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The Effect of Politics-Policy and ESG Ratings on International Stock Returns

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Abstract

First and foremost, our study provides evidence of a relationship between a country's returns and its Politics-Policy ratings. We document that the univariate spread portfolio that is long on the low politics (policy) portfolio and short on the high politics (policy) portfolio generates a statistically significant return of 6.77% (6.50%). We identify a global political risk factor, the P-factor, that produces a statistically significant return of 10.22%. This P-factor captures common systematic variation across countries leading to priced global political risk. We demonstrate that the P-factor is priced in the market with a risk premium of 7.24% for the unit exposure to the P-factor risk. Second, we investigate the relationship between a country's returns and its ESG rating. We do not find any statistically significant relationships, in the spread portfolios, over the whole sample that covers 1995-2019. Still, we are able to find a relationship between country returns and ESG ratings after controlling for country characteristics. However, from 2000 to 2010, we do find a number of statistically significant relationships in the spread portfolios. In particular, over this period, the return on the portfolio of the low-rated countries was statistically significantly higher than the return on the portfolio of the high-rated countries. We show that an improvement in ESG ratings negatively impacts a country's stock market returns. Our results also suggest that high Policy-Politics ratings tend to cause high ESG ratings. Further, we document that the country's ESG rating affects the country's GDP growth rate and vice versa. Then, we find that the spread portfolio of High political risk countries generates a positive and statistically significant return. Finally, we demonstrate that countries that improve (worsen) their ESG ratings tend to produce higher (lower) returns.

Key words: political uncertainty, policy uncertainty, international equities, asset pricing, ESG rating

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Chapter 1

Introduction

Through direct investment in the stock market or pension plans, most individuals are exposed to fluctuations in the stock market. Arguably, both politics and policy uncertainty are affecting the world economy (Baker, Bloom, and Davis (2016)) and financial markets (Pastor and Veronesi (2012)). However, commonly known asset pricing models do not account for the politics and policy risk factors. As these factors play a role in everyday life of citizens and, ultimately, their well-being through their investment in pension plans, there appears to be a gap in understanding how these factors play out in the financial markets. Fortunately, in recent years, economists have started to bridge the gap between the fields of political science and finance. Moreover, the world has opened the doors for "green"-investing, or ESG investing. This approach incorporates environmental, social, and governance factors into decisions throughout the investment life cycle. Sustainable investments have become an integral part of the Norwegian Wealth Fund's strategy for long-term investment and are primarily in place to reduce the fund's exposure to excess risks.

The goal of this master thesis is twofold. First, we replicate the empirical study by Gala, Pagliardi, and Zenios (2020) using a dataset that covers a more extended historical period. In this part, we identify a global political risk factor, P-factor, that carries a significant risk premium. This factor captures common systematic variation across countries leading to priced global political risk. In particular, we demonstrate that the P-factor is priced in the market with a risk premium of 7.24% for the unit exposure to the P-factor risk. Second, using the same methodology as well as the methodology in the book by Murray, Engle, and Bali (2016), we extend the study by creating an ESG risk factor. This factor, however, does not appear to be priced in the market. Despite this, we document a statistically significant return on univariate-sorted spread portfolios over the period from 2000 to 2010. Besides, we establish a number of important and statistically significant relationships between the ESG ratings and stock market returns, Politics-Policy ratings, and GDP growth rates. A closer look at the period from 2000 to 2010 allows us to draw some interesting conclusions.

To construct the P-factor, we have to recognize two distinct yet interrelated dimensions of uncertainty in the market: the instability of a federal government, such as electoral risk, and uncertainty about its economic policies, that is, policy risk. Elections in a country can resolve or create political instability, and the outcomes usually dictate the direction of the policy in the country. To proxy both politics and policy, we use novel survey-based measures from the Ifo World Economic Survey, in which both politics and policy ratings are provided for 42 countries starting in 1992. We find that both politics and policy have a positive risk premium in international stock market returns. These results confirm the study of Kelly, Pastor, and Veronesi (2016a) that showed that political uncertainty is an important determinant of stock market returns. The paper distinguishes between politics and policy as there is uncertainty about who will be elected and which government policy will be chosen. Both politics and policy steer a country towards a goal by producing guidelines and structure for issues on their agendas. If a country were to receive low politics and policy ratings, it would suggest instabilities and that it is more difficult to enforce regulations. In addition, it would be highly anticipated that the government's focus is on creating stability.

First, we document that the univariate spread portfolio that is long on the low politics (policy) portfolio and short on the high politics (policy) portfolio generates a statistically significant return of 6.77% (6.50%). Further, the bivariate spread portfolio (P-factor portfolio) that is long on the low politics-policy portfolio and short on the high politics-policy portfolio generates a statistically significant return of 10.22%. Second, we demonstrate that politics-policy portfolios share a strong factor structure, with the first two principal components of these portfolio returns accounting for more than 74% of their variation. Third, various asset pricing tests confirm that the politics, policy, and P-factor risks are priced in the cross-section of international stock returns. Forth, we find that all spread portfolios generate a statistically significant abnormal return (alpha) in various asset pricing models. Fifth, we show that the GRS test (Gibbons, Ross, and Shanken (1989)) applied to both univariate and bivariate sorted portfolios augmented with the P-factor cannot reject the null hypothesis that all pricing errors are jointly zero.

In the second part of our thesis, we extend the study by Gala et al. (2020) by using the ESG country ratings instead of the politics-policy ratings. It is commonly assumed that an ESG rating affects the stock returns. We use the Notre-Dame index, which splits the ESG rating into six different indicators, constructing our leading ESG indicator - the Gain rating. The other five components of this indicator are Vulnerability, Economic, Readiness, Social, and Government indicators (ratings). We use the same methodology as in the first part. Specifically, we construct univariate sorted portfolios and investigate the spread (Low-High) portfolio return. Unfortunately, using the data over the total sample that covers 1995-2019, we do not find evidence that the return on the spread portfolios is statistically significantly different from zero. Still, we are able to find a relationship between country returns and ESG ratings after controlling for country characteristics. However, we do find evidence that the spread portfolios generated abnormal returns from 2000 to 2010. In particular, over this period, the return on the portfolio of the low-rated countries was statistically significantly higher than the return on the portfolio of the high-rated countries. This finding confirms that the ESG ratings could predict the excess returns in the countries in this specific period.

Further, we find that an improvement in ESG ratings negatively impacts a country's stock market returns. This result is robust after controlling for country-specific variables. We also document that high Policy-Politics ratings tend to cause high ESG ratings. Another interesting result is the evidence of bi-directional Granger causality between ESG ratings and GDP growth rates. On the one hand, we find that an increased ESG rating causes the GDP growth rate to decrease. On the other hand, we demonstrate that an increased GDP growth rate causes the ESG rating to decrease.

Finally, we take a closer look at the relationship between the ESG ratings and other macroeconomic variables over the period from 2000 to 2010. First, we construct univariate sorted portfolios for Developed and Emerging countries separately. We do not find significant results in this study. Yet, our results suggest that the return on the spread portfolio of Developed (Emerging) countries tends to be negative (positive). Second, we construct univariate sorted portfolios separately for the Low political and High political risk countries. We find that the spread portfolio of High political risk countries generates a positive and statistically significant return. Third and last, we investigate how the change in the ESG ratings affects the returns. We find that countries that improve (worsen) their ESG ratings tend to produce higher (lower) returns. We conclude that the main drivers of the relationship between the ESG ratings and international stock market returns are the Emerging, High-risk countries that most improved their ESG ratings.

The rest of the thesis is organized as follows. Subsequent Chapter 2 reviews the relevant literature. Chapter 3 presents the data used in our studies. Chapter 4 investigates the relationship between the Politics-Policy ratings and international stock returns, while Chapter 5 studies the relationship between the ESG ratings and international stock returns. Finally, Chapter 6 draws the conclusions.

Chapter 2

Literature Review

There is a growing literature related to the effects of both political and policy uncertainty on stock returns. Early evidence of political effects in stock markets was documented by Bittlingmayer (1998). More recent articles that document the existence of risk premium for political and policy uncertainty are Brogaard, Dai, Ngo, and Zhang (2020), Kelly, Pastor, and Veronesi (2016b), Liu, Shu, and Wei (2017), and Pastor and Veronesi (2012). A number of studies use political cycles to study the effect of political uncertainty. These studies include Boutchkova, Doshi, Durnev, and Molchanov (2012) and Leblang and Mukherjee (2005). Several studies use political cycles to identify the impact government policies on asset prices (see Belo, Gala, and Li (2013) and Santa-Clara and Valkanov (2003)).

Recently, Gala et al. (2020) have documented predictable variation in stock market returns across countries using novel measures of politics-policy uncertainty. They identified a global political risk factor (P-factor) commanding a risk premium of 11% per annum. The authors found that countries with high politics-policy uncertainty co-vary positively with the P-factor, thus earning higher average returns. When they augmented the global market portfolio with the P-factor, this combination significantly reduces pricing errors and improves cross-sectional fit. In our thesis, we replicate most of the study in this paper, and, by and large, our results agree with the results obtained by Gala et al. (2020).

Following North (1990) idea of separating political uncertainty into two dimensions, we use a survey-based dataset that separates the analysis of politics from policy to establish, empirically, that both dimensions matter in the financial markets. Merging the two datasets of political and policy uncertainty may entail data loss. For example, a country might have the same policy no matter who wins the elections. This situation has been seen during German and Italian elections compared to Greece from 2011 to 2019, in which they implemented a fiscal adjustment program under a three-way government between the liberals, liberal-socialists, and radical left. These examples and many more suggest that one may need to account for both dimensions in order to help identify the impact of each of those on the financial markets.

There is also a growing literature related to the effects of ESG ratings on stock returns. Theoretically, the sign of the relationship is not clear. On the one hand, according to a risk story, high ESG firms should have lower expected returns because they are less risky. On the other hand, according to a cash-flow story, high ESG firms could have higher returns because their high scores in ESG help them be more competitive and efficient. A priori, we cannot know which effect dominates.

A recent study by Glossner (2021) showed that a low ESG rating is connected with lower stock returns. The study investigates the price of ignoring ESG risk on portfolio performance and finds a negative excess return of 3.5% for the portfolio of stocks that perform worse on ESG than others. Since ESG is not anything physical, it can be viewed as an intangible asset representing a particular risk factor. Then, investing in highly rated ESG assets should yield a return that cannot be explained by market efficiency. Examples of abnormal returns on intangibles are documented by Chan, Lakonishok, and Sougiannis (2001) where they found out that Research and Development (henceforth, R&D) firms earned abnormal returns in the time between 1975 and 1995. In particular, Chan et al. (2001) found that the firms with high R&D to equity market value produced large excess returns. Their theory was that accounting rules allowed these R&D investments to be expensed rather than accounted for on the balance sheets as intangibles. The results of these studies can be interpreted as ESG is not a risk factor. If ESG is a risk factor, the results should be the opposite. Lower ESG ratings should be associated with higher expected returns, as firms with low ESG ratings should have lower prices in the market and hence higher expected returns.

Another study conducted by Edmans (2011) concluded that companies with higher employee satisfaction earned an annual four-factor alpha of 3.5% between 1984 and 2009. Apparently, this paper is not proposing purely "a risk story", but it investigates the cash-flow channel too. Firms with high ESG ratings may have higher returns because their cash-flows are higher thanks to the high ESG characteristics. Recent empirical evidence by Pastor, Stambaugh, and Taylor (2020) shows that investors are willing to pay more for greener firms, thus lowering the cost of capital of the firm. According to this theory, investors should be willing to invest more in ESG-friendly countries because these countries generate higher returns. A recent study by Pedersen, Fitzgibbons, and Pomorski (2020) presents a theoretical model that bridges the gap between those that found that ESG ratings hurt the stock performance and those that come to the opposite conclusion that ESG generates a positive abnormal return (see Gompers, Ishii, and Metrick (2003) and Edmans (2011)).

The results of our study support the idea that ESG is a risk factor. Specifically, we find that countries with low ESG ratings produce higher returns than the countries with high ESG ratings. In addition, we find that low ESG-rated countries also have higher GDP growth and vice versa, creating a bi-directional Granger causality effect. Countries with higher GDP growth can possibly utilize these cash flows to increase their ESG rating and, further on from this, create more cash flows as investors are pooling into those assets. When the country reaches stability, the GDP growth is reduced, and the ESG rating rises.

ESG ratings are used to screen investments in, for example, the Norwegian Wealth Fund. This procedure can, in turn, create a demand shock for some assets. Merton (1987) argued that if investors neglect some specific assets, it could harm the possible risk-reward ratio for the investor should all assets be available for investing. Hong and Kacperczyk (2009) provided evidence for the effects of social norms on markets by studying "sin" stocks: publicly traded companies involved in producing alcohol, tobacco, and gaming. These stocks typically have low demand, which creates abnormal returns. Specifically, Hong and Kacperczyk (2009) found that "sin" stocks generated an annual four-factor alpha of 3.7% between 1926 and 2006 relative to comparable industries. This finding indicates that the effect of ESG on stock returns is not trivial.

There is a number of papers that study ESG rating disagreement and stock returns, see Brandon, Krueger, and Schmidt (2021) and Dimson, Marsh, and Staunton (2020). These studies found that stock returns are positively related to ESG rating disagreement, suggesting a risk premium for firms with higher ESG rating disagreement. The relationship is primarily driven by disagreement about the environmental dimension.

Only a few studies attempt to bridge the gap between Politics-Policy ratings and ESG ratings. A study done by Limkriangkrai, Koh, and Durand (2017) investigates the relationship between the ESG ratings and financial policy in Australia. The paper only studies one country and concludes that there is no significant difference in risk-adjusted returns for portfolios based on ESG ratings. Our study generalizes this finding by looking at global ESG risk. We arrive at the same conclusion: there is no significant difference between portfolios formed on different ESG ratings. However, we study this effect on a country level instead of a firm level.

Overall, we conclude that the investigation of the relationship between Politics-Policy ratings or ESG ratings and international stock returns represents an exciting research area. We aim to replicate and extend the existing studies with the goal of providing a new contribution to this strand of literature.

Chapter 3

Data

3.1 Politics and Policy Data

Our source of data for politics and policy is from the Ifo World Economic Survey (henceforth, WES), provided by our supervisor. The survey is conducted by the Ifo Institute for Economic Research in Munich in cooperation with the International Chamber of Commerce and has received financial support from the European Commission. This survey focuses on qualitative information and assesses the country's general economic situation based on key indicators. This survey fits our study as it assesses the political climate across countries. This feature also allows us to study the relationship between politics and policy as the same pool of experts provides answers to these two different areas. We use the data from 42 countries spanning the period from 1992 to 2019, with the results being announced in May and November of each year. The 42 countries represent an equal mix of both developed and emerging markets.

Politics ratings are ranked from 1 to 9 until 2016 and from 0 to 100 after 2016. Policy ratings are ranked from 0 to 100 in the whole period. For both indicators, the higher the number, the higher the confidence in governmental policy and politics from the experts' point of view. Table 3.1 reports the mean and standard deviation of politics and policy ratings, as well as the country rankings, from the WES. The table also reports the overall mean, standard deviation, and rank for the politics and policy ratings.

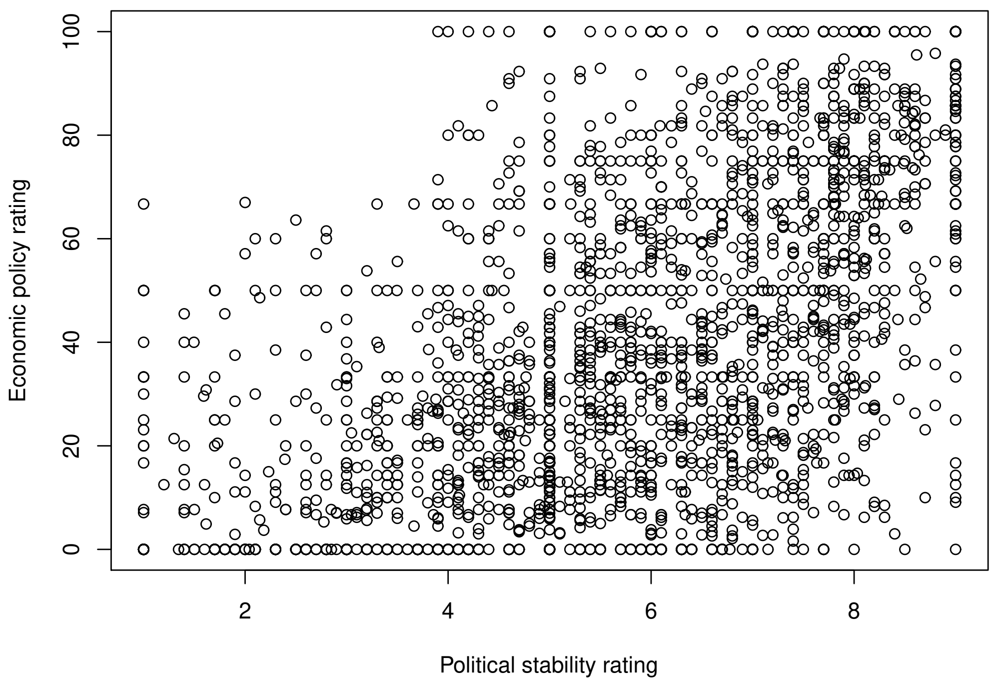
Table 3.1: **Summary statistics of politics and policy**

	Politics			**Policy**		
	Mean	StDev	Rank	Mean	StDev	Rank
Australia	7.11	1.24	9	51.46	27.35	12
Austria	7.68	0.78	4	51.52	22.52	11
Belgium	5.84	1.44	20	42.90	22.53	15
Brazil	4.62	1.80	31	32.26	23.29	26
Canada	6.69	1.43	14	67.25	23.38	4
Chile	7.04	1.16	10	62.17	31.73	8
China	5.55	1.17	24	63.27	22.07	7
Colombia	4.40	1.64	34	42.23	23.51	16
Czech Republic	5.13	1.73	26	35.54	28.04	23
Denmark	7.53	1.04	5	67.78	25.29	2
Egypt	4.17	1.70	37	14.04	17.06	41
Finland	7.97	0.77	2	60.99	30.90	9
France	6.67	1.23	15	31.37	23.23	27
Germany	7.42	0.53	6	34.01	24.08	25
Greece	6.11	2.27	18	28.63	30.67	30
Hong Kong	5.71	1.20	23	29.79	23.00	28
Hungary	5.76	1.42	22	17.98	16.45	38
India	4.73	1.84	30	38.61	24.89	21
Ireland	7.19	0.99	8	63.55	33.23	6
Israel	4.13	1.92	38	29.14	23.31	29
Italy	3.91	1.31	39	15.03	12.92	40
Japan	6.03	1.10	19	22.06	17.87	36
Malaysia	5.36	1.61	25	43.72	33.06	14
Mexico	4.73	1.16	29	24.78	22.54	33
Netherlands	7.40	1.11	7	65.24	24.64	5
New Zealand	6.41	1.25	17	48.62	29.65	13
Norway	7.71	1.18	3	74.99	26.08	1
Peru	3.65	1.41	41	39.74	22.62	19
Philippines	4.47	1.70	32	36.28	32.66	22
Poland	4.82	1.47	28	26.20	19.44	31
Portugal	6.95	1.55	12	40.39	28.09	18
Russia	4.29	1.88	36	15.74	13.19	39
South Africa	4.37	1.50	35	25.87	21.84	32
South Korea	5.10	1.11	27	22.78	18.96	35
Spain	5.77	1.82	21	38.82	27.88	20
Sweden	6.72	1.17	13	54.17	28.34	10
Switzerland	8.01	0.76	1	67.72	19.59	3
Taiwan	4.47	1.49	33	8.38	13.73	42
Thailand	3.40	1.49	42	21.70	22.50	37
Turkey	3.88	1.49	40	23.33	21.60	34
UK	6.56	1.77	16	41.31	29.90	17
US	6.98	1.18	11	35.10	25.94	24
Means	5.77	1.38		39.44	24.04	

Notes: This table reports the mean and standard deviation of politics and policy ratings, together with the country rankings, from Ifo World Economic Survey. The sample spans 1992-2019.

We observe substantial differences in both policy and politics across countries. The average politics range is from 3.4 to 8.01, and the average range for policy is from 8.38 to 74.99. There are also significant variabilities over time, with an average standard deviation of 1.38 around the mean of 5.77 and 24.04 around the mean of 49.44 for politics and policy, respectively. Based on policy, Norway and Denmark are the top performers, while Egypt and Taiwan are the worst performers. From politics, Switzerland and Finland are the top performers, while Thailand and Peru are the worst performers. Politics and policy do not move in tandem, as evident from Figure 3.1, resulting in some cases where countries rank over the median on policy and under the median on politics and visa versa. This observation is not isolated, and it is apparent that it happens rather often.

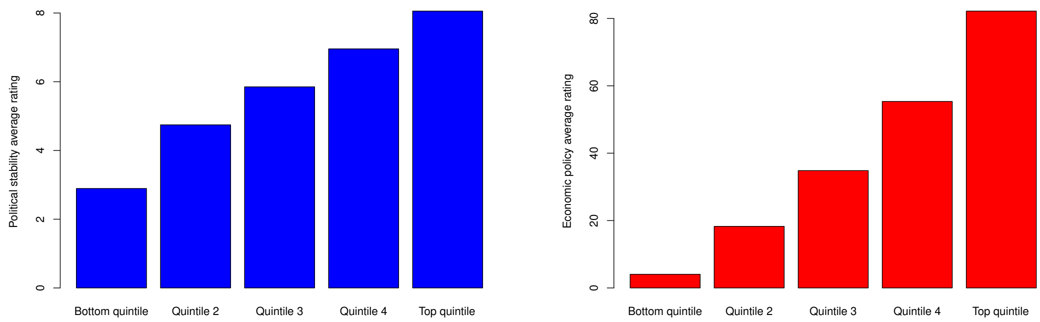
Figure 3.1: **Politics and policy ratings**



Notes: This figure shows the ratings of political stability and confidence in economic policy for 42 countries during 1992-2019 from the Ifo World Economic Survey.

Figure 3.2 plots the distribution of politics-policy ratings and divides them into quantiles. At each point in time where the data from WES is known, we allocate each country in their respective quantile based on both politics and policy rating before we compute the average of the rating. This procedure allows us to view the cross-country variation between the different quantiles. We document a large spread between the top and bottom quintiles for both policy and politics. The politics spread is 5.16/8, and the policy spread is 78.13/100. This variation in policy-politics spreads highlights the cross-country variation in the ratings.

Figure 3.2: **Empirical distribution of politics and policy**



Notes: This figure plots the empirical distribution of the average political stability ratings (left panel) and confidence in economic policy ratings (right panel) for 42 countries.

3.2 Financial Data

We gather data for each of the 42 countries in our sample. This data includes country's returns, global market returns, and returns on risk factors used for asset pricing models. We use Datastream to find MSCI Global Market Indicies (Investable) in USD, including dividends. The International market portfolio is the MSCI All Countries World index measured in USD. The stock market returns are computed using the MSCI Global Market Indicies. The risk factors for the Fama-French 5-factor model, as well as for the International Carhart model, are downloaded from Kenneth French Website - developed countries[1]. Moreover, we download data for asset pricing tests such as World CAPM (WCAPM) and Betting against Beta (BAB) from the AQR website[2].

Table 3.2 reports the descriptive statistics of returns: mean returns and standard deviations. The table also reports the overall mean and standard deviation. To visualize the risk-return relationship, Figure 3.3 plots the countries' mean returns versus standard deviations. The dots in the figure suggest a positive relationship between the standard deviation of returns (risk measure) and mean returns. For example, Russia has the largest mean return with the second-largest standard deviation of returns. On the other hand, Japan has the second-lowest mean return and the third-lowest standard deviation of returns. There are some apparent exceptions from the positive risk-return relationship. For example, Greece has the lowest mean return, while the standard deviation of its returns is close to the overall average standard deviation.

[1] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
[2] https://www.aqr.com/Insights/Datasets?&page=2#filtered-list

Table 3.2: **Descriptive statistics of returns**

	Country	Mean return	Standard deviation
1	AUSTRALIA	10.60	19.86
2	AUSTRIA	6.34	24.21
3	BELGIUM	8.78	19.79
4	BRAZIL	19.14	38.02
5	CANADA	9.92	18.95
6	CHILE	9.45	23.42
7	CHINA	7.02	32.59
8	COLOMBIA	15.26	30.32
9	CZECH REPUBLIC	12.33	26.78
10	DENMARK	12.15	19.12
11	EGYPT	16.41	32.11
12	FINLAND	15.88	30.25
13	FRANCE	9.35	19.18
14	GERMANY	9.44	21.41
15	GREECE	1.14	35.04
16	HONG KONG	12.23	24.53
17	HUNGARY	16.86	34.89
18	INDIA	12.12	28.29
19	IRELAND	5.75	21.03
20	ISRAEL	7.22	22.68
21	ITALY	7.55	24.08
22	JAPAN	3.79	18.36
23	MALAYSIA	8.30	26.61
24	MEXICO	11.21	27.73
25	NETHERLANDS	10.79	18.94
26	NEW ZEALAND	11.42	21.43
27	NORWAY	10.74	24.79
28	PERU	17.77	29.67
29	PHILIPPINES	9.14	28.37
30	POLAND	17.82	43.47
31	PORTUGAL	6.58	21.80
32	RUSSIA	22.93	48.28
33	SOUTH AFRICA	12.28	26.06
34	SOUTH KOREA	12.56	35.00
35	SPAIN	10.16	23.45
36	SWEDEN	13.04	24.32
37	SWITZERLAND	11.70	15.85
38	TAIWAN	9.19	27.88
39	THAILAND	11.34	34.79
40	TURKEY	16.94	49.37
41	UK	7.35	15.44
42	US	10.43	14.08
	Average	11.20	26.72

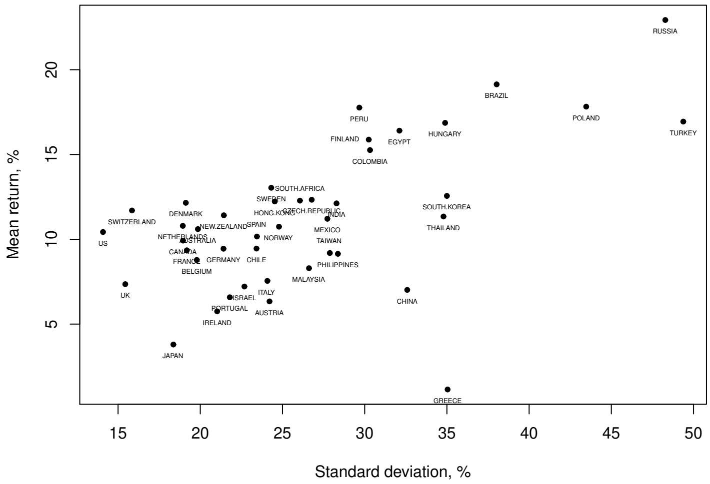
Mean returns and standard deviations are annualized and reported in percentages. The sample spans 1992-2019.

3.3 ESG Country Data

The data for ESG ratings are retrieved from the Notre Dame Global Adaptation Initiative (ND-GAIN) Country Index [3] (henceforth, ND-GAIN Index), which is settled in the Climate Change Adaptation Program of the University of Notre Dame's Environ-

[3] `https://gain.nd.edu/our-work/country-index/`

Figure 3.3: **Risk-return relationship**



Note: Mean returns and standard deviations are annualized and reported in percentages. The sample spans 1992-2019.

mental Change Initiative and was formerly settled in the Global Adaptation Institute in Washington, D.C. The experts affiliated with the universities satisfy professional and competence requirements, and the diversity of universities connected to the research diminishes conflicts of interest and induces reliability.

ND-GAIN is a free open-source index that gives a rating to a country's vulnerability and readiness to react to climate disruptions (Chen, Noble, Hellmann, Coffee, Murillo, and Chawla (2015)). Incorporating 74 variables to form 45 core indicators, the experts have built two factors, Vulnerability and Readiness, that compose the ND-GAIN factor (henceforth, Gain). Gain is rated between 0-100 where higher is better, Vulnerability is rated between 0-1 where lower is better, and Readiness is rated between 0-1 where higher is better. We have extracted ratings that cover the period between 1995-2019 for 40 countries that match the data from the policy-politics study. The ratings come out at an annual frequency, implying that we have 25 observations in our data set.

In addition to Gain, Vulnerability, and Readiness, we use three out of nine indicators that compose Readiness because they produce interesting results. The three indicators are Economic, Governance, and Social, which are key parameters in ESG. That is, totally we use the following 6 indicators:

1. Gain (ND-GAIN factor)

2. Vulnerability

3. Readiness

4. Economic

5. Governance

6. Social

Our main indicator Gain is composed of the indicators Vulnerability and Readiness, which are built on a dataset of smaller indicators. Vulnerability addresses a country's predisposition to be impacted by climate hazards negatively. By looking at six life-supporting sectors: health, water, food, human habitat, ecosystem services, and infrastructure, it evaluates each sector's exposure, sensitivity, and adaptive capacity to climate hazards. Each sector consists of six indicators that all together compose the Vulnerability rating.

Readiness addresses a country's ability to efficiently use investments for adaptive actions, with an appreciation for a healthy business environment. Recollecting the composition of Readiness, we have three components. Economic Readiness, assess the climate in which deploy private investments. Governance Readiness, evaluate the public structure and stability that support private investments through facilitation and reassurance. Finally, Social Readiness rates the conditions that support a society in utilizing the invested capital to maximize the return.

3.4 Economic Country Data

We retrieve risk-free interest rates, unemployment rates, and real GDP growth rates as control variables. We use risk-free interest rates from Oxford Economics and unemployment rates from Refinitiv Datastream.

The real GDP growth rates are computed using GDP data. We use OECD Main Economic Indicators as the main source. If this main source does not have data for some countries, we use Oxford Economics to fill in the gaps. The data are seasonally adjusted and on a quarterly basis. The data are retrieved from Refinitiv Datastream. The GDP growth rate for country i is computed as

$$GDPG_{i,t} = \frac{GDP_{i,t} - GDP_{i,t-1}}{GDP_{i,t-1}}, \tag{3.1}$$

where $GDP_{i,t}$ and $GDP_{i,t-1}$ are the GDP at times t and $t-1$, respectively.

Chapter 4

Politics-Policy Ratings and International Stock Returns

This chapter presents our results for the relationship between the Politics-Policy ratings and international stock market returns. We identify a global political risk factor, the P-factor, that produces a statistically significant return. This P-factor captures common systematic variation across countries leading to global political risk. We demonstrate that the P-factor is priced in the market with a substantial risk premium.

4.1 Policy-Politics Portfolio Returns

We analyze the relationship between the Politics-Policy ratings and international stock market returns in order to compare market returns of countries with different Politics-Policy ratings. We create various portfolios that are rebalanced semi-annually because the WES data are provided semi-annually. Yet, the stock market returns come at a monthly frequency; thus, portfolio returns also come at a monthly frequency.

We create univariate-sorted portfolios and denote them P1(H), P2, P3, and P4(L), where H (high) and L (Low) are the top and bottom quantile portfolios, respectively. This means that we need three breakpoints that are created based on percentiles. Our split is 20% in H, 30% in both P2 and P3, and lastly, 20% in the bottom portfolio, L. The breakpoints are the same for each time period analyzed. Moreover, we also create the spread portfolio (L-H), representing the difference between the returns on the portfolio of countries with the lowest ratings and those with the highest ratings.

The bivariate analysis is similar to that of the univariate, except that there are two sorting variables instead of one in the bivariate analysis. In the bivariate method, we use two sets of breakpoints. The first set of breakpoints corresponds to values of the first sort variable, Policy, and the second set of breakpoints corresponds to Politics rating. The bivariate sort is in terciles (33%, 33%, and 33%), sorting first by the less volatile Politics ratings and then by the more volatile Policy ratings. This portfolio analysis allows us to assess the cross-sectional relations between Politics and Policy. Totally, we create nine portfolios for the bivariate case. Besides, we also create the spread portfolio (LL-HH), representing the difference between the returns on the portfolio of countries with the lowest Politics-Policy ratings and those with the highest Politics-Policy ratings. Therefore, we work with a total of 17 portfolios plus 3 spread portfolios.

Table 4.1 reports the average annualized returns of the univariate sort of both politics and policy, as well as the bivariate sort based on politics-policy ratings. We observe that the low-rated politics portfolio outperforms the high-rated portfolio by 6.77% p.a., and the low-rated policy portfolio outperforms the high-rated policy portfolio by 6.50% p.a. The returns on each spread portfolio are highly statistically significant. The Sharpe ratio is 0.47 and 0.48 for the policy and politics spread portfolio, respectively. The bivariate spread portfolio, which is long on the low-rated politics-policy and short on the high-rated politics-policy, generates a return of 10.22% with strong statistical significance and a Sharpe ratio of 0.49. Table 4.2 reports the average number of countries in politics-, policy-, and politics-policy portfolios.

These results document the impact that politics, as well as policy, have on market returns. We observe a clear pattern that low-rated portfolios have higher returns than high-rated ones.

4.2 Fama-MacBetch Cross-Sectional Regressions

We have until now provided preliminary evidence that the Politics-Policy ratings are able to predict the cross-section of international stock market returns. To further identify the marginal predictive power of these ratings and to evaluate the risk premia, we turn to Fama and MacBeth (1973) regressions of future country returns on both politics and policy.

Specifically, we run Fama-MacBeth cross-sectional predictive regressions of country returns on the lagged (last available) policy and politics ratings. When we regress on

Table 4.1: **Average returns of politics-policy portfolios**

(a) Univariate sort

	Policy	Politics
P1 (H)	8.42*	8.41*
	(0.04)	(0.03)
P2	9.27*	10.69*
	(0.02)	(0.01)
P3	11.87*	10.33*
	(0.00)	(0.02)
P4 (L)	14.92*	15.18*
	(0.00)	(0.00)
L-H	6.50*	6.77*
	(0.02)	(0.02)
Sharpe ratio	0.47	0.48

(b) Bivariate sort

	Policy		
Politics	H	M	L
H	6.94*	9.41*	9.68*
	(0.09)	(0.02)	(0.01)
M	9.30*	10.16*	12.44*
	(0.02)	(0.01)	(0.00)
L	13.01*	11.73*	17.17*
	(0.01)	(0.03)	(0.00)
LL-HH	10.22*		
	(0.02)		
Sharpe ratio	0.49		

This table reports annualized average returns for both univariate and bivariate sorted portfolios. In the univariate case, the first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. "L-H" refers to the low minus high spread portfolios. In the bivariate case, the portfolios are split between "H", "M", and "L" which refers to high, mid, and low terciles along each of the two dimensions in policy and politics, respectively. "LL-HH" refers to the low-low minus high-high portfolio spread. Portfolios are rebalanced semi-annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 1992-2019.

only one rating, we run the following regression T times over all countries

$$r_{i,t} - r_{f,t} = \lambda_{0,t} + \lambda_{1,t} R_{i,t-1} + \varepsilon_t, \quad t \in [1, T], \tag{4.1}$$

where T is the number of return observations, $r_{i,t} - r_{f,t}$ is the time t excess return on country $i \in [1, 42]$, and $R_{i,t-1}$ is the country i last available rating. As a result, we have vector λ_1 of size T. We estimate the mean value of λ_1

$$\bar{\lambda}_1 = \frac{1}{T} \sum_{t=1}^{T} \lambda_{1,t}. \tag{4.2}$$

Subsequently, we test the following null hypothesis. If the ratings do not influence returns, then the average slope coefficient must be zero.

$$H_0 : \lambda_1 = 0 \text{ vs } H_A : \lambda_1 \neq 0. \tag{4.3}$$

The standard errors of estimation of $\bar{\lambda}_1$ are computed using the Newey-West methodology.

Table 4.2: **Average number of countries in politics-policy portfolios**

(a) Univariate sort

	Policy	Politics
P1 (H)	8.44	8.46
P2	12.54	13.02
P3	12.02	11.82
P4 (L)	8.33	8.20

(b) Bivariate sort

	Policy		
Politics	H	M	L
H	4.20	4.93	3.29
M	4.60	6.96	5.35
L	3.49	5.04	3.42

This table reports the average number of countries in the univariate and bivariate sorted portfolios. In the univariate case, the first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. In the bivariate case, the portfolios are split between "H", "M" and "L" which refers to high, mid and low terciles along each of the two dimensions in policy and politics, respectively. Portfolios are rebalanced semi-annually.

When we regress on two ratings, in principle, we want to run the following regression

$$r_{i,t} - r_{f,t} = \lambda_0 + \lambda_1 R^{plc}_{i,t-1} + \lambda_2 R^{plt}_{i,t-1} + \varepsilon_t, \quad t \in [1, T], \tag{4.4}$$

where, for example, $R^{plc}_{i,t-1}$ is the country i last available policy rating. The problem is that $R^{plc}_{i,t-1}$ and $R^{plt}_{i,t-1}$ are correlated and, thus, there is a collinearity problem. To avoid this issue, we orthogonalize the ratings. To this end, we run the following regression

$$R^{plt}_t = a + bR^{plc}_t + e^{plt}_t. \tag{4.5}$$

In this case, R^{plc}_t and the residuals e^{plt}_t are orthogonal. The orthogonal version of the politics rating is given by $R^{plt*}_t = e^{plt}_t$. Therefore, when we regress on two ratings, we run

$$r_{i,t} - r_{f,t} = \lambda_0 + \lambda_1 R^{plc}_{i,t-1} + \lambda_2 R^{plt*}_{i,t-1} + \varepsilon_t, \quad t \in [1, T]. \tag{4.6}$$

Subsequently, we compute $\bar{\lambda}_1$ and $\bar{\lambda}_2$ and conduct the test of the null hypotheses that each lambda equals zero.

Table 4.3 reports the results where regression (1) includes only Policy ratings, regression (2) includes only Politics ratings, and, lastly, regression (3) includes both Politics and Policy. Note that the country ratings change semi-annually. Therefore, all regressions in this section are predictive regressions where the ratings predict the country's returns for 6 months ahead.

We observe statistically significant slope coefficients in all three cases, which confirms our preliminary evidence of predictability power in the cross-section of country returns by politics and policy ratings. We here notice the same patterns as our portfolio sorts that a negative coefficient denotes evidence that high Politics- or Policy-rated

Table 4.3: **Fama-MacBetch cross-sectional regressions**

	(1)	(2)	(3)
Policy	-0.33*		-0.33*
	(0.02)		(0.02)
Politics		-0.64*	-0.52*
		(0.02)	(0.11)
R^2	0.03	0.03	0.07

This table reports the results of Fama-MacBeth cross-sectional predictive regressions of semi-annual returns on lagged politics and policy ratings for 6-month investment horizons. Regression (1) includes only Policy ratings, regression (2) includes only Politics ratings, and, lastly, regression (3) includes both Politics and Policy. The coefficients are re-scaled by multiplying the original value by 6×10^2.

countries forecast lower future returns. We can interpret this as the marginal increase in future country returns should the country improve its political and policy rating and move upwards to the next quartile.

4.3 Global and Local Asset Pricing Models

In this section, we investigate whether the patterns observed in Table 4.1 can be explained by the existing local and international risk factors. Research done by Solnik (1974), Stulz (1981), Grauer, Litzenberger, and Stehle (1976) and Errunza and Losq (1985) provide evidence that international asset pricing models, such as global market and macroeconomic factors, matter for the pricing of local stocks. However, more recent research shows that local, country-specific components of these factors matter more than their international counterparts. For example, an article by Kewei, Karolyi, and Kho (2011) find that local and global versions of these models provide a lower pricing error than the purely global factors, especially for emerging markets. Thus, to be in line with the debate about global risk factors, we choose to include both global and local risk factors.

Following the international asset pricing literature, we have chosen 5 different asset pricing models described below to see whether these models can explain the cross-sectional variation in our spread portfolios (L-H and LL-HH). By choosing a broad range of models, we minimize the likelihood of having omitted risk factors that could explain the return spreads found in our politics-policy spreads. Should we observe that the patterns are due to abnormal returns referencing to the benchmark models, then this would suggest that the existing models used are missing risk factors that capture the political and policy risks.

In each model, the abnormal returns are estimated as follows:

$$r_{p,t} - r_{f,t} = \alpha + \sum_{j=1}^{K} \beta_{p,j} r^*_{j,t} + \varepsilon_{p,t}, \tag{4.7}$$

where $r_{p,t} - r_{f,t}$ is the excess return on the spread portfolio p at time t, $\beta_{p,j}$ is the risk factor loading, j, on portfolio p, and $r^*_{j,t}$ is the return on risk factor j. α is our measure of abnormal returns. If the portfolio returns can be explained by the asset pricing models that we test, then α should not be statistically significant from 0.

We perform the asset pricing tests using both global and local risk factors. We use the World CAPM, International CAPM, Fama-French 3-factor model, Fama-French and Carhart four-factor model, and Betting against Beta model as our global and local asset pricing models.

First, we review the global asset pricing models. The World CAPM is developed by Harvey (1991) and is specified by:

$$r_{p,t} - r_{f,t} = \alpha + \beta_{MKT} R_{t,MKT} + \varepsilon_t, \tag{4.8}$$

where $R_{t,MKT}$ is the excess market return.

Developed by Dumas and Solnik (1995), the International CAPM model is given by

$$r_{p,t} - r_{f,t} = \alpha + \beta_{MKT} R_{t,MKT} + \beta_{EUR} EUR_t + \beta_{JPY} JPY_t + \beta_{GBP} GBP_t + \varepsilon_t, \tag{4.9}$$

where EUR_t is the log excess currency return on the EUR, JPY_t is the log excess currency return on the JPY, and GBP_t is the log currency excess return on the GBP.

The Fama-French 3-factor model is specified by

$$r_{p,t} - r_{f,t} = \alpha + \beta_{MKT} R_{t,MKT} + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \varepsilon_t, \tag{4.10}$$

where SMB_t is the small minus big Fama-French factor and HML_t is the high minus low Fama-French Factor.

The model by Carhart (1997), also known as the Fama-French-Carhart (FFC) four-factor model is given by

$$r_{p,t} - r_{f,t} = \alpha + \beta_{MKT} R_{t,MKT} + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \beta_{MOM} MOM_t + \varepsilon_t, \tag{4.11}$$

where MOM_t is the Carhart momentum factor.

Developed by Prazzini and Pedersen (2014), the Betting against Beta (henceforth, BAB) model is as follows:

$$r_{p,t} - r_{f,t} = \alpha + \beta_{MKT} R_{t,MKT} + \beta_{BAB} BAB_t + \varepsilon_t, \tag{4.12}$$

where BAB_t is the Betting Against Beta factor.

Next, we turn to review the local asset pricing models. The local factors correspond to 3 regions: Europe, North America, and Pacific. We use only three regions because AQR provides data for only these three regions.

The local version of the World CAPM is given by

$$r_{p,t} - r_{f,t} = \alpha + \beta_{MKTE} R_{t,MKTE} + \beta_{MKTN} R_{t,MKTN} + \beta_{MKTP} R_{t,MKTP} + \varepsilon_t,$$

where $R_{t,MKTE}$, $R_{t,MKTN}$, and $R_{t,MKTP}$ are the excess market returns in Europe, North America, and Pacific regions, respectively.

The local version of the International CAPM adds is similar to the local version of the World CAPM, but it adds the local currency risk factors:

$$\begin{aligned} r_{p,t} - r_{f,t} = \alpha &+ \beta_{MKTE} R_{t,MKTE} + \beta_{MKTN} R_{t,MKTN} + \beta_{MKTP} R_{t,MKTP} \\ &+ \beta_{EUR} EUR_t + \beta_{GBP} GBP_t + \beta_{JPY} JPY_t + \varepsilon_t. \end{aligned}$$

where

The local version of the Fama-French 3-factor model is specified by

$$\begin{aligned} r_{p,t} - r_{f,t} = \alpha &+ \beta_{MKTE} R_{t,MKTE} + \beta_{MKTN} R_{t,MKTN} + \beta_{MKTP} R_{t,MKTP} \\ &+ \beta_{SMBE} SMBE_t + \beta_{SMBN} SMBN_t + \beta_{SMBP} SMBP_t \\ &+ \beta_{HMLE} HMLE_t + \beta_{HMLN} HMLN_t + \beta_{HMLP} HMLP_t + \varepsilon_t, \end{aligned}$$

where $SMBE_t$, $SMBN_t$, and $SMBP_t$ are the small minus big factor returns in Europe, North America, and Pacific regions, respectively. Similarly, $HMLE_t$, $HMLN_t$, and $HMLP_t$ are the high minus low factor returns in Europe, North America, and Pacific regions, respectively.

The local versions of the FFC four-factor model and the BAB models are specified in a similar manner.

Table 4.4: **Abnormal returns, Global asset pricing models**

		WCAPM	ICAPM	FF	FFC	BAB
Politics spread portfolio (L-H)	α	5.85*	5.53*	6.16*	7.68*	7.82*
		(0.03)	(0.04)	(0.01)	(0.00)	(0.00)
	R^2	0.01	0.06	0.03	0.04	0.02
Policy spread portfolio (L-H)	α	6.46*	6.15*	7.09*	7.93*	7.45*
		(0.03)	(0.05)	(0.01)	(0.00)	(0.02)
	R^2	0.00	0.04	0.03	0.03	0.00
Politics-policy spread portfolio (LL-HH)	α	8.98*	8.41*	9.22*	11.43*	9.70*
		(0.03)	(0.04)	(0.02)	(0.01)	(0.01)
	R^2	0.01	0.05	0.03	0.04	0.01

This table reports the average annualized abnormal returns and adjusted R^2 from the time-series regression on policy and politics spread portfolios using global asset pricing models. Assets pricing models include World CAPM (WCAPM), International CAPM (ICAPM), International Fama-French three factor model (FF), Fama-French-Carhard four factor model (FFC) and Betting against beta (BAB) model. Portfolios are rebalanced semi-annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis. Asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 1992-2019.

Table 4.5: **Abnormal returns, Local asset pricing models**

		Local asset pricing models				
		WCAPM	ICAPM	FF3	FFC	BAB
Politics spread portfolio (L-H)	α	6.06*	6.46*	5.78*	7.02*	8.54*
		(0.01)	(0.01)	(0.02)	(0.01)	(0.00)
	R^2	0.04	0.09	0.04	0.05	0.05
Policy spread portfolio (L-H)	α	6.19*	6.46*	5.30*	4.56*	5.76*
		(0.03)	(0.02)	(0.06)	(0.08)	(0.03)
	R^2	0.04	0.05	0.06	0.08	0.06
Politics-policy spread portfolio (LL-HH)	α	9.09*	9.35*	9.05*	10.96*	9.85*
		(0.03)	(0.02)	(0.04)	(0.02)	(0.02)
	R^2	0.04	0.06	0.04	0.05	0.04

This table reports the average annualized abnormal returns and adjusted R^2 from the time-series regression on policy and politics spread portfolios using local asset pricing models. Assets pricing models include World CAPM (WCAPM), International CAPM (ICAPM), International Fama-French three factor model (FF), Fama-French-Carhard four factor model (FFC) and Betting against beta (BAB) model. Portfolios are rebalanced semi-annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis. Asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 1992-2019.

Tables 4.4 and 4.5 report the excess returns of our spread test portfolios. All used asset pricing models reject the null hypothesis that a particular asset pricing model can explain the excess returns of the spread portfolio. Specifically, we have evidence that all abnormal returns are statistically significantly different from zero. From the global asset pricing models, we have excess returns in the range from 6.06% to 8.59% p.a. Furthermore, the abnormal return on the policy spread portfolio is in the range from

6.15% to 7.93% p.a. Additionally, testing the policy-politics bivariate sorted portfolio gives us a statistically significant alpha in the range of from 8.41% to 11.43% p.a. Yet, all adjusted R^2 are below 0.05. Looking at the local models, we get similar results to their global counterparts, with R^2 slightly higher up to 0.09.

The results of these tests allow us to conclude that the known risk premia cannot explain the abnormal return on all spread portfolios. In other words, the abnormal returns on politics and policy spread portfolios are not captured by risk factors proposed in the existing literature. This conclusion also holds true for both global and local factors, meaning that market segmentation is not responsible for the results.

4.4 Global Political Risk Factor

The results reported in the previous sections reveal that the politics-policy portfolios exhibit novel monotonic cross-sections of average returns along one or two dimensions (Table 4.1). Besides, the abnormal return of the spread portfolios is unexplained by the benchmark local and global models (Tables 4.4 and 4.5).

We call the Politics-Policy spread portfolio (LL-HH) the "P-factor". The idea behind the construction of this risk factor is the same as that behind the construction of the SMB and HML Fama-French factors. It is a zero-cost tradeable portfolio, going long on the countries in the bottom terciles of politics and policy and short on the countries in the top terciles of politics and policy. In line with the APT, we interpret the P-factor as mimicking priced global political risk.

Table 4.6 provides a summary statistic of the P-factor and the correlations with the other risk factors. We observe that the P-factor is both economically and statistically significant, with an average return of 8.48 % p.a., and a Sharpe ratio of 0.49. Most importantly, the P-factor has a low correlation with other risk factors; these correlations range from -0.2 to 0.18.

Our next goal is to uncover a common factor structure in country ratings by performing a principal component analysis. Table 4.7 summarizes the results from the principal component analysis of the nine bivariate sorted portfolios. Our results show that 82.3% of the return variability is explained by only two factors. The first factor in our principal component analysis explains 74.7% of the total variation on our politics-policy sorted portfolios. This first factor can be viewed as a common level factor. As we observe from Panel (b) in Table 4.7, all portfolio loadings on the first factor are

Table 4.6: **Summary statistics of the risk factors**

	P-factor	MKT	SMB	HML	WML	EUR	GBP	JPY	BAB
				Factor statistics					
Mean	8.48*	6.52*	-0.23	2.90	7.92*	-1.23	-0.68	-2.41	10.68*
Pvalue	(0.02)	(0.04)	(0.87)	(0.18)	(0.00)	(0.53)	(0.72)	(0.25)	(0.00)
Sharpe	0.49	0.45	-0.04	0.40	0.58	-0.13	-0.07	-0.23	1.08
				Correlations					
P-factor	1.00								
MKT	0.13	1.00							
SMB	0.18	0.18	1.00						
HML	-0.02	-0.16	-0.13	1.00					
MOM	-0.20	-0.33	-0.04	-0.11	1.00				
EUR	0.14	-0.36	-0.08	-0.09	0.10	1.00			
GBP	0.15	-0.34	-0.11	-0.08	0.11	0.63	1.00		
JPY	-0.00	-0.04	-0.00	0.05	-0.00	0.28	0.09	1.00	
BAB	-0.11	-0.25	0.03	0.48	0.34	-0.21	-0.25	-0.06	1.00

This table reports summary statistics of the risk factors of the benchmark models as well as the P-factor. We use the following benchmark factors: MSCI-World excess return (MKT), Small minus big Fama-French factor (SMB), High minus low Fama-French factor (HML), Global momentum, Carhart momentum factor (MOM), log excess return on the EURO, Great British Pound and Japanese Yen (EUR, GBP, JPY) and International betting against beta factor (BAB) OF Franzzini and Pedersen. Returns are in percentages and are denominated in USD, including dividends. Factor averages, as well as Sharpe ratios, are annualized. P-values are Newey-West and are in parenthesis, and the asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 1992-2019.

approximately equal; the loadings vary from 0.29 to 0.4. The first principal component can also be viewed as the world market portfolio because its correlation with the market portfolio amounts to 0.9 (see Panel C). Furthermore, the second principal component explains an additional 8% of the variability in returns. This factor can be viewed as a slope factor for which loadings decrease in a monotonic fashion from low to high politics-policy portfolios and is in line with their average returns. This factor has a correlation of 0.6 with the P-factor. Consequently, this global political risk mimicking portfolio is our P-factor.

4.5 Pricing the Portfolio Sorts

In this section, we examine whether the cross-section of the politics-, policy-, and politics- policy-sorted portfolios can be explained by known asset pricing models. First of all, we check if the World CAPM can explain the cross-section of portfolio returns. Besides, we augment the World CAPM with the P-factor and check whether the new model can explain the cross-section of portfolio returns. In this section, we rely on the

Table 4.7: **Principal component analysis**

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9
(a) Factor eigenvalues									
Proportion of Variance	74.65	7.66	5.39	4.45	2.31	1.66	1.58	1.37	0.94
Cumulative Proportion	74.65	82.30	87.69	92.15	94.45	96.12	97.69	99.06	100
(b) Factor loadings									
LL	0.40	0.81	0.42	-0.03	0.11	-0.01	0.02	0.03	-0.02
LM	0.39	-0.52	0.60	-0.44	-0.05	0.11	-0.02	0.09	-0.09
LH	0.35	-0.25	0.16	0.86	0.11	0.14	0.03	0.09	0.01
ML	0.31	0.03	-0.20	0.05	-0.72	-0.40	0.27	0.24	-0.21
MM	0.32	-0.02	-0.10	-0.03	-0.29	0.11	0.01	-0.68	0.57
MH	0.32	-0.11	-0.17	-0.03	0.37	-0.71	-0.45	-0.10	0.00
HL	0.29	0.03	-0.37	-0.16	0.02	0.32	-0.28	0.62	0.44
HM	0.29	0.05	-0.34	-0.06	-0.05	0.43	-0.34	-0.27	-0.65
HH	0.31	-0.07	-0.33	-0.17	0.48	0.03	0.73	-0.04	-0.06
(c) Correlations									
Market portfolio	0.90	0.03	-0.22	-0.06	-0.03	0.07	-0.06	-0.02	-0.05
P-factor	0.27	0.60	0.58	0.08	-0.19	-0.07	-0.13	0.12	0.05

This table summarizes the results from the principal component analysis of the nine bivariate sorted portfolios. Panel (a) shows the proportion in percentage and cumulative proportion in percentage explained by each principal component. Panel (b) reports the loadings of each principal component. ”H”, ”M”, and ”L” refers to the high, mid, and low terciles along each dimension in the politics-policy sorted portfolios. Panel (c) reports the correlation of each principal component with the global market portfolio as well as the correlation with the P-factor.

GRS test (Gibbons et al. (1989)) explained in the following subsection.

4.5.1 GRS Test

The GRS test is the simplest time-series test of a validity of an asset-pricing model. We explain the methodology of testing using a general exposition. Assume we have N risky assets and $K \geq 1$ risk factors. In the excess return form, the K-factor model

$$R_{i,t} = \alpha_i + \sum_{k=1}^{K} \beta_{i,k} F_{k,t} + \varepsilon_{i,t} \quad i = 1, \ldots, N,$$

where $R_{i,t}$ is the excess return of asset i, and $F_{k,t}$ is the return on factor k. In the matrix form

$$\begin{pmatrix} R_{1,t} \\ R_{2,t} \\ \vdots \\ R_{N,t} \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_N \end{pmatrix} + \begin{pmatrix} \beta_{11} & \beta_{12} & \ldots & \beta_{1K} \\ \beta_{21} & \beta_{22} & \ldots & \beta_{2K} \\ \vdots & \vdots & \ddots & \vdots \\ \beta_{N1} & \beta_{N2} & \ldots & \beta_{NK} \end{pmatrix} \begin{pmatrix} F_{1,t} \\ F_{2,t} \\ \vdots \\ F_{K,t} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \\ \vdots \\ \varepsilon_{N,t} \end{pmatrix}.$$

In matrix notation

$$\mathbf{R}_t = \boldsymbol{\alpha} + \boldsymbol{\beta}\mathbf{F}_t + \varepsilon_t. \tag{4.13}$$

with additional notations and assumptions

$$E[\mathbf{R}_t] = \boldsymbol{\mu}, \quad E[(\mathbf{R}_t - \boldsymbol{\mu})(\mathbf{R}_t - \boldsymbol{\mu})'] = \boldsymbol{\Sigma},$$

$$E[\boldsymbol{\varepsilon}_t] = 0, \quad E[\boldsymbol{\varepsilon}_t \boldsymbol{\varepsilon}_t'] = \boldsymbol{\Omega},$$

$$E[\mathbf{F}_t] = \mathbf{e}, \quad E[(\mathbf{F}_t - \mathbf{e})(\mathbf{F}_t - \mathbf{e})'] = \mathbf{V},$$

$$Cov[F_{kt}, \varepsilon_{jt}] = 0 \text{ for all } k \text{ and } j,$$

where $\mathbf{R}_t$ is an $(N \times 1)$ vector of time-t excess returns for N assets, $\boldsymbol{\alpha}$ is an $(N \times 1)$ vector of the model's pricing errors (the part of the excess returns that is not explained by the factors), $\boldsymbol{\beta}$ is an $(N \times K)$ matrix of factor loadings, $\mathbf{F}_t$ is a $(K \times 1)$ vector of time-t returns on the K factors, and $\boldsymbol{\varepsilon}_t$ is an $(N \times 1)$ vector of time-t disturbance terms.

In an exact factor pricing model, the expected excess returns are fully explained by the included risk factors. In this case, all the elements of the vector $\boldsymbol{\alpha}$ are equal to zero. To find out whether some proposed K factors can explain the expected excess returns on N assets, one first estimates the model given by (4.13) and then tests whether all the pricing errors are jointly equal to zero (formally one tests $H_0 : \boldsymbol{\alpha} = 0$). To perform this test, one computes the following GRS statistics

$$GRS = \frac{\hat{\boldsymbol{\alpha}}'\hat{\boldsymbol{\Omega}}^{-1}\hat{\boldsymbol{\alpha}}}{1 + \hat{\mathbf{e}}'\hat{\mathbf{V}}^{-1}\hat{\mathbf{e}}} \left(\frac{T - N - K}{N} \right) \sim F_{N,T-N-K}, \tag{4.14}$$

where T is the number of observations, $\hat{\boldsymbol{\alpha}}$ is the vector of estimated pricing errors, $\hat{\boldsymbol{\Omega}}$ is the sample residual covariance matrix, $\hat{\mathbf{e}}$ is the vector of estimated mean factor returns, and $\hat{\mathbf{V}}$ is the estimated covariance matrix of factor returns. Under the null hypothesis this test statistics follows the F distribution with N degrees of freedom in the numerator and $T - N - K$ degrees of freedom in the denominator.

We can summarize this method as follows. First, we estimate alphas, then we test the following joint null hypothesis

$$H_0 : \begin{bmatrix} \hat{\alpha}_1 \\ \hat{\alpha}_2 \\ \hat{\alpha}_3 \\ \vdots \\ \hat{\alpha}_N \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ \vdots \\ 0 \end{bmatrix}$$

That is, the null hypothesis says that all estimated alphas are zeros.

We remind that the World CAPM is specified by

$$R_{p,t} = \alpha_p + \beta_{p,MKT} R_{MKT,t} + \varepsilon_{p,t}, \tag{4.15}$$

where $R_{p,t}$ is the excess return of portfolio p and $R_{MKT,t}$ is the excess return of the market portfolio. Table 4.8 reports the results of the estimation of the World CAPM for the univariate and bivariate sorted portfolios. Our first observation is that all estimated betas are close to 1. Our second observation is that all alphas are not statistically significantly different from zero, even though alphas seem to be economically significant. The p-value of the GRS test equals 0.50. Consequently, the GRS test cannot reject the null hypothesis that the World CAPM can explain the cross-section of portfolio returns.

Next, we perform the test of the World CAPM augmented with the P-factor. The linear regression is as follows:

$$R_{p,t} = \alpha_p + \beta_{p,MKT} R_{MKT,t} + \beta_{p,PF} R_{PF,t} + \varepsilon_{p,t}, \tag{4.16}$$

where $R_{PF,t}$ is the return on the P-factor. Table 4.9 reports the results of the estimations and testing. Our observations are as follows. First, none of the portfolios has a statistically significant alpha. Second, all loadings to the market factor are close to 1 and highly statistically significant. Third, 13 out of 17 tested portfolios have a statistically significant loading to the P-factor. We also notice that the P-factor loadings account for cross-sectional heterogeneity in average returns. For example, we observe large positive betas for low rated political portfolios (L and LL), and negative political betas for high rated portfolios (H and HH) as well as monotonic patterns for the portfolios between the two points. Fourth and finally, the p-value of the GRS test is

Table 4.8: **Results for the World CAPM**

	Policy sort		Politics sort	
	α	β_{MKT}	α	β_{MKT}
P1 (H)	-1.31	1.12*	-1.27	1.12*
	(0.52)	(0.00)	(0.39)	(0.00)
P2	-0.31	1.12*	1.24	1.10*
	(0.85)	(0.00)	(0.42)	(0.00)
P3	2.41	1.09*	0.43	1.13*
	(0.26)	(0.00)	(0.87)	(0.00)
P4 (L)	4.54	1.23*	5.20	1.19*
	(0.18)	(0.00)	(0.14)	(0.00)

	Politics-policy sort				
	α	β_{MKT}		α	β_{MKT}
HH	-2.69	1.11*	ML	2.84	1.10*
	(0.25)	(0.00)		(0.27)	(0.00)
HM	-0.35	1.13*	LH	3.42	1.10*
	(0.86)	(0.00)		(0.33)	(0.00)
HL	0.14	1.09*	LM	1.48	1.20*
	(0.94)	(0.00)		(0.76)	(0.00)
MH	-0.35	1.11*	LL	6.30	1.30*
	(0.89)	(0.00)		(0.14)	(0.00)
MM	0.56	1.10*			
	(0.80)	(0.00)			

GRS statistic	P-value
0.96	0.50

This table reports the results of asset pricing tests for the univariate and bivariate sorted portfolios. The first part shows intercepts in annualized percentages as well as the factor loading from the global market portfolio (MKT). In the univariate case, the first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. In the bivariate case, the portfolios are split between "H", "M" and "L" which refers to high, mid and low terciles along each of the two dimensions in policy and politics, respectively. We also report the GRS statistic as well the p-value for the GRS test. P-values are Newey-West and are in parenthesis and asterisk (*) denotes a statistical significance of at least 10%. The data is monthly and spans 1992-2019.

close to 100%. That is, the GRS test cannot reject the validity of the World CAPM augmented with the P-factor.

In principle, the results of the GRS tests say that the World CAPM is valid with and without the P-factor. However, because all loadings on the market factor are almost constant across portfolios, we do need the P-factor to explain the cross-sectional differences in portfolio returns. Therefore, despite the result of the GRS test, we strongly suspect that the World CAPM without the P-factor is invalid.

In a similar manner, we conduct the GRS test of all other asset pricing models with and without the P-factor. Table 4.10 summarizes the results. The GRS test concludes that all models, with and without P-factor, are able to explain the cross-

Table 4.9: **Results for the World CAPM with P-factor.**

	Policy sort			Politics sort		
	α	β_{MKT}	β_{PF}	α	β_{MKT}	β_{PF}
P1 (H)	-0.64	1.13*	-0.09*	-0.73	1.13*	-0.07*
	(0.76)	(0.00)	(0.00)	(0.63)	(0.00)	(0.01)
P2	-0.70	1.11*	0.05*	1.11	1.10*	0.02
	(0.68)	(0.00)	(0.08)	(0.48)	(0.00)	(0.55)
P3	1.80	1.08*	0.08*	-1.14	1.10*	0.21*
	(0.37)	(0.00)	(0.06)	(0.62)	(0.00)	(0.00)
P4 (L)	0.11	1.14*	0.59*	1.23	1.11*	0.53*
	(0.96)	(0.00)	(0.00)	(0.63)	(0.00)	(0.00)

Politics-policy sort

	α	β_{MKT}	β_{PF}		α	β_{MKT}	β_{PF}
HH	-1.18	1.14*	-0.20*	ML	1.71	1.08*	0.15*
	(0.64)	(0.00)	(0.00)		(0.47)	(0.00)	(0.00)
HM	-0.18	1.13*	-0.02	LH	2.31	1.08*	0.15*
	(0.93)	(0.00)	(0.25)		(0.49)	(0.00)	(0.01)
HL	0.07	1.09*	0.01	LM	0.22	1.18*	0.17*
	(0.97)	(0.00)	(0.80)		(0.96)	(0.00)	(0.02)
MH	-0.46	1.11*	0.02	LL	-0.46	1.16*	0.90*
	(0.85)	(0.00)	(0.70)		(0.80)	(0.00)	(0.00)
MM	-0.12	1.09*	0.09*				
	(0.96)	(0.00)	(0.05)				

GRS statistic	P-value
0.53	0.94

This table reports the results of asset pricing tests for the univariate and bivariate sorted portfolios. The first part shows intercepts in annualized percentages as well as the factor loading from the global market portfolio (MKT) and the P-factor (PF). In the univariate case, the first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. In the bivariate case, the portfolios are split between "H", "M" and "L" which refers to high, mid and low terciles along each of the two dimensions in policy and politics, respectively. We also report the GRS statistic as well the p-value for the GRS test. P-values are Newey-West and are in parenthesis and asterisk (*) denotes a statistical significance of at least 10%. The data is monthly and spans 1992-2019.

section of returns on all portfolios. However, taking into account the issue with the GRS test (mentioned in the preceding paragraph), we suspect that the GRS test is wrong regarding the ability of the asset pricing models without the P-factor to explain the cross-section of stock returns. Besides, we can note that the p-value of the GRS test of a model with the P-factor is higher than that without the P-factor. This observation suggests that a model augmented with the P-factor does a clearly better job explaining the cross-section of portfolio return than a model without the P-factor. Last but not least, the results presented in the subsequent section show that the P-factor risk is priced in the market.

Table 4.10: **GRS test results with and without P-factor.**

(a) GRS test results without P-factor

	WCAPM	ICAPM	FF	FFC	BAB
GRS statistics	0.81	0.80	0.88	0.92	1.19
GRS p-value	(0.68)	(0.70)	(0.60)	(0.55)	(0.27)

(b) GRS test results with P-factor

	WCAPM	ICAPM	FF	FFC	BAB
GRS statistics	0.53	0.54	0.58	0.44	0.83
GRS p-value	(0.94)	(0.93)	(0.91)	(0.98)	(0.66)

This table reports the results of the GRS test for the univariate and bivariate sorted portfolios using various asset pricing models. Assets pricing models include World CAPM (WCAPM), International CAPM (ICAPM), International Fama-French three factor model (FF), Fama-French-Carhard four factor model (FFC) and Betting against beta (BAB) model. The data is monthly and spans 1992-2019.

4.5.2 Fama-MacBeth Methodology

In this subsection, we use the Fama-MacBeth methodology as an alternative to the GRS test performed in the preceding subsection. This does not only allow us to test the null-hypothesis about the validity of an asset pricing model but also allows us to estimate the risk premia and test whether risk premia are different from zero. We document that despite not being able to reject the null hypothesis, we still find evidence that the P-factor is priced. These results will be discussed further in this subsection.

We illustrate the Fama-MacBeth methodology with a rolling window using the World CAPM. Fama and MacBeth suggest that when the CAPM model is tested, one has to estimate the betas using a 5-year or a 60-month rolling window. To be more specific, the first estimation window uses the returns over $t \in [1, 60]$. The betas are estimated using (the first-pass regression)

$$R_{p,t} = \alpha_p + \beta_{p,1:60} R_{MKT,t} + \varepsilon_{p,t}. \tag{4.17}$$

Subsequently, $\lambda_{0,61}$ and $\lambda_{1,61}$ are estimated by running (the second-pass regression)

$$R_{p,t} = \lambda_{0,61} + \lambda_{1,61} \hat{\beta}_{p,1:60} + \epsilon_p. \tag{4.18}$$

Then, the estimation window is pushed forward by 1 step. That is, the next estimation period is $t \in [2, 61]$, The new betas $\hat{\beta}_{i,2:61}$ are used to estimate $\lambda_{0,62}$ and $\lambda_{1,62}$ for $t = 62$. One repeats this sequence of steps until the last period T.

At the end, we have two vectors λ_0 and λ_1 of size $T - 60$. We estimate the mean values of lambdas

$$\bar{\lambda}_0 = \frac{1}{T-60}\sum_{t=61}^{T}\lambda_{0,t}, \quad \bar{\lambda}_1 = \frac{1}{T-60}\sum_{t=61}^{T}\lambda_{1,t}. \tag{4.19}$$

The World CAPM predicts that there are no unexplained returns and that the market risk premium is positive. Formally, the predictions are

$$\lambda_0 = 0 \text{ and } \lambda_1 > 0. \tag{4.20}$$

The main null hypothesis is therefore that there are no unexplained returns in the models:

$$H_0^1 : \lambda_0 = 0 \text{ vs } H_A^1 : \lambda_0 \neq 0. \tag{4.21}$$

The second null hypothesis is (this is a one-tailed test)

$$H_0^2 : \lambda_1 = 0 \text{ vs } H_A^2 : \lambda_1 > 0. \tag{4.22}$$

When we use this methodology with the P-factor, we are also interested whether the P-factor is priced. To find this out, we test

$$H_0^3 : \lambda_{PF} = 0 \text{ vs } H_A^3 : \lambda_{PF} > 0. \tag{4.23}$$

where λ_{PF} is the risk premium of the P-factor. The standard errors in both test are computed using the Newey-West methodology.

Table 4.11 reports the Fama-MacBeth results for the World CAPM without the P-factor in Panel (a) and with the P-factor in Panel (b). First, we consider the World CAPM without the P-factor. The results for this model are reported in Panel (a). We observe that we cannot reject the null hypothesis $H_0 : \lambda_0 = 0$. The market price of risk is 9.94% (in annual terms) for the unit exposure to the beta risk factor. The market price of risk is statistically significantly greater than zero. In principle, these results may suggest that the World CAPM is a valid model. However, it does not exclude other factors being priced too. Second, we consider the World CAPM augmented with the P-factor. These results are reported in Panel (b). We also observe that we cannot reject the null hypothesis $H_0 : \lambda_0 = 0$. The market price of risk is 6.69% for the unit exposure to the beta risk factor. The market price of risk is statistically significantly greater than zero at the 10% level. Additionally, we note that the P-factor risk is priced: the P-factor price of risk is 7.24% for the unit exposure to the P-factor risk. The P-factor price of risk is statistically significantly greater than zero. Besides, we document that the R^2 is substantially higher with the P-factor than without the P-factor (Table 4.12). Consequently, our results suggest that the World CAPM with the P-factor is a valid model that is better than that without the P-factor.

Table 4.11: **Fama-MacBeth results for the World CAPM without and with the P-factor**

(a) Without P-factor

	λ_0	λ_1
Mean, %	-4.26	9.94*
P-value	(0.58)	(0.05)

(b) With P-factor

	λ_0	λ_1	λ_{PF}
Mean, %	-1.50	6.69*	7.24*
P-value	(0.83)	(0.10)	(0.01)

This table reports the results of the Fama-MacBeth test for the univariate and bivariate sorted portfolios using the World CAPM with and without the P-factor. λ_0 denotes the intercept, λ_1 denotes the risk premium to the unit exposure to the market portfolio, and λ_{PF} denotes the risk premium to the unit exposure to the P-factor. P-values are Newey-West and are in parenthesis and asterisk (*) denotes a statistical significance of at least 10%. The data is monthly and spans 1992-2019.

To gain further insight into the difference between the two models with and without the P-factor, we do the following. First, we run the first-pass regression for the World CAPM without the P-factor

$$R_{p,t} = \alpha_p + \beta_p R_{MKT,t} + \varepsilon_{p,t}. \tag{4.24}$$

Next, using the estimated $\hat{\beta}_p$ and $E[R_p]$, we run the second-pass regression

$$E[R_p] = \lambda_0 + \lambda_1 \hat{\beta}_p + \epsilon_p. \tag{4.25}$$

Finally, we plot the realized returns versus the predicted (fitted) returns from regression (4.25). Second, we run the first-pass regression for the World CAPM with the P-factor

$$R_{p,t} = \alpha_p + \beta_{p,MKT} R_{MKT,t} + \beta_{p,PF} R_{PF,t} + \varepsilon_{p,t}. \tag{4.26}$$

Next, using the estimated $\hat{\beta}_{p,MKT}$, $\hat{\beta}_{p,PF}$, and $E[R_p]$, we run the second-pass regression

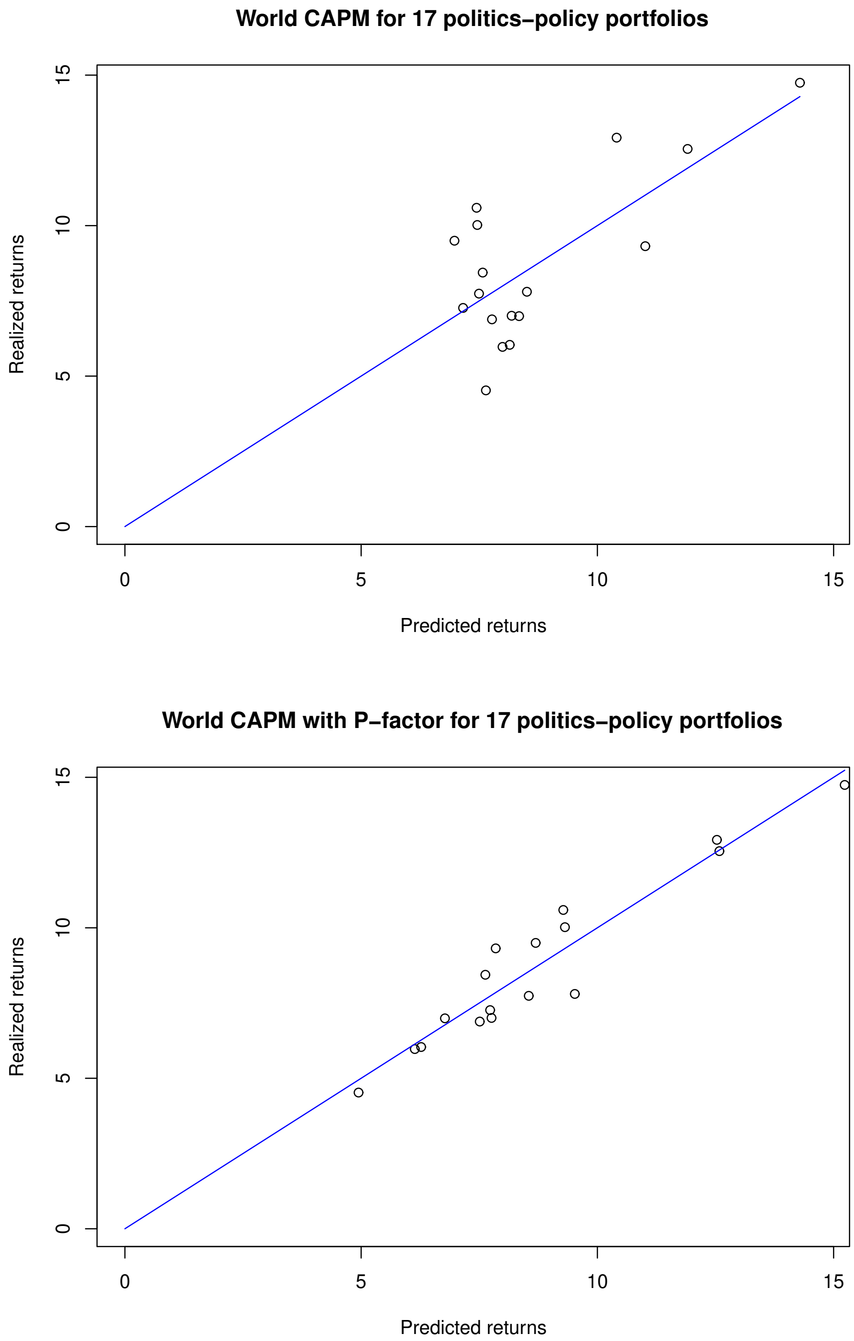
$$E[R_p] = \lambda_0 + \lambda_1 \hat{\beta}_{p,MKT} + \lambda_2 \hat{\beta}_{p,PF} + \epsilon_p. \tag{4.27}$$

Finally, we plot the realized returns versus the predicted (fitted) returns from regression

(4.27).

Figure 4.1 plots the results when we use 17 univariate and bivariate sorted portfolios. Specifically, the top panel plots the realized vs. predicted excess returns in the World CAPM, while the bottom panel plots the realized vs. predicted excess returns in the World CAPM augmented with the P-factor. The goodness of fit to a model is measured by R^2 in the second-pass regression. For the World CAPM without the P-factor, the R^2 is 50%. In contrast, for the World CAPM augmented with the P-factor, the R^2 is 91%. Figure 4.2 plots the results when we use 42 country portfolios. Again, the top panel plots the realized vs. predicted excess returns in the World CAPM, while the bottom panel plots the realized vs. predicted excess returns in the World CAPM augmented with the P-factor. For the World CAPM, the R^2 is 19%. In contrast, for the World CAPM augmented with the P-factor, the R^2 is 32%. These results suggest that the World CAPM with the P-factor is a better model than that without the P-factor because the P-factor allows us to better explain the cross-section of stock returns.

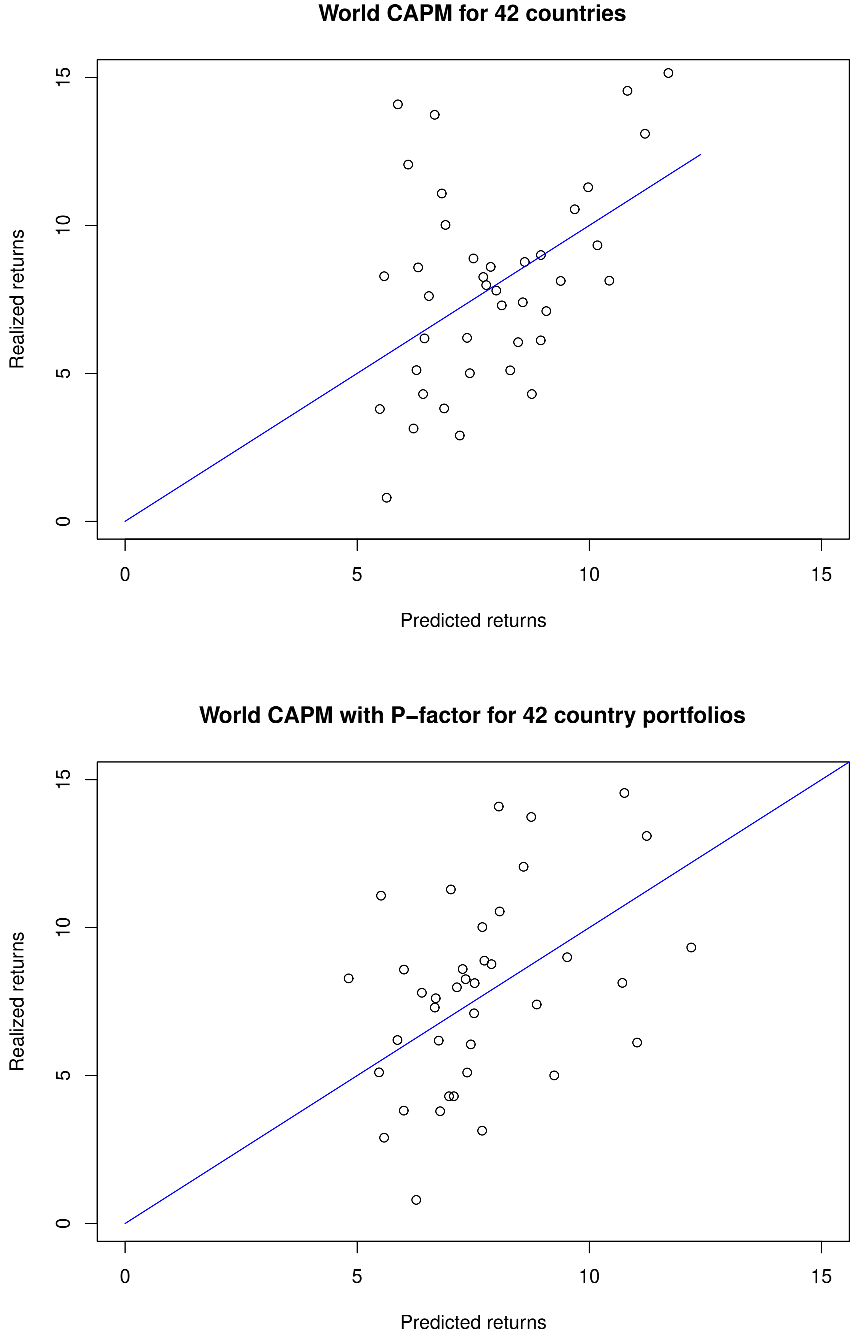
Figure 4.1: **Realized vs predicted excess returns**



The top panel plots the realized vs predicted excess returns in the World CAPM for 17 politics-, policy-, and politics-policy sorted portfolios. The R^2 is 50%. The bottom panel plots the realized vs predicted excess returns in the World CAPM augmented with the P-factor. The R^2 is 91%.

Table 4.12 presents the results of the Fama-MacBeth test with and without the P-factor using global asset pricing models. We focus only on the statistical significance of λ_0 and λ_{PF}. That is, we want to see whether the pricing errors are zeros and whether the P-factor has a positive risk premium. Our first observation is that the null hypothesis $H_0 : \lambda_0 = 0$ is never rejected regardless of whether the model is with or

Figure 4.2: **Realized vs predicted excess returns**



The top panel plots the realized vs predicted excess returns in the World CAPM for 42 country portfolios. The R^2 is 19%. The bottom panel plots the realized vs predicted excess returns in the World CAPM augmented with the P-factor. The R^2 is 32%.

without the P-factor. Our second observation is that the P-factor always has a positive and statistically significant risk premium. Our final and third observation is that the models with the P-factor have a substantially higher R^2 than the models without the P-factor.

Table 4.13 presents the results from Fama-MacBeth test using local asset pricing

Table 4.12: **Fama-MacBeth results with and without the P-factor, Global models**

(a) Fama-MacBeth test results without P-factor

	WCAPM	ICAPM	FF	FFC	BAB
Mean λ_0, %	-4.26	0.75	-3.94	-4.17	-1.12
P-value	(0.58)	(0.91)	(0.61)	(0.58)	(0.89)
R^2	0.53	0.70	0.80	0.82	0.55

(b) Fama-MacBeth test results with P-factor

	WCAPM	ICAPM	FF	FFC	BAB
Mean λ_0, %	-1.50	1.81	-3.30	-3.60	-4.15
P-value	(0.83)	(0.79)	(0.64)	(0.63)	(0.52)
Mean λ_{PF}, %	7.24*	5.61*	5.76*	6.31*	7.26*
P-value	(0.01)	(0.03)	(0.03)	(0.03)	(0.01)
R^2	0.91	0.94	0.93	0.93	0.91

This table reports the results of the Fama-MacBeth test for the univariate and bivariate sorted portfolios using various asset pricing models with and without the P-factor. Assets pricing models include World CAPM (WCAPM), International CAPM (ICAPM), International Fama-French three factor model (FF), Fama-French-Carhard four factor model (FFC) and Betting against beta (BAB) model. λ_0 denotes the intercept and λ_{PF} denotes the risk premium to the unit exposure to the P-factor. P-values are Newey-West and are in parenthesis and asterisk (*) denotes a statistical significance of at least 10%. The data is monthly and spans 1992-2019.

models. Again, as in the global versions, the P-factor has always positive and statistically significant risk premium. As before, the models with the P-factor have a substantially higher R^2 than the models without the P-factor. However, the null hypothesis $H_0 : \lambda_0 = 0$ with the P-factor is always rejected at the 10% level. That is, the local versions of all tested asset pricing models perform worse than their global counterparts.

The conclusion from Fama Macbeth's methodology is that we cannot reject the validity of the global versions of the asset pricing models augmented with the P-factor. We find that the P-factor has a positive and significant risk premium, and the pricing errors are zero. Unfortunately, the results are worse when the local versions of the asset pricing models are used. In this case, we typically reject the validity of all asset pricing models with the P-factor because pricing errors are not zero. On the positive side, we find that also in the local versions, the P-factor commands a positive and statistically significant risk premium.

Table 4.13: **Fama-MacBeth results with and without the P-factor, Local models**

(a) Fama-MacBeth test results without P-factor

	WCAPM	ICAPM	FF	FFC	BAB
Mean λ_0, %	7.50*	8.94*	7.00*	6.73	6.74
P-value	(0.10)	(0.03)	(0.10)	(0.12)	(0.17)
R^2	0.19	0.25	0.25	0.25	0.19

(b) Fama-MacBeth test results with P-factor

	WCAPM	ICAPM	FF	FFC	BAB
Mean λ_0, %	9.05*	8.80*	8.73*	8.34*	7.94*
P-value	(0.04)	(0.03)	(0.03)	(0.04)	(0.08)
Mean λ_{PF}, %	6.11*	4.73*	3.97*	3.90*	6.51*
P-value	(0.02)	(0.04)	(0.10)	(0.09)	(0.02)
R^2	0.32	0.34	0.33	0.41	0.32

This table reports the results of the Fama-MacBeth test for the univariate and bivariate sorted portfolios using various asset pricing models with and without the P-factor. Assets pricing models include World CAPM (WCAPM), International CAPM (ICAPM), International Fama-French three factor model (FF), Fama-French-Carhard four factor model (FFC) and Betting against beta (BAB) model. λ_0 denotes the intercept and λ_{PF} denotes the risk premium to the unit exposure to the P-factor. P-values are Newey-West and are in parenthesis and asterisk (*) denotes a statistical significance of at least 10%. The data is monthly and spans 1992-2019.

Chapter 5

ESG Ratings and International Stock Returns

This chapter presents our results for the relationship between the ESG ratings and international stock market returns. Our first important result is that the return on the spread portfolios is not statistically significant, and there are no risk premia to the exposure to ESG rating risk over the total sample period from 1995 to 2019. However, we do find significant returns and risk premia over the period from 2000 to 2010. Our second important result is that an improvement in ESG ratings negatively impacts a country's stock market returns. Our third interesting result is that the countries with high Policy-Politics ratings tend to have high ESG ratings. The fourth significant result is the evidence of bi-directional Granger causality between ESG ratings and GDP growth rates. On the one hand, an increased ESG rating causes the GDP growth rate to decrease. On the other hand, an increased GDP growth rate causes the ESG rating to decrease. Our fifth and final important result is that the main drivers of the relationship between the ESG ratings and international stock market returns are the Emerging, High-risk countries that most improved their ESG ratings.

5.1 ESG Portfolio Returns

In this section, our objective is to analyze the relationship between the ESG ratings and international stock market returns in order to compare the market returns of countries with different ESG ratings. The country returns come at a monthly frequency, but the original ESG data come at an annual frequency. Therefore, the portfolios are rebalanced annually.

In the same manner as in Section 4.1, we create univariate-sorted portfolios and denote them P1(H), P2, P3, and P4(L), where H (high) and L (Low) are the top and bottom quantile portfolios, respectively. This means that we need three breakpoints that are created based on percentiles. Our split is 20% in H, 30% in both P2 and P3, and lastly, 20% in the bottom portfolio, L. Besides, we also create the spread portfolio (L-H), representing the difference between the returns on the portfolio of countries with the lowest ratings and those with the highest ratings.

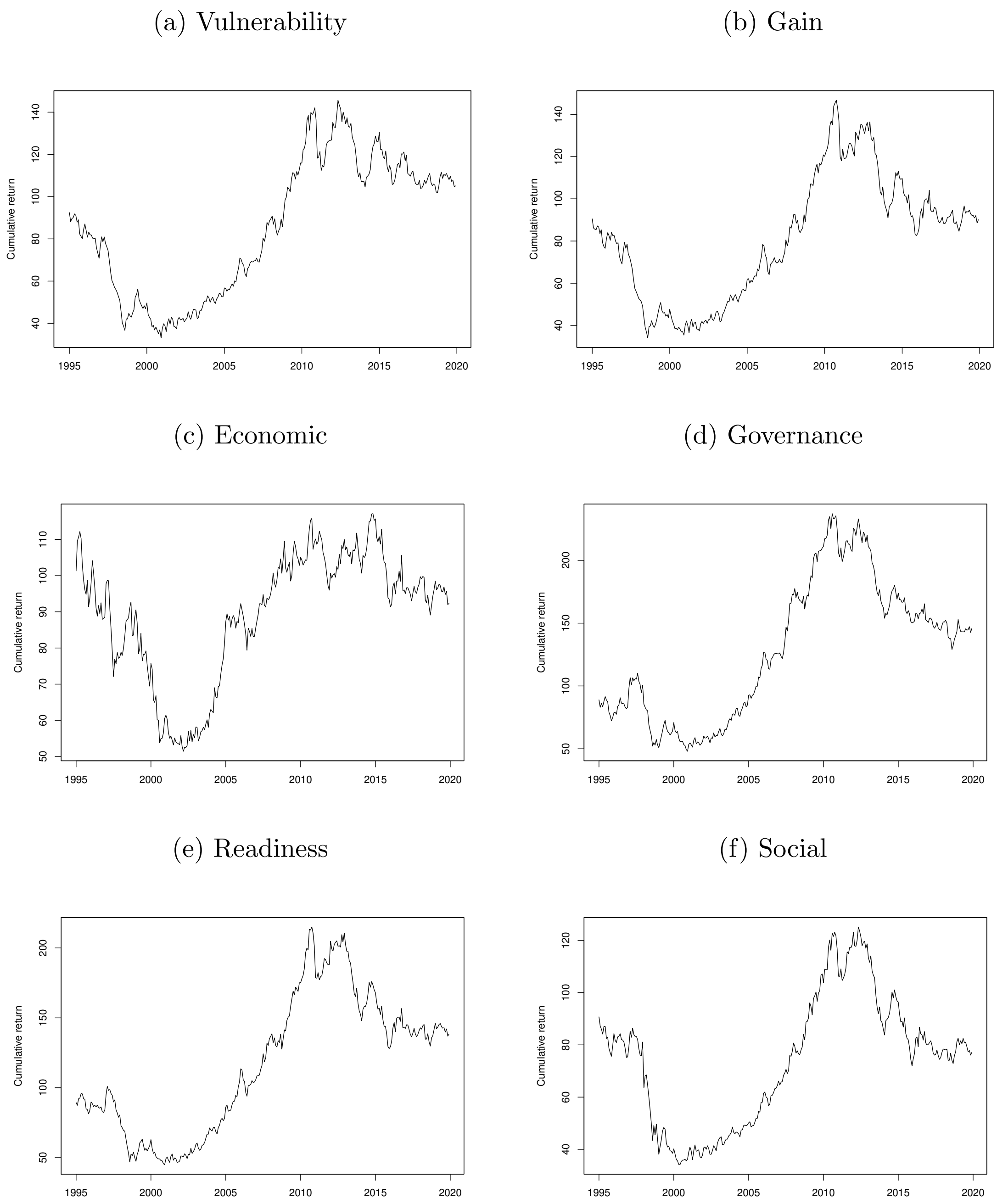
Table 5.1: **Average annual returns of ESG portfolios (1995-2019)**

	P1 (H)	**P2**	**P3**	**P4 (L)**	**L-H**
(a) Sort with respect to Vulnerability					
Mean return	10.28*	9.41*	10.91*	11.53*	1.25
P-value	(0.02)	(0.02)	(0.02)	(0.03)	(0.71)
Sharpe ratio	0.54	0.51	0.52	0.55	0.09
(b) Sort with respect to Gain					
Mean return	10.57*	9.29*	11.02*	11.26*	0.68
P-value	(0.01)	(0.02)	(0.03)	(0.03)	(0.84)
Sharpe ratio	0.59	0.53	0.49	0.54	0.05
(c) Sort with respect to Economic					
Mean return	12.55*	9.55*	8.27*	13.02*	0.47
P-value	(0.01)	(0.02)	(0.05)	(0.01)	(0.84)
Sharpe ratio	0.60	0.55	0.43	0.60	0.04
(d) Sort with respect to Governance					
Mean return	11.19*	8.32*	9.83*	13.88*	2.69
P-value	(0.01)	(0.03)	(0.04)	(0.02)	(0.45)
Sharpe ratio	0.62	0.50	0.44	0.62	0.17
(d) Sort with respect to Readiness					
Mean return	10.47*	9.62*	9.71*	12.83*	2.36
P-value	(0.01)	(0.02)	(0.04)	(0.02)	(0.47)
Sharpe ratio	0.61	0.53	0.44	0.59	0.16
(d) Sort with respect to Social					
Mean return	10.81*	9.48*	10.96*	10.83*	0.02
P-value	(0.01)	(0.01)	(0.02)	(0.03)	(0.99)
Sharpe ratio	0.55	0.53	0.53	0.51	0.00

This table reports annualized average returns for the univariate sorted portfolios. The first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. "L-H" refers to the low minus high spread portfolios. Portfolios are rebalanced annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 1995-2019.

Table 5.1 reports the average annual returns for each respective portfolio sorted by the ESG indicators over the total sample that covers 1995-2019. Our main observation is that, regardless of the ESG indicator, none of the spread portfolios (L-H) produces significant returns. Figure 5.1 plots the cumulative returns to the spread portfolios. The graphs in this figure advocate that there was a steep increase in the cumulative returns to all portfolios over the period 2000-2010. This motivates us to investigate the returns to the univariate-sorted portfolios over 2000-2010.

Figure 5.1: **Cumulative returns to the spread portfolios**



(a) Vulnerability
(b) Gain
(c) Economic
(d) Governance
(e) Readiness
(f) Social

Cumulative returns to the L-H spread portfolios constructed by the various ESG ratings.

Table 5.2 reports the average annual returns for the univariate-sorted portfolios over the period 2010-2010. Despite the fact that all average portfolio returns are economically significant, many portfolio returns are statistically insignificantly different from zero. Apparently, the problem is that the sample size is short and, as a result, the power of statistical tests is low. However, we find that all ESG indicators have statistically significant returns on the L-H portfolios, except for the Economic indicator. For example, we observe that the low-rated Gain portfolio outperforms the high-rated portfolio by 11.50% p.a., and the low-rated Governance portfolio outperforms the high-rated Governance portfolio by 12.51% p.a. The returns on each spread portfolio are highly statistically significant. These results document the impact of ESG ratings on market returns from 2000-to 2010. Over this specific period, we observe a clear pattern that low-rated portfolios have higher returns than high-rated ones.

5.2 Fama-MacBetch Cross-Sectional Regressions

In this section, we use the Fama-MacBeth cross-sectional predictive regressions to see if country returns are significantly related to ESG ratings. We run the Fama-MacBeth regressions over the total sample 1995-2019 as well as the sub-sample 2000-2010 because the results in the previous section suggest the existence of the relationship only over this specific sub-sample.

The methodology is the same as outlined in Section 4.2. The return data come at a monthly frequency, and the ESG indicator ratings come at an annual frequency. Therefore, we convert monthly returns to annual returns before running the regressions. Specifically, the first-pass regression for each t over all countries

$$r_{i,t} - r_{f,t} = \lambda_{0,t} + \lambda_{1,t} ESG_{i,t-1} + \varepsilon_t, \quad t \in [1, T], \tag{5.1}$$

where $r_{i,t} - r_{f,t}$ is the excess return on country i and $ESG_{i,t-1}$ is the country i last available ESG rating. At the end, we have vectors λ_0 and λ_1 of size T. We estimate the mean values of both coefficients

$$\bar{\lambda}_0 = \frac{1}{T}\sum_{t=1}^{T} \lambda_{0,t}, \quad \bar{\lambda}_1 = \frac{1}{T}\sum_{t=1}^{T} \lambda_{1,t}. \tag{5.2}$$

Subsequently, we test the null hypothesis that λ_0 and λ_1 are statistically different from

Table 5.2: **Average annual returns of ESG portfolios (2000-2010).**

	P1 (H)	**P2**	**P3**	**P4 (L)**	**L-H**
(a) Sort with respect to Vulnerability					
Mean return	9.98	7.95	12.08	20.88*	10.90*
P-value	(0.25)	(0.34)	(0.16)	(0.04)	(0.00)
Sharpe ratio	0.44	0.37	0.54	0.89	0.71
(b) Sort with respect to Gain					
Mean return	8.93*	6.92*	14.10*	20.44*	11.50*
P-value	(0.30)	(0.40)	(0.12)	(0.03)	(0.00)
Sharpe ratio	0.42	0.33	0.59	0.89	0.78
(c) Sort with respect to Economic					
Mean return	13.09	8.89	10.96	18.04	4.95
P-value	(0.13)	(0.29)	(0.20)	(0.08)	(0.20)
Sharpe ratio	0.58	0.42	0.51	0.74	0.39
(d) Sort with respect to Governance					
Mean return	8.51	6.77	14.13	21.02*	12.51*
P-value	(0.31)	(0.39)	(0.11)	(0.05)	(0.00)
Sharpe ratio	0.40	0.35	0.59	0.86	0.85
(d) Sort with respect to Readiness					
Mean return	7.81	8.31	13.69	20.09*	12.27*
P-value	(0.33)	(0.32)	(0.13)	(0.05)	(0.00)
Sharpe ratio	0.38	0.39	0.58	0.85	0.86
(d) Sort with respect to Social					
Mean return	9.55	8.51	12.11	20.40	10.85*
P-value	(0.28)	(0.25)	(0.23)	(0.03)	(0.00)
Sharpe ratio	0.42	0.43	0.51	0.90	0.89

This table reports annualized average returns for the univariate sorted portfolios. The first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. "L-H" refers to the low minus high spread portfolios. Portfolios are rebalanced annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 2000-2010.

0 on average. The coefficient λ_0 represents the abnormal return, and λ_1 is the risk premium to the unit exposure to an ESG rating. The null and alternative hypotheses that we test are

$$H_0 : \lambda_0 = 0 \text{ vs } H_A : \lambda_0 \neq 0, \tag{5.3}$$

$$H_0 : \lambda_1 = 0 \text{ vs } H_A : \lambda_1 \neq 0. \tag{5.4}$$

If we can reject the null hypothesis about λ_0, the prices errors are not zero. Rejecting the null hypothesis of λ_1, suggests the ESG indicator carries a risk premium. The standard errors of estimation of $\bar{\lambda}_0$ and $\bar{\lambda}_1$ are computed using the Newey-West methodology.

Table 5.3 reports the results of the of Fama-MacBeth cross-sectional predictive regressions for the total period 1995-2019. Table 5.4 reports the results of the of Fama-MacBeth cross-sectional predictive regressions for the sub-period 2000-2010. Our main focus is on the statistical significance of λ_1 because our main goal is to determine whether there is a risk premium to the exposure to an ESG factor. Our results in this section are consistent with the previous section's results. Specifically, over the total sample, we find no ESG risk premia. In contrast, over the sub-period 2000-2010, we find statistically significant risk premia to all ESG indicators but the Economic indicator. We here notice the same patterns as our portfolio sorts that a negative coefficient denotes evidence that high ESG-rated countries forecast lower future returns. We can interpret this as the marginal increase in future country returns should the country improve its ESG rating and move upwards to the next quartile.

Table 5.3: **Fama-MacBetch cross-sectional regressions (1995-2019)**

	Vulnerability	**Gain**	**Economic**	**Governance**	**Readiness**	**Social**
λ_0	-0.032	0.189	0.107	0.194	0.157*	0.125*
	(0.680)	(0.135)	(0.177)	(0.029)	(0.070)	(0.033)
λ_1	-0.210	-0.001	-0.018	-0.139	-0.102	-0.039
	(0.403)	(0.437)	(0.900)	(0.177)	(0.415)	(0.651)
R^2	0.102	0.111	0.035	0.129	0.102	0.089

This table reports the results of Fama-MacBeth cross-sectional predictive regressions of annual returns on lagged ESG ratings. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %.

Table 5.4: **Fama-MacBetch cross-sectional regressions (2000-2010)**

	Vulnerability	**Gain**	**Economic**	**Governance**	**Readiness**	**Social**
λ_0	0.176*	0.534*	0.265*	0.400*	0.379*	0.275*
	(0.087)	(0.035)	(0.165)	(0.046)	(0.049)	(0.074)
λ_1	-0.890*	-0.007*	-0.305	-0.409*	-0.461*	-0.305*
	(0.021)	(0.015)	(0.265)	(0.013)	(0.015	0.008)
R^2	0.132	0.129	0.047	0.152	0.111	0.093

This table reports the results of Fama-MacBeth cross-sectional predictive regressions of annual returns on lagged ESG ratings. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %.

5.3 Country Returns and ESG Ratings

In this section, we want to investigate the relationship between the excess returns and each country's last available ESG indicator rating. That is, we want to explore whether the ESG rating can be used as a predictive variable for excess returns. Recall that the return data come at a monthly frequency, while the ESG indicator ratings come at an annual frequency. Therefore, we convert annual ratings to monthly ratings before running the regressions. We run the regression for each country separately. In addition, we run a pooled regression to increase statistical power and hope that a pooled regression may produce more significant results.

In particular, we run the following regression for each country $i \in [1, 40]$

$$r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-1} + \varepsilon_t,$$

where $r_{i,t} - r_{f,t}$ is the excess return on country i and $ESG_{i,t-1}$ is the country i last available ESG rating. Then, we run a pooled version of the same regression by simultaneously using the data for all countries.

Table 5.5 presents the estimated slope coefficients β and the corresponding p-values for the regression as well as the p-values of β. We find no significant results other than sporadic exceptions on a country basis, as well for the pooled regression. Yet, the changes in country ratings over the years are, in fact, marginal. This observation may suggest that we might need more data in order to establish significant relationships.

Table 5.5: **Country Returns and ESG Ratings**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	-11.93	-0.53	0.60	-0.00	-0.01	0.99	-1.44	-0.45	0.65	-42.27	-0.78	0.44	-0.72	-0.12	0.90	2.17	0.47	0.64
AUSTRIA	-36.02	-0.43	0.66	-0.07	-0.37	0.71	-5.98	-0.94	0.35	-6.87	-0.21	0.83	-4.93	-0.44	0.66	2.05	0.36	0.72
BELGIUM	-8.41	-0.32	0.75	-0.03	-0.20	0.84	-9.50	-0.57	0.57	-0.77	-0.02	0.98	-5.13	-0.43	0.66	-0.20	-0.04	0.97
BRAZIL	-0.52	-0.01	0.99	-0.02	-0.16	0.87	-0.09	-0.03	0.97	-12.35	-0.64	0.52	-1.27	-0.17	0.87	-2.15	-0.23	0.82
CANADA	46.02	1.87	0.06	-0.15	-0.88	0.38	-4.58	-0.78	0.43	-26.45	-0.87	0.38	-7.27	-0.65	0.52	-2.48	-0.27	0.79
CHILE	16.76	0.86	0.39	-0.05	-0.46	0.65	-3.84	-0.71	0.48	3.97	0.23	0.82	-2.36	-0.28	0.78	0.21	0.05	0.96
CHINA	7.07	0.18	0.85	0.10	0.92	0.36	2.33	0.86	0.39	-35.38	-1.13	0.26	6.34	1.02	0.31	2.73	0.81	0.42
COLOMBIA	0.73	0.02	0.99	-0.10	-0.45	0.65	-12.15	-0.71	0.47	-19.11	-1.24	0.22	-8.44	-0.60	0.55	-0.27	-0.03	0.98
CZECH.REPUBLIC	-87.72	-1.51	0.13	-0.15	-0.87	0.38	-8.60	-1.42	0.15	-12.39	-0.52	0.60	-8.98	-1.06	0.29	-3.16	-0.54	0.59
DENMARK	17.81	0.23	0.82	-0.00	-0.01	0.99	-0.03	-0.01	0.99	-12.08	-0.56	0.58	0.07	0.01	0.99	1.68	0.31	0.76
EGYPT	61.91	0.82	0.41	-1.11	-1.47	0.14	-9.62	-0.70	0.49	3.19	0.25	0.80	-29.62	-0.81	0.42	-19.15	-0.81	0.42
FINLAND	76.89	1.61	0.11	-0.29	-1.19	0.23	-4.92	-0.82	0.41	0.36	0.01	0.99	-14.74	-1.00	0.32	-21.79	-1.12	0.26
FRANCE	71.07	1.50	0.13	-0.10	-0.62	0.53	-2.18	-0.44	0.66	-10.30	-0.40	0.69	-3.89	-0.43	0.67	-1.86	-0.33	0.74
GERMANY	32.27	1.25	0.21	-0.08	-0.58	0.56	-0.46	-0.09	0.93	-57.04	-1.62	0.10	-3.28	-0.38	0.71	-1.92	-0.33	0.74
GREECE	129.30	1.38	0.17	-0.59	-1.91	0.06	-33.62	-1.85	0.06	17.63	1.45	0.15	-34.11	-1.86	0.06	-9.10	-1.67	0.10
HUNGARY	31.96	0.58	0.56	-0.70	-1.06	0.29	-15.02	-0.85	0.39	3.08	0.29	0.77	-44.11	-1.01	0.31	-16.87	-1.00	0.32
INDIA	-27.01	-0.92	0.36	0.03	0.23	0.82	0.30	0.14	0.89	-17.82	-0.68	0.50	0.68	0.10	0.92	0.55	0.04	0.97
IRELAND	25.00	1.02	0.31	-0.18	-1.15	0.25	-5.72	-0.90	0.37	-72.09	-2.06	0.04	-11.67	-1.14	0.25	-3.20	-0.67	0.51
ISRAEL	51.24	0.62	0.54	-0.32	-0.60	0.55	-1.81	-0.15	0.88	-24.98	-1.64	0.10	-18.35	-0.57	0.57	9.87	0.54	0.59
ITALY	-13.70	-0.31	0.76	-0.30	-0.97	0.33	-11.90	-1.15	0.25	3.40	0.35	0.73	-31.57	-1.48	0.14	-5.92	-0.92	0.36
JAPAN	-1.48	-0.01	0.99	0.09	0.87	0.39	1.14	0.50	0.62	22.76	1.84	0.07	4.50	0.87	0.38	10.29	1.50	0.13
MALAYSIA	-36.10	-0.39	0.70	0.00	0.02	0.98	-1.84	-0.39	0.70	-20.66	-0.73	0.47	-0.69	-0.05	0.96	7.27	0.52	0.60
MEXICO	16.79	0.40	0.69	0.05	0.42	0.68	1.42	0.60	0.55	16.84	1.36	0.17	3.36	0.51	0.61	-7.57	-1.06	0.29
NETHERLANDS	26.44	0.70	0.48	-0.06	-0.50	0.62	-0.58	-0.16	0.87	-15.94	-1.05	0.30	-2.16	-0.31	0.76	-0.39	-0.07	0.94
NEW.ZEALAND	-23.32	-1.42	0.15	0.05	0.59	0.56	0.80	0.26	0.80	18.32	0.64	0.52	1.61	0.27	0.78	0.82	0.16	0.87
NORWAY	-39.95	-1.12	0.26	-0.02	-0.16	0.88	-1.84	-0.63	0.53	-33.47	-0.68	0.50	-2.86	-0.44	0.66	5.30	0.64	0.52
PERU	-3.88	-0.13	0.90	-0.10	-0.52	0.61	-20.10	-1.26	0.21	-36.08	-1.33	0.18	-12.25	-0.85	0.40	-2.63	-0.30	0.76
PHILIPPINES	-79.41	-1.72	0.09	0.18	0.49	0.63	-19.53	-0.67	0.50	-23.91	-1.40	0.16	-25.64	-0.92	0.36	21.18	1.25	0.21
POLAND	31.64	0.42	0.68	-0.20	-1.31	0.19	-6.85	-1.05	0.29	-30.76	-2.35	0.02	-11.74	-1.41	0.16	-3.94	-0.69	0.49
PORTUGAL	17.89	0.67	0.51	-0.10	-0.94	0.35	-4.70	-1.03	0.30	9.96	0.72	0.47	-6.74	-1.01	0.31	-3.02	-0.89	0.37
RUSSIA	48.39	0.95	0.34	-0.22	-1.00	0.32	-5.27	-0.90	0.37	-25.50	-0.43	0.67	-13.46	-1.00	0.32	-12.76	-1.05	0.29
SOUTH.AFRICA	-64.80	-1.17	0.24	0.88	1.32	0.19	0.78	0.06	0.95	10.23	0.66	0.51	24.13	0.59	0.56	-7.09	-0.26	0.79
SOUTH.KOREA	-24.58	-0.41	0.68	0.01	0.08	0.94	-2.36	-0.48	0.63	7.18	0.21	0.83	0.21	0.02	0.98	4.08	0.47	0.64
SPAIN	94.61	1.35	0.18	-0.53	-2.13	0.03	-8.08	-0.93	0.35	2.54	0.23	0.82	-32.38	-2.14	0.03	-9.83	-1.64	0.10
SWEDEN	-8.07	-0.03	0.98	-0.11	-0.69	0.49	-2.39	-0.64	0.52	-35.36	-1.10	0.27	-5.52	-0.67	0.50	-2.64	-0.33	0.74
SWITZERLAND	24.36	1.02	0.31	-0.07	-0.71	0.47	-0.80	-0.28	0.78	-39.79	-1.70	0.09	-3.95	-0.61	0.54	-4.05	-0.57	0.57
THAILAND	-98.34	-1.46	0.15	0.36	1.17	0.24	4.95	0.65	0.52	-15.30	-1.07	0.29	16.19	0.91	0.36	22.49	1.68	0.09
TURKEY	64.91	1.15	0.25	-0.32	-1.29	0.20	-28.96	-1.65	0.10	16.72	0.80	0.43	-20.96	-1.33	0.18	-8.61	-1.36	0.17
UK	45.48	1.40	0.16	-0.14	-1.32	0.19	-1.22	-0.53	0.60	-5.39	-0.50	0.62	-5.50	-0.97	0.33	-4.56	-0.77	0.44
US	-5.69	-0.28	0.78	-0.02	-0.19	0.85	-0.02	-0.01	0.99	-15.74	-1.46	0.14	-1.35	-0.24	0.81	-2.36	-0.35	0.72
POOLED	1.00	0.76	0.45	-0.01	-1.20	0.23	-0.54	-0.96	0.34	-0.74	-1.44	0.15	-0.80	-1.32	0.19	-0.36	-0.80	0.42

Results of regressing each country's returns on the last available ESG rating, $r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-1} + \varepsilon_t$. The table reports the estimated slope coefficients β and the corresponding p-values for the regression as well as the p-values of β. Each slope is multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags. The data spans 1995-2019.

In addition, we control for both country and time fixed effects and run the following regression

$$r_{i,t} - r_{f,t} = \alpha_i + \beta ESG_{i,t-1} + \varepsilon_t,$$

where $ESG_{i,t-1}$ is the last available ESG rating. The fixed effects regression technique like the pooled model uses data for all countries simultaneously. The outcome is a vector of estimates $\boldsymbol{\alpha} = \{\alpha_1, \alpha_2, \ldots, \alpha_n\}$ and a single estimate β. Still, we are primarily interested in the sign and statistical significance of β. The vector $\boldsymbol{\alpha}$ is of less importance. We discuss the results of running this regression in Section 5.5 below.

5.4 Country Returns and Lagged ESG Ratings

In the previous section, we were not able to find statistically significant results. One potential explanation is that the returns do not respond quickly to changes in ESG ratings. To account for a potential time lag, in this section we investigate the relationship between the excess returns and each country's lagged ESG indicator rating. We denote by n the time lag measured in months, and use $n \in [2, 12]$ for each respective country.

Specifically, we run the following regression for each country $i \in [1, 40]$

$$r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-n} + \varepsilon_t,$$

where $r_{i,t} - r_{f,t}$ is the excess return on country i and $ESG_{i,t-n}$ is the country i ESG rating lagged n months. Then, we run a pooled version of the same regression by simultaneously using the data for all countries.

We tested the regressions with $n \in [2, 12]$ to investigate all relational connections to a lag in ESG ratings within a year. None of the respective results yielded significant values. To give specific examples, Table 5.6 and Table 5.7 report the estimated slope coefficients β, the t-statistic of $beta$, and the corresponding p-values for $beta$ for lagged ratings at $n = 6$ and $n = 12$. No country seems to have significant results across the ESG ratings, with the sporadic exception. Neither of the pooled regressions presents significant results either.

Table 5.6: **Country Returns and ESG Rating Lagged 6 Months**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	-14.55	-0.60	0.55	0.01	0.06	0.95	-1.48	-0.46	0.65	-54.66	-0.93	0.35	-0.39	-0.06	0.95	2.83	0.60	0.55
AUSTRIA	-33.14	-0.39	0.70	-0.06	-0.31	0.76	-5.69	-0.85	0.39	1.80	0.05	0.96	-4.32	-0.37	0.71	1.50	0.26	0.79
BELGIUM	-3.53	-0.13	0.90	-0.04	-0.26	0.80	-12.58	-0.74	0.46	30.21	0.82	0.41	-5.11	-0.44	0.66	-0.35	-0.07	0.94
BRAZIL	-24.14	-0.49	0.62	-0.03	-0.19	0.85	-0.17	-0.06	0.95	-22.46	-1.14	0.25	-2.02	-0.27	0.79	-2.60	-0.28	0.78
CANADA	34.37	1.29	0.20	-0.14	-0.85	0.40	-4.79	-0.83	0.41	-54.43	-2.39	0.02	-7.79	-0.71	0.48	-1.86	-0.21	0.84
CHILE	18.23	0.92	0.36	-0.05	-0.43	0.67	-3.60	-0.67	0.50	11.56	0.58	0.56	-1.83	-0.22	0.82	0.04	0.01	0.99
CHINA	5.22	0.14	0.89	0.08	0.74	0.46	1.58	0.59	0.55	-41.82	-1.39	0.16	4.97	0.81	0.42	2.67	0.81	0.42
COLOMBIA	5.97	0.13	0.90	-0.14	-0.61	0.54	-22.32	-1.33	0.18	-17.37	-1.11	0.27	-10.82	-0.77	0.44	-1.15	-0.13	0.89
CZECH.REPUBLIC	-91.79	-1.28	0.20	-0.15	-0.92	0.36	-8.38	-1.44	0.15	-15.39	-0.64	0.52	-9.36	-1.12	0.26	-3.43	-0.60	0.55
DENMARK	-4.20	-0.05	0.96	-0.01	-0.06	0.95	-0.36	-0.15	0.88	-8.37	-0.37	0.71	-0.38	-0.07	0.95	1.77	0.33	0.74
EGYPT	79.20	1.04	0.30	-1.52	-2.85	0.00	-8.21	-0.65	0.51	-0.67	-0.06	0.96	-40.80	-1.39	0.16	-24.57	-0.99	0.32
FINLAND	66.79	1.42	0.16	-0.29	-1.24	0.21	-5.30	-0.91	0.36	-10.68	-0.27	0.79	-15.47	-1.09	0.28	-19.86	-1.04	0.30
FRANCE	59.37	1.31	0.19	-0.10	-0.64	0.52	-2.85	-0.56	0.57	-4.61	-0.17	0.86	-4.24	-0.47	0.64	-1.86	-0.33	0.74
GERMANY	22.99	0.92	0.36	-0.07	-0.50	0.62	-0.92	-0.18	0.86	-41.23	-1.26	0.21	-3.18	-0.37	0.71	-1.60	-0.28	0.78
GREECE	128.96	1.35	0.18	-0.64	-2.02	0.04	-39.94	-2.16	0.03	16.39	1.36	0.17	-37.96	-2.00	0.05	-9.18	-1.68	0.09
HUNGARY	34.78	0.63	0.53	-0.62	-1.01	0.31	-16.77	-1.11	0.27	3.87	0.36	0.72	-38.47	-0.95	0.34	-13.02	-0.79	0.43
INDIA	-23.30	-0.81	0.42	0.07	0.49	0.62	0.94	0.45	0.65	-18.34	-0.79	0.43	2.76	0.39	0.69	-0.45	-0.04	0.97
IRELAND	20.43	0.82	0.41	-0.19	-1.22	0.22	-7.50	-1.19	0.23	-75.75	-2.04	0.04	-13.22	-1.31	0.19	-3.40	-0.70	0.49
ISRAEL	61.49	0.70	0.49	-0.51	-1.07	0.29	-4.60	-0.41	0.68	-10.90	-0.75	0.46	-31.96	-1.12	0.26	-11.19	-0.65	0.51
ITALY	-0.36	-0.01	0.99	-0.36	-1.12	0.26	-17.09	-1.63	0.10	4.61	0.48	0.63	-34.31	-1.54	0.12	-5.50	-0.87	0.38
JAPAN	-10.67	-0.08	0.93	0.08	0.84	0.40	1.01	0.44	0.66	25.12	2.04	0.04	4.22	0.84	0.40	9.61	1.47	0.14
MALAYSIA	-38.87	-0.44	0.66	-0.01	-0.04	0.97	-2.12	-0.45	0.65	-20.76	-0.82	0.41	-1.66	-0.13	0.89	5.70	0.43	0.67
MEXICO	20.87	0.50	0.62	0.04	0.33	0.74	1.24	0.51	0.61	18.48	1.51	0.13	2.86	0.43	0.67	-8.07	-1.13	0.26
NETHERLANDS	22.03	0.60	0.55	-0.08	-0.58	0.56	-0.67	-0.18	0.86	-19.23	-1.18	0.24	-3.08	-0.45	0.65	-1.39	-0.27	0.79
NEW.ZEALAND	-23.50	-1.44	0.15	0.07	0.77	0.44	1.30	0.41	0.68	5.75	0.20	0.84	2.90	0.51	0.61	3.05	0.62	0.54
NORWAY	-32.89	-0.90	0.37	-0.03	-0.30	0.76	-2.29	-0.77	0.44	-24.93	-0.51	0.61	-3.68	-0.57	0.57	3.79	0.49	0.62
PERU	-3.00	-0.10	0.92	-0.12	-0.58	0.56	-12.46	-0.80	0.42	-47.83	-1.97	0.05	-13.48	-0.94	0.34	-4.72	-0.53	0.59
PHILIPPINES	-73.71	-1.64	0.10	-0.04	-0.12	0.90	-28.69	-1.09	0.28	-27.95	-1.59	0.11	-38.79	-1.43	0.15	18.64	1.10	0.27
POLAND	39.59	0.52	0.60	-0.20	-1.27	0.20	-7.22	-1.14	0.25	-26.97	-2.02	0.04	-11.55	-1.36	0.17	-3.79	-0.67	0.50
PORTUGAL	16.96	0.63	0.53	-0.10	-0.95	0.34	-4.72	-1.03	0.30	12.29	0.91	0.36	-7.02	-1.02	0.31	-3.41	-0.99	0.32
RUSSIA	53.86	1.09	0.28	-0.25	-1.16	0.25	-6.92	-1.22	0.22	-26.17	-0.46	0.64	-15.50	-1.17	0.24	-12.80	-1.05	0.29
SOUTH.AFRICA	-36.52	-0.76	0.45	0.89	1.43	0.15	-3.20	-0.24	0.81	17.10	1.13	0.26	45.09	1.13	0.26	3.91	0.14	0.89
SOUTH.KOREA	-19.31	-0.34	0.73	0.00	0.01	0.99	-2.16	-0.45	0.65	-5.14	-0.14	0.89	-0.40	-0.04	0.97	3.05	0.38	0.71
SPAIN	88.00	1.23	0.22	-0.55	-2.09	0.04	-13.13	-1.52	0.13	5.52	0.51	0.61	-33.18	-2.09	0.04	-9.07	-1.50	0.13
SWEDEN	-40.23	-0.14	0.89	-0.11	-0.68	0.49	-2.57	-0.70	0.48	-28.31	-0.89	0.38	-5.46	-0.67	0.50	-2.17	-0.29	0.77
SWITZERLAND	17.38	0.71	0.48	-0.07	-0.64	0.52	-0.93	-0.32	0.75	-35.45	-1.50	0.13	-3.90	-0.60	0.55	-3.73	-0.56	0.58
THAILAND	-99.30	-1.50	0.13	0.35	1.11	0.27	4.20	0.56	0.58	-13.80	-1.00	0.32	14.90	0.80	0.42	20.45	1.54	0.12
TURKEY	63.82	1.17	0.24	-0.33	-1.35	0.18	-28.80	-1.65	0.10	10.90	0.48	0.63	-21.62	-1.40	0.16	-8.84	-1.40	0.16
UK	12.19	0.40	0.69	-0.11	-1.03	0.30	-1.40	-0.59	0.55	-5.52	-0.58	0.56	-5.51	-0.96	0.34	-3.46	-0.61	0.54
US	-12.51	-0.59	0.55	0.00	0.03	0.98	0.23	0.11	0.91	-14.73	-1.34	0.18	-0.40	-0.07	0.94	-1.07	-0.16	0.87
POOLED	0.99	0.76	0.45	-0.01	-1.27	0.20	-0.67	-1.17	0.24	-0.75	-1.46	0.15	-0.86	-1.42	0.15	-0.39	-0.86	0.39

Results of regressing each country's returns on the last available ESG rating, $r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-6} + \varepsilon_t$. The table reports the estimated slope coefficients β and the corresponding p-values for the regression as well as the p-values of β. Each slope is multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags. The data spans 1995-2019.

Table 5.7: **Country Returns and ESG Rating Lagged 12 Months**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	10.26	0.43	0.67	-0.01	-0.08	0.93	-1.68	-0.52	0.60	-2.30	-0.05	0.96	-0.02	-0.00	1.00	3.13	0.70	0.48
AUSTRIA	-50.13	-0.59	0.55	-0.05	-0.25	0.80	-5.47	-0.81	0.42	-13.71	-0.28	0.78	-3.86	-0.32	0.75	2.78	0.52	0.60
BELGIUM	1.52	0.05	0.96	-0.02	-0.12	0.91	-10.87	-0.80	0.42	37.37	1.27	0.21	-1.48	-0.15	0.88	1.39	0.28	0.78
BRAZIL	-19.61	-0.39	0.69	-0.07	-0.45	0.65	-1.12	-0.39	0.69	-15.94	-0.76	0.45	-3.89	-0.55	0.58	-2.01	-0.22	0.83
CANADA	-2.41	-0.08	0.94	-0.10	-0.58	0.56	-4.71	-0.83	0.41	-38.93	-1.82	0.07	-7.63	-0.73	0.47	-2.74	-0.32	0.75
CHILE	14.80	0.72	0.47	-0.03	-0.30	0.76	-3.95	-0.73	0.47	15.33	0.70	0.48	-1.05	-0.13	0.89	0.95	0.20	0.84
CHINA	-9.25	-0.26	0.79	0.07	0.71	0.48	1.32	0.52	0.60	-54.32	-1.61	0.11	4.14	0.72	0.47	2.43	0.73	0.46
COLOMBIA	14.85	0.33	0.74	-0.15	-0.67	0.50	-21.38	-1.02	0.31	-17.13	-1.07	0.28	-10.97	-0.78	0.44	-1.58	-0.18	0.86
CZECH.REPUBLIC	-133.19	-1.64	0.10	-0.15	-0.96	0.34	-8.02	-1.42	0.16	-20.30	-0.91	0.36	-9.93	-1.21	0.23	-3.77	-0.69	0.49
DENMARK	-29.43	-0.37	0.71	-0.03	-0.25	0.81	-0.91	-0.38	0.70	-21.23	-0.74	0.46	-1.61	-0.28	0.78	1.78	0.31	0.75
EGYPT	73.04	0.96	0.34	-0.58	-0.46	0.65	6.33	0.28	0.78	0.23	0.02	0.99	-3.14	-0.06	0.95	-25.27	-1.00	0.32
FINLAND	90.68	1.90	0.06	-0.32	-1.39	0.16	-5.43	-0.99	0.32	-20.91	-0.60	0.55	-16.01	-1.19	0.24	-20.00	-1.12	0.26
FRANCE	53.85	1.24	0.22	-0.11	-0.70	0.48	-2.61	-0.53	0.59	-24.18	-0.86	0.39	-4.86	-0.54	0.59	-1.56	-0.28	0.78
GERMANY	6.35	0.22	0.82	-0.06	-0.46	0.65	-2.35	-0.46	0.64	-39.66	-1.28	0.20	-4.22	-0.49	0.62	-0.62	-0.11	0.91
GREECE	67.41	0.73	0.47	-0.63	-2.03	0.04	-48.11	-2.51	0.01	13.70	1.11	0.27	-39.79	-2.10	0.04	-8.36	-1.55	0.12
HUNGARY	25.61	0.47	0.64	-0.51	-0.91	0.36	-13.65	-1.06	0.29	3.43	0.29	0.77	-33.50	-0.88	0.38	-11.69	-0.71	0.48
INDIA	-15.73	-0.53	0.60	0.06	0.43	0.67	0.88	0.42	0.67	-19.18	-0.78	0.43	2.56	0.37	0.71	-0.00	-0.00	1.00
IRELAND	24.06	0.95	0.34	-0.20	-1.31	0.19	-8.62	-1.43	0.15	-78.15	-1.93	0.05	-13.94	-1.39	0.16	-3.60	-0.70	0.49
ISRAEL	42.83	0.46	0.64	-0.50	-1.04	0.30	-7.30	-0.62	0.54	-4.07	-0.27	0.78	-33.55	-1.11	0.27	-13.70	-0.74	0.46
ITALY	13.73	0.28	0.78	-0.33	-0.94	0.35	-13.45	-1.20	0.23	5.47	0.58	0.56	-28.59	-1.14	0.25	-5.44	-0.83	0.41
JAPAN	-4.88	-0.04	0.97	0.07	0.68	0.50	0.90	0.41	0.68	7.64	0.49	0.62	3.40	0.68	0.49	9.71	1.48	0.14
MALAYSIA	-52.71	-0.61	0.54	-0.04	-0.16	0.87	-2.57	-0.56	0.58	-56.46	-2.15	0.03	-3.97	-0.34	0.74	6.78	0.52	0.60
MEXICO	26.87	0.67	0.50	-0.01	-0.05	0.96	0.16	0.07	0.95	19.05	1.55	0.12	0.25	0.04	0.97	-7.70	-1.08	0.28
NETHERLANDS	-18.81	-0.51	0.61	-0.01	-0.07	0.94	-0.24	-0.07	0.94	-20.99	-1.20	0.23	-1.38	-0.23	0.82	0.61	0.14	0.89
NEW.ZEALAND	-21.91	-1.33	0.18	0.07	0.83	0.41	1.18	0.38	0.70	3.82	0.13	0.90	3.42	0.62	0.53	5.42	1.11	0.27
NORWAY	-40.20	-1.22	0.22	-0.02	-0.22	0.83	-2.12	-0.74	0.46	-21.84	-0.38	0.71	-3.32	-0.53	0.59	3.07	0.40	0.69
PERU	-2.06	-0.07	0.94	-0.13	-0.69	0.49	-10.86	-0.66	0.51	-44.35	-1.67	0.10	-15.69	-1.08	0.28	-7.62	-0.91	0.36
PHILIPPINES	-76.53	-1.68	0.09	-0.11	-0.29	0.77	-40.23	-1.77	0.08	-28.11	-1.88	0.06	-45.10	-1.87	0.06	18.79	1.14	0.25
POLAND	31.73	0.44	0.66	-0.16	-1.03	0.30	-6.24	-0.97	0.33	-17.27	-1.03	0.30	-9.57	-1.09	0.27	-3.47	-0.64	0.52
PORTUGAL	12.84	0.49	0.62	-0.07	-0.65	0.52	-4.02	-0.97	0.33	19.94	1.48	0.14	-4.34	-0.68	0.50	-2.42	-0.73	0.47
RUSSIA	56.79	1.21	0.23	-0.27	-1.30	0.19	-9.15	-1.68	0.09	-45.29	-0.86	0.39	-16.83	-1.32	0.19	-9.93	-0.85	0.40
SOUTH.AFRICA	-63.08	-1.31	0.19	0.86	1.42	0.16	-2.94	-0.21	0.83	9.63	0.61	0.54	15.73	0.43	0.66	-1.79	-0.07	0.95
SOUTH.KOREA	-15.36	-0.27	0.79	0.01	0.03	0.97	-2.11	-0.46	0.65	-32.43	-0.84	0.40	-0.09	-0.01	0.99	4.40	0.54	0.59
SPAIN	59.22	0.77	0.44	-0.41	-1.56	0.12	-16.25	-1.88	0.06	14.69	1.36	0.17	-25.17	-1.59	0.11	-7.86	-1.34	0.18
SWEDEN	117.04	0.32	0.75	-0.13	-0.78	0.44	-2.83	-0.80	0.42	-19.53	-0.59	0.55	-6.09	-0.76	0.45	-3.56	-0.47	0.63
SWITZERLAND	12.04	0.52	0.61	-0.08	-0.74	0.46	-1.40	-0.48	0.63	-43.01	-2.08	0.04	-4.90	-0.77	0.44	-3.84	-0.59	0.55
THAILAND	-91.87	-1.40	0.16	0.39	1.12	0.26	4.59	0.59	0.56	-11.83	-0.93	0.35	18.82	0.87	0.38	19.86	1.48	0.14
TURKEY	64.93	1.21	0.22	-0.34	-1.42	0.16	-32.42	-1.83	0.07	1.22	0.05	0.96	-22.88	-1.48	0.14	-8.88	-1.38	0.17
UK	7.85	0.26	0.80	-0.13	-1.26	0.21	-1.79	-0.77	0.44	-11.37	-1.43	0.15	-7.10	-1.25	0.21	-2.62	-0.48	0.63
US	-7.48	-0.35	0.73	0.01	0.11	0.92	0.21	0.11	0.91	-7.79	-0.58	0.56	0.22	0.04	0.97	0.52	0.08	0.94
POOLED	0.96	0.73	0.46	-0.01	-1.31	0.19	-0.85	-1.49	0.14	-0.78	-1.51	0.13	-0.90	-1.49	0.14	-0.32	-0.72	0.47

Results of regressing each country's returns on the last available ESG rating, $r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-6} + \varepsilon_t$. The table reports the estimated slope coefficients β and the corresponding p-values for the regression as well as the p-values of β. Each slope is multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags. The data spans 1995-2019.

5.5 ESG Ratings and Country Characteristics

The goal of this section is to investigate if country characteristics mask the effect of ESG ratings. Such characteristics can distort the significance of the relation through inflated or deflated trends. We do this by testing the relationship between the excess returns and each country's last ESG rating. This time, we control for a number of country characteristics and business cycle variables known to predict international stock market returns. These control variables are: the GDP growth rate, risk-free interest rate, and unemployment rate. Our ESG ratings might be correlated with these country characteristics. To extract the predictive power of ESG ratings, we run the regressions including the control variables

The data for the GDP growth rates are available from 1997. Thus, we adjust the ESG data to the period 1997-2019. In addition, the GDP growth rates come at a quarterly frequency. Therefore, we convert annual ESG indicator ratings, risk-free interest rates, and unemployment rates to quarterly data by duplication.

We run the following regression for each country i

$$r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-1} + \gamma GDP_{i,t-1} + \delta RF_{i,t-1} + \theta URATE_{i,t-1} + \varepsilon_t,$$

where $r_{i,t} - r_{f,t}$ is the excess return on country i, $ESG_{i,t-1}$ is the last available ESG rating, $GDP_{i,t-1}$ the country's GDP growth rate, $RF_{i,t-1}$ is the country's risk-free interest rate, and $URATE_{i,t-1}$ is the last available unemployment rate. Then, we run a pooled version of the same regression by simultaneously using the data for all countries.

Table 5.8 reports the estimated coefficients β with the corresponding p-values for the ESG indicator ratings. We find some interesting results for Austria, Chile, Czech Republic, Egypt, Portugal, South Africa, and Turkey when controlling for GDP growth rates, interest rates, and unemployment rates. Each of these countries has statistically significant results for 3 or more ESG indicators with economically significant values. In the pooled regression, we find statistical significance for three ESG factors: Vulnerability, Gain (ND-GAIN), and Governance. For the Vulnerability indicator, a higher rating captures a larger portion of excess return as our coefficient is positive. This suggests that a country vulnerable to climate hazards captures a higher portion of excess return. For the Gain (ND-GAIN) and Governance indicators, the coefficient is negative, meaning a higher rating has a negative effect on excess return. We recollect that a higher rating for these two indicators indicates stability and less risk with respect to ESG changes and suggest our results are in alignment with risk-reward theory. Recall that the ESG ratings range from 0-1 (Gain from 0-100). Therefore, the impact of a change in ratings is quite low.

Table 5.8: **ESG Ratings and Country Characteristics**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	-10.86	-0.30	0.76	-0.03	-0.18	0.85	-4.43	-0.70	0.49	-34.81	-0.62	0.53	-3.42	-0.29	0.77	4.22	0.47	0.64
AUSTRIA	571.56	1.77	0.08	-1.59	-3.03	0.00	-36.67	-3.17	0.00	94.78	2.29	0.02	-80.31	-3.02	0.00	-101.41	-3.46	0.00
BELGIUM	49.36	0.65	0.51	-0.68	-1.24	0.21	-21.83	-1.14	0.25	3.87	0.11	0.91	-50.08	-1.52	0.13	-47.38	-1.67	0.10
BRAZIL	-20.74	-0.11	0.91	0.00	0.00	1.00	-0.13	-0.03	0.98	18.44	0.32	0.75	-0.02	-0.00	1.00	278.24	1.08	0.28
CANADA	78.39	1.26	0.21	-0.16	-0.44	0.66	-4.50	-0.50	0.62	-43.06	-1.32	0.19	-3.21	-0.16	0.87	17.49	0.98	0.32
CHILE	95.70	2.33	0.02	-1.26	-3.23	0.00	-46.33	-2.24	0.03	17.07	0.73	0.47	-100.82	-2.48	0.01	-47.31	-2.45	0.01
CHINA	-72.13	-0.78	0.43	0.04	0.36	0.72	-0.41	-0.14	0.89	37.43	0.63	0.53	1.23	0.20	0.84	5.41	0.60	0.55
COLOMBIA	156.90	0.97	0.33	-0.63	-0.84	0.40	2.53	0.12	0.91	-66.97	-1.90	0.06	-25.04	-0.65	0.51	-9.64	-0.30	0.77
CZECH.REPUBLIC	26.55	0.23	0.82	-1.66	-2.17	0.03	-32.50	-1.67	0.10	-14.85	-0.14	0.89	-83.56	-2.38	0.02	-61.43	-2.65	0.01
DENMARK	-153.85	-2.02	0.04	0.42	1.48	0.14	2.41	0.47	0.63	52.82	1.07	0.28	17.54	1.24	0.21	33.63	2.66	0.01
EGYPT	365.88	3.75	0.00	-0.47	-0.56	0.57	9.95	0.63	0.53	70.64	2.10	0.04	33.33	0.75	0.46	-126.81	-2.75	0.01
FINLAND	-150.02	-2.09	0.04	0.47	0.62	0.53	-6.38	-0.47	0.64	58.36	0.44	0.66	-3.48	-0.09	0.93	538.56	2.54	0.01
FRANCE	56.64	0.69	0.49	-0.49	-1.39	0.16	-18.70	-1.87	0.06	20.58	0.64	0.52	-25.95	-1.40	0.16	-25.26	-1.36	0.17
GERMANY	803.04	1.74	0.08	-0.45	-0.96	0.34	-5.07	-0.50	0.62	-14.22	-0.24	0.81	-21.45	-0.89	0.37	-57.39	-1.67	0.10
GREECE	-87.23	-0.31	0.76	0.42	0.41	0.68	8.53	0.20	0.84	-32.70	-1.16	0.24	15.72	0.31	0.76	17.82	1.27	0.20
HUNGARY	11.05	0.03	0.98	-0.65	-0.17	0.86	-13.19	-0.21	0.84	-6.48	-0.09	0.93	-30.11	-0.16	0.87	213.60	2.00	0.05
INDIA	53.90	1.37	0.17	-0.00	-0.03	0.98	0.72	0.33	0.74	-1.41	-0.06	0.95	1.16	0.16	0.87	-23.29	-1.63	0.10
IRELAND	54.50	1.06	0.29	-0.66	-1.62	0.11	-20.81	-1.58	0.11	-78.42	-2.27	0.02	-42.62	-1.69	0.09	-45.23	-1.61	0.11
ISRAEL	42.60	0.55	0.58	0.15	0.24	0.81	11.57	0.90	0.37	-37.58	-1.42	0.16	18.41	0.44	0.66	16.28	0.63	0.53
ITALY	466.16	1.66	0.10	-1.40	-1.71	0.09	-32.62	-1.72	0.09	101.36	2.06	0.04	-73.84	-1.57	0.12	-65.46	-1.87	0.06
JAPAN	9.30	0.05	0.96	0.10	0.81	0.42	1.97	0.81	0.42	30.36	1.41	0.16	4.81	0.82	0.41	6.95	0.57	0.57
MALAYSIA	49.74	0.53	0.60	-0.15	-0.37	0.71	-1.71	-0.22	0.83	-21.48	-0.86	0.39	-5.11	-0.25	0.80	55.85	1.14	0.25
MEXICO	79.92	0.31	0.76	-0.10	-0.63	0.53	-1.51	-0.58	0.56	27.99	1.26	0.21	-4.52	-0.59	0.55	-10.91	-0.72	0.47
NETHERLANDS	22.66	0.43	0.67	-0.72	-2.02	0.04	-15.57	-1.88	0.06	-72.60	-1.17	0.24	-34.30	-1.97	0.05	-33.67	-1.84	0.07
NEW.ZEALAND	4.79	0.14	0.89	-0.23	-1.54	0.12	-8.49	-1.85	0.06	-68.99	-1.68	0.09	-15.99	-1.78	0.07	-6.61	-1.08	0.28
NORWAY	1.76	0.02	0.98	-0.70	-1.85	0.06	-20.36	-2.65	0.01	-72.50	-1.83	0.07	-44.61	-2.35	0.02	-10.20	-0.41	0.68
PERU	1.74	0.02	0.99	-0.33	-0.62	0.54	-43.93	-1.28	0.20	-2.91	-0.07	0.94	-29.33	-0.83	0.41	-12.55	-0.61	0.54
PHILIPPINES	-121.71	-1.54	0.12	-0.57	-0.73	0.47	-25.44	-0.89	0.38	-14.86	-0.72	0.47	-30.55	-0.91	0.36	-81.58	-1.29	0.20
POLAND	-53.19	-0.24	0.81	-0.48	-1.04	0.30	-13.20	-1.06	0.29	-17.73	-0.95	0.34	-28.29	-1.15	0.25	-4.31	-0.20	0.84
PORTUGAL	85.14	0.96	0.34	-0.65	-2.04	0.04	-23.11	-2.15	0.03	22.71	0.69	0.49	-41.07	-2.25	0.02	-20.34	-1.79	0.07
RUSSIA	-36.51	-0.52	0.60	-0.07	-0.24	0.81	-3.33	-0.64	0.52	114.11	1.47	0.14	-5.96	-0.39	0.70	-0.59	-0.02	0.98
SOUTH.AFRICA	581.39	1.36	0.17	-0.45	-0.43	0.67	-4.70	-0.26	0.79	80.92	1.27	0.20	-13.75	-0.28	0.78	-182.97	-1.98	0.05
SOUTH.KOREA	232.32	1.61	0.11	-0.78	-2.32	0.02	-19.82	-2.98	0.00	-19.47	-0.46	0.64	-44.15	-2.39	0.02	-21.76	-0.74	0.46
SPAIN	411.82	1.76	0.08	-1.46	-1.91	0.06	-12.61	-0.76	0.44	7.62	0.33	0.74	-79.73	-1.86	0.06	-26.59	-1.60	0.11
SWEDEN	-657.89	-1.30	0.19	-0.31	-0.82	0.41	-10.20	-1.37	0.17	7.17	0.19	0.85	-15.99	-0.85	0.40	4.66	0.33	0.74
SWITZERLAND	222.80	1.94	0.05	-0.30	-1.50	0.13	-5.54	-1.34	0.18	-28.82	-1.06	0.29	-15.99	-1.45	0.15	-11.37	-0.39	0.69
THAILAND	-52.10	-0.23	0.82	-0.66	-1.17	0.24	-19.33	-1.37	0.17	-13.38	-0.41	0.68	-38.87	-1.30	0.20	-25.20	-0.66	0.51
TURKEY	275.86	1.98	0.05	-1.16	-2.25	0.02	-50.31	-2.04	0.04	37.40	1.42	0.15	-71.33	-2.27	0.02	-20.03	-1.88	0.06
UK	-13.06	-0.29	0.77	-0.58	-1.52	0.13	-8.40	-1.18	0.24	-19.05	-1.86	0.06	-26.46	-1.45	0.15	-3.76	-0.26	0.79
US	7.65	0.35	0.73	-0.07	-0.50	0.61	-0.55	-0.21	0.83	-28.86	-2.22	0.03	-3.38	-0.47	0.64	-2.02	-0.16	0.88
POOLED	4.19	2.08	0.04	-0.03	-1.95	0.05	-0.76	-0.96	0.34	-1.59	-2.27	0.02	-1.70	-1.77	0.08	-0.81	-1.16	0.25

Results of regressing each country's returns on the last available ESG rating including control variables, $r_{i,t} - r_{f,t} = \alpha + \beta ESG_{i,t-1} + \gamma GDP_{i,t-1} + \delta RF_{i,t-1} + \theta URATE_{i,t-1} + \varepsilon_t$. The table reports the estimated slope coefficients β and the corresponding p-values for the regression as well as the p-values of β. Each slope is multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags. The data spans 1995-2019.

Further, we control for the possibility that our ESG indicators correlate with the country and time fixed effects. To account for these effects, we first run a pooled regression model that assumes that the coefficient of time effects is equal across all countries. The regression with control variables and time effects is presented below.

$$r_{i,t} - r_{f,t} = \alpha + \gamma \text{Time} + \beta ESG_{i,t-1} + \delta GDP_{i,t-1} + \theta RF_{i,t-1} + \kappa URATE_{i,t-1} + \varepsilon_t,$$

where $Time$ is the time index. Second, we control for both country- and time-fixed effects by running the following regression

$$r_{i,t} - r_{f,t} = \alpha_i + \gamma_i \text{Time} + \beta ESG_{i,t-1} + \delta GDP_{i,t-1} + \theta RF_{i,t-1} + \kappa URATE_{i,t-1} + \varepsilon_t.$$

Like the pooled model, the fixed effects regression technique uses data for all countries simultaneously. The outcome are two vectors of estimates $\boldsymbol{\alpha} = \{\alpha_1, \alpha_2, \ldots, \alpha_n\}$, $\boldsymbol{\gamma} = \{\gamma_1, \gamma_2, \ldots, \gamma_n\}$ and four single estimates β, δ, θ, and κ. Still, we are primarily interested in the sign and statistical significance of β. The vectors $\boldsymbol{\alpha}$ and $\boldsymbol{\gamma}$ are of less importance.

Table 5.9: **Returns and ESG Ratings, Pooled and Fixed Effects Models**

Panel A: No control variables				**Panel B: With control variables**			
	Beta	t-stat	P-value		Beta	t-stat	P-value
Vulnerability				**Vulnerability**			
Pooled model	1.00	0.85	0.40	Pooled model	**3.95**	2.26	0.02
Fixed effects model	6.03	0.81	0.42	Fixed effects model	24.67	1.90	0.06
Gains				**Gains**			
Pooled model	-0.01	-1.32	0.19	Pooled model	**-0.03**	-2.17	0.03
Fixed effects model	**-0.06**	-2.49	0.01	Fixed effects model	**-0.16**	-4.35	0.00
Economic				**Economic**			
Pooled model	-0.54	-1.07	0.28	Pooled model	-0.76	-1.12	0.26
Fixed effects model	**-1.21**	-2.21	0.03	Fixed effects model	**-3.05**	-3.44	0.00
Governance				**Governance**			
Pooled model	-0.01	-1.32	0.19	Pooled model	**-0.03**	-2.17	0.03
Fixed effects model	**-0.06**	-2.49	0.01	Fixed effects model	**-0.16**	-4.35	0.00
Readiness				**Readiness**			
Pooled model	-0.80	-1.43	0.15	Pooled model	**-1.73**	-2.01	0.04
Fixed effects model	**-3.76**	-2.60	0.01	Fixed effects model	**-8.87**	-4.25	0.00
Social				**Social**			
Pooled model	-0.36	-0.86	0.39	Pooled model	-0.84	-1.39	0.16
Fixed effects model	-2.20	-1.66	0.10	Fixed effects model	**-6.94**	-4.78	0.00

Results of estimation of the pooled and fixed effects models. Panel A reports the results of estimation without control variables. Panel B reports the results of estimation with control variables. Beta coefficients are multiplied by 100. Standard errors are heteroskedasticity robust standard errors computed using White's estimator. Bold highlights the coefficients that are statistically significant at the 5% level.

Table 5.9, Panel A, reports the results of estimation of the pooled and fixed effects models without control variables. Table 5.9, Panel B, reports the results of estimation of the pooled and fixed effects models with control variables. Our first conclusion is that it is necessary to use a fixed effect model because most of the coefficients are statistically significant with a fixed effect model. Our second conclusion is that it is necessary to use the control variables. Again, most of the coefficients are statistically significant with the control variables. The beta coefficients are negative (we need to invert the sing of the coefficient in front of Vulnerability). Thus, we have evidence that an improvement in ESG ratings impacts negatively on a country's stock market returns.

5.6 Politics and Policy and ESG Ratings

In this section, we explore a relationship between the Politics-Policy and ESG ratings of the respective countries. Our hypothesis is that a high ESG rating is driven by governments with high politics-policy ratings. In section 5.5 we found that higher ESG ratings were related to lower excess return. Therefore, we expect higher politics-policy ratings to be the driver of it. Both ratings refer to the stability of a country, meaning that the risk should be reflected in the returns: higher ratings mean lower risk and, hence, lower returns.

The Politics and Policy data come at a semi-annual frequency, and the ESG indicator ratings come at an annual frequency. Therefore, we convert annual ratings to semi-annual ratings by duplication before running the regressions. In addition, we supplement the regressions with a pooled regression to increase statistical power.

Specifically, first, we run the following regression to study the relationship between Policy and ESG ratings

$$\text{ESG}_{i,t} = \alpha + \gamma \text{Policy}_{i,t-1} + \varepsilon_t, \tag{5.5}$$

where $\text{ESG}_{i,t}$ is the ESG rating of country i at time t and $\text{Policy}_{i,t-1}$ is the last available Policy rating of country i at time $t-1$. Second, the following regression to study the relationship between Politics and ESG ratings

$$\text{ESG}_{i,t} = \alpha + \gamma \text{Politics}_{i,t-1} + \varepsilon_t, \tag{5.6}$$

where $\text{ESG}_{i,t}$ is the ESG indicator rating of country i at time t and $\text{Politics}_{i,t}$ is the last available Politics rating of country i at time $t-1$.

Table 5.10 presents the results of ESG indicator ratings regressed on Policy ratings, while Table 5.11 reports the results of ESG indicator ratings regressed on Politics ratings. Our main observation is that there are relatively modest number of countries and ESG ratings that produce statistically significant results. However, the results of the pooled regressions strongly advocate that there is a significant positive relationship between Politics-Policy and ESG ratings. Specifically, a higher Politics or Policy rating commands a higher ESG rating (recall that we need to invert the sign of the slope for the Vulnerability rating).

Our main conclusion from this study is that a high Politics-Policy rating tends to cause a high ESG rating (since our regressions are predictive regressions). Countries with high ESG ratings are the countries with stability and conditions to support, facilitate, reassure and utilize invested capital. A country with a high ESG rating and a high Politics-Policy rating is a country with more stability, which is often connected to having a lower risk. It is worth noting that previously we found that countries with high Politics-Policy ratings produce lower returns.

Table 5.10: **Policy and ESG Ratings**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	0.01	0.93	0.35	-2.54	-1.25	0.21	-0.11	-1.79	0.07	-0.00	-0.56	0.58	-0.04	-1.29	0.20	-0.02	-0.42	0.67
AUSTRIA	-0.00	-0.64	0.52	0.82	0.24	0.81	-0.01	-0.07	0.94	0.01	0.50	0.62	0.01	0.21	0.84	0.04	0.36	0.72
BELGIUM	0.02	0.88	0.38	-2.58	-0.98	0.33	-0.05	-1.31	0.19	-0.01	-0.34	0.73	-0.03	-0.99	0.32	-0.04	-0.50	0.62
BRAZIL	0.01	0.62	0.53	7.07	1.64	0.10	0.44	2.55	0.01	0.04	1.97	0.05	0.15	1.93	0.05	-0.04	-0.53	0.60
CANADA	0.01	0.90	0.37	-0.77	-0.20	0.84	-0.00	-0.02	0.99	0.01	0.41	0.68	-0.01	-0.10	0.92	-0.02	-0.35	0.73
CHILE	0.02	1.23	0.22	-2.93	-1.34	0.18	-0.06	-1.39	0.16	0.00	0.15	0.88	-0.04	-1.22	0.22	-0.06	-0.82	0.41
CHINA	0.01	0.76	0.45	1.22	0.35	0.73	0.17	0.94	0.35	-0.01	-0.34	0.74	0.03	0.58	0.56	-0.06	-0.01	0.99
COLOMBIA	-0.04	-8.42	0.00	5.36	5.23	0.00	0.01	0.33	0.74	0.07	5.11	0.00	0.07	3.94	0.00	0.13	5.59	0.00
CZECH.REPUBLIC	0.01	0.77	0.44	1.78	0.59	0.55	0.05	0.48	0.63	0.05	2.50	0.01	0.04	0.80	0.42	0.02	0.21	0.83
DENMARK	-0.00	-0.12	0.90	4.52	2.38	0.02	0.16	2.23	0.03	-0.01	-0.43	0.66	0.09	2.44	0.01	0.12	3.78	0.00
EGYPT	0.01	0.70	0.49	-0.13	-0.14	0.89	-0.00	-0.04	0.97	0.03	0.40	0.69	0.01	0.25	0.80	-0.01	-0.10	0.92
FINLAND	0.00	0.32	0.75	-3.82	-2.01	0.04	-0.19	-2.85	0.00	0.02	1.91	0.06	-0.07	-2.31	0.02	-0.05	-1.46	0.14
FRANCE	0.00	1.08	0.28	-2.10	-1.25	0.21	-0.07	-1.23	0.22	0.01	0.41	0.68	-0.04	-1.32	0.19	-0.05	-1.06	0.29
GERMANY	-0.02	-1.28	0.20	5.72	3.74	0.00	0.17	4.03	0.00	-0.00	-0.18	0.86	0.09	4.28	0.00	0.11	2.40	0.02
GREECE	0.01	0.58	0.56	-2.29	-0.93	0.35	-0.04	-1.69	0.09	0.10	3.59	0.00	-0.04	-1.06	0.29	-0.19	-3.30	0.00
HUNGARY	0.02	0.34	0.73	-4.47	-5.29	0.00	-0.10	-2.44	0.01	0.06	0.49	0.63	-0.07	-4.95	0.00	-0.18	-4.22	0.00
INDIA	-0.01	-0.27	0.78	-0.84	-0.25	0.80	-0.11	-0.33	0.74	0.02	1.25	0.21	-0.02	-0.28	0.78	0.02	0.32	0.75
IRELAND	0.02	2.89	0.00	-2.97	-2.03	0.04	-0.06	-1.59	0.11	0.00	0.12	0.90	-0.04	-1.63	0.10	-0.05	-1.30	0.19
ISRAEL	-0.00	-0.50	0.62	0.39	0.54	0.59	-0.00	-0.17	0.87	-0.01	-0.74	0.46	0.01	0.56	0.58	0.03	3.70	0.00
ITALY	0.00	0.04	0.97	-0.12	-0.11	0.91	0.02	0.27	0.79	-0.03	-0.55	0.58	-0.00	-0.12	0.90	0.00	0.06	0.95
JAPAN	-0.00	-0.05	0.96	6.42	0.94	0.35	0.18	0.53	0.59	0.08	3.55	0.00	0.13	0.95	0.34	0.13	2.62	0.01
MALAYSIA	0.01	2.17	0.03	-3.44	-1.40	0.16	-0.12	-1.22	0.22	0.04	4.56	0.00	-0.06	-1.18	0.24	-0.09	-2.22	0.03
MEXICO	0.01	0.91	0.36	2.77	0.53	0.60	0.21	0.92	0.36	0.06	1.94	0.05	0.07	0.71	0.47	-0.07	-1.01	0.31
NETHERLANDS	-0.00	-0.11	0.91	-2.07	-0.79	0.43	-0.09	-0.97	0.33	0.04	1.31	0.19	-0.04	-0.91	0.36	-0.08	-1.39	0.17
NEW.ZEALAND	-0.01	-0.49	0.62	3.93	1.25	0.21	0.11	0.79	0.43	0.02	1.90	0.06	0.07	1.51	0.13	0.08	1.73	0.08
NORWAY	-0.02	-2.68	0.01	5.48	5.21	0.00	0.23	5.65	0.00	0.01	0.80	0.42	0.09	5.27	0.00	0.04	2.14	0.03
PERU	-0.02	-1.78	0.07	2.93	1.13	0.26	0.01	0.14	0.89	0.01	1.02	0.31	0.04	0.90	0.37	0.09	1.66	0.10
PHILIPPINES	0.01	0.19	0.85	1.71	1.56	0.12	0.02	1.34	0.18	0.08	3.64	0.00	0.04	4.75	0.00	0.02	0.26	0.80
POLAND	0.01	1.07	0.28	-1.22	-0.22	0.82	-0.05	-0.39	0.70	0.07	4.30	0.00	-0.02	-0.15	0.88	-0.07	-0.97	0.33
PORTUGAL	0.02	0.22	0.82	-3.08	-0.25	0.81	-0.06	-0.42	0.67	0.04	0.74	0.46	-0.04	-0.26	0.79	-0.11	-0.26	0.80
RUSSIA	-0.03	-0.67	0.50	13.26	1.23	0.22	0.37	0.92	0.36	0.04	1.20	0.23	0.23	1.42	0.16	0.28	1.19	0.23
SOUTH.AFRICA	-0.00	-0.24	0.81	0.03	0.04	0.97	-0.04	-1.73	0.08	0.07	3.04	0.00	-0.00	-0.10	0.92	-0.03	-0.82	0.41
SOUTH.KOREA	-0.02	-2.60	0.01	8.97	3.19	0.00	0.32	4.32	0.00	0.03	1.91	0.06	0.16	3.27	0.00	0.12	1.66	0.10
SPAIN	0.01	2.64	0.01	-1.45	-1.76	0.08	-0.05	-1.84	0.07	0.07	3.78	0.00	-0.02	-1.28	0.20	-0.08	-2.00	0.05
SWEDEN	0.00	3.39	0.00	5.71	5.31	0.00	0.26	6.52	0.00	0.02	2.24	0.03	0.12	5.44	0.00	0.08	1.48	0.14
SWITZERLAND	-0.02	-1.54	0.12	6.16	2.50	0.01	0.25	2.61	0.01	0.00	0.26	0.80	0.10	2.63	0.01	0.06	1.08	0.28
THAILAND	-0.00	-0.29	0.77	1.27	0.32	0.75	0.02	0.02	0.98	0.02	0.18	0.86	0.02	0.17	0.87	0.03	0.50	0.61
TURKEY	-0.03	-3.89	0.00	6.52	2.98	0.00	0.04	0.97	0.33	0.04	2.37	0.02	0.10	2.62	0.01	0.21	2.41	0.02
UK	-0.00	-0.81	0.42	-1.61	-1.41	0.16	-0.13	-2.31	0.02	0.04	1.80	0.07	-0.04	-1.74	0.08	-0.02	-0.79	0.43
US	0.01	1.62	0.11	-6.13	-3.51	0.00	-0.31	-3.00	0.00	0.06	6.18	0.00	-0.11	-3.10	0.00	-0.09	-8.44	0.00
Pooled	-0.05	-4.88	0.00	9.69	6.11	0.00	0.09	3.39	0.00	0.23	8.95	0.00	0.14	6.06	0.00	0.11	3.33	0.00

Results of regressing each country's ESG rating on the Policy rating, $\text{ESG}_{i,t} = \alpha + \gamma \text{Policy}_{i,t-1} + \varepsilon_t$. All slope coefficients are multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags.

Table 5.11: **Politics and ESG Ratings**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	0.40	2.40	0.02	-118.06	-3.12	0.00	-3.77	-3.56	0.00	-0.21	-3.49	0.00	-1.96	-3.33	0.00	-1.90	-2.49	0.01
AUSTRIA	-0.04	-0.46	0.65	-2.18	-0.03	0.97	-0.60	-0.25	0.80	0.00	0.01	0.99	-0.08	-0.07	0.94	0.35	0.21	0.84
BELGIUM	0.27	0.99	0.32	-50.19	-1.60	0.11	-1.09	-2.63	0.01	-0.17	-0.72	0.47	-0.73	-1.84	0.07	-0.94	-0.54	0.59
BRAZIL	0.15	0.73	0.46	149.95	3.17	0.00	8.86	5.32	0.00	0.88	2.45	0.01	3.15	3.66	0.00	-0.31	-0.24	0.81
CANADA	-0.52	-4.44	0.00	95.80	4.20	0.00	2.22	2.99	0.00	0.10	0.93	0.35	1.39	3.91	0.00	1.87	3.68	0.00
CHILE	0.39	0.00	1.00	-73.97	-0.58	0.56	-1.72	-0.79	0.43	-0.03	-0.01	0.99	-1.09	-0.90	0.37	-1.51	-0.30	0.76
CHINA	-0.41	-2.52	0.01	84.51	1.33	0.18	-1.48	-0.64	0.52	0.44	1.23	0.22	1.28	1.14	0.25	4.88	1.70	0.09
COLOMBIA	-0.50	-7.25	0.00	101.28	8.22	0.00	0.52	1.40	0.16	1.45	7.71	0.00	1.52	6.96	0.00	2.60	11.65	0.00
CZECH.REPUBLIC	0.05	0.21	0.83	21.46	0.77	0.44	0.84	0.83	0.41	0.48	3.07	0.00	0.48	0.93	0.35	0.13	0.07	0.94
DENMARK	-0.00	-0.01	0.99	81.32	1.81	0.07	3.28	1.98	0.05	-0.50	-0.94	0.34	1.62	1.87	0.06	2.09	2.52	0.01
EGYPT	0.21	1.00	0.32	-2.01	-0.34	0.74	-0.30	-0.74	0.46	0.96	0.93	0.35	0.17	1.48	0.14	-0.16	-0.10	0.92
FINLAND	-0.03	-0.09	0.93	-137.52	-2.38	0.02	-7.65	-3.72	0.00	0.75	1.01	0.31	-2.78	-2.89	0.00	-1.42	-1.41	0.16
FRANCE	-0.09	-1.25	0.21	-23.44	-0.83	0.41	-1.32	-1.38	0.17	0.28	1.06	0.29	-0.56	-1.02	0.31	-0.62	-0.82	0.41
GERMANY	-0.49	-1.46	0.14	101.76	1.40	0.16	2.54	1.09	0.28	0.24	0.41	0.68	1.55	1.38	0.17	1.86	1.12	0.26
GREECE	0.06	1.56	0.12	-35.89	-3.57	0.00	-0.91	-2.31	0.02	1.96	14.38	0.00	-0.65	-3.81	0.00	-3.01	-6.51	0.00
HUNGARY	0.18	0.06	0.96	-50.36	-1.18	0.24	-1.43	-1.24	0.21	0.72	0.47	0.64	-0.83	-5.78	0.00	-1.77	-0.51	0.61
INDIA	-0.53	-8.63	0.00	17.80	0.17	0.86	-1.52	-0.17	0.87	-0.11	-0.28	0.78	-0.17	-0.07	0.94	1.11	4.63	0.00
IRELAND	0.25	0.76	0.45	-23.55	-0.33	0.74	-0.78	-0.40	0.69	0.14	0.10	0.92	-0.22	-0.19	0.85	-0.01	-0.01	0.99
ISRAEL	-0.07	-1.16	0.25	21.80	3.63	0.00	0.66	3.03	0.00	0.05	0.17	0.87	0.36	3.33	0.00	0.38	2.09	0.04
ITALY	-0.05	-0.43	0.67	11.97	0.66	0.51	-0.01	-0.01	0.99	-0.32	-0.61	0.54	0.19	0.91	0.36	0.90	1.10	0.27
JAPAN	-0.02	-0.14	0.89	-165.13	-2.38	0.02	-8.52	-2.88	0.00	-0.24	-0.63	0.53	-3.32	-2.39	0.02	-1.20	-1.10	0.27
MALAYSIA	0.33	3.66	0.00	-118.03	-3.20	0.00	-4.20	-2.34	0.02	0.36	1.28	0.20	-2.04	-2.68	0.01	-2.26	-3.75	0.00
MEXICO	-0.22	-1.65	0.10	40.29	0.81	0.42	-0.34	-0.15	0.88	1.00	0.86	0.39	0.58	0.67	0.50	1.09	0.11	0.91
NETHERLANDS	-0.04	-0.17	0.86	-91.00	-3.06	0.00	-3.70	-3.43	0.00	0.77	1.43	0.15	-1.86	-3.69	0.00	-2.66	-3.46	0.00
NEW.ZEALAND	-1.22	-5.72	0.00	197.66	4.51	0.00	5.42	7.26	0.00	0.22	1.98	0.05	2.74	3.79	0.00	2.57	2.69	0.01
NORWAY	-0.08	-0.40	0.69	46.01	0.98	0.32	2.28	1.35	0.18	0.24	1.45	0.15	0.84	1.06	0.29	-0.00	-0.00	1.00
PERU	-0.31	-2.14	0.03	52.63	1.88	0.06	0.38	0.67	0.50	0.38	1.72	0.09	0.74	1.77	0.08	1.46	2.32	0.02
PHILIPPINES	-0.14	-0.60	0.55	42.72	5.52	0.00	0.37	1.68	0.09	0.94	2.28	0.02	0.72	4.93	0.00	0.84	2.97	0.00
POLAND	-0.08	-0.44	0.66	6.45	0.03	0.98	-1.62	-1.15	0.25	0.59	1.66	0.10	0.05	0.01	0.99	1.19	0.27	0.79
PORTUGAL	0.28	0.56	0.57	-66.55	-0.61	0.54	-1.58	-0.96	0.34	0.58	1.14	0.25	-1.05	-0.66	0.51	-2.15	-0.53	0.60
RUSSIA	-0.74	-3.96	0.00	171.56	3.38	0.00	3.69	1.72	0.09	0.63	4.14	0.00	2.69	3.11	0.00	3.75	4.43	0.00
SOUTH.AFRICA	0.01	0.08	0.94	-4.05	-0.30	0.77	-0.98	-2.59	0.01	1.36	6.37	0.00	-0.07	-0.42	0.67	-0.60	-2.13	0.03
SOUTH.KOREA	-0.21	-1.95	0.05	104.13	3.49	0.00	3.56	3.84	0.00	0.73	1.94	0.05	1.87	3.69	0.00	1.33	1.49	0.14
SPAIN	0.17	4.88	0.00	-23.36	-1.72	0.09	-1.29	-3.79	0.00	1.16	3.27	0.00	-0.30	-1.22	0.22	-0.76	-1.17	0.24
SWEDEN	-0.01	-0.29	0.77	94.19	1.41	0.16	2.36	0.70	0.48	0.43	1.70	0.09	1.88	1.38	0.17	2.85	2.78	0.01
SWITZERLAND	0.50	1.26	0.21	-138.50	-1.62	0.10	-4.73	-1.54	0.12	-0.19	-0.73	0.47	-2.27	-1.80	0.07	-1.89	-1.69	0.09
THAILAND	-0.02	-0.11	0.91	19.42	0.19	0.85	0.18	0.04	0.97	0.59	0.62	0.54	0.37	0.02	0.98	0.34	0.40	0.69
TURKEY	-0.60	-4.61	0.00	122.22	4.01	0.00	0.86	2.56	0.01	0.55	0.75	0.45	1.84	3.77	0.00	4.10	2.45	0.01
UK	-0.09	-0.99	0.32	-52.18	-2.34	0.02	-3.38	-5.28	0.00	0.50	1.53	0.13	-1.13	-3.14	0.00	-0.52	-1.19	0.24
US	0.36	2.55	0.01	-90.18	-2.05	0.04	-3.39	-1.02	0.31	0.96	1.92	0.06	-1.44	-1.34	0.18	-1.90	-5.34	0.00
Pooled	-1.54	-8.28	0.00	266.35	13.08	0.00	1.82	5.52	0.00	5.49	17.79	0.00	3.79	13.46	0.00	4.04	9.17	0.00

Results of regressing each country's ESG rating on the Politics rating, $\text{ESG}_{i,t} = \alpha + \gamma \text{Politics}_{i,t-1} + \varepsilon_t$. All slope coefficients are multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags.

5.7 ESG Ratings and GDP Growth

In this section, we investigate the relationship between ESG indicator ratings and each country's respective GDP growth rate. We want to see if a country's GDP growth (henceforth, GDPG) is relevant to the ESG rating and if ESG can explain some of the growth. A relationship could suggest that ESG is a driver of GDPG or that a country with high GDPG has a higher ESG rating. This would help us interpret the regressions done in subsection 5.5, in terms of extracting the value that ESG indicators add to excess returns through the GDP growth. In addition, we suspect that countries with lower ESG ratings have higher GDP growth and more economic instability.

The data for GDPG come at a quarterly frequency, but the data for the ESG ratings come at an annual frequency. We create the data for the ESG ratings with the same frequency as that of the GDPG. This largely consists in repeating the annual rating four times. Additionally, we run a pooled regression as before to increase statistical power. We regress the GPD growth rate on the ESG indicator rating. Specifically, we run the following regression

$$GDPG_{i,t} = \alpha + \gamma ESG_{i,t-1} + \varepsilon_t, \tag{5.7}$$

where $GDPG_{i,t}$ is the country i GDP growth rate at time t and $ESG_{i,t-1}$ is the last available ESG rating.

Table 5.12 reports the results of regressing the GDP growth rate on ESG ratings. The table reports the estimated coefficients γ, their t-statistics, and the corresponding p-values. For most individual countries, the results are not statistically significant. However, the results of pooled regressions are statistically significant for all ESG indicators. The slope coefficients are negative, which means that an increased ESG rating causes the GDP growth rate to decrease.

Table 5.12: **Regressing GDP Growth on ESG Rating**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	11.97	2.50	0.01	-0.06	-4.12	0.00	-1.64	-4.14	0.00	-22.79	-3.07	0.00	-3.59	-4.49	0.00	-3.30	0.00	-3.87
AUSTRIA	24.46	1.31	0.19	-0.08	-2.25	0.02	-1.95	-1.99	0.05	0.80	0.19	0.85	-4.26	-2.32	0.02	-2.95	0.00	-2.34
BELGIUM	7.99	1.25	0.21	-0.07	-1.83	0.07	-4.09	-1.39	0.16	-4.52	-0.96	0.34	-4.97	-2.06	0.04	-1.82	0.00	-1.60
BRAZIL	8.43	0.69	0.49	0.09	2.46	0.01	1.75	2.67	0.01	7.02	1.39	0.17	4.45	2.43	0.02	-2.53	0.00	-0.97
CANADA	28.99	5.55	0.00	-0.13	-3.05	0.00	-3.36	-2.44	0.01	-13.76	-1.98	0.05	-7.11	-2.61	0.01	-5.93	0.00	-2.45
CHILE	15.89	2.33	0.02	-0.08	-1.47	0.14	-3.59	-1.83	0.07	14.44	2.20	0.03	-4.40	-1.16	0.25	-3.04	0.00	-1.28
CHINA	27.63	4.45	0.00	-0.01	-0.41	0.69	1.13	1.79	0.07	-24.43	-4.56	0.00	0.12	0.12	0.91	-1.51	0.00	-2.27
COLOMBIA	-17.93	-1.41	0.16	0.04	0.60	0.55	-3.92	-0.98	0.33	2.14	0.51	0.61	1.58	0.37	0.71	2.30	0.00	0.82
CZECH.REPUBLIC	-24.04	-1.09	0.28	0.01	0.14	0.89	1.21	0.49	0.62	-4.32	-1.11	0.27	0.02	0.01	1.00	-0.60	0.00	-0.29
DENMARK	29.15	1.55	0.12	-0.04	-1.13	0.26	-0.41	-0.69	0.49	-6.72	-1.50	0.13	-1.49	-0.96	0.34	-1.92	0.00	-1.03
EGYPT	9.63	0.67	0.51	-0.16	-1.73	0.08	-4.13	-3.95	0.00	2.13	1.16	0.25	-4.79	-0.73	0.47	-0.42	0.00	-0.13
FINLAND	34.53	2.36	0.02	-0.22	-3.95	0.00	-3.95	-3.39	0.00	10.69	1.73	0.08	-11.52	-3.63	0.00	-15.37	0.00	-3.15
FRANCE	32.49	4.54	0.00	-0.10	-2.83	0.00	-2.78	-2.57	0.01	-1.39	-0.24	0.81	-5.24	-2.50	0.01	-3.91	0.00	-2.62
GERMANY	5.58	1.02	0.31	0.01	0.35	0.72	0.79	0.68	0.49	12.42	1.24	0.21	1.17	0.57	0.57	-0.48	0.00	-0.31
GREECE	-4.35	-0.11	0.91	-0.25	-2.57	0.01	-8.09	-1.73	0.08	12.10	3.04	0.00	-16.20	-2.71	0.01	-6.23	0.00	-3.07
HUNGARY	2.90	0.21	0.83	-0.39	-2.45	0.01	-7.79	-1.98	0.05	0.75	0.28	0.78	-26.37	-2.86	0.00	-9.66	0.00	-2.13
INDIA	-6.20	-0.83	0.40	0.02	0.62	0.54	0.27	0.56	0.58	-5.43	-0.89	0.37	0.79	0.52	0.60	-0.11	0.00	-0.03
IRELAND	15.21	0.61	0.54	-0.04	-0.23	0.82	-0.52	-0.09	0.93	-4.77	-0.25	0.80	-1.33	-0.13	0.90	-0.71	0.00	-0.12
ISRAEL	-24.13	-0.90	0.37	0.15	0.79	0.43	0.33	0.08	0.94	-1.25	-0.27	0.78	8.75	0.72	0.47	11.16	0.00	1.29
ITALY	23.75	1.84	0.07	-0.16	-1.94	0.05	-2.28	-0.86	0.39	5.77	1.94	0.05	-9.45	-1.53	0.13	-4.81	0.00	-2.36
JAPAN	-18.21	-0.43	0.66	0.00	0.05	0.96	-0.07	-0.09	0.93	1.96	0.63	0.53	0.06	0.04	0.97	0.66	0.00	0.34
MALAYSIA	-25.19	-0.64	0.52	0.06	0.63	0.53	0.81	0.47	0.64	8.84	0.90	0.37	3.02	0.61	0.54	4.53	0.00	0.67
MEXICO	7.60	0.57	0.57	-0.02	-0.45	0.65	-0.14	-0.18	0.86	-0.04	-0.01	0.99	-0.95	-0.42	0.67	-2.96	0.00	-1.33
NETHERLANDS	-11.49	-1.03	0.30	-0.06	-1.18	0.24	-1.75	-1.33	0.18	8.79	1.68	0.09	-3.90	-1.35	0.18	-4.15	0.00	-1.69
NEW.ZEALAND	4.56	0.77	0.44	-0.02	-0.71	0.48	-0.77	-0.98	0.33	7.32	1.12	0.26	-1.09	-0.67	0.50	-0.29	0.00	-0.22
NORWAY	12.09	1.96	0.05	-0.04	-2.44	0.01	-0.89	-2.20	0.03	2.69	0.45	0.65	-2.17	-2.29	0.02	-4.03	0.00	-2.01
PERU	-6.16	-0.54	0.59	-0.01	-0.12	0.90	-3.20	-0.66	0.51	-13.98	-1.94	0.05	-2.17	-0.47	0.64	0.08	0.00	0.03
PHILIPPINES	-24.83	-2.46	0.01	0.16	2.90	0.00	6.67	1.51	0.13	-5.54	-1.19	0.23	2.83	0.44	0.66	10.39	0.00	3.17
POLAND	7.62	0.42	0.68	-0.01	-0.39	0.70	0.40	0.44	0.66	-5.59	-1.91	0.06	-0.65	-0.38	0.70	-0.49	0.00	-0.38
PORTUGAL	14.67	1.51	0.13	-0.04	-0.99	0.32	-1.00	-0.70	0.48	6.55	1.19	0.23	-2.19	-0.88	0.38	-1.69	0.00	-1.16
RUSSIA	12.44	0.85	0.40	-0.04	-0.64	0.52	-0.70	-0.38	0.70	-13.97	-0.99	0.32	-2.17	-0.57	0.57	-2.28	0.00	-0.61
SOUTH.AFRICA	13.03	0.33	0.74	-0.07	-0.27	0.79	-9.19	-3.53	0.00	13.39	4.91	0.00	-2.07	-0.17	0.86	-10.35	0.00	-1.35
SOUTH.KOREA	22.53	0.78	0.44	-0.06	-0.69	0.49	-1.94	-1.16	0.25	-4.24	-0.31	0.76	-3.12	-0.67	0.50	-2.03	0.00	-0.35
SPAIN	40.23	1.18	0.24	-0.24	-1.95	0.05	-3.08	-0.90	0.37	7.10	1.76	0.08	-15.18	-2.02	0.04	-7.77	0.00	-2.62
SWEDEN	-61.50	-0.94	0.35	-0.01	-0.39	0.69	-0.14	-0.21	0.83	-15.61	-2.53	0.01	-0.67	-0.42	0.67	-0.48	0.00	-0.20
SWITZERLAND	21.89	3.32	0.00	-0.07	-1.67	0.10	-1.38	-1.28	0.20	7.78	0.68	0.50	-3.82	-1.42	0.16	-5.42	0.00	-1.56
THAILAND	-12.53	-0.36	0.72	-0.01	-0.05	0.96	-0.82	-0.27	0.79	-1.44	-0.25	0.81	-2.25	-0.29	0.77	1.80	0.00	0.22
TURKEY	-15.34	-0.93	0.35	0.05	0.60	0.55	1.31	0.27	0.79	3.93	0.53	0.59	2.54	0.51	0.61	0.82	0.00	0.41
UK	5.88	0.58	0.56	-0.05	-1.22	0.22	-0.91	-1.51	0.13	6.80	2.14	0.03	-1.97	-1.13	0.26	-4.07	0.00	-2.04
US	-1.66	-0.24	0.81	-0.07	-2.19	0.03	-1.35	-2.15	0.03	4.06	1.13	0.26	-4.02	-2.26	0.02	-5.56	0.00	-2.31
POOLED	3.57	8.69	0.00	-0.02	-8.42	0.00	-0.48	-2.12	0.03	-1.15	-6.43	0.00	-1.43	-7.56	0.00	-1.12	-7.37	0.00

Results of regressing each country's GDP growth rate on the last available ESG rating. $GDPG_{i,t} = \alpha + \gamma ESG_{i,t-1} + \varepsilon_t$. Each slope is multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags.

Now we run the regression the other way around. That is, we regress the ESG ratings on the GDP growth rates. Specifically, we run the following regression

$$ESG_{i,t} = \alpha + \gamma GDPG_{i,t-1} + \varepsilon_t. \tag{5.8}$$

As before, we run this regression for each country individually, and then we run a pooled regression.

Table 5.13 reports the results of regressing the ESG rating on the GDP growth rate. The table reports the estimated coefficients γ, their t-statistics, and the corresponding p-values. Again, for most individual countries, the results are not statistically significant. However, the results of pooled regressions are statistically significant for all ESG indicators. The slope coefficients are negative, which means that an increased GDP growth rage cause the ESG rating to decrease.

In statistical terms, we find evidence of bi-directional Granger causality. On the one hand, an increased ESG rating causes the GDP growth rate to decrease. On the other hand, an increased GDP growth rate causes the ESG rating to decrease. Put differently, the GDP growth Granger-cause the ESG rating (the higher, the lower), and also the ESG rating Granger-cause the GDP growth (the higher, the lower). However, since our data come at a low frequency and the variables are highly persistent, we believe that we just observe a negative correlation between ESG ratings and GDP growth rates instead of bi-directional Granger causality. In particular, an alternative explanation can be as follows: Countries with high ESG ratings tend to have low GDP growth and vice versa.

Table 5.13: **Regressing ESG Rating on GDP Growth**

	Vulnerability			Gain			Economic			Governance			Readiness			Social		
	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val	Slope	*t*-stat	P-val
AUSTRALIA	55.39	2.45	0.01	-161.79	-3.51	0.00	-471.55	-3.66	0.00	-36.47	-3.55	0.00	-268.19	-3.73	0.00	-296.54	0.00	-3.08
AUSTRIA	8.10	0.96	0.33	-63.20	-1.62	0.10	-194.31	-1.81	0.07	5.92	0.16	0.88	-118.30	-1.68	0.09	-166.51	0.00	-1.57
BELGIUM	39.67	1.30	0.19	-82.59	-1.95	0.05	-164.84	-2.60	0.01	-21.74	-0.63	0.53	-125.52	-2.12	0.03	-189.97	0.00	-1.33
BRAZIL	6.44	0.67	0.50	95.77	2.35	0.02	607.32	2.31	0.02	45.53	1.23	0.22	197.98	2.35	0.02	-58.91	0.00	-0.89
CANADA	46.46	1.71	0.09	-126.06	-3.03	0.00	-386.02	-3.46	0.00	-35.41	-1.91	0.06	-205.66	-3.58	0.00	-195.55	0.00	-2.32
CHILE	40.98	1.30	0.20	-52.46	-1.20	0.23	-126.06	-1.45	0.15	57.09	2.02	0.04	-63.93	-1.10	0.27	-122.82	0.00	-1.24
CHINA	69.00	2.72	0.01	-27.11	-0.43	0.67	709.97	1.99	0.05	-95.55	-3.01	0.00	14.78	0.13	0.90	-570.09	0.00	-1.80
COLOMBIA	-23.56	-1.45	0.15	23.31	0.58	0.56	-40.56	-0.55	0.58	27.66	0.49	0.63	23.05	0.28	0.78	82.06	0.00	0.57
CZECH.REPUBLIC	-10.10	-1.25	0.21	5.27	0.09	0.93	65.19	0.06	0.95	-27.24	-0.52	0.60	0.43	0.00	1.00	-36.65	0.00	-0.28
DENMARK	8.74	0.72	0.47	-30.93	-1.11	0.27	-94.53	-0.56	0.58	-23.58	-0.62	0.54	-53.11	-0.88	0.38	-41.22	0.00	-0.82
EGYPT	4.20	0.75	0.46	-6.09	-0.56	0.58	-53.24	-0.80	0.42	31.17	1.08	0.28	-7.98	-0.32	0.75	-1.88	0.00	-0.13
FINLAND	14.56	1.59	0.11	-53.17	-2.21	0.03	-224.26	-2.22	0.03	16.08	0.98	0.33	-91.78	-2.24	0.03	-67.16	0.00	-1.98
FRANCE	33.60	1.64	0.10	-133.17	-2.29	0.02	-382.62	-2.27	0.02	-11.25	-0.29	0.77	-232.74	-2.22	0.03	-304.34	0.00	-1.86
GERMANY	5.37	0.89	0.38	6.91	0.34	0.74	50.82	0.61	0.54	18.81	1.30	0.19	19.20	0.52	0.60	-12.05	0.00	-0.30
GREECE	-0.37	-0.09	0.93	-19.08	-1.77	0.08	-32.76	-1.56	0.12	141.65	3.58	0.00	-38.54	-1.90	0.06	-224.51	0.00	-3.18
HUNGARY	2.08	0.02	0.99	-38.46	-4.57	0.00	-94.94	-2.17	0.03	13.32	0.01	0.99	-74.84	-5.40	0.00	-142.89	0.00	-4.85
INDIA	-9.96	-0.48	0.63	26.56	0.62	0.54	149.74	0.52	0.61	-19.20	-0.62	0.53	43.15	0.48	0.63	-1.10	0.00	-0.00
IRELAND	2.13	0.43	0.67	-1.87	-0.16	0.87	-2.08	-0.06	0.95	-1.19	-0.20	0.84	-1.61	-0.09	0.93	-1.57	0.00	-0.09
ISRAEL	-4.51	-0.84	0.40	10.05	0.65	0.51	3.25	0.08	0.93	-5.51	-0.22	0.83	15.58	0.63	0.53	49.00	0.00	1.31
ITALY	25.04	1.36	0.17	-30.35	-1.44	0.15	-40.20	-0.78	0.44	127.79	1.51	0.13	-35.66	-1.40	0.16	-194.59	0.00	-2.19
JAPAN	-1.16	-0.42	0.67	1.70	0.05	0.96	-14.07	-0.08	0.94	10.39	0.63	0.53	2.24	0.03	0.97	10.40	0.00	0.29
MALAYSIA	-5.92	-0.70	0.48	18.79	0.71	0.48	38.55	0.42	0.67	13.08	0.80	0.42	31.65	0.65	0.51	43.33	0.00	0.66
MEXICO	4.99	0.57	0.57	-19.78	-0.52	0.60	-42.66	-0.19	0.85	-0.33	-0.00	1.00	-34.56	-0.50	0.62	-60.69	0.00	-1.18
NETHERLANDS	-21.56	-1.06	0.29	-46.18	-1.10	0.27	-219.30	-1.40	0.16	65.94	0.64	0.52	-113.93	-1.67	0.09	-188.43	0.00	-1.88
NEW.ZEALAND	18.28	0.80	0.42	-29.40	-0.76	0.45	-120.62	-0.97	0.33	11.80	0.74	0.46	-40.51	-0.68	0.49	-12.71	0.00	-0.23
NORWAY	11.95	1.95	0.05	-32.66	-2.43	0.02	-128.58	-2.25	0.02	4.03	0.46	0.64	-53.37	-2.30	0.02	-35.55	0.00	-2.16
PERU	-6.60	-0.27	0.79	-2.15	-0.00	1.00	-13.16	-0.29	0.77	-20.76	-0.91	0.36	-10.89	-0.03	0.98	1.25	0.00	0.00
PHILIPPINES	-35.10	-1.90	0.06	23.60	1.25	0.21	26.47	1.23	0.22	-86.06	-0.95	0.34	12.10	0.41	0.68	95.89	0.00	2.98
POLAND	2.28	0.32	0.75	-8.49	-0.40	0.69	22.27	0.10	0.92	-41.21	-1.60	0.11	-14.70	-0.30	0.77	-25.15	0.00	-0.33
PORTUGAL	37.02	0.90	0.37	-64.72	-0.50	0.61	-113.48	-0.49	0.62	80.52	1.42	0.16	-92.42	-0.40	0.69	-244.30	0.00	-0.81
RUSSIA	16.27	0.81	0.42	-27.55	-0.66	0.51	-53.13	-0.41	0.68	-12.23	-0.62	0.54	-38.83	-0.60	0.55	-51.12	0.00	-0.57
SOUTH.AFRICA	3.83	0.38	0.70	-3.72	-0.21	0.83	-145.88	-1.98	0.05	202.31	2.89	0.00	-3.60	-0.14	0.89	-67.24	0.00	-0.77
SOUTH.KOREA	13.72	0.58	0.56	-42.34	-0.48	0.63	-149.32	-0.69	0.49	-10.30	-0.27	0.79	-70.95	-0.46	0.64	-53.23	0.00	-0.27
SPAIN	15.90	0.59	0.56	-45.19	-1.54	0.12	-97.04	-0.60	0.55	173.75	1.05	0.29	-74.48	-1.62	0.11	-300.16	0.00	-2.37
SWEDEN	-2.90	-0.81	0.42	-14.08	-0.38	0.71	-40.73	-0.20	0.84	-38.09	-1.57	0.12	-31.05	-0.41	0.68	-14.33	0.00	-0.17
SWITZERLAND	22.10	1.52	0.13	-44.74	-1.22	0.22	-150.91	-1.00	0.32	16.89	0.71	0.48	-67.38	-1.09	0.27	-68.12	0.00	-1.26
THAILAND	-2.92	-0.35	0.72	-0.61	-0.00	1.00	-10.74	-0.04	0.97	-10.06	-0.24	0.81	-4.14	-0.01	0.99	8.39	0.00	0.19
TURKEY	-4.62	-0.85	0.40	7.17	0.44	0.66	3.47	0.26	0.80	6.23	0.52	0.61	9.71	0.32	0.75	19.44	0.00	0.05
UK	7.36	0.50	0.62	-42.22	-0.64	0.52	-264.97	-0.78	0.43	152.90	2.31	0.02	-77.08	-0.62	0.54	-119.18	0.00	-1.56
US	-5.71	-0.25	0.80	-142.06	-2.90	0.00	-776.15	-3.59	0.00	53.96	0.67	0.50	-289.83	-3.55	0.00	-147.29	0.00	-1.63
POOLED	93.73	4.99	0.00	-134.00	-5.27	0.00	-65.27	-1.89	0.06	-216.98	-4.57	0.00	-174.27	-4.94	0.00	-240.58	-5.49	0.00

Results of regressing each country's ESG rating on the last available GDP growth rate: $ESG_{i,t} = \alpha + \gamma GDPG_{i,t-1} + \varepsilon_t$. Each slope is multiplied by 100. Standard errors are computed using the Newey-West estimator with 12 lags.

5.8 A Closer Look at Period 2000-2010

As previously observed in Section 5.1, the returns on the spread portfolios appear to be statistically significant over the period from 2000 to 2010. This section aims to take a closer look at the relationship between the portfolio returns and ESG ratings over this period. We investigate the potential drives of this significant relationship.

First of all, we conduct a univariate portfolio sort on Developed and Emerging countries separately. The goal is to investigate what type of country is the main driver of the relationship between the ESG ratings and international stock market returns. Our methodology is the same as that used in Section 5.1. In brief, we construct four portfolios: P1(H), P2, P3, and P4(L), and then find the return of the spread portfolio L-H. Table 5.14 reports the average annual returns for the univariate-sorted portfolios for Developed and Emerging countries. There are only a few spread portfolios with statistically significant returns. However, there is a clear-cut pattern: the return to the spread portfolio of Developed countries is negative, while the return to the spread portfolio of Emerging countries is positive. Figure 5.2 plots the cumulative return to the L-H portfolio constructed by various ESG ratings for Developed and Emerging countries separately. The plots in this figure support our observation. Therefore, our conclusion is that Emerging countries mainly drive the relationship between the ESG ratings and international stock market returns.

Table 5.14: **ESG Portfolio Returns, Developed vs Emerging Countries**

	P1(H)	P2	P3	P4(L)	L-H	P1(H)	P2	P3	P4(L)	L-H
	Vulnerability, Developed countries					**Vulnerability, Emerging countries**				
Mean return	8.88	5.59	8.55	4.40	-4.49*	13.04*	18.86*	19.89*	19.94	6.90
P-value	(0.54)	(0.25)	(0.52)	(0.31)	(0.05)	(0.08)	(0.02)	(0.05)	(0.22)	(0.12)
Sharpe ratio	0.40	0.25	0.43	0.24	-0.58	0.46	0.69	0.84	0.82	0.35
	Gain, Developed countries					**Gain, Emerging countries**				
Mean return	9.15	8.27	4.10	6.20	-2.95	17.27	15.94*	17.48*	22.72*	5.45
P-value	(0.28)	(0.29)	(0.61)	(0.43)	(0.19)	(0.11)	(0.08)	(0.09)	(0.02)	(0.18)
Sharpe ratio	0.40	0.41	0.21	0.29	-0.29	0.62	0.61	0.69	0.96	0.29
	Economic, Developed countries					**Economic, Emerging countries**				
Mean return	6.31	10.60	4.24	6.54	0.23	20.79*	16.12*	18.12*	18.01*	-2.78
P-value	(0.40)	(0.19)	(0.64)	(0.40)	(0.93)	(0.04)	(0.10)	(0.07)	(0.09)	(0.58)
Sharpe ratio	0.32	0.51	0.19	0.30	0.02	0.76	0.66	0.71	0.72	-0.15
	Governance, Developed countries					**Governance, Emerging countries**				
Mean return	9.16	7.65	4.80	5.98	-3.18	16.99	14.31	20.39	20.66	3.66
P-value	(0.25)	(0.41)	(0.54)	(0.42)	(0.15)	0.09	0.10	0.06	0.04	0.22
Sharpe ratio	0.42	0.35	0.24	0.30	-0.33	0.66	0.57	0.79	0.82	0.20
	Readiness, Developed countries					**Readiness, Emerging countries**				
Mean return	8.49	8.33	4.61	6.18	-2.31	15.96	18.68*	15.56	23.48*	7.52*
P-value	(0.31)	(0.29)	(0.57)	(0.43)	(0.34)	(0.15)	(0.03)	(0.11)	(0.03)	(0.03)
Sharpe ratio	0.38	0.43	0.22	0.29	-0.23	0.59	0.77	0.58	0.98	0.43
	Social, Developed countries					**Social, Emerging countries**				
Mean return	7.99	6.61	9.56	2.46	-5.54	16.98*	17.02	15.69	24.33*	7.36
P-value	(0.37)	(0.40)	(0.18)	(0.78)	(0.11)	(0.10)	(0.13)	(0.11)	(0.01)	(0.13)
Sharpe ratio	0.35	0.32	0.51	0.11	-0.49	0.59	0.63	0.68	1.00	0.45

This table reports annualized average returns for the univariate sorted portfolios. The first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. "L-H" refers to the low minus high spread portfolios. Portfolios are rebalanced annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 2000-2010.

Figure 5.2: **Cumulative returns to the spread portfolios of developed and emerging countries**

Cumulative return to the L-H portfolio constructed by various ESG ratings. Developed countries versus emerging countries.

Second, we conduct a univariate portfolio sort on High political risk countries and Low political risk countries separately. Again, the aim is to examine what type of country is the main driver of the relationship between the ESG ratings and international stock market returns. We divide all countries into two equal groups using their average Politics ratings. Table 5.15 lists the countries with High and Low political risk. Table 5.15 reports the average annual returns for the univariate-sorted portfolios for Low- and High-risk countries. The return on the spread portfolio of the Low-risk countries is negative but is not statistically significant. In contrast, the return on the spread portfolio of the High-risk countries is typically positive and statistically significant. Figure 5.3 plots the cumulative return to the L-H portfolio constructed by various ESG ratings for Low and High-risk countries separately. The plots in this figure support our observation. Therefore, we conclude that the High-risk countries mainly drive the relationship between the ESG ratings and international stock market returns.

Table 5.15: **High and Low political Risk Countries**

	Political risk	
	High	**Low**
1	PHILIPPINES	JAPAN
2	PERU	PORTUGAL
3	THAILAND	NEW ZEALAND
4	ISRAEL	SPAIN
5	COLOMBIA	CANADA
6	TURKEY	CHILE
7	ITALY	SWEDEN
8	EGYPT	FRANCE
9	SOUTH KOREA	NORWAY
10	MEXICO	NETHERLANDS
11	CZECH REPUBLIC	US
12	RUSSIA	GERMANY
13	INDIA	UK
14	POLAND	GREECE
15	SOUTH AFRICA	IRELAND
16	MALAYSIA	AUSTRALIA
17	BRAZIL	AUSTRIA
18	CHINA	DENMARK
19	HUNGARY	SWITZERLAND
20	BELGIUM	FINLAND

Table 5.16: **ESG Portfolio Returns, High Risk vs Low Risk Countries**

	P1(H)	P2	P3	P4(L)	L-H	P1(H)	P2	P3	P4(L)	L-H
	Vulnerability, Low risk countries					**Vulnerability, High risk countries**				
Mean return	10.10	6.55	6.04	5.93	-4.18	13.60*	14.91*	20.65	19.94*	6.33
P-value	(0.40)	(0.49)	(0.44)	(0.25)	(0.25)	(0.08)	(0.02)	(0.14)	(0.10)	(0.25)
Sharpe ratio	0.45	0.29	0.28	0.35	-0.38	0.57	0.55	0.84	0.82	0.33
	Gain, Low risk countries					**Gain, High risk countries**				
Mean return	7.81	9.31	4.10	7.00	-0.81	13.24	16.47*	17.48*	22.72*	9.47*
P-value	(0.38)	(0.23)	(0.61)	(0.42)	(0.78)	(0.15)	(0.08)	(0.09)	(0.02)	(0.04)
Sharpe ratio	0.33	0.46	0.21	0.31	-0.06	0.55	0.63	0.69	0.96	0.56
	Economic, Low risk countries					**Economic, High risk countries**				
Mean return	4.20	11.29	4.52	7.00	2.80	20.79*	13.49	18.56*	18.01*	-2.78
P-value	(0.57)	(0.16)	(0.61)	(0.42)	(0.40)	(0.04)	(0.15)	(0.04)	(0.09)	(0.58)
Sharpe ratio	0.21	0.55	0.21	0.31	0.20	0.76	0.56	0.80	0.72	-0.15
	Governance, Low risk countries					**Governance, High risk countries**				
Mean return	8.52	8.32	6.74	3.80	-4.72	13.83	14.53*	20.39*	20.66*	6.82*
P-value	(0.33)	(0.33)	(0.36)	(0.66)	(0.15)	(0.16)	(0.07)	(0.06)	(0.04)	(0.06)
Sharpe ratio	0.37	0.39	0.36	0.17	-0.38	0.52	0.65	0.79	0.82	0.38
	Readiness, Low risk countries					**Readiness, High risk countries**				
Mean return	8.25	8.52	4.59	7.00	-1.24	12.35	17.90*	16.13*	23.48*	11.13*
P-value	0.29	0.31	0.57	0.42	0.68	(0.18)	(0.04)	(0.10)	(0.03)	(0.02)
Sharpe ratio	0.40	0.40	0.22	0.31	-0.09	0.51	0.75	0.60	0.98	0.64
	Social, Low risk countries					**Social, High risk countries**				
Mean return	8.65	6.40	7.34	5.65	-3.00	13.13	16.67	16.27	24.33*	11.21*
P-value	(0.36)	(0.40)	(0.33)	(0.52)	(0.29)	(0.12)	(0.12)	(0.11)	(0.01)	(0.00)
Sharpe ratio	0.35	0.32	0.36	0.27	-0.22	0.55	0.63	0.67	1.00	0.70

This table reports annualized average returns for the univariate sorted portfolios. The first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. "L-H" refers to the low minus high spread portfolios. Portfolios are rebalanced annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 2000-2010.

Figure 5.3: **Cumulative returns to the spread portfolios of high and low risk countries**

Cumulative return to the L-H portfolio constructed by various ESG ratings. Low political risk countries versus high political risk countries.

Third and finally, we investigate how changes in ESG rating affect stock market returns. The methodology is the same as before: we construct four portfolios. Now, instead of ESG ratings, we sort the portfolios using the first differences of ESG ratings. Because the ratings of the Economic indicator are the same over 2000-2004, we use the data over 2004-2010 for this indicator. Table 5.17 shows the returns to the portfolios sorted by the first differences in ESG ratings for the various ESG indicators. We find that 5 out of 6 ESG indicators have statistically significant negative returns for the spread portfolio. This result suggests that the countries that most improved their ratings produce the highest returns, while those that most worsened have the lowest returns. Figure 5.4 provides the visual representation of the cumulative returns.

Overall, we conclude that the main drivers of the relationship between the ESG ratings and international stock market returns are the Emerging, High-risk countries that most improved their ESG ratings.

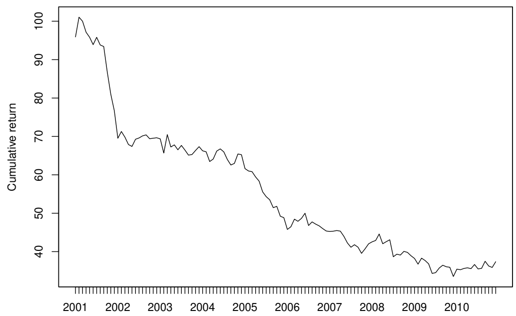
Table 5.17: **Change in ESG Ratings and Portfolio Returns**

	P1 (H)	**P2**	**P3**	**P4 (L)**	**L-H**
(a) Sort with respect to Vulnerability					
Mean return	22.83	13.43	12.72	13.62*	-9.21*
P-value	(0.16)	(0.17)	(0.13)	(0.02)	(0.00)
Sharpe ratio	0.94	0.61	0.57	0.62	-0.85
(b) Sort with respect to Gain					
Mean return	20.22*	16.01*	11.62	14.01	-6.21*
P-value	(0.04)	(0.08)	(0.19)	(0.15)	(0.07)
Sharpe ratio	0.84	0.74	0.52	0.62	-0.55
(c) Sort with respect to Economic					
Mean return	14.61	13.45	14.78	13.57	-1.04
P-value	(0.30)	(0.28)	(0.27)	(0.26)	(0.83)
Sharpe ratio	0.56	0.56	0.63	0.51	-0.08
(d) Sort with respect to Governance					
Mean return	20.03*	14.93	13.40	13.16	-6.87*
P-value	(0.03)	(0.09)	(0.14)	(0.20)	(0.03)
Sharpe ratio	0.89	0.68	0.61	0.55	-0.70
(d) Sort with respect to Readiness					
Mean return	20.90*	15.48	12.16	13.32	-7.59*
P-value	(0.03)	(0.09)	(0.19)	(0.15)	(0.01)
Sharpe ratio	0.91	0.70	0.54	0.58	-0.71
(d) Sort with respect to Social					
Mean return	16.59*	15.19	16.40*	11.72	-4.88*
P-value	(0.09)	(0.11)	(0.07)	(0.18)	(0.05)
Sharpe ratio	0.68	0.65	0.78	0.55	-0.51

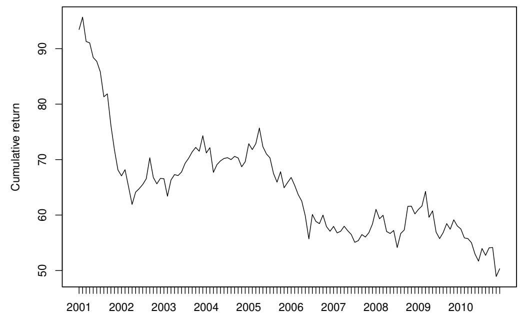
This table reports annualized average returns for the univariate sorted portfolios. The first portfolio "P1 (H)" refers to the top and the last portfolio "P4 (L)" refers to the bottom quintiles. "L-H" refers to the low minus high spread portfolios. Portfolios are rebalanced annually. Returns are in percentages and are denominated in USD including dividends. P-values are Newey-West and are in parenthesis, and asterisk (*) denotes a statistical significance of at least 10 %. The data is monthly and spans 2000-2010.

Figure 5.4: **Cumulative returns to the spread portfolios**

(a) Vulnerability

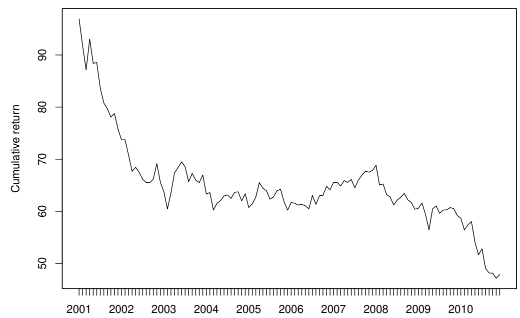


(b) Gain



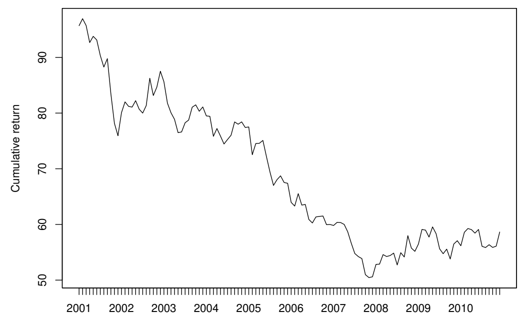
(c) Economic

(d) Governance



(e) Readiness

(f) Social



Cumulative return to the L-H portfolio constructed by various ESG ratings. First differences of ESG ratings are used.

Chapter 6

Conclusions

In the first part of this thesis, we investigate the impact of Politics-Policy ratings on international stock returns using the Ifo World Economic Survey survey data. We document that the univariate spread portfolio that is long on the low politics (policy) portfolio and short on the high politics (policy) portfolio generates a statistically significant return of 6.77% (6.50%). The bivariate spread portfolio (P-factor portfolio) that is long on the low politics-policy portfolio and short on the high politics-policy portfolio generates a statistically significant return of 10.22%. This P-factor captures common systematic variation across countries leading to priced global political risk. Various asset pricing tests confirm that the politics, policy, and P-factor risks are priced in the cross-section of international stock returns. In particular, we demonstrate that the P-factor is priced in the market with a risk premium of 7.24% for the unit exposure to the P-factor risk. We show that the GRS test applied to both univariate and bivariate sorted portfolios augmented with the P-factor cannot reject the null hypothesis that all pricing errors are jointly zero. For the most part, our results in this part of the thesis agree well with the results documented by Gala et al. (2020).

In the second part of this thesis, we investigate the impact of ESG ratings on international stock returns using the Notre-Dame indices, which split the ESG rating into six different indicators. These indicators are Vulnerability, Gain, Economic, Readiness, Social, and Government indicators (ratings). We use the same methodology as in the first part. Specifically, we construct univariate sorted portfolios and investigate the return on the spread (Low-High) portfolio. Unfortunately, using the data over the total sample that covers 1995-2019, we do not find evidence that the return on the spread portfolios is statistically significantly different from zero. Still, we are able to find a relationship between country returns and ESG ratings after controlling for country characteristics. However, we do find evidence that the spread portfolios generated abnormal returns from 2000 to 2010. In particular, over this period, the return on the portfolio of the low-rated countries was statistically significantly higher than the return on the portfolio of the high-rated countries. We show that an improvement in ESG ratings negatively impacts a country's stock market returns. Our results suggest that high Policy-Politics ratings tend to cause high ESG ratings. We document that the country's ESG rating affects the country's GDP growth rate and vice versa.

Further, we take a closer look at the relationships from 2000 to 2010. We construct univariate sorted portfolios for Developed and Emerging countries separately. We do not find significant results in this study. Yet, our results suggest that the return on the spread portfolio of Developed (Emerging) countries tends to be negative (positive). We construct univariate sorted portfolios for the Low political and high political risk countries separately. We find that the spread portfolio of High political risk countries generates a positive and statistically significant return. Finally, we investigate how the change in the ESG ratings affects the returns. We find that countries that improve (worsen) their ESG ratings tend to produce higher (lower) returns.

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