company specific data, and carbon emission data.	Companies with high carbon emissions will present higher levels of stock returns.	High carbon dioxide emissions companies tend to generate higher financial performance, measured as stock returns.
Lins, K., Servaes, H., & Tamayo, A. (2017)	Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis	United States	2008 - 2009	CSR ratings from the MSCI ESG Stats Database, and stock returns.	Firm-level social capital pays off during a crisis of trust.	During periods of crisis, such as the global financial crisis of 2008 – 2009, highly socially responsible companies generated outperform companies with low levels of social capital.
Crook, T., Todd, S., Combs, J., & Woehr, D. (2011)	Does Human Capital Matter? A Meta-Analysis of the Relationship Between Human Capital and Firm Performance.	NA	NA	Meta analysis of 66 studies.	Human capital is positively related to performance.	Human capital relates strongly to financial performance of firms, therefore to stock returns.
Ertugrul, M., & Hegde, S. (2009)	Corporate Governance Ratings and Firm Performance.	United States	2003 - 2006	Corporate governance ratings and stock returns.	High corporate governance rating is positively related to financial performance.	Did not find any significance in the alpha value, which would represent an effect of corporate governance structures in the companies' stock performance.
Halbritter, G., & Dorfleitner, G. (2015)	The wages of social responsibility — where are they? A critical review of ESG investing.	United States	2002 - 2011	Stock returns and ESG scores	High ESG scores are related to better financial performance.	Did not find a clear relationship between ESG and returns, meaning that no significant return difference was found between high and low ESG rated portfolios.
Cherkasova, V., & Nenuzhenko, I. (2022, March).	Investment in ESG Projects and Corporate Performance of Multinational Companies	Latin America	2011-2019	ESG scores and firm-level financial metrics	Investing in ESG projects boosts corporate financial performance	ESG projects for companies in Latin America are negatively related to corporate financial performance.

3. DATA AND METHODOLOGY

In this section I present the dataset used to perform the empirical analysis, providing key statistical descriptive measures for the whole emerging markets sample, as well as for the Latin American Sample. Next, I present the portfolio construction methodology proposed, alongside with the asset pricing models that will be used later in the regression implementation stage.

3.1Data

To conduct the research, the data used as input is the ESG-related information of 2788 listed companies in emerging markets, retrieved from DataStream. The definition of emerging market used was the one developed by MSCI, which serves as a basis for the MSCI Emerging Markets Index[2]. The sample period is from 2004 to 2022. This dataset contains information about companies based in 48 different emerging markets around the world, which can be grouped by geographical regions. As shown in *Table 1*, such regions are Latin America, Africa, Europe, Asia, and the Middle East. Specifically, in line with the scope of this work, we can observe that Latin American companies in the sample represent 12.7% of the total companies in the emerging markets available data, and the 6 markets represented in this region, account for 13.3% of the sample. Additionally, it is observable that, in general terms, companies based in Latin American countries have a lower average size than the ones in other emerging markets, such as Asia and the Middle East.

[2] The market classification by country is available here: https://www.msci.com/our-solutions/indexes/market-classification

Table 1: Description of sample data by geographical region

Region	Number of countries	% of total	Number of Companies	% of total	Market cap (USD millions)	%	Comp Avg Size (USD millions)
Latam	6	13,33%	354	12,70%	1.475.629	7,20%	4.168,44
Africa	7	15,56%	152	5,45%	398.645	1,94%	2.622,67
Europe	13	28,89%	209	7,50%	866.955	4,23%	4.148,11
Asia	12	26,67%	1896	68,01%	14.498.835	70,70%	7.647,06
Middle east	7	15,56%	177	6,35%	3.267.127	15,93%	18.458,35
Total	45	100,00%	2788	100,00%	20.507.191,58	100,00%	

It is also important to highlight the size of the market capitalization in the whole sample. Table 1 shows that for emerging markets companies, the total market cap is more than 20 trillion US dollars, which in perspective is half of the total market cap of the American stock market ($40 trillion) or more than twice the size of the European stock market ($8 trillion). In particular, the Latin American market represents 7.2% of the market cap in the sample, with $1.45 trillion.

Additionally, Figure 1 shows the sector composition of the companies in each region, using the Industry Classification Benchmark (ICB[3]). A particular characteristic is observable in the Latin American market, which is the relative proportionality of sectors in the sample. There is not one specific sector with a predominant share, but the sample is evenly distributed across sectors, meaning that most of the sectors are fairly represented in the sample. The major sectors in the Latin American market are Financials, Industrials, and Consumer Staples. Moreover, Table 2 presents average returns by each sector for the companies in the Latin American market, and the sector cumulative return from 2007 to 2022. Sectors with the highest returns were Energy and Utilities, while Telecommunications and Technology presented the lowest cumulative returns.

[3] ICB is a comprehensive and rules-based classification methodology based on research and market trends. More information available in: https://www.ftserussell.com/data/industry-classification-benchmark-icb

Figure 1: Industry sector distribution by region

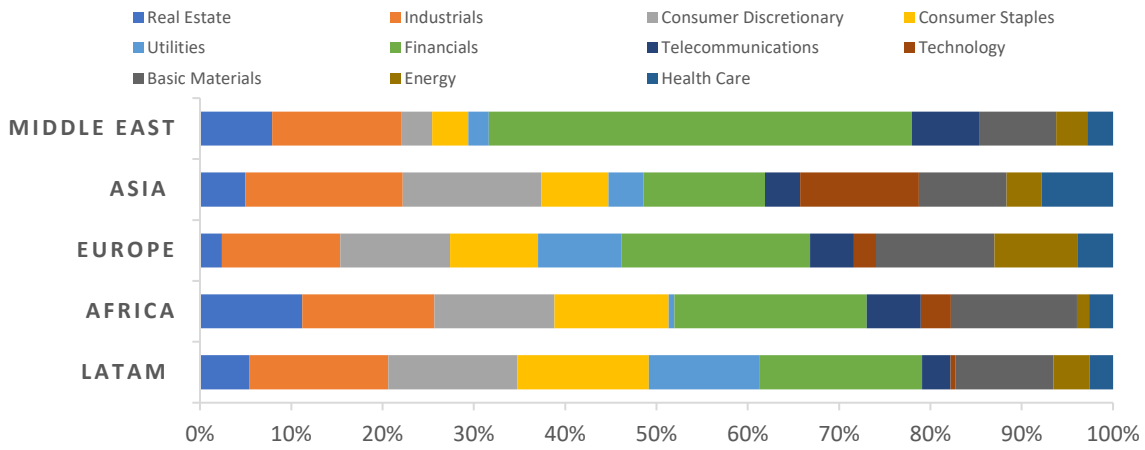

Figure 1 illustrates the sector distribution by region within the broad company sample retrieved from DataStream. Important to focus on the sector distribution in the Latin American markets since it seems to be the most homogeneous among the emerging markets regions.

Table 3 shows the specific countries included in each region and the number of companies in the data set for each country. There is observable that Asia accounts for the greatest share of companies in the sample, with China at the top of the list with 993 companies. For Latin America, the data set presents the 6 biggest stock markets in the region, which are the ones in Brazil, Mexico, Argentina, Chile, Peru, and Colombia. They account for a total of 354 companies in the aggregated Latin American stock market.

The available sample of companies in the Latin American region accounts for more than 85% of the total market capitalization of the stock markets in the composite countries', while these 6 financial markets represent more than 85% of the total market capitalization of the Latin American region, giving a great sense of representativeness to the data set.

To examine the ESG adoption levels within the companies, the Thomson Reuters ESG Scores were used. This is an enhancement and replacement of the already existing ASSET4 ratings. Specifically, the research has a particular focus on the ESG combined score (TRESGCS), and on the Environmental, Social, and Governance pillars separately. The ESG combined score is aimed to assess the reported information in the environmental, social, and corporate

governance characteristics of the companies, with the inclusion of an ESG controversies overlay[4]. The range of the score is from 0 to 100, the latter being the best possible rating.

[4] ESG controversies overlay relates to the verification made by Refinitiv of companies' actions against commitments, to magnify the impact of significant controversies on the overall ESG scoring. The scoring methodology aims to address the market cap bias from which large companies suffer by introducing severity weights, which ensure controversy scores are adjusted based on a company's size (Refinitiv, 2022).

Table 4: ESG Characteristics for companies in the Latin American markets between 2007 and 2022.

Pillar	Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Number of observations	14	40	61	114	125	131	141	149	155	234	259	293	316	323	294	59
ESG Combined	$\bar{X}$	42,81	43,64	42,18	43,60	43,06	45,02	44,49	43,91	45,58	39,67	42,28	43,43	45,34	48,41	51,67	51,48
	σ	21,44	19,85	20,77	21,18	20,44	21,91	21,24	21,60	21,08	22,39	23,44	22,07	21,68	21,16	20,12	22,46
	Max	87,64	91,58	87,08	93,44	89,8	94,36	95,72	94,92	94,09	96,28	95,95	96,19	92,98	95,45	97,39	94,79
	Min	0,29	2,71	4,79	1,02	1,6	1,11	1,17	1,27	1,29	1,4	1,14	1	1,35	1,12	1,16	2,06
Environmental (E)	$\bar{X}$	47,60	46,52	44,83	42,24	43,29	44,12	43,61	43,31	45,67	43,92	43,48	41,51	42,97	45,05	48,46	46,51
	σ	29,58	24,36	22,44	24,14	23,43	26,71	26,34	26,08	25,75	25,30	26,40	26,49	26,00	25,22	25,17	25,45
	Max	87,6	91,6	87,1	93,4	89,8	94,4	95,7	94,9	94,1	96,3	96,0	96,2	93,0	95,5	97,4	94,8
	Min	0,3	2,7	4,8	1,0	1,6	1,1	1,2	1,3	1,3	1,4	1,1	1,0	1,4	1,1	1,2	2,1
Social (S)	$\bar{X}$	11,80	17,24	19,94	26,09	26,65	28,14	27,94	28,07	29,24	29,48	31,00	29,92	28,79	28,04	30,46	23,03
	σ	32,09	26,36	26,67	26,48	25,55	26,37	25,35	25,73	25,58	27,44	28,25	26,63	25,91	24,98	24,20	27,60
	Max	89,8	92,4	95,7	94,6	96,9	96,3	96,4	93,5	95,6	94,7	94,6	95,0	96,7	96,5	96,7	97,7
	Min	4,1	3,3	2,1	1,1	1,4	1,7	1,1	0,7	0,6	0,4	0,5	0,4	0,3	0,5	0,3	0,3
Governance (G)	$\bar{X}$	46,25	47,55	48,87	50,69	49,74	49,35	50,23	49,85	49,35	47,94	48,99	48,91	48,93	50,94	53,51	53,52
	σ	21,74	22,71	22,18	22,67	22,19	22,39	21,85	21,83	21,90	23,48	23,37	23,65	23,54	22,82	21,88	20,20
	Max	71,4	87,8	90,1	94,2	89,7	91,0	92,2	94,9	95,3	96,4	95,8	95,5	95,3	95,0	95,0	88,7
	Min	6,2	6,2	4,9	5,4	3,6	4,6	4,3	2,9	4,6	0,1	1,5	0,8	0,8	3,3	6,3	5,4

Table 4 shows descriptive information about the companies available in the sample of the Latin American markets. The information about combined ESG, environmental, social, and corporate governance scores is presented on a yearly basis. Additionally, for each criterion the table shows the average score for the specific year, its standard deviation, the minimum, and maximum values for the relevant ESG score.

From Table 4 we can observe the information regarding the ESG scores for the aggregate sample of Latin American companies. It is important to consider the timeframe of the data available, which ranges from 2007 to 2022. However, the data available becomes relevant after 2007, as the number of observations is simply too low before that year. Table 4 shows in detail the scores for the combined ESG criteria (TRESGCS), and also the individual scores for each of the pillars (E, S, and G) on a yearly basis. The average value for each one of the scores is presented, and also its standard deviation, its maximum value, and its minimum value. As a general remark, it is noticeable that scores have had the tendency to slightly increase over time, which might be a sign of a more generalized adoption of ESG measures by such companies.

Additionally, it is important to notice from Table 4 that, in general, the Environmental and Governance pillars present higher scores than the ones by the S factor. This characteristic holds constant for the entire timeframe for the sample studied.

Figure 2: Relation between ESG and market capitalization by sectors in Latin America.

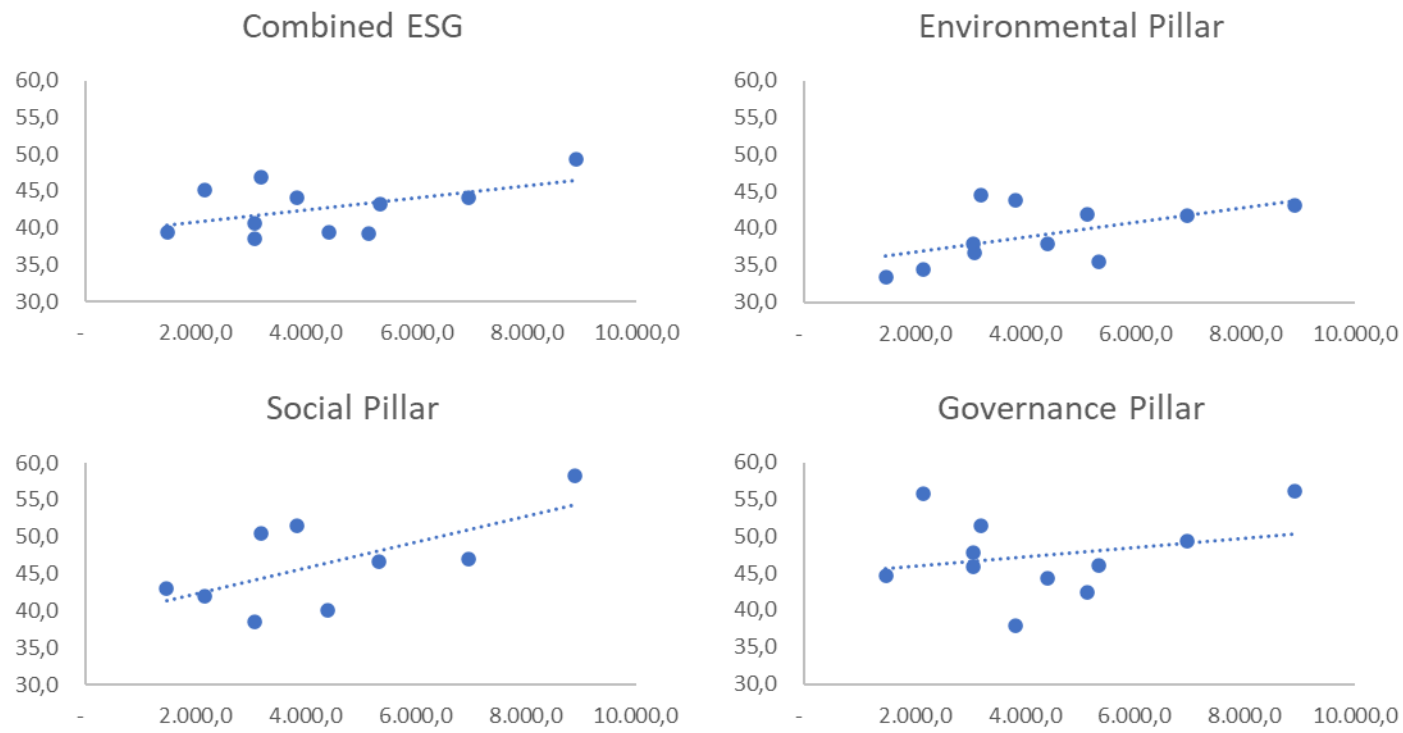

Figure 2 illustrates the relation of market capitalization (X axis) and relevant ESG score (Y axis) by sectors in the Latin American market. Market capitalization is understood as the average market capitalization of the constituent companies within each industrial sector. A positive relation is observable for each one of the different ESG criteria, denoted by the tendency lines. These graphs match with data in Table 2.

Figure 2 shows the relation that ESG scores have with the market capitalization of the firms. In this case, the graphs show the average values of relevant ESG scores and the average market cap of companies within the same sector. As a result, it is observable a tendency for bigger firms to present higher ESG scores. Such relation is present for all 4 relevant criteria in this study (combined ESG, E-pillar, S-pillar, and G-pillar). This could be cataloged as an expected result since ESG adoption is a process that requires capital investments, and in these types of markets, the biggest firms are the ones that dispose of a budget big enough to tackle ESG projects and concerns. In other words, financial resources are scarce for most of Latin American companies, and for them investing in business expansion is a more sensible and profitable strategy than investing in ESG-related projects (Cherkasova & Nenuzhenko, 2022).

Table 2: ESG scores by industry sector in the sample (Latin American market).

	Average Scores			
Sector	**Combined ESG**	**Environmental**	**Social**	**Governance**
Energy	49,38	43,18	58,32	56,03
Utilities	46,93	44,44	50,43	51,45
Technology	45,07	34,39	41,99	55,82
Health Care	44,10	43,73	51,52	37,93
Telecommunications	44,08	41,79	47,04	49,32
Financials	43,26	35,44	46,64	45,99
Industrials	40,67	36,62	43,83	47,82
Consumer Staples	39,47	37,90	40,12	44,25
Real Estate	39,34	33,46	43,07	44,71
Basic Materials	39,16	41,81	39,79	42,36
Consumer Discretionary	38,55	37,83	38,55	45,89

Table 2 presents the different industry sectors present in the sample, and their average scores for each of the relevant criteria in this study (combined ESG, Environmental, Social, and Governance). Industry sectors are sorted based on their score in the first ESG criterion (combined ESG).

Table 2 describes the differences in ESG levels by industry sector in the Latin American market. Differences in ESG levels between sectors are evident across all the criteria relevant to this study. For instance, in the combined ESG criterion the sector with the highest average score is Energy, while Consumer Discretionary is the one with the lowest average score. For the individual environmental, social, and governance criteria, the score levels do not

necessarily match the ones of the combined score. In the case of the environmental pillar the top-rated sector is Utilities and Real Estate is the one with the lowest score. For the social and governance pillars the Energy sector presented the highest scores, while the bottom-rated sectors were the Consumer discretionary for the social criterion, and Health care for the governance one. A graphical representation of such results can be observed in Figure 3.

3.2 Methodology - Regression Models

To examine whether the adoption of ESG-related policies by companies has influenced their stock prices, this research was based predominantly on the best-in-class methodology implemented by Ertugrul and Hegde (2009), Halbritter and Dorfleitner (2015), Boffo et al (2020), Przychodzka (2021), and by Hereijgers (2022). For each year of the available data, two portfolios were created based on their combined ESG scores (TRESGCS), as well as on each individual ESG pillar score (Environmental, Social, and Governance). Companies with available ESG score information were sorted in descending order, dividing the sample into quintiles. The two portfolios were constructed using the top 20% and the bottom 20% companies ranked by their score in each criterion. This is the 1^{st,} and 5th quintile in the sample. The final result was a set of 8 different portfolios, which are the top – Q1 portfolio, and the Bottom – Q5 portfolio, for each of the ESG criteria examined (TRESGCS, E-pillar, S-pillar, and G-pillar), for data from 2007 to 2022.

The main purpose of this is to capture any differences in the effects on excess return related to the level of ESG adoption, which is measured by its ESG score. For every year, the constructed portfolios' constituents varied with respect to the previous year due to new companies obtaining ESG scores and some others having changes in their current scores (upgrades or downgrades).

Models:

(1) $$R_{i,t} - R_{f,t} = \alpha_i + \beta_{1,i}\left(R_{m,t} - R_{f,t}\right) + \beta_{2,i}(SMB)_t + \beta_{3,i}(HML)_t + \varepsilon_{i,t}$$

(2) $$R_{i,t} - R_{f,t} = \alpha_i + \beta_{1,i}\left(R_{m,t} - R_{f,t}\right) + \beta_{2,i}(SMB)_t + \beta_{3,i}(HML)_t + \beta_{4,i}(MOM)_t + \varepsilon_{i,t}$$

(3) $$R_{i,t} - R_{f,t} = \alpha_i + \beta_{1,i}\left(R_{m,t} - R_{f,t}\right) + \beta_{2,i}(SMB)_t + \beta_{3,i}(HML)_t + \beta_{4,i}(MOM)_t + \beta_{5,i}(RMW)_t + \beta_{6,i}(CMA)_t + \varepsilon_{i,t}$$

The 8 portfolios created will be tested using pooled OLS regressions for every model above shown. These are the Fama and French 3-factor model (Fama and French, 1993) (1), the Carhart four-factor model (2), and a six-factor model, based on the Fama French five-factor model (2015) and the Carhart four-factor model (3). Detailed explanation of such factors can be found in table 5.

Table 5: Explanation of risk factors and the models proposed.

		Model		
Risk Factor	**Definition**	**Fama-French 3 factor**	**Carhart 4 factor**	**6 - Factor**
Market (Mkt-RF)	Return of the market portfolio minus the risk-free rate.	✓	✓	✓
Size premium (SMB)	Difference between the returns of diversified portfolios of small stocks minus the returns of diversified portfolios of big stocks.	✓	✓	✓
Value premium (HML)	Difference between the returns of diversified portfolios of high B/M (Book-to-market) stocks minus the returns of diversified portfolios of low B/M.	✓	✓	✓
Profitability premium (RMW)	Difference between the returns of diversified portfolios of robust profitability stocks minus the returns of diversified portfolios of weak profitability stocks.			✓
Investment premium (CMA)	Difference between the returns of diversified portfolios of low investment stocks minus the returns of diversified portfolios of high investment stocks			✓
Momentum factor (MOM)	Average of the returns for the two winner portfolios minus the average of the returns for the two loser portfolios		✓	✓

Table 5 provides an explanation of the risk factors used as explanatory variables in the models proposed, accordingly with the theory. Table 5 denotes which risk factors are employed in each specific model proposed.

These models were selected, as they include factors that may have relevant explanatory power for the returns generated by the portfolios constructed, and therefore they could bring information regarding the relationship, if there is any, between ESG and stock returns.

To test the hypothesis, and to examine whether ESG adoption has had a relationship with stock return at a portfolio level, portfolios' alphas (α_i) were estimated by regressing the models proposed with the corresponding explanatory factors as independent variables and having the excess return of the portfolio as a dependent variable. Special attention was taken to alpha coefficients' statistical significance and their estimated value direction (positive or negative).

The process was implemented for all the models, using the different portfolios constructed based on the ESG criteria. This was done by running a pooled OLS regression, looking for implementing a cross-sectional analysis of the data. If there is a positive and significant value for the alpha estimated, that would mean that there is evidence of the presence of abnormal return sources, in addition to the ones proposed in each specific model, which in this case would be attributable to a positive influence of ESG characteristics on returns. Results bring information related to whether any specific ESG criteria has brought additional return advantages for investors relying upon ESG adoption in the Latin American markets.

4. EMPIRICAL RESULTS

In this section the results of the portfolio construction methodology are presented, showing key descriptive characteristics of the final portfolios created based on each one of the ESG-relevant measures (Combined ESG, E-pillar, S-pillar, and G-pillar). Later the results of the regression models are presented, comparing them with the relevant literature regarding the specific measure in consideration, and allowing for testing the proposed hypotheses.

4.1 Portfolio Construction

The portfolio construction process started with an outlook of the relation between combined ESG scores, E scores, S scores, and G scores with the average annual return for the different companies in the sample. Figure 4 shows the basic relation between these 2 variables. From the graphs, it is noticeable some little differences in return distribution at different levels of ESG score. E and S scores seem to be the ones to have the greater proportion of high average returns more concentrated to the lowest levels of E and S scores respectively. Combined ESG and G scores have more concentrated returns in the middle area of ESG and G scores.

After having an overview of the raw data relation, I continued the study by following the best-in-class and worst-in-class methodology proposed. For each year on the dataset, companies were sorted based on their scores on the relevant criteria (TRESGCS, E-pilar, S-pillar, and G-pillar). Subsequently, the top 20% (Q1) companies, and the bottom 20% (Q1) were bundled together to create single portfolios of securities for each year. After repeating the process for all the years available in the data set, the final 8 portfolios with aggregate yearly data were created. Those portfolios were called as follows: TRESGCS-Q1, TRESGCS-Q5, E-Q1, E-Q5, S-Q1, S-Q5, G-Q1, G-Q5. Companies' returns were also retrieved from DataStream, on a yearly basis.

Figure 4: Relation between ESG related score and annual return

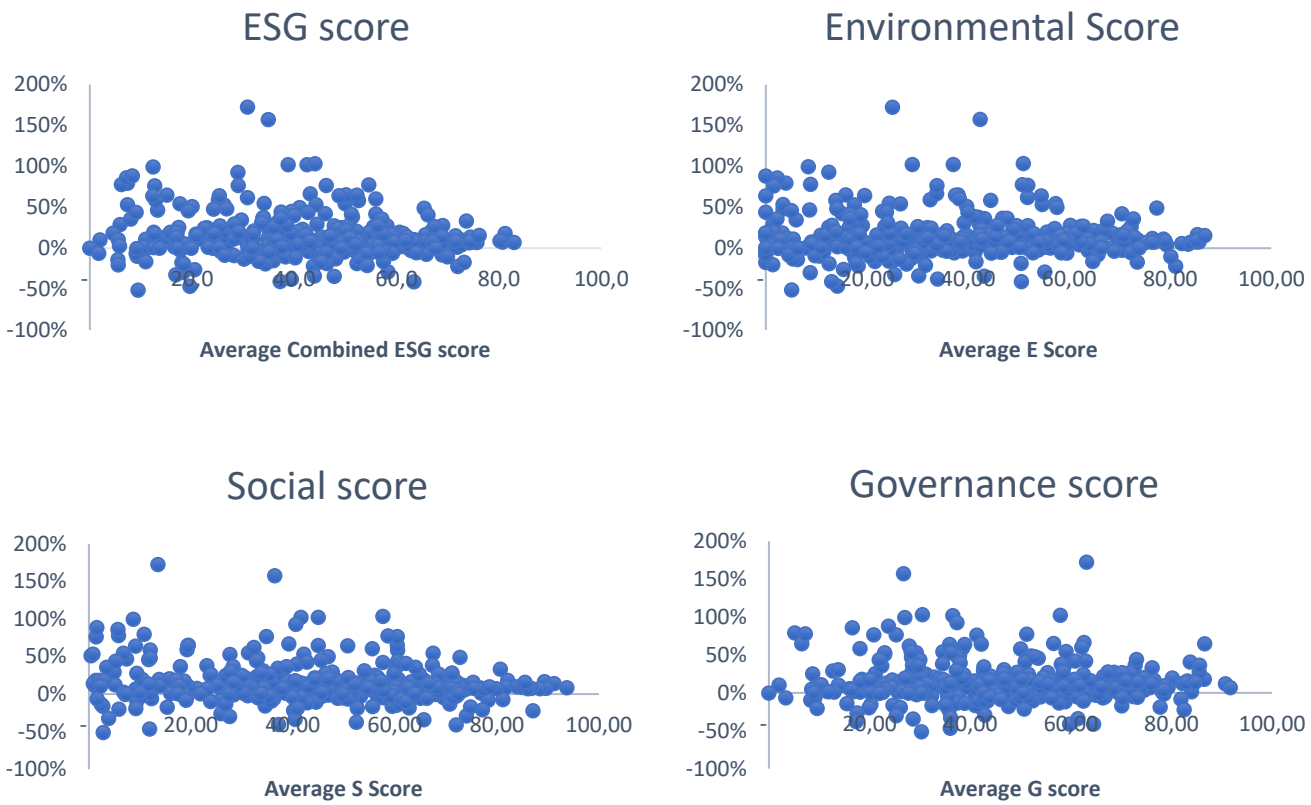

Figure 4 shows graphically the relation between average ESG related score and the average return for each specific company in the sample for the Latin American market.

Such portfolios were created under an equal-weight criteria, meaning that every constituent company had the same weight in the overall portfolio for each year. During the portfolio creation process, yearly return observations higher than 150% and lower than 75% were considered outliers, and therefore disregard from the data sample. The final portfolios had on average 475 observations.

Table 6 presents in detail the information of the 8 different portfolios constructed. There are shown the yearly key statistics for the portfolios constructed, such as their average return and their volatility for the defined period. Additionally, excess return over the MSCI Emerging Markets Latin America Index and over the MSCI Emerging Markets Index is provided. This

helps to get a better perception of the returns generated by the portfolios created, so they could be analyzed in relative terms. Table 7 shows a more digestible form of the data for the 8 portfolios constructed in average terms.

Table 7: Summary of descriptive information of portfolios created

Portfolio	Quintile	Avg return	Avg excess LA	Avg excess EM	Volatility	Sharpe Ratio
Combined ESG	Q1 - Top	5,84%	2,82%	1,37%	19,08%	0,26
	Q5 - Bottom	11,43%	8,41%	6,96%	23,63%	0,45
E	Q1 - Top	7,42%	4,39%	2,94%	21,69%	0,30
	Q5 - Bottom	9,33%	6,30%	4,85%	18,18%	0,47
S	Q1 - Top	7,62%	4,60%	3,14%	27,76%	0,24
	Q5 - Bottom	14,30%	11,27%	9,82%	24,14%	0,56
G	Q1 - Top	7,42%	4,39%	2,94%	19,80%	0,33
	Q5 - Bottom	6,91%	3,88%	2,43%	22,50%	0,27

Table 7 presents a summary of the data presented in Table 6, which contains average returns, excess returns over certain benchmarks, volatilities, and Sharpe ratios. Data from 2007 to 2022.

From the information in Table 7, it is observable that the average return for the portfolio constructed based on the combined ESG score was lower for the highest-rated companies than the average return generated by the lowest-rated companies. Even though the volatility was higher for the portfolio with the lowest scores, its Sharpe ratio was higher. Regarding the results for the portfolios constructed based on the E, S, and G pillars, for the first two of them, the portfolios showed a better return generation for the lowest-scored companies, while for the G-pillar the highest-rated companies generated a slightly better performance of the portfolio, compared to the lowest rated ones.

In all 3 scenarios for the specific ESG pillars, the best-performing portfolio also had the lowest volatility on its returns, which consequently generates a better Sharpe ratio. The portfolio that better performed in an absolute return criterion, under the defined conditions, was the lowest ranked in the S-pillar. The one that performed the best in risk-adjusted terms, measured by the Sharpe ratio, was the portfolio with the lowest ranked in the S-pillar as well.

Additionally, Table 7 shows that all 8 portfolios created outperformed the market when considering a proxy of the market the MSCI Emerging Markets Latin America Index and over the MSCI Emerging Markets Index.

4.2 Regression Results

Table 8 shows the OLS regression results for the portfolios created based on the combined ESG score created by Refinitiv (TRESGCS), which are the top 20% rated portfolio (Q1), and the bottom 20% rated portfolio (Q5). Each portfolio was tested using the Fama French 3-factor model (1), the Carhart 4-factor model (2), and the 6-factor model proposed (6). Important attention should be placed on the intercept value, which is the coefficient of the alpha measure, central for the hypothesis testing in this study. Robust standard errors were implemented when estimating the model's regression results. The SMN, HML, MOM, RMW, CMA, and RF factor values for emerging markets were retrieved from Kenneth R. French's website[5].

Table 8*:* Regression results for portfolios created based on combined ESG scores.

	Q1	**Q1**	**Q1**	**Q5**	**Q5**	**Q5**
	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**
MktRF	0.541***	0.512***	0.467***	0.645***	0.657***	0.753***
	(0.0594)	(0.0592)	(0.107)	(0.0913)	(0.0921)	(0.168)
SMB	-0.739***	-0.717***	-0.639***	-0.317	-0.327	-0.382
	(0.186)	(0.184)	(0.190)	(0.286)	(0.286)	(0.297)
HML	0.446***	0.255**	0.215	0.639***	0.719***	0.564*
	(0.114)	(0.124)	(0.205)	(0.175)	(0.193)	(0.320)
MOM		-0.357***	-0.448***		0.150	0.0955
		(0.0987)	(0.128)		(0.154)	(0.200)
RMW			0.651**			-0.0738
			(0.274)			(0.428)
CMA			-0.129			0.396
			(0.376)			(0.587)
Constant	-0.00866	0.0427**	0.0396**	0.0316	0.0100	0.0116
	(0.0138)	(0.0197)	(0.0196)	(0.0212)	(0.0306)	(0.0307)
Observations	488	488	488	488	488	488
R-squared	0.173	0.195	0.205	0.114	0.116	0.117

Table 8 presents the pooled OLS regression results on the portfolios created based on the combined ESG score measure. Portfolio Q1 was created with the top 20% combined ESG scored companies, and portfolio Q5 was created with the bottom 20% scored companies in the combined ESG measure. For each portfolio 3 asset pricing models were tested to find the effect of the coefficient value on the excess return generation (dependent variable). Such models are the Fama and French 3-factor model (Fama and French, 1993) (1), the Carhart four-factor model (2), and a six-factor model, based on the Fama French five-factor model (2015) and the Carhart four-factor model (3). The 10%, 5% and 1% significance levels are denoted as follows: *, **, ***.

[5] Data available in http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html

The regression results in Table 8 show that, for the portfolio constructed based on the combined ESG score (TRESGCS), the proposed factors included in the different asset pricing models tended to work well as sources of explanatory information for the excess return generated by the portfolio, since most of them presented statistical significance. R-squared values showed results in the range of 0.173 to 0.205 for the highest-scored companies' portfolio and 0.114 to 0.117 for the portfolio of the lowest-scored companies.

Regarding the regression results for the intercepts, also denoted as Alpha value (α_i), table 8 shows that in 2 out of the 3 models they were positive and higher for the top-rated companies. The only coefficients that showed statistical significance in the alpha values were the ones for the Q1 portfolio using the Carhart 4-Factor model (2), and the 6-Factor model (3), while it did not show significance for any of the models proposed using the low rated portfolios (Q5).

From the regression results it is observable that the relationship between combined ESG scores (TRESGCS), and financial performance of companies is significant and positive for the Latin American market. Such results do not support Hypothesis 1, which states that companies with high levels of combined ESG score have lower expected returns than companies with low levels of such scores. Additionally, the result regarding the relationship between the aforementioned variables is in line with the findings in Lodders (2019), Nagy et al (2015), and Sherwood & Pollard (2018).

On the other hand, the results of the model proposed are contrary to the findings of Boffo et al (2020), who applied a similar methodology to US stock data, and found that low ESG-scored companies outperformed high ESG companies. Similarly occurred with Hereijgers (2022), where positive significance was found in the intercept value for the low ESG portfolio using several models. Hereijgers (2022) examined the effect of ESG rating on stock performance for a much broader sample of companies, in both developed and emerging markets, which might be the reason for differences in results. In the same line, the results of this study partly contradict what was found by Przychodzka (2021), Halbritter & Dorfleitner (2015), given the nonexistent relationship that these studies found between ESG and stocks' financial performance.

Particularly interesting is how this study's findings contradict what was found in Fogliano de Souza Cunha and Samanez (2013), and in Cherkasova & Nenuzhenko (2022). In the case of Fogliano de Souza Cunha and Samanez (2013) they found that ESG-related measures hurt the financial performance of companies' stocks in the Brazilian market. Even though the findings between both studies are contradictive, there are limitations in terms of the data timeframe used in both studies, specific ESG-related information sources, and countries where companies were based on.

In regard to Cherkasova & Nenuzhenko (2022), the positive relationship between ESG and financial performance found in this study contradicts what they found for the Latin American markets. However, they used a different set of companies, and they studied firm-level specific financial metrics, such as ROA, debt to equity, revenue generation, and so on. This is not necessarily perfectly correlated with stock prices, giving space for the differences in results.

Table 9: Regression results for portfolios created based on environmental pillar scores.

	Q1	**Q1**	**Q1**	**Q5**	**Q5**	**Q5**
	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**
MktRF	0.618***	0.591***	0.549***	0.530***	0.533***	0.625***
	(0.0687)	(0.0689)	(0.123)	(0.0926)	(0.0937)	(0.167)
SMB	-0.802***	-0.747***	-0.707***	-0.556**	-0.563**	-0.588**
	(0.210)	(0.209)	(0.216)	(0.283)	(0.284)	(0.294)
HML	0.624***	0.461***	0.491**	0.545***	0.566***	0.366
	(0.125)	(0.137)	(0.233)	(0.168)	(0.186)	(0.317)
MOM		-0.313***	-0.327**		0.0414	-0.0617
		(0.114)	(0.146)		(0.155)	(0.199)
RMW			0.239			0.210
			(0.307)			(0.417)
CMA			-0.157			0.403
			(0.431)			(0.585)
Constant	0.000414	0.0452**	0.0436*	0.0275	0.0216	0.0222
	(0.0153)	(0.0223)	(0.0224)	(0.0206)	(0.0303)	(0.0305)
Observations	446	446	446	446	446	446
R-squared	0.191	0.205	0.206	0.086	0.087	0.088

Table 9 presents the pooled OLS regression results on the portfolios created based on the environmental score measure. Portfolio Q1 was created with the top 20% environmental factor scored companies, and portfolio Q5 was created with the bottom 20% scored companies in the environmental measure. For each portfolio 3 asset pricing models were tested to find the effect of the coefficient value on the excess return generation (dependent variable). Such models are the Fama and French 3-factor model (Fama and French, 1993) (1), the Carhart four-factor model (2), and a six-factor model, based on the Fama French five-factor model (2015) and the Carhart four-factor model (3). The 10%, 5% and 1% significance levels are denoted as follows: *, **, ***.

Just as Table 8 does, Table 9 presents the regression results after applying the models proposed with the portfolios constructed based on the environmental factor scores. For these portfolios, the results are very similar to the ones found for the combined ESG portfolios. In this case, all intercept values were positive, for both Q1 and Q5 portfolios. Positive and statistical significance was found only for the alpha value in the Carhart 4-factor model and in the 6-factor model for the Q1 portfolio.

Given such results, we can interpret that portfolios with higher levels of E-pillar scores tend to generate excess returns Latin American market, and therefore partially supports and accepts Hypothesis 2. In addition, this result is in line with the findings in Halbritter and Dorfleitner (2015) who after conducting a similar best-in-class analysis, found a positive relationship between environmental scores and excess return generation. Albertini (2013), and Lindsey, Pruitt, & Schiller (2023) found a similar positive relationship between these variables as well.

Nevertheless, this result refutes what was found by Auer (2016) and Bolton and Kacperczyk (2021). The first did not find a significant relationship between environmental measures and the financial performance of stocks, and the second found a negative relationship between environmental measures and stock returns.

Table 10: Regression results for portfolios created based on social pillar scores.

	Q1	Q1	Q1	Q5	Q5	Q5
	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**
MktRF	0.640***	0.623***	0.705***	0.703***	0.721***	0.984***
	(0.0632)	(0.0632)	(0.117)	(0.0927)	(0.0930)	(0.171)
SMB	-0.992***	-0.967***	-0.983***	-0.443	-0.470*	-0.594**
	(0.194)	(0.193)	(0.200)	(0.284)	(0.284)	(0.294)
HML	0.674***	0.530***	0.338	0.800***	0.953***	0.494
	(0.118)	(0.130)	(0.221)	(0.173)	(0.191)	(0.325)
MOM		-0.274***	-0.383***		0.291*	0.108
		(0.105)	(0.137)		(0.155)	(0.201)
RMW			0.269			0.00149
			(0.289)			(0.425)
CMA			0.366			1.096*
			(0.409)			(0.601)
Constant	-0.0131	0.0263	0.0265	0.0467**	0.00495	0.00821
	(0.0143)	(0.0208)	(0.0208)	(0.0210)	(0.0306)	(0.0306)
Observations	493	493	493	493	493	493
R-squared	0.223	0.234	0.236	0.136	0.142	0.148

Table 10 presents the pooled OLS regression results on the portfolios created based on the social score measure. Portfolio Q1 was created with the top 20% social factor scored companies, and portfolio Q5 was created with the bottom 20% scored companies in the social measure. For each portfolio 3 asset pricing models were tested to find the effect of the coefficient value on the excess return generation (dependent variable). Such models are the Fama and French 3-factor model (Fama and French, 1993) (1), the Carhart four-factor model (2), and a six-factor model, based on the Fama French five-factor model (2015) and the Carhart four-facto model (3). The 10%, 5% and 1% significance levels are denoted as follows: *, **, ***.

To analyze the results on the S-pillar constructed portfolios we can observe Table 10, which presents the regression results after applying the models proposed with the portfolios constructed based on the social factor scores. The values for the intercepts were positive in all the models proposed for the Q5 portfolio and were positive in 2 out of 3 models for the Q5 portfolio.

Statistical significance was found in the intercept coefficient when testing the Fama French 3-factor model, that for companies with the lowest social scores (Q5). The results obtained for the alpha value showed a positive sign, meaning that lower-rated companies in the social criteria tended to generate additional returns or excess returns. The implications of such results are not in line with hypothesis 3, which states that portfolios with higher levels of

social pillar scores tend to generate higher expected returns than portfolios with lower social pillar scores, and therefore reject hypothesis 3.

These results are in line with the findings in Borgers et al (2015), who found a negative relation between social scores and financial performance for equity mutual funds in the U.S. market. It supports the findings as well in Brammer et al. (2006), who concluded in their research that firms with higher social performance tend to generate lower returns.

However, this result contradicts the results in Lins et al (2017) and Crook et al (2011), since they found a positive relationship between the level of corporate social responsibility levels and the company's stock performance.

Table 11: Regression results for portfolios created based on governance pillar scores.

	Q1	**Q1**	**Q1**	**Q5**	**Q5**	**Q5**
	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**	**RiRf**
MktRF	0.628***	0.627***	0.560***	0.734***	0.735***	0.795***
	(0.0709)	(0.0712)	(0.127)	(0.0847)	(0.0851)	(0.152)
SMB	-0.586***	-0.583***	-0.537**	-1.010***	-1.014***	-1.022***
	(0.216)	(0.217)	(0.226)	(0.259)	(0.259)	(0.271)
HML	0.520***	0.510***	0.601**	0.676***	0.690***	0.535*
	(0.131)	(0.145)	(0.239)	(0.157)	(0.174)	(0.286)
MOM		-0.0195	0.00187		0.0264	-0.0675
		(0.120)	(0.152)		(0.143)	(0.181)
RMW			0.132			0.281
			(0.318)			(0.379)
CMA			-0.268			0.276
			(0.442)			(0.529)
Constant	0.00272	0.00551	0.00442	0.0134	0.00962	0.00888
	(0.0158)	(0.0233)	(0.0234)	(0.0189)	(0.0279)	(0.0280)
Observations	490	490	490	490	490	490
R-squared	0.160	0.160	0.161	0.164	0.164	0.166

Table 11 presents the pooled OLS regression results on the portfolios created based on the governance score measure. Portfolio Q1 was created with the top 20% governance scored companies, and portfolio Q5 was created with the bottom 20% scored companies in the governance measure. For each portfolio 3 asset pricing models were tested to find the effect of the coefficient value on the excess return generation (dependent variable). Such models are the Fama and French 3-factor model (Fama and French, 1993) (1), the Carhart four-factor model (2), and a six-factor model, based on the Fama French five-factor model (2015) and the Carhart four-factor model (3). The 10%, 5% and 1% significance levels are denoted as follows: *, **, ***.

Lastly, we can observe Table 11, which shows the regression results for the governance pillar constructed portfolios (Q1 and Q5), using the 3 asset pricing models proposed. The intercept values results presented in Table 11 are higher in the 3 models for the low-rated companies (Q5) than for the high-rated companies (Q1). However, no statistical significance was found in any of the models applied. This result does not allow for any testing of Hypothesis 4.

Interestingly, the same results were found by Ertugrul and Hegde (2009), who after using the Fama-French (1995) factors, and the Carhart, (1997) momentum factor, did not find any significance in the alpha value. Moreover, these results do not bring the opportunity to compare findings with the ones made by Eisenhofer (2014) and Auer (2016).

To conclude this section, Table 12 (see in appendix) presents a summary of the regression results for the coefficient of the Alpha value (α_i) for the portfolio constructed based on the combined ESG, as well as for the environmental, Social, and Governance pillars. Table 12 presents the results for the 3 asset pricing models proposed.

5. DISCUSSION

In this section, I present the discussions on the research results, the findings, and their implications. Additionally, I present the limitations of the study and some suggestions for further research on this topic.

5.1 Research results

This section discusses the results of the methodology proposed for the research and evaluates from a critical perspective the findings related to the relationships between the different ESG-related measures, and the financial performance of companies' shares in the stock markets. Additionally, some limitations of the proposed study are presented.

Regarding the combined ESG score relation with stocks' financial performance, this study found a positive and statistically significant relationship between high combined ESG scores and excess return generation. Hypothesis 1 states that "Portfolios with higher levels of combined ESG scores have lower expected excess returns than portfolios with lower levels of combined ESG scores". The findings of this study do not support such a hypothesis, since in this case the alpha coefficient for low ESG companies is not significant, and the alpha coefficient for high combined ESG-rated companies is positive and significant, therefore hypothesis 1 is rejected.

A probable explanation for this relationship is the incentive that such companies have on becoming more sustainable, in order to generate better future business perspectives, an effort that is therefore valued positively by the market. Additionally, is important to consider that companies with high quality in ESG tend to be larger in market capitalization size, and therefore more capable to incur into ESG-related projects. Further research on this relation would be interesting.

With respect to Hypothesis 2, which states that "Portfolios with higher levels of Environmental pillar scores have higher expected excess returns than portfolios with lower levels of Environmental pillar scores", the study results partially support it. This is because positive and statistically significant relationship was found between the environmental score and the companies' financial performance for high E-rated companies, but there was no

significance found for the intercept when evaluating the low E-rated rated portfolio. Therefore, no comparison can be made between the alpha values for both portfolios.

This is an important finding, given the support that it has in terms of previous literature with similar findings, but none of them had a focus on the Latin American markets. That is an interesting contribution to the literature that this study can provide.

Concerning the relation between social-pillar levels and financial performance, the study found a positive relation between these variables for the low-rated portfolio, based on the significance detected in the alpha value for the Q5 portfolio. No other alpha values showed statistical significance regarding the social pillar. This result did not support Hypothesis 3, which states that "portfolios with high levels of social pillar scores have higher expected excess returns than portfolios with low levels of social pillar scores", therefore hypothesis 3 was rejected.

This is another interesting finding of the study, since it reflects a positive payoff for investor when considering positions in companies with low levels of social responsibility measures. Or inversely, there seems to be a trade-off in the Latin American markets between achieving abnormal returns and having a positive exposure to socially friendly companies.

For Hypothesis 4, which states that "Portfolios with higher levels of Governance pillar scores have lower expected return than portfolios with lower levels of Governance pillar scores", no significance was found in any coefficient for the alpha value, neither for the Q1 portfolio nor for the Q5 portfolio. This does not allow the study to confirm or reject the hypothesis, since the relationship found does not present statistical significance.

5.2 Limitations and future research suggestions

The results from this study are subject to some limitations, encouraging to interpret the results and conclusions in perspective. This study examined the relationship between firms' ESG-related scores with the financial performance of their stocks in the equity markets. To explore this relationship, a model was proposed, and a set of data was used. Both are susceptible of limitations.

The first limitation to take into account is the quality of the information in the dataset. Even though stock returns are clearly identifiable, and the market knows the exact price and return for every stock listed, that is not the case with the ESG data. In this study I used the ESG data produced by Refinitiv, but that is only one source of ESG data available in the market. As mentioned by Chatterji et al. (2014), Berg et al. (2022), and Boffo et al. (2020), ESG ratings differ between providers, ultimately affecting the consistency in results based on different sets of ESG data. Additional to the lack of consistency in information depending on the data provider, there is a lack of quality in the Latin American market data, due to the lower reporting standards in the region.

The second limitation of the research is the limited amount of information from the Latin American markets, related to the relatively small size of such markets. Due to the small size of this markets, a relatively small sample of companies listed is available. When comparing to samples of companies available in developed markets, the difference is sizeable.

Additionally, and related to characteristics of the Latin American markets, is the type of companies that are listed in such markets and the. Due to the relative underdevelopment of capital markets in this region, most of the listed companies are the biggest companies in their markets. This specific characteristic might create biases in the results, and they should be taken into account.

For further research on this interesting topic, I suggest using additional sources of ESG data available in the market, as well as studying the differences in the relationship findings between different regions among the emerging markets and between different industrial sectors. Another suggestion would be to use explore the relationship between ESG and financial performance using the best-in-class methodology proposed, it but based value-weighted constructed portfolio, instead of an equal-weighted portfolio. Would be interesting to see the research results with such a construction.

Additionally, different cut-off hurdles could be used when processing the data, previous to applying the model. For instance, using different cut-off return levels for outlier identification (+150% and -75% in this model), and employing deciles or quantiles instead of quintiles for the top-rated and bottom-rated portfolios.

Lastly, for further research would be interesting to explore the effect that the adoption of ESG measures has had on risk-return metrics for portfolios invested in Latin American markets, for instance by analyzing Sharpe ratios.

6. CONCLUSIONS

This study investigates whether there is evidence of a relationship between the level of ESG adoption by companies and their stock prices, focused on the Latin American equity markets. Previous literature available is mostly focused on the ESG effects on stock returns in developed markets, and just a few of them analyzed the relationship within emerging markets. However, ESG-related investments and approaches have become a very popular feature in the current financial markets, and a big focus is in place on the opportunities in Latin American countries, making this study relevant, interesting, and useful for investors willing to obtain stock exposure within these markets, while considering ESG-related factors.

To explore the relationship between ESG adoption and financial performance of companies in this region, data from the 6 major Latin American markets, between 2008 and 2022 was retrieved from the DataStream database. The study mainly builds upon the work of Boffo et al (2020), Auer (2016), Halbritter and Dorfleitner (2015), Hereijgers (2022), and Przychodzka (2021) by implementing a best-in-class methodology to sort portfolios, based on their ESG criteria, and then using pooled OLS regression to test for the presence of alpha, or excess return, for the different ESG levels. This procedure was performed using 3 different asset pricing models proposed, for the combined ESG score, as well as for each one of the ESG pillars. Following this, hypotheses were tested based on the regression results.

The study found a positive value for the alpha coefficient in the relation of high combined ESG-scored companies and the financial performance of their shares in the stock markets, meaning that investing in such type of companies was a source of excess return generation in the broad Latin American markets. This result can be explained from the sustainability point of view. If a company invests in ESG-related projects, which is then translated into higher ESG scores, then the future outlook of the company is likely to be more stable and profitable for investors, which would value that in the stock markets.

Similarly, this study reveals a positive relationship between excess return generation and investing in high E-pillar rated companies. The sustainability explanation could potentially describe part of the reasons for this finding. Another explanation could be related to the great increase in responsible investing attention, which is generally interpreted as a sole

Environmental focus. This might have increased the demand for E-related stocks of companies with environmentally friendly projects and initiatives in the Latin American region, having an impact on stock prices and therefore their returns.

For the S-pillar, the relationship found was positive for the low S-pillar-scored companies, which implies that excess return can be generated by investing in companies with low scores on the social aspect within the Latin American markets. This result supports previous findings on this topic and has interesting implications for investors seeking to have social-pillar exposure in their portfolios. A possible reason for this is that it reflects a positive payoff for investor when considering positions in companies with low levels of social responsibility measures due to the lack of scrutiny by analysts and investors.

Lastly, the study did not find a particular relationship between the G-pillar adoption levels and financial performance. One possible reason for this finding is an overcrowding effect that might have happened in the market for governance related stocks. The lack of additional return related to exposures on governance-related assets could be a sign that all possible sources of excess returns related to this factor were already exploited by the market participants.

To conclude, this study provides interesting evidence of various relationships between ESG-related factors and the financial performance of companies' stocks in the Latin American equity markets. By considering companies' specific factors and performing certain types of screenings on them, using ESG scores as a tool to assess the level of adoption of such factors, investors could potentially get exposure to assets with a positive relationship with excess return generation. Such evidence can be used by investors as a starting point to which additional research could be implemented to base their ESG investment decisions in these markets.

7. REFERENCES:

Arias Fogliano de Souza Cunha, F., & Samanez, C. P. (2013). Performance Analysis of Sustainable Investments in the Brazilian Stock Market: A Study About the Corporate Sustainability Index (ISE). *117*(1), 19-36. Retrieved from https://www.jstor.org/stable/42001964

Nagy, Z., Kassam, A., & Lee, L.-E. (2015). CAN ESG ADD ALPHA?

Albertini, E. (2013). Does Environmental Management Improve Financial Performance? A Meta-Analytical Review.

Auer, B. R. (2016). Do Socially Responsible Investment Policies Add or Destroy European Stock Portfolio Value? *Journal of Business Ethics, 135*(2), 381-397. Retrieved from https://www.jstor.org/stable/24736088

Berg, F., Kölbel, J., & Rigobon, R. (2019). Aggregate Confusion: The Divergence of ESG Ratings. doi:https://dx.doi.org/10.2139/ssrn.3438533

Boffo, R., & R. Patalano. (2020). *ESG Investing: Practices, Progress and Challenges.* OECD, Paris.

Bolton, P., & Kacperczyk, M. (2021, November). Do investors care about carbon risk? *Journal of Financial Economics, 142*(2), 517-549.

Borgers, A., Derwall, J., Koedijk, K., & ter Horst, J. (2015, July). Do social factors influence investment behavior and performance? Evidence from mutual fund holdings. *Forthcoming Journal of Banking & Finance*.

Brammer, S., Brooks, C., & Pavelin, S. (2006). Corporate Social Performance and Stock Returns: UK Evidence from Disaggregate Measures. *35*(3), 97-116. Retrieved from https://www.jstor.org/stable/30137803

Bruner, R. F., Conroy, CFA, R., Li, W., O'Halloran, E., & Palacios Lleras, M. (2003). *Investing in Emerging Markets.* Darden Graduate School of Business Administration.

University of Virginia. Retrieved from https://www.cfainstitute.org/-/media/documents/book/rf-publication/2003/rf-v2003-n2-3923-pdf.ashx

Capital Group. (2022). *ESG Global Study* .

Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance*.

Carlini, J., Grace, D., France, C., & Lo Iacono, J. (2019). The corporate social responsibility (CSR) employer brand process: Integrative review and comprehensive model . *Journal of Marketing Management*.

Castro Martins, H. (2022). Competition and ESG practices in emerging markets: Evidence from a difference-in-differences model. *Finance Research Letters, 46*. doi:https://doi.org/10.1016/j.frl.2021.102371

CFA Institute Research Foundation. (2022). ESG Investment Outcomes, Performance Evaluation, and Attribution.

Chatterji, A., Durand, R., Levine, D., & Touboul, S. (2014). Do Ratings of Firms Converge? Implications for Managers, Investors and Strategy Researchers. *Strategic Management Journal*. Retrieved from https://ssrn.com/abstract=2524861

Cherkasova, V., & Nenuzhenko, I. (2022, March). Investment in ESG Projects and Corporate Performance of Multinational Companies. *Journal of Economic Integration,, 37*(1), 54-92. Retrieved from https://www.jstor.org/stable/27107054

Crook, T., Todd, S., Combs, J., & Woehr, D. (2011, January). Does Human Capital Matter? A Meta-Analysis of the Relationship Between Human Capital and Firm Performance. *Journal of Applied Psychology*.

(2021). *Cuntry Sustainability Ranking.* ROBECO.

Duttagupta, R., & Pazarbasioglu, C. (2021). *Emerging markets must balance overcoming the pandemic, returning to more normal policies, and rebuilding their economies.* IMF.

EBA . (2021). *On Management and Supervision of ESG Risks for Credit Institutions and Inverstmet Firms.*

Eisenhofer, J. W. (2014). Does Corporate Governance Matter to Investment Returns?

Ertugrul, M., & Hegde, S. (2009). Corporate Governance Ratings and Firm Performance. *Financial Management, 38*(1), 139-160. Retrieved from https://www.jstor.org/stable/20486688

FAMA, E., & FRENCH, K. (1995). Size and Book-to-Market Factors in Earnings and Returns. *The Journal of Finance* .

Halbritter, G., & Dorfleitner, G. (2015). The wages of social responsibility—where are they? A critical review of ESG investing. *Review of Financial Economics*.

Hereijgers, T. (2022). *The impact of changes in ESG ratings on stock performance: A study comparing developed markets and emerging markets.* Rotterdam School of Management. Retrieved from http://hdl.handle.net/2105/65108

HEUGH, KRISTIAN ; FOX, MARC ;. (2023). *ESG Update.* Retrieved from https://www.morganstanley.com/im/publication/insights/articles/article_esgupdate.pdf

International Bar Association . (2022). *ESG survey results report: ESG in Latin America.*

J.P Morgan Asset Management . (2022). *The evolution of the ESG investment landscape* .

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, 304-329. doi:https://doi.org/10.1016/j.jfineco.2014.09.008

Larcker, D., Pomorski, L., Tayan, B., & Watts, E. (2022). *ESG Ratings: A Compass without Direction.* Stanford Closer LOOK series.

Lindsey, L., Pruitt, S., & Schiller, C. (2023, July 5). The Cost of ESG Investing. doi:https://dx.doi.org/10.2139/ssrn.3975077

LINS, K., SERVAES, H., & TAMAYO, A. (2017, August). Social Capital, Trust, and Firm Performance:The Value of Corporate Social Responsibilityduring the Financial Crisis. *THE JOURNAL OF FINANCE*.

Lodders, P. (2021). *Effect of ESG factors on stock performance during COVID-19.* Rotterdam School of Management. Retrieved from http://hdl.handle.net/2105/57860

Morgan Stanley Investment Management. (2023). *ESG Update.* Retrieved from https://www.morganstanley.com/im/publication/insights/articles/article_esgupdate.pdf

MSCI. (n.d.). *ESG 101: What is Environmental, Social and Governance?* Retrieved from https://www.msci.com/esg-101-what-is-esg

Muller, D. (2018). *Emerging Markets – Powerhouse of global growth.* Ashmore Investment Management Limited. Retrieved from https://www.ashmoregroup.com/sites/default/files/article-docs/MC_10%20May18_2.pdf

Natalucci, F. M., Gautam, D., & Goel, R. (2022). *Sustainable Finance in Emerging Markets: Evolution, Challenges, and Policy Priorities.* IMF.

Nguyen, D. K. (2022). *Handbook of Banking and Finance in Emerging Markets.*

OECD. (2021). *ESG Investing and Climate Transition: Market Practices, Issues and Policy Considerations.*

PRI. (2020). Retrieved from https://www.unpri.org/annual-report-2020?navCode=626

Przychodzka, S. (2021). *The impact of ESG scores on stock returns during periods of economic growth and downturn: Is the sustainable stocks outperformance bull, bear or normal market phenomenon? The comparison between emerging and developed countries.* Rotterdam School of Management. Retrieved from http://hdl.handle.net/2105/57560

PWC. (2022). *Exponential Expectations for ESG.*

Refinitiv. (2022, May). *Environmental, Social and Governance Scores from Refinitiv*.

ROBECO. (2021). *Country Sustainability Rankin.* Retrieved from https://assets.ctfassets.net/tl4x668xzide/4riGTXnIgDcep7Ngl3QP6V/cd4fe505025e4571fecbbc99ab7e3a73/202201-brochure-country-sustainability-ranking-2.pdf

Schuhmacher, F., & Auer, B. (2016). Do socially (ir)responsible investments pay? New evidence from international ESG data. *The Quarterly Review of Economics and Finance, 59*, 51-62.

Sherwood, M. W., & Pollard, J. (2018). The risk-adjusted return potential of integrating ESG strategies into emerging market equities. *Journal of Sustainable Finance & Investment, 8*(1).

Witt, M., Kabbach de Castro, L. R., Amaeshi, K., Mahroum, S., Bohle, D., & Saez, L. (2017). Mapping the business systems of 61 major economies: a taxonomy and implications for varieties of capitalism and business systems research. *Socio-Economic Review*, 5–38. doi:https://doi.org/10.1093/ser/mwx012

8. APPENDIX

Table 2: Average return by sector in the Latin American market.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg return
Basic Materials	69,9%	-42,5%	99,3%	34,7%	-24,2%	4,5%	-11,1%	-4,7%	-19,2%	105,6%	34,3%	-5,3%	4,1%	31,3%	22,0%	17,3%	19,7%
Cons. Discretionary	26,1%	-46,7%	107,6%	33,1%	-19,6%	33,8%	-0,2%	-1,7%	-0,9%	28,3%	54,5%	-3,5%	27,7%	-14,9%	0,7%	-20,4%	12,7%
Consumer Staples	57,2%	-29,9%	75,7%	38,0%	-4,8%	23,4%	13,3%	17,8%	21,3%	16,8%	14,4%	-11,6%	22,2%	16,0%	16,9%	26,5%	19,6%
Energy	30,8%	-29,9%	45,0%	31,9%	-8,3%	-5,4%	27,6%	5,5%	5,0%	40,3%	106,2%	0,2%	39,4%	-1,3%	22,4%	75,4%	24,1%
Financials	28,4%	-29,0%	77,9%	45,3%	-12,2%	17,7%	7,2%	20,0%	5,7%	25,9%	36,6%	-0,9%	33,9%	-2,4%	4,1%	16,5%	17,2%
Health Care	12,5%	-23,9%	145,5%	48,1%	-19,9%	18,2%	13,0%	-0,8%	-10,2%	50,8%	29,6%	-18,1%	69,6%	9,0%	-3,3%	-9,8%	19,4%
Industrials	38,7%	-41,5%	60,3%	54,0%	-12,6%	33,1%	13,8%	6,5%	14,7%	38,9%	41,8%	-9,1%	19,0%	2,0%	16,3%	17,2%	18,3%
Real Estate	64,2%	-55,7%	136,9%	29,3%	-6,4%	26,2%	5,8%	7,0%	-8,2%	10,7%	32,0%	-9,1%	58,8%	-10,2%	-14,0%	8,4%	17,2%
Technology	13,1%	-21,9%	124,5%	44,7%	3,3%	21,8%	-12,8%	4,6%	-12,2%	-13,9%	13,7%	-10,2%	48,7%	0,4%	-21,4%	13,1%	12,2%
Telecommunications	25,8%	-25,4%	41,2%	-3,0%	-5,3%	-8,5%	18,3%	-1,9%	-7,7%	4,7%	27,8%	-20,1%	9,1%	26,0%	-6,9%	-9,0%	4,1%
Utilities	20,5%	-28,5%	52,5%	32,2%	-3,1%	-1,5%	20,0%	35,4%	20,7%	50,2%	50,1%	-1,2%	25,8%	-3,1%	7,8%	66,8%	21,5%

Table 2 shows the average return for companies with available data, for certain years, between 2007 and 2022. Last Column shows the average return by sector. The energy and utilities sectors presented the highest average returns during the timeframe studied. The lowest average return was produced by companies in the telecommunications sector.

Table 3: Number of companies per region in the sample

LATAM		ASIA		EUROPE		AFRICA		MIDDLE EAST	
Country	**Firms**	**Country**	**Firms**	**Country**	**Firms**	**Country**	**Firms**	**Country**	**Firms**
Brazil	122	China	993	Turkey	84	South Africa	122	Qatar	45
Mexico	78	India	172	Russian Federation	46	Egypt	18	Saudi Arabia	42
Argentina	56	Taiwan	165	Poland	45	Morocco	6	United Arab Emirates	40
Chile	43	South Korea	163	Iceland	9	Nigeria	2	Bahrain	18
Peru	32	Thailand	161	Hungary	6	Uganda	2	Kuwait	14
Colombia	23	Malaysia	117	Cyprus	5	Kenya	1	Oman	11
		Indonesia	58	Channel Islands	4	Zimbabwe	1	Jordan	7
		Philippines	33	Czech Republic	3				
		Vietnam	22	Romania	3				
		Pakistan	10	Jersey	1				
		Kazakhstan	1	Malta	1				
		Sri Lanka	1	Slovenia	1				
				Ukraine	1				

Table 3 shows the sample of information available with ESG scores for companies in emerging markets. The sample is dividend in 5 geographical regions, presenting the countries within each region and the number of firms in each country.

Table 6: Key return characteristics of portfolios created based on ESG criteria, for period between 2007 and 2022

			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Combined ESG	Top Q1	Avg	27,03%	-24,68%	53,50%	10,22%	-8,81%	15,12%	-6,97%	-1,19%	-6,04%	17,67%	16,83%	-1,28%	23,28%	-5,47%	-4,94%	-10,76%
		SD	55,07%	27,15%	22,57%	25,78%	24,00%	30,16%	20,13%	22,62%	26,23%	24,13%	22,92%	26,96%	35,90%	21,47%	30,36%	20,92%
		Excess LA	-19,86%	28,10%	-44,64%	-1,85%	13,12%	9,69%	8,75%	13,59%	26,88%	-10,25%	-3,99%	7,99%	9,57%	10,50%	8,19%	-10,69%
		Excess EM	-9,45%	29,79%	-21,00%	-6,15%	11,60%	-0,03%	-1,99%	3,44%	10,92%	9,09%	-17,52%	15,35%	7,87%	-21,32%	-0,35%	11,61%
	Bottom Q5	Avg	-7,67%	-18,08%	53,35%	32,09%	-11,74%	3,80%	-5,59%	-3,70%	-8,86%	32,03%	31,04%	-16,08%	20,79%	10,23%	18,31%	52,99%
		SD	12,14%	21,71%	38,97%	33,34%	26,25%	39,39%	32,98%	29,17%	36,01%	41,54%	44,57%	25,50%	53,70%	40,40%	50,78%	56,41%
		Excess LA	-54,56%	34,70%	-44,79%	20,02%	10,18%	-1,63%	10,13%	11,08%	24,06%	4,11%	10,22%	-6,80%	7,08%	26,20%	31,44%	53,06%
		Excess EM	-44,15%	36,39%	-21,15%	15,72%	8,67%	-11,35%	-0,61%	0,93%	8,10%	23,45%	-3,31%	0,55%	5,38%	-5,61%	22,90%	75,36%
Portfolio E	Top Q1	Avg	36,91%	-25,11%	60,22%	8,93%	-7,17%	6,56%	-2,03%	-1,85%	-12,17%	30,32%	17,52%	-4,72%	24,40%	-1,58%	0,38%	-11,88%
		SD	46,90%	20,98%	26,23%	26,59%	27,05%	21,05%	19,39%	20,92%	29,46%	33,23%	25,27%	29,66%	36,62%	28,23%	29,89%	18,64%
		Excess LA	-9,99%	27,68%	-37,92%	-3,14%	14,75%	1,13%	13,69%	12,93%	20,75%	2,40%	-3,30%	4,55%	10,69%	14,39%	13,51%	-11,81%
		Excess EM	0,43%	29,37%	-14,27%	-7,44%	13,24%	-8,58%	2,95%	2,78%	4,79%	21,74%	-16,82%	11,91%	8,99%	-17,42%	4,97%	10,49%
	Bottom Q5	Avg	2,45%	-12,64%	44,38%	31,54%	-7,09%	-1,02%	-9,83%	-1,88%	-9,00%	22,61%	29,04%	-6,70%	19,30%	4,38%	10,85%	32,88%
		SD	27,99%	24,09%	26,97%	33,61%	31,25%	34,70%	31,44%	33,86%	31,62%	39,54%	40,39%	34,23%	44,15%	42,23%	44,07%	65,30%
		Excess LA	-44,45%	40,15%	-53,76%	19,47%	14,83%	-6,45%	5,89%	12,90%	23,92%	-5,31%	8,21%	2,57%	5,59%	20,35%	23,98%	32,95%
		Excess EM	-34,03%	41,84%	-30,12%	15,17%	13,32%	-16,17%	-4,85%	2,74%	7,96%	14,03%	-5,31%	9,93%	3,89%	-11,47%	15,44%	55,25%
Portfolio S	Top Q1	Avg	70,19%	-39,19%	56,51%	13,10%	-3,45%	12,73%	-7,12%	-9,14%	-14,24%	28,10%	19,46%	-1,04%	22,82%	-4,11%	-1,73%	-20,94%
		SD	33,55%	17,14%	26,44%	26,26%	23,04%	29,56%	15,60%	23,98%	27,24%	32,96%	25,77%	30,83%	33,00%	24,70%	30,26%	28,98%
		Excess LA	23,30%	13,60%	-41,63%	1,03%	18,47%	7,30%	8,60%	5,64%	18,68%	0,19%	-1,37%	8,23%	9,11%	11,86%	11,40%	-20,87%
		Excess EM	33,71%	15,29%	-17,99%	-3,27%	16,96%	-2,42%	-2,14%	-4,51%	2,72%	19,52%	-14,89%	15,59%	7,41%	-19,96%	2,86%	1,43%
	Bottom Q5	Avg	5,31%	-21,54%	49,84%	38,67%	-9,95%	20,72%	-3,83%	2,04%	-15,96%	38,91%	35,37%	-13,36%	17,52%	8,54%	22,59%	53,89%
		SD	27,21%	21,58%	39,91%	36,71%	26,87%	31,68%	33,05%	29,29%	32,40%	40,47%	45,28%	34,64%	54,29%	36,63%	50,40%	60,23%
		Excess LA	-41,58%	31,25%	-48,30%	26,60%	11,97%	15,29%	11,89%	16,82%	16,96%	11,00%	14,55%	-4,09%	3,81%	24,51%	35,72%	53,97%
		Excess EM	-31,17%	32,94%	-24,66%	22,31%	10,46%	5,57%	1,14%	6,66%	1,00%	30,34%	1,03%	3,27%	2,10%	-7,31%	27,18%	76,27%
Portfolio G	Top Q1	Avg	35,76%	-21,13%	48,97%	10,02%	-17,68%	19,60%	-7,31%	-2,36%	-6,38%	22,60%	26,90%	-4,09%	17,77%	1,46%	6,05%	-11,51%
		SD	57,73%	27,61%	24,41%	22,29%	22,80%	33,25%	17,77%	28,39%	29,20%	38,75%	34,97%	23,79%	37,86%	30,80%	37,36%	22,24%
		Excess LA	-11,13%	31,65%	-49,17%	-2,05%	4,24%	14,17%	8,41%	12,43%	26,54%	-5,32%	6,08%	5,19%	4,06%	17,43%	19,18%	-11,43%
		Excess EM	-0,72%	33,35%	-25,53%	-6,34%	2,73%	4,45%	-2,34%	2,27%	10,58%	14,02%	-7,44%	12,55%	2,35%	-14,38%	10,64%	10,87%
	Bottom Q5	Avg	-8,24%	-35,47%	45,18%	23,86%	-9,30%	15,37%	-9,14%	-3,35%	-20,44%	36,77%	28,85%	-12,59%	29,60%	4,64%	8,15%	16,61%
		SD	12,02%	22,34%	32,65%	34,67%	22,50%	31,48%	20,81%	21,62%	27,78%	45,65%	39,81%	28,93%	51,43%	36,61%	40,84%	50,10%
		Excess LA	-55,13%	17,31%	-52,96%	11,79%	12,62%	9,94%	6,58%	11,44%	12,48%	8,85%	8,03%	-3,31%	15,89%	20,61%	21,28%	16,69%
		Excess EM	-44,72%	19,00%	-29,32%	7,49%	11,11%	0,22%	-4,16%	1,28%	-3,48%	28,19%	-5,49%	4,05%	14,18%	-11,21%	12,74%	38,99%

Table 6 shows a description of key statistics from portfolios constructed based on ESG scores. For each ESG criterion 2 portfolios are shown. Top Q1 represents the portfolios with the top 20% rated companies for the relevant criterion. Bottom Q5 represents the portfolios with the bottom 20% rated companies for the relevant criterion. For each portfolio the yearly average return information is presented, as well as its standard deviation, its excess return over the Latin American index (MSCI EM LA), and its excess return over the emerging markets index (MSCI EM).

Figure 3: Average ESG scores by sectors in the Latin American sample

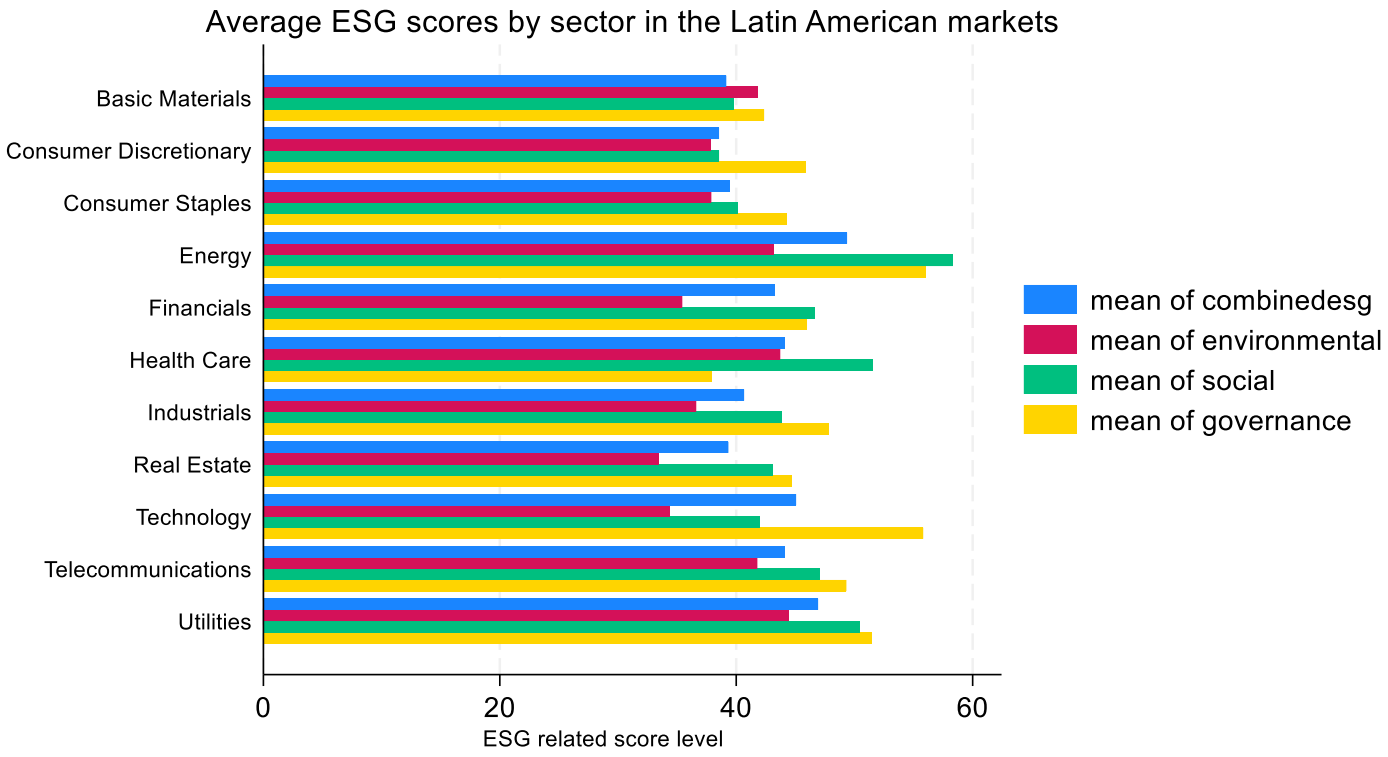

Table 12: Alpha coefficients for various models and different portfolios constructed based on ESG scores.

	Portfolios							
Model	**TRESGCS**		**E-Pillar**		**S-Pillar**		**G-Pillar**	
	Q1	Q5	Q1	Q5	Q1	Q5	Q1	Q5
Fama-French 3-Factor	-0.00866	0.0316	0.000414	0.0275	-0.0131	0.0467**	0.00272	0.0134
	(0.0138)	(0.0212)	(0.0153)	(0.0206)	(0.0143)	(0.0210)	(0.0158)	(0.0189)
Carhart 4-Factor	0.0427**	0.0100	0.0452**	0.0216	0.0263	0.00495	0.00551	0.00962
	(0.0197)	(0.0306)	(0.0223)	(0.0303)	(0.0208)	(0.0306)	(0.0233)	(0.0279)
6-Factor	0.0396**	0.0116	0.0436*	0.0222	0.0265	0.00821	0.00442	0.00888
	(0.0196)	(0.0307)	(0.0224)	(0.0305)	(0.0208)	(0.0306)	(0.0234)	(0.0280)

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