ECO3002 Introduction to Econometrics

S02-Group 1

Topic: The Impact of Environmental, Social, and Governance (ESG) Factors on Stock Returns: An Econometric Analysis

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Introduction

In recent years, there has been a growing interest in responsible investing, which incorporates Environmental, Social, and Governance (ESG) factors into investment decisions. The importance of ESG factors has been recognized not only for their ethical implications but also for their potential impact on financial performance. This study aims to explore the relationship between ESG factors and stock returns using an econometric approach.

The objective of this study is to investigate the relationship between Environmental, Social, and Governance (ESG) factors and stock returns. Using cross-sectional data from publicly traded companies in the S&P 500 index, we estimate a multiple regression model to examine the impact of ESG factors on stock returns. The study considers four explanatory variables: Environmental Score (ENV), Social Score (SOC), Governance Score (GOV), and Market Capitalization (MCAP). By analyzing the effect of ESG factors on stock returns, this research contributes to the growing literature on responsible investing and provides valuable insights for investors, policymakers, and other stakeholders.

Literature Review

ESG impact on performance of US S&P 500-listed firms

The study analysis the impact of ESG scores and declaration on the performance of S&P 500 companies between 2008 and 2018.

As **independent variables** it uses overall firm disclosure of its environmental, social and governance (**ESG**), Social responsibility disclosure (**CSR**), environmental disclosure (**EVN**) and Governance **disclosure** (**CG**) Bloomberg **indices**.

As **dependent variables** it uses the firms performance measured by **ROA** (ROA equals net income divided by total assets (TA) of the firm (i), in the period (t)), **ROE** (ROE equals net income divided by equity of firm (i), in the period (t)) and **Tobin's Q** (Tobin's Q equals current liabilities plus the market value of share capital divided by TA of the firm (i), in the period (t)).

As **control variables** the study uses the Firm size (**FS**), leverage, assets growth (**AG**) and assets turnover (**AT**)

This leads to the following linear regression model:

$$Perf_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 EVN_{it} + \beta_3 CSR_{it} + \beta_4 CG_{it} + \beta_5 FS_{it} + \beta_6 FL_{it} + \beta_7 AT_{it} + \beta_8 AG_{it} + \varepsilon_{it}$$

The study finds that overall ESG, CSG, EVN and CG disclosures have a positive impact on the firm's performance (ROA and ROE). Nevertheless, firms with a low CG exposure had a higher ROA. Low levels of ESG, CSR, EVN and CG disclosure further lead to a higher market performance measured via Tobin's Q.

The literature differs from our work as we use different independent variables and only use one control variable which is market cap (MCAP). In addition to this we do not analyse impact on the company's performance but on the Stock Return as dependent variable.

Does the ESG Index Affect Stock Return? Evidence from the Eurostoxx50

The study analysis the effects of the ESG overall index on the stock return from the Eurostoxx50 from 2010 to 2018.

As **independent variables** it uses **ΔGOV** (changes in the Governance synthetic sub-index), **ΔCOM** (variations of the Community synthetic sub-index), **ΔEMP** (variations of the synthetic sub-index Employees), **ΔENV** (changes of the synthetic sub-index Environment), **Return** (lagged value).

Return (Quarterly stock returns) is the dependent variable.

This leads to the following linear model:

$$Return_t = \alpha + \beta_1 \Delta GOV_t + \beta_2 \Delta COM_t + \beta_3 \Delta EMP_t + \beta_4 \Delta ENV_t + \beta_5 Return_{t-n} + \varepsilon_t$$

This study differs from our work, as it analyses the Eurostoxx50 instead of the S&P500. It further includes time series data while we focus on 2021. Although the study has the same topic it additionally uses other variables the determine ESG scoring and stock return.

When ESG meets AAA: The effect of ESG rating changes on stock returns

The study analysis the impact of **changes in ESG ratings** on Stock returns of US-traded firms rated by MSCI in 2016–2021 using the calendar-time portfolio methodology.

It found that ESG upgrades lead to small positive abnormal returns, while downgrades are consistently detrimental to stock performance.

In comparison to our work, it uses a different methodology. It also uses a wider range of firms while we focus on the firms listed in the S&P500. Further our work uses absolute ESG scores instead of changes in ESG scores.

Reconsidering systematic factors during the Covid19 pandemic–the rising importance of ESG

The study evaluated the performance of the "S&P 500 index" in relation to Top25 ESG portfolios and Bottom25 ESG portfolios. The authors found that the top 25 ESG portfolios outperform the "S&P 500 index", while the bottom 25 ESG portfolios underperformed the "S&P 500 index". They also investigated how ESG and its components affected different businesses and found that the effects varied by industry. It was discovered that during the Covid-19 window, companies with high ESG scores outperformed the S&P 500 index and companies with low ESG scores underperformed the S&P 500.

Econometric model / Data and Methodology

We use cross-sectional data from companies listed in the S&P 500 index.

We estimate the following multiple regression model:

$$\mathbf{Stock\_Return = \beta 0 + \beta 1 * ENV + \beta 2 * SOC + \beta 3 * GOV + \beta 4 * MCAP + \varepsilon}$$

A brief discussion of variables that might be used

1. **Stock_Return** represents the annual stock return of each company : This is the dependent variable representing the annual stock return of each company. Stock returns are a measure of how much an investor gains or losses from an investment in a particular stock, expressed as a percentage of the original investment. It is typically calculated based on the change in stock prices and dividends paid over a specified period.
2. **ENV** is the Environmental Score : This independent variable represents the Environmental Score of a company. The score is a measure of a company's performance and commitment to environmental sustainability, considering factors such as energy use, waste management,

emissions, and resource conservation. Higher scores indicate better environmental performance and practices.

3. **SOC** is the Social Score : This independent variable represents the Social Score of a company. The score evaluates a company's performance in social responsibility, which includes factors like human rights, labor practices, community engagement, and product responsibility. A higher score indicates a better commitment to social responsibility and positive relationships with stakeholders.
4. **GOV** is the Governance Score : This independent variable represents the Governance Score of a company. The score assesses a company's performance in corporate governance, which involves factors such as board structure, executive compensation, shareholder rights, and transparency. Higher scores indicate better corporate governance practices and a lower likelihood of corporate misconduct.
5. **MCAP** is the Market Capitalization : This independent variable represents the Market Capitalization of a company. Market capitalization is calculated by multiplying the current stock price by the total number of outstanding shares. It is an important indicator of a company's size, financial stability, and growth potential.
6. **ε** is the error term : The error term captures the unexplained variation in the dependent variable, Stock_Return, that is not accounted for by the independent variables. It represents factors that affect stock returns but are not included in the model

Data sources

The sample period covers 2021, and the data is obtained from from a variety of reputable sources, including financial databases and ESG rating agencies such as Bloomberg (Terminal : ticker "**FA ESG" ; "EQUITY" ; "MARKET_CAP"**), Yahoo Finance, TradingView, Moody's official website, Standard & Poor's official website, and Fitch official website.

By using data from multiple sources, the analysis can provide a more comprehensive view of the S&P 500 towards ESG.

References

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Peer Assessment Form

Print Full Name	Percentage of team mark	Justification(s)
1. Jan Straka	100%	Good communication, teamwork, and workload distribution.
2. Théo Enzo Arno Lebrun	100%	Good communication, teamwork, and workload distribution.
3. Singh Aadhitya Mandral	100%	Good communication, teamwork, and workload distribution.

Notes:

- 100% allocated to each member means equal marks for everyone.
- 80% for an individual member means the member will get 80% of the mark for the proposal/final paper. For example, if the mark for the final paper is 50, the member will get 50*80% = 40 for the final paper.

Signature team member 1: Jan Straka

Signature team member 2: Théo Lebrun

Signature team member 3: Singh Aadhitya Mandral

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