The expected returns of ESG excluded stocks. Shocks to firms' costs of capital? Evidence from the World's largest fund

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June 2023

Abstract

We investigate the link between ESG-based portfolio exclusions and the expected returns of excluded firms. The exclusions of Norway's "Oil Fund," the world's largest SWF, provide a sample of stocks that face widespread exclusions by institutional investors. The portfolios of excluded firms have significantly superior performance (alpha) of about 5%. Excluded stocks have a return premium, as predicted by e.g. Pastor et.al (2021). Investigating the corporate reactions to exclusion, we find that companies with low ESG scores at the time of exclusion (scope for improvement), and higher revenue growth (investment needs) are more likely to get their exclusion revoked, which we interpret as evidence of dynamics: Firms improve their ESG to revoke exclusions and achieve lower cost of capital. In fact, firms that get off the exclusion list do not have superior performance going forward.

Keywords: ESG investing; Exclusions; Cost of Capital
JEL Codes: G10; G11; G20

Introduction

We study ethical exclusions from institutional investor portfolios in the context of the exclusions by Norway's Government Pension Fund Global (GPFG), better known as the oil fund. The implication of such preference-based exclusions is a central question in sustainable finance, a research field with a high amount of current interest. However, as argued in Starks (2023)'s recent presidential address to the AFA, there is still a lot of ambiguity in this research, as researchers have yet to agree on the definitions of the many terms used here, such as Sustainability, ESG (Environmental Social and Governance), SRI (Socially Responsible Investing) and CSR (Corporate Social Responsibility). For our purposes, we will use ESG as a general term implying the consequences of corporate actions beyond pure cash flow.

Theoretically, there are two groups of explanations linking ESG and equity performance, pecuniary and non-pecuniary views.[1] The pecuniary view, or "doing well by doing good," argues that stock prices currently do not fully incorporate the consequences of future sustainability shocks, i.e. it is a mispricing argument, as in the short-termism literature (Stein, 1989). With this view, over time more responsible/sustainable (good ESG) firms will do better, and there will be a return premium associated with ESG.

With the non-pecuniary view investors have preferences over both the monetary return from an investment and that investment's ESG characteristics. For example, investors can feel satisfaction in not supporting gun violence through the avoidance of weapon manufacturers (negative screening). On the other hand, investors may want to support clean energy generation and get extra utility from investing in such energy companies. In equilibrium, such preferences will support lower returns for firms with high ESG. Heinkel et al. (2001) Pástor et al. (2021) Pedersen et al. (2021) are examples of models of this trade-off. In equilibrium, a number of firms will be excluded from the portfolios of responsible investors, and pay a higher cost of capital. Firms are aware of this. Firms can choose to take steps to improve their ESG to achieve a lower cost of capital, but will only do so if the cost of improving ESG is lower than their cost

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[1]This categorization is from a recent survey paper, Hong and Shore (2023).

of capital gain.

Both these types of models have predictions for the return difference between high quality and low quality ESG firms, let us call it the green return premium. With the pecuniary view, it is positive. With the non-pecuniary view, it is negative.

In our research, we will provide an estimate of this green return premium using the exclusions by GPFG. We believe using these exclusions are particularly useful for this estimation. The GPFG is one of the World's largest Sovereign Wealth Funds, with assets under management over 1 trillion USD in 2021.[2] Our data sample starts in 2004, giving us a long time period, necessary for estimating returns (Merton, 1980). The GPFG exclusions are decided upon by a committee set up by the Norwegian Parliament, which needs to show clear evidence that a given firm violates ethical norms before exclusions are effected. The exclusions of the GPFG are thus distinct from exclusions based on ESG rankings, as the ethical committee investigates each firm, often also communicating with the firm, before recommending exclusion. This leads us to argue that the GPFG's exclusions is a list of "worst offenders."[3] Unlike many other institutional investor exclusions, the divestments by the GPFG are publicly announced, which has led them to be used as a model for many institutional investors, which typically follow the GPFG's exclusions.

We find that we, in agreement with much of the relevant literature, estimate a negative green return premium, thus supporting the non-pecuniary view. Where we add to the literature is by the magnitude of the premium. We find a point estimate of approximately -5% in annual terms. The question of the size of the green premium is still an unsettled question in the literature. It is addressed by e.g. Luo and Balvers (2017) and Berk and van Binsbergen (2021). These papers ask what is a reasonable magnitude of the price change necessary to induce an already well-diversified investor to take the other side to the divesting investors. Berk and van Binsbergen argue that as stocks are close substitutes, the magnitude of this price effect is necessarily small. There is

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[2]It was surpassed as the largest SWF by China Investment Corporation in 2022.

[3]In the terminology of Starks (2023), the GPFG exclusions are the result of a *values* judgement, not results of a *value* estimate.

however one troubling feature of the Berk and van Binsbergen model. It relies on agreement about the ESG standing of a given firm. However, empirical evidence points to widespread disagreement in ESG rankings by providers of ESG scores (Avramov et al., 2022; Berg et al., 2022). Situations with updates in perception of a firm's ESG quality can potentially lead to substantial changes in demand for a given stock. This is one of the motivations for the present study.

Our second contribution is to provide an understanding of the above-mentioned tradeoff between a higher cost of capital for excluded firms, and the costs of changing ESG profile to avoid being excluded. When firms evaluate this trade-off, it is evaluating the probability of facing future exclusions (and higher cost of capital). When the GPFG announces that it has excluded a firm, this firm moves from *potential* to *actual* future exclusions. At this point, the firm needs to re-evaluate. It needs to ask: Is it *now* worthwhile to pay the cost necessary to reverse the exclusion?

To investigate this question, we look at the GPFG's decisions to revoke their exclusions. From 2005 to 2021, 26 of the GPFG's exclusions have been revoked, mainly because the firms took actions to remove the offending activities, by changing their product mix, selling off subsidiaries, etc. We evaluate the corporate decisions driving these actions with a number of analyses. Firstly, looking at the cost of changing ESG profiles, we find that firms with low ESG scores at the time of exclusion are more likely to get their exclusion revoked – possibly because their cost of ESG improvement was small, as they were starting from a low base. Secondly, we investigate firms capital needs. Higher costs of capital will primarily hurt when firms raise *new* capital, either through a SEO or debt issue. We find that firms with high revenue growth – likely to need to raise capital – are also more likely to get their exclusion revoked. We also look at the number of deals where firms raise new equity (SEO's), and find that firms that got their exclusion revoked are more likely to raise new equity capital. All of these results are consistent with the idea that firms react to shocks to the cost of capital, and attempt to fight staying excluded.

A final supporting result concerns the firms that have had their exclusions revoked. After these firms are "let back in the warmth" their returns fall back

immediately, which we demonstrate by constructing a post-exclusion portfolio. The return of this portfolio shows no sign of superior performance.

From society's point of view, our results can be interpreted as a sign that exclusions achieve their stated goals. The higher capital cost discourages investment in low-rated ESG projects, as only projects able to sustain the high returns demanded survive. The more marginal firms have to change their ESG profile.

The structure of the paper is as follows. Section 1 gives an overview of the issues and discusses the literature, before giving some background on the Norwegian Government Pension Fund Global (GPFG) in Section 2. Section 3 discusses the data sources and gives some summary statistics. Section 4 demonstrates that portfolios of excluded firms provide superior performance, and use this to provide an estimate of the green return premium. Section 5 investigates firms who have had their exclusion revoked. We finally offer a short conclusion. A separate Appendix provides additional supportive analysis.

1 Literature and research issue

We are analyzing investment decisions by institutional investors, how they are affected by environmental, social, and governance (ESG) considerations, and the equilibrium implications for stock returns. While the concept of ethical investing has a long history (Liang and Renneboog, 2017), it is in the last fifteen years or so that the ESG viewpoint has moved to the forefront. Mutual funds marketed as "socially responsible" and "sustainable" have seen large inflows, to the extent that today, one third of U.S. assets under management are subject to a sustainable investment strategy (SIF, 2020).[4] Regulation is also a driver of the increased ESG focus. The best-known example is the EU's introduction of a taxonomy of sustainable activities, which directly affects institutional investors allocations.

From a large institutional investor's point of view, ESG considerations will affect all their portfolio decisions. The investor's investment universe needs

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[4]For the practitioner view of the state of ESG, see the Special report on ESG investing in the 23 July 2022 issue of *The Economist*.

ranking in the ESG dimension, which will affect over- and under-weighting decisions. For low ESG ranked stocks, an institutional investor will react by either dialogue or divestment. The most common reaction from institutional investors is dialogue, either directly, or through voting at the annual meeting. Institutional investors argue that dialogue is a better way of achieving change. There is also research pointing to the value effect of dialogue.[5]

Exclusion is chosen in only a minority of cases and is viewed as a reaction of last resort. Even if it is a last resort, the number of stocks seeing widespread exclusions is increasing. Our first empirical investigation will be to construct the return of the portfolio of firms excluded by the oil fund and estimate the abnormal return (alpha) for this portfolio. We will use this alpha as an estimate of the return differential between high-quality vs low-quality ESG firms.

To simplify the discussion, let us label the stocks with high-quality ESG rankings "green" and those with low-quality ESG ratings "brown". As mentioned in the introduction, there are two theoretical approaches to generate a price (return) difference between brown and green stocks.

The first is a mispricing argument. With this view, current stock prices do not fully reflect the ESG consequences of firms' choices, either because brown stocks' prices e.g. do not endogenize the future climate consequences, or because the stock market does not appreciate the potential higher future returns for green firms "preparing for the new circular economy." One theoretical approach that generates such results is the classical short-termism argument of e.g. Stein (1989). While the short-termism argument is general, in the context of ESG, a prime source of disagreement concerns future *regulation*. As countries have to adapt to international agreements such as the Paris Climate Accords, firms will be facing intrusive regulation of climate-related aspects of their operations. Disagreement as to the degree of intrusion will translate into differences in views on cash flow consequences of regulation.[6]

The first argument is framed in a traditional risk-return framework. The

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[5]Dimson et al. (2021), Jagannathan et al. (2022) and Lewellen and Lewellen (2022) provides empirical evidence. Broccardo et al. (2021) provides theoretical arguments.

[6]Empirical evidence consistent with such different views is the differences between Democratic and Republican CEOs in their approach to ESG (Di Giuli and Kostovetsky, 2014).

second type of argument moves beyond this, by introducing nonpecuniary preferences, where the ESG component of a firm directly affects utility functions. For example, one allows the (dis)utility of potential owners (stock buyers) from owning stock in a company employing child labour, and lets this enter the utility function.[7]

The argument of e.g. Pástor et al. (2021) is that when there is a subset of investors that gets utility from green stocks beyond the pure monetary return, green stocks can sustain lower returns.[8]

There is, however, a tradeoff. The higher expected returns for brown firms also mean that costs of capital for these firms are higher. Thus, when financing new investments, the brown firms will face a steeper hurdle rate than green firms. These brown firms will then have an incentive to become greener to access cheaper capital. In equilibrium, this will be a true tradeoff. In a model that explicitly model this tradeoff in the context of climate risk, Hong et al. (2023) shows that the equilibrium return difference between green and brown stocks in their setting equals $-m/q$, where m is the firm spending on mitigating externalities (as a fraction of firm capital) and q is the price of capital. More generally, we expect firms to be trading off the costs of improving ESG with the benefits of a lower cost of capital. In equilibrium there will be a set of excluded firms where the costs of improving ESG outweigh the expected gains from a lower cost of capital.

By Hong et al.'s argument the green return premium will be proportional to the costs of ameliorating externalities, which can be sizeable. Their argument thus implies that the green return premium can be large. Countering this is an argument of e.g. Luo and Balvers (2017) and Berk and van Binsbergen (2021). Instead of looking at it from the company's point of view, they ask: What will investors do when faced with the opportunity of earning such a

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[7]While the theoretical models typically only consider the preferences of equity buyers, a related argument concerns corporate management. ESG considerations may drive management to deviate from profit-maximizing behavior, either directly from CEO/Management preferences (as in Di Giuli and Kostovetsky (2014)), or indirectly, through large owners threat of exit affecting managerial decisions – the governance channel (Admati and Pfleiderer, 2009; Gantchev et al., 2022).

[8]Models with similar results include Pedersen et al. (2021) and Zerbib (2022). See also recent surveys by (Gillan et al., 2021, Section 5.2) and Hong and Shore (2023).

large return premium? If there is a large enough pool of investors who do not care about the causes of exclusion, they will overweight their portfolios with excluded firms, pushing the prices up (and returns down). This is close to an arbitrage argument, relying on stocks being close substitutes. By the Berk and van Binsbergen argument, if there is a green return premium, it will be small in magnitude.

Finally, Avramov et al. (2022), points to a moderating effect to the ESG-return relationship: ESG uncertainty. Empirical evidence shows that the various ESG ranking providers do not agree on their ESG rankings (Berg et al., 2022). This introduces noise in any ESG-return relationship estimation, including the Berk and van Binsbergen (2021) argument.

If we now turn to the empirical implications of the above theoretical discussion, These two theoretical models have clear empirical predictions for the return difference between green and brown stocks (the green return premium). Under the pecuniary view, the green return premium will be positive. Under the non-pecuniary view, this premium will be negative. There are less clear predictions on the magnitude of any premium.

There is a voluminous empirical literature that provides estimates of a green return premium, with various assumptions as to what ESG aspect is relevant, and variations in asset choice.[9]

One strand of this literature investigates the performance of mutual funds with varying degrees of ESG. For example, Renneboog et al. (2008) find that green funds underperform. Liang et al. (2022), who looks at the returns of hedge funds, shows that funds that endorse the United Nations Principles for Responsible Investment (PRI) underperforms other hedge funds by, on average, 2.45% per annum.[10]

Our research complements this literature by looking directly at the stocks in question, without the additional layer of the institutional investors. As such,

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[9]Surveys of empirical studies of ESG and performance include (Coqueret, 2021) and (Whelan et al., 2021).

[10]There is some discussion as to which degree endorsing the PRI leads to improvements in ESG. Both Kim and Yoon (2020), who looks at active mutual funds, and Brandon et al. (2022), who investigates institutional investors, see signs of PRI used for green-washing, particularly in the US context.

it is closer to the second strand of the research literature, which uses individual stocks, and looks at links between stock returns and company ESG properties. An pioneering study is Hong and Kacperczyk (2009) investigation of so-called "sin stocks," industries such as alcohol, gambling, and tobacco. Hong and Kacperczyk show that sin stocks have significantly positive abnormal returns, their results imply an estimate of -3.5% for the green return premium (Hong and Shore, 2023). Studies using ESG rankings to sort into green and brown stocks include El Ghoul et al. (2011), Avramov et al. (2022) and Pástor et al. (2022). These studies generally find negative estimates of the green return premium. Other researchers use more specific aspects of ESG, such as Chava (2014) who investigates the effects of environmental concerns and argues that the stocks excluded by environmental screens have a higher cost of capital and higher expected returns. Similarly, looking at carbon emissions Bolton and Kacperczyk (2021) find that stocks with higher carbon emissions (both in terms of levels and innovations) earn higher returns.

A key difference between our research and this second branch of investigations is that we only look at a small group of excluded firms, not the entire crossection of stocks. While many of the firms excluded by GPFG are within industries typically labeled as "sinful" they are not exclusively in this narrow group (For example, one of the GPFG's early exclusions was Walmart). Only when the GPFG ethical committee decides that a specific firm is in violation will it be divested. It enters our exclusion portfolios after this active decision is made. Our analysis is thus closer to the Edmans et al. (2022) idea of only divesting from the worst offenders.

Our first investigation estimates a green return premium. To preview the results we find a (negative) green return premium of approximately -5%, leading us to conclude that the evidence is for the non-pecuniary explanation, where firms are trading off the cost of ameliorating causes of exclusion with the benefits of a lower cost of capital.

This finding prompts us to undertake our second empirical investigation, looking at the behaviour of firms where the GPFG reverses the exclusion. GPFG will only revoke an exclusion if the original cause of exclusion is removed. The firm must thus have taken a positive action, such a closing the

offending line of business. We can then ask: Is the sample of firms which has managed to get their exclusion revoked consistent with the tradeoff theory? In particular, we can ask: Are these firms facing lower costs of ameliorating the cause of exclusion? Are their benefits of a lower cost of capital larger (higher investment needs).

We believe this is an important contribution. We have already discussed the relevant theory of the tradeoff. There is however scant empirical evidence on corporate reactions to exclusions. Direct evidence on whether firms actually react to exclusions, and what type of firms make the effort, will further strengthen the evidence for the non-pecuniary type of arguments/models.

The literature on whether/how firms react to ESG pressure, be it from the general public, or its owners, is more limited. For example Gantchev et al. (2022) looks at public E&S (Environmental and Social) news coverage, and show that firms change their E&S policies in response to these E&S incidents. Turning to actions by owners, Heath et al. (2023) look at SRI funds, argue that these do not change firm behaviour, and even coin the term "impact washing" for their behavior. On the other hand, Rohleder et al. (2022) looks at mutual funds' decarbonization trades, and find that divested firms reduce their carbon emissions. Our investigation of the high-visibility exclusions of the GPFG will complement the current literature.

Finally, our research also intersects with a large research literature linking ESG with ownership characteristics in general. We refer to (Gillan et al., 2021, Section 4) for a survey of this literature, without going into specifics.

Let us close our survey of relevant literature by mentioning previous research using the exclusions of the Norwegian GPFG as objects of study. Existing studies using GPFG data can be grouped by the question they ask. First, a number of recent studies (Atta-Darkua, 2020; Ayoubi and Enjolras, 2020; Eriksen et al., 2020) considers the short-term price reactions to exclusion announcements by the oil fund (i.e. these are event studies). They all estimate negative announcement price effects.

Second, several papers look beyond the immediate market reaction and investigate the returns of the stocks excluded by the GPFG. Beck and Fidora (2008) and Dewenter et al. (2010) were early studies. More recent is Hoepner

and Schopohl (2018), which analyzes the exclusions from the GPFG and the Swedish AP-funds. They find no significant return differences relative to the funds' benchmark portfolios, but their time period is shorter. As is well known from Merton (1980), it is necessary with a long time series to estimate average returns with precision.

2   The oil fund and the fund's exclusions

In this section we provide some background information on Norway's GPFG, and the fund's evolving ESG and exclusion policies.[11]

The fund's purpose is to manage Norway's considerable resource wealth stemming from oil and gas production in the North Sea. The fund is an attempt to avoid the consequences of the "resource curse" — the adverse effects of a sudden increase in natural resource wealth (Ross, 1999). The fund translates the oil and gas in the North Sea into a well-diversified financial portfolio invested outside of Norway. The first oil revenues were transferred into the fund in 1996. Initially, the fund invested in treasury securities, but it was soon realized that the size of the revenues channeled into the fund would make it necessary to diversify the asset mix. In 1998 the funds' portfolio was split into 40% equity and 60% fixed-income securities. The equity fraction has since increased to its current level of 70%, and several other asset classes, such as real estate and infrastructure investments, have been added. At the end of 2021, the fund's market value was 12,340 billion NOK (NBIM, 2021).

In our discussion, we will concentrate on the equity part of the portfolio. The equity part of the GPFG was valued at 8,878 billion NOK (1,014 billion USD) at year-end 2021. At the time, the fund's portfolio contained 9,338 stocks across 65 countries.

The fund is managed by Norges Bank (the central bank of Norway) on behalf of Norway's Ministry of Finance (which is instructed by the Norwegian

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[11]For more information we refer to NBIM's recent survey of their ESG history (NBIM, 2020). For more academic views of the fund, we refer to Chambers et al. (2012, 2021) and the evaluations of the fund's performance: Ang et al. (2009), Ang et al. (2014), Dahlquist and Ødegaard (2018) and Bauer et al. (2022).

Parliament). The fund can thus be viewed as being owned by the people of Norway. The Ministry attempts hands-off management of the fund by limiting instructions to an investment mandate (Ministry of Finance, 2021). For our purposes, the most important part of this mandate is that the Ministry of Finance specifies a *target portfolio*, a weighted average of the developed worlds stock markets, close to a world portfolio, together with a maximal allowable tracking error (the difference between the return of the target portfolio and the GPFG portfolio). This construction ensures that the fund should be thought of as a "near index fund"[12] The mandate by the Ministry instructs the fund to have an active strategy attempting to achieve returns above those of the target portfolio within specific risk limits.

Exclusions of companies from the fund's equity universe will lead to deviations from a well-diversified market portfolio, and are thus a cost for the GPFG.[13] Exclusions still happen, though, and are the subject of this article. It is helpful to consider some political issues to understand the reasons for exclusions. By adding equities to the GPFG asset mix, the Norwegian Parliament effectively became part-owners of thousands of companies worldwide. As an owner, one is arguably party to the actions of companies one owns, which can quickly become a political issue.

The first ethically motivated exclusion took place in 2002 of Singapore Tech, a producer of anti-personnel mines (Ministry of Finance, 2002). The first specific mention of Singapore Tech was in a 2001 discussion in the Parliament between human rights organizations and Christian Democratic and Social Democratic political parties. Singapore Tech was the only company mentioned by name, but the broader discussion raised the question of a need to ensure ethical guidelines for the fund's investments. Up until then, the fund had no ethical guidelines impacting investment strategies. The question in 2001 was

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[12]Using standard classifications of mutual funds, (Dahlquist and Ødegaard, 2018, pg 91) shows that the GPFG's active share is so low that it would be classified as an index fund.

[13]Note that the Ministry of Finance adjusts the target index for the asset allocator, the central bank, removing the excluded firms from the index. This means these exclusions will not lead to tracking error for the asset allocator, but the exclusions still lead to the GPFG portfolio deviating from the unconstrained portfolio from the point of view of the ultimate owners, the people of Norway.

whether the investment in Singapore Tech was a direct breach of Norway's obligations towards human rights.

In the autumn of 2002, the Norwegian government appointed a public committee to propose ethical guidelines for the fund. The question of participation raises difficult questions. The committee argued that owning shares or bonds in a company that can be expected to commit gross unethical acts can be considered as complicity in these actions (Graver et al., 2003). In the revised national budget of 2004, ethical guidelines were established and aligned with the recommendations in the report.

The Council on Ethics was established in November 2004. Its primary function is to advise Norges Bank on the observation and exclusion of companies from the fund. The ethical guidelines are determined by the Ministry of Finance and contain both product-based exclusions (currently including tobacco, cannabis, certain types of weapons, and coal), and conduct-based exclusions (currently including human rights abuses, environmental damage, unacceptable levels of greenhouse gas emissions, corruption, and sale of weapons to specific states) (Etikkrådet (Council of Ethics), 2005). The threshold for exclusion is high. Only companies representing an unacceptable high future ethical risk to the fund are excluded.

Both the Ministry of Finance and the management of the GPFG acknowledge that the opportunity to exercise ownership rights instead of exclusion may be a more suitable alternative to reduce the risk of continued norm violations. The action to exclude is therefore grounded by a discussion with the Fund, which has information about their corporate interactions (Ministry of Finance, 2021). The Ethical Council publishes its announcement after Norges Bank has agreed. The process provides the fund time to divest before the information is official.[14] Through continued dialogue with the excluded firms, the Ethical Council can revoke the decision to exclude in the event of a change

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[14]The time frame Norges Bank has had to implement their selloff has varied. An early mandate for the ethical council (Etikkrådet (Council of Ethics), 2006, pg. 9) explicitly gave Norges Bank two months to sell their stake before the exclusion was announced. This mention of an explicit time is no longer present in more recent mandates. The mandate is now just specifying that the ethical council will make their announcement after Norges Bank's announcement of the divestiture — which means the fund has ample opportunity to sell its stake before anything is public.

in operations for the excluded company.

In July 2006, the Fund became a signatory to the UN Principles of Responsible Investment (PRI).

The ethical guidelines were again revised in 2020 (Mestad et al., 2020). Based on their conclusions and the fund's response, the domestic consensus is that the guidelines have served their purpose (Norges Bank, 2020). The Fund particularly highlights that the ethical guidelines serve to reduce non-financial risk, as this type of risk cannot be diversified away. The revision suggested a further broadening of the exclusion criteria to reflect developments in the last 15 years. An example is the inclusion of deadly autonomous weapons. Part of the feedback on the report from the fund is illuminating. For example, the report suggests the inclusion of a new criterion for excluding companies that sell military equipment to states that use this for serious and systematic violations of humanitarian law. Whereas Norges Bank agrees with the sentiment of the request, they highlight that the fund does not exclude countries but companies. Thereby, there must be broad and conclusive company evidence for such actions to make the guidelines effective. Otherwise, this type of exclusion will be based on foreign politics rather than individual company actions.

In addition to exclusions made by the Ethical Counsel, the fund conducts its own risk-based divestments (NBIM, 2020). These are divestments based on the fund ESG risk management. Risk-based divestments are not published, but the underpinnings of such decisions are transparent. These divestments will not be analyzed in our study.

To close our discussion of the GPFG, let us discuss the influences of the GPFG exclusions on the investment industry in general, and to what degree other institutional investors are likely to follow the GPFG's example. First, the GPFG is widely acknowledged as an example in the financial industry, due to its transparency, among others with respect to their ESG decisions. The largest Norwegian institutional investors publicly state that they follow the GPFG exclusions. While we don't know to what degree this is the case outside of Norway, we note that many of the GPFG exclusions have made headlines in newspapers like the Wall Street Journal and the Financial Times. As clearer evidence of influence, we note that in the step before exclusion, corporate en-

gagement, GPFG is part of a network of institutional investors cooperating to influence firms on environment and social issues (Dimson et al., 2021). Finally, the criteria used by the GPFG in their exclusions are similar to criteria published by other large institutional investors and investor groupings.[15]

3 Data

3.1 Exclusions

The prime source of data is announcements from the Ethical council and GPFG. From these announcements, we construct a history of companies excluded, with the key dates those of the GPFG news release. Throughout the 2005-2021 period, 189 companies have been excluded for shorter or longer periods. In Table 1 we break down the official reasons for exclusion. The majority of exclusion justifications are product-based, with the production of coal the largest group. The excluded stocks are distributed across 32 countries. The country with the largest number of exclusions is the US, with 51 exclusions. Following the US are China and India, with 27 and 13 exclusions, respectively.[16]

For the identified companies, we gather stock market data from Refinitiv, including daily prices and shares outstanding. We also gather exchange rates, from Yahoo Finance. Of the 189 excluded companies, we are able to match 184 stocks with Refinitiv data. Table 2 gives an overview of the sample. We note that of the 189 excluded firms, 26 have had their exclusion revoked and again been allowed to enter the GPFG portfolio. The 189 firms is a very small number compared to the fund's investment universe, where the fund had almost ten thousand different companies in its portfolio at year-end 2021. Exclusion is thus truly an exceptional reaction for the GPFG.

In Figure 1 we give an overview of the exclusions over time. The number of exclusions has been increasing gradually, with the exception of a major jump in

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[15]See for example lists published by The World Banks International Finance Corporation and European finance institutions (EDFI).

[16]See the Appendix for detailed breakdowns by country, industry, and year, as well as a complete list of companies.

Table 1: Reasons for exclusions

Overview of the reasons for exclusions in the period 2005–2021. The reasons are grouped into two major causes, conduct and product based. Data from the Ethical Council and GPFG.

Exclusion reasons	Events
Conduct	67
Environmental damage	28
Individuals' rights in war or conflict	12
Violation of human rights	12
Environmental damage / Violation of human rights	4
Violation of ethical norms	5
Greenhouse gas emissions	4
Gross corruption	2
Product	122
Coal or coal-based energy	75
Weapons	26
Tobacco	21

Table 2: Sample of stocks

Overview of the exclusions, revocations and sample content. Data from the Ethical council, GPFG and Refinitiv.

Status	Events
Total exclusions	189
Exclusion revoked	26
Excluded again	1
Not matched with Refinitiv	5
Total sample	184
Conduct-based exclusions	67
Product-based exclusions	122

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exclusions in 2016. That is the year when the Fund introduces the production or use of coal as a separate product-based cause of exclusion.

Figure 1: The number of excluded shares over time

The figure shows the number of stock returns in the exclusion portfolios, broken down by product-based and conduct-based. The product-based category is further broken down by coal-based and other product-based exclusions. Data from the Ethical council, GPFG and Refinitiv.
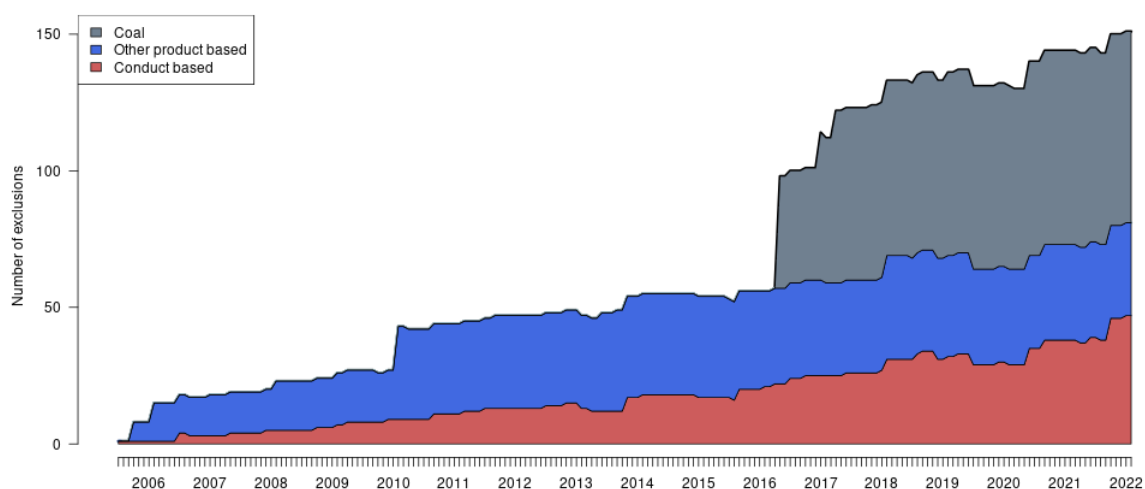

3.2   Equity data

The basis for our analysis is monthly equity returns. In addition to the returns, we calculate market capitalizations as the product of shares outstanding and closing prices. All returns and market capitalizations are denominated in dollars (USD). From these returns we construct the Exclusion Portfolio. We let a stock enter the Exclusion Portfolio the start of the month after the company has been excluded by the GPFG. If an exclusion is revoked, the stock leaves the Exclusion Portfolio at the end of the month in which the revoke decision is announced. Figure 2 illustrates the portfolio construction.
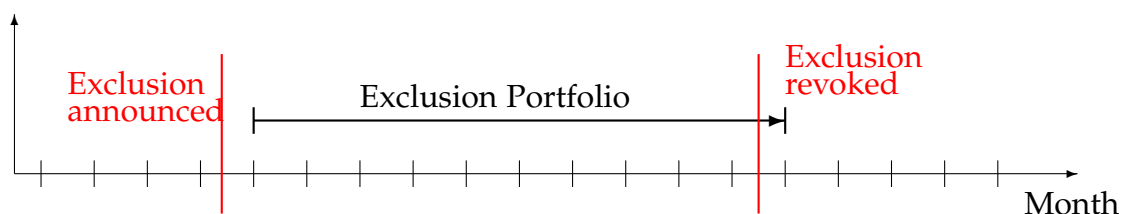
Figure 2: Illustrating the construction of the Exclusion Portfolio

The figures illustrate the timing of stocks entering the Exclusion Portfolio (Panel A) and exiting the Exclusion Portfolio (Panel B).

Panel A: Exclusion Portfolio, firms still excluded
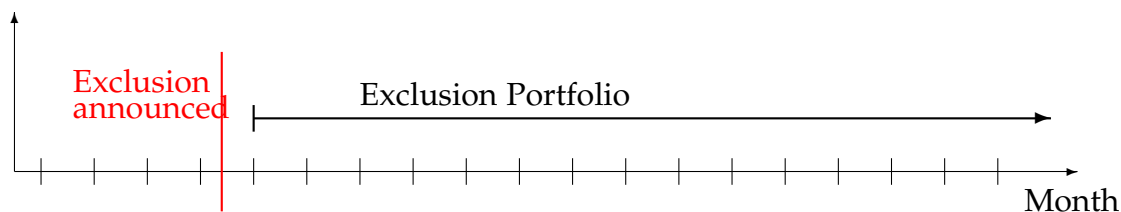
Panel B: Exclusion Portfolio, firms with a revoked exclusion

We consider two methods to calculate portfolio returns: equally weighted and value weighted, where the latter uses market capitalizations as weights.

Figure 3 provides some data descriptives. Amongst these is some information on the size distribution of the excluded firms. Most of them are relatively small, half of the firms in the sample have a market capitalization below 6 bill USD, but there are also some very large companies, with the largest equity value being 316 bill USD.

3.3   Corporate data

In addition to the equity returns, in the later analysis of revoked exclusions, we use various corporate data, such as ESG scores, accounts, and data on raising equity capital. All data is collected from Eikon Refinitiv.

The Refinitiv ESG corporate scores come in five flavors, as shown in panel A of Table 3. As our measure of the corporate ESG score, we select the TRESGCS score, which combines the self-reported scores with additional information
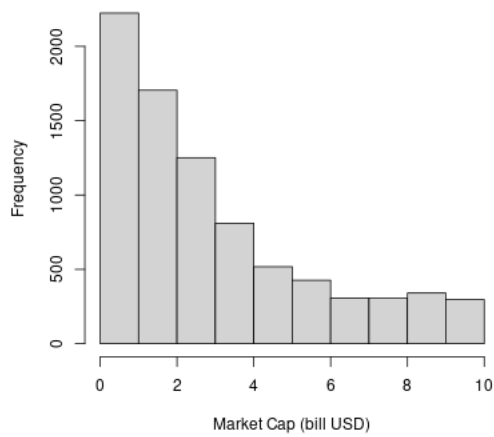
Figure 3: Equity data

Panel A provides descriptive statistics for the data series. Returns are monthly percentages (not annualized). Market Cap are monthly figures, calculated as month-end price times shares outstanding. Panel B illustrates the distribution of equity market capitalization (in bill USD) for the excluded firms. They are shown separately for firms with market cap below 10 bill USD (left-hand figure) and above 10 bill USD (right-hand figure). Monthly estimates are calculated for all firms. Data from Refinitiv. Returns and values in US dollar terms.

Panel A: Descriptives

	min	mean	med	max
Monthly Return (percent)	-72.8	1.1	0.6	166.2
Market Cap (bill USD)	0.0	20.4	6.0	315.8

Panel B: Distribution of Firm Size (Market Capitalization)

B.1: Mkt Cap $\leq$ 10 bill USD　　　　　**B.2**: Mkt Cap $>$ 10 bill USD

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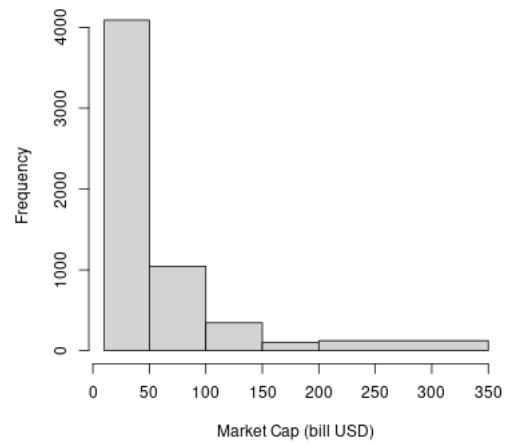
on controversies involving the company. ESG scores are not available for all companies. We have been able to identify the scores of 144 companies. The ESG score is a number between 0 and 100, increasing in ESG quality. Panel B of the table provides some descriptives for the company ESG scores of the portfolio of excluded firms.

We also collect the history of annual accounts (income and balance statements) for the firms in the sample. The accounting variables we use in the later analysis are the growth of earnings (EPS) and revenues. We use growth measures as they are easier to compare across countries and accounting regimes. Panel C of Table 3 provides some descriptive statistics for these measures.

Finally, we collect data on deals of corporate raising of capital. The data contains details about dates, amounts, and types of capital events. We concentrate on equity capital and remove issues of debt and convertible securities.

Table 3: Additional corporate data

Panel A shows Refinitiv's definitions of their ESG scores. Panel B provides summary descriptives for the two overall scores `TRESGS` and `TRESGCS` for the sample of excluded stocks. Panel C provides descriptives for the measures of earnings and revenue growth for the sample of excluded stocks. Data sources: Ethical Council, GPFG and Refinitiv.

Panel A: ESG Scores - definitions

TRESGS	Overall company score based on the self-reported information in the environmental, social and corporate governance pillars.
TRESGCS	Overall company score based on the reported information in the environmental, social and corporate governance pillars (ESG Score) with an ESG Controversies overlay.
ENSCORE	Environment Pillar Score – weighted average relative rating based on the reported environmental information and the resulting three environmental category scores.
SOSCORE	Social Pillar Score – weighted average relative rating based on the reported social information and the resulting four social category scores.
CGSCORE	Governance Pillar Score – weighted average relative rating based on the reported governance information and the resulting three governance category scores.

Panel B. Descriptives for ESG Scores

	min	mean	median	max
TRESGS	4.8	55.8	57.2	92.1
TRESGCS	4.8	51.4	50.4	89.3

Panel C: Additional Corporate data

	min	mean	median	max
EPS growth (%)	-7000	64	1.8	35933
Revenue growth (%)	-98	9.4	3.6	2489

4 Estimates of the green return premium

We start by analyzing the return of excluded firms, where a key issue is whether the portfolio of excluded firms have exceptional returns, beyond a possible short-term market reaction due to the exclusion itself.

4.1 The return of the Exclusion Portfolios

A simple, intuitive way to compare returns of two portfolios is to plot their cumulative returns. In Panel A of Figure 4 we compare the evolution of the equally weighted exclusion portfolio with a global market portfolio. The exclusion portfolio clearly outperforms the market portfolio over the period.

One observation is worth making using this picture. During the two large crises in this period, the '08 global financial crisis and the '20 Covid crisis, the decline in the exclusion portfolio seems more prominent. This corresponds to research evidence from Lins et al. (2017) who show that high-quality ESG firms performed better during the '08 Financial Crisis. Albuquerque et al. (2020) make a similar observation at the onset of the Covid-19 crisis in March '20. As the Exclusion Portfolio contains low-quality ESG firms, these results suggest that the Exclusion Portfolio will underperform in these two periods.

The comparison of cumulative returns of the Exclusion Portfolio with the world market portfolio should, however, not be used to argue about expected return differences. To formally make a return comparison it is necessary to account for risk differences through a performance estimation in the setting of an asset pricing model. To measure portfolio performance we rely on the Fama-French international five-factor model (Fama and French, 2017):[17]

$$
\begin{aligned}
(r_{p,t} - r_{f,t}) \;=\; & \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t \\
& + b^{RMW}RMW_t + b^{CMA}CMA_t + \varepsilon_{p,t},
\end{aligned}
$$

where the factors are international versions of the corresponding US factors (Fama and French, 2015). To show robustness, we also report a number of

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[17]See Dahlquist et al. (2015) and Dahlquist and Ødegaard (2018) for a discussion of relevant performance measurement for a fund like GPFG.

Figure 4: Cumulative returns of the exclusion portfolios

The figures show the cumulative returns from two investments: The exclusion portfolio (black line), and the world market portfolio provided by Ken French (broken line). Cumulative returns are calculated as $CR_{p,T} = \prod_{t=1}^{T}(1 + r_{p,t})$, where $r_{p,t}$ is the monthly portfolio return in month t. Panel A: The equally weighted exclusion portfolio. Panel B: The value weighted exclusion portfolio. All individual returns are denominated in USD. Data sources: Ethical Council, GPFG and Refinitiv.

Panel A: Equally weighted exclusion portfolio
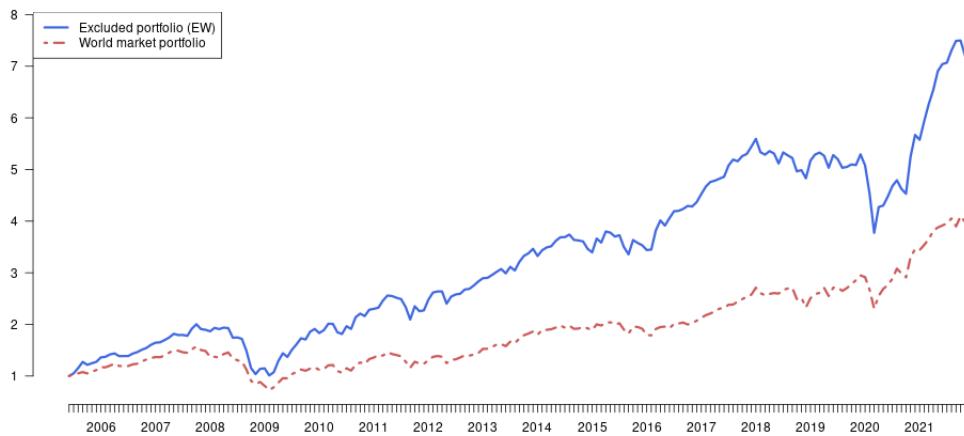
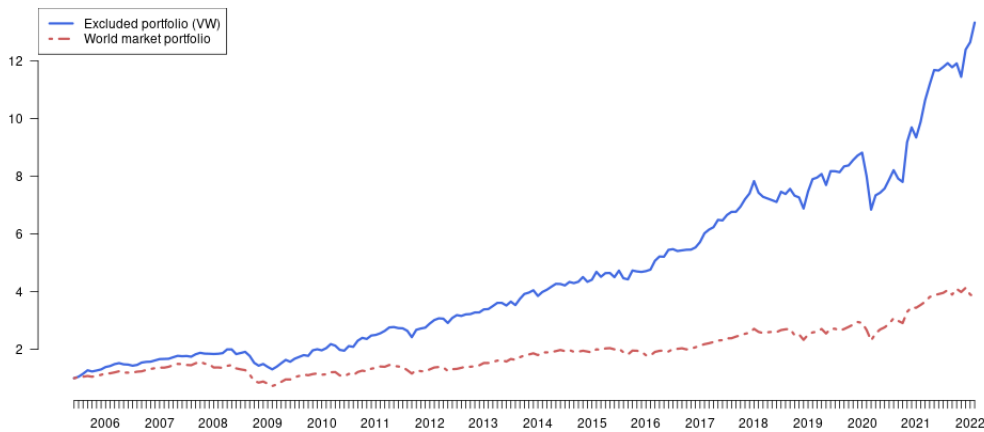## Panel B: Value weighted exclusion portfolio

Table 4: Estimates of alpha for exclusion portfolios

Column (1) reports estimates of the regression $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t + b^{RMW}RMW_t + b^{CMA}CMA_t + \varepsilon_{p,t}$, where r_{pt} is the return of the exclusion portfolio, r_{ft} the risk free rate, SMB, HML, RMW, CMA and WML the Ken French factors. Column (2) estimates the one factor CAPM $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + \varepsilon_{p,t}$, (3) estimates of the regression three-factor regression $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t + \varepsilon_{p,t}$, and (4) the four-factor regression $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t + b^{WML}WML_t + \varepsilon_{p,t}$. The Exclusion Portfolios constructed from shares excluded from the GPFG. Data is from 2005 to 2021. The international asset pricing factors are from Ken French's data page. Standard errors are Newey-West adjusted. Annualized alphas are calculated from monthly α_i as Annual $\alpha_i = (1 + \alpha_i)^{12} - 1$. Significance levels are indicated as: $^* p < 10\%$, $^{**} p < 5\%$, $^{***} p < 1\%$. All individual returns are denominated in USD. Data sources: Ethical Council, GPFG, Ken French and Refinitiv.

Panel A: Equally weighted exclusion portfolio

	(1)	(2)	(3)	(4)
Alpha	0.004***	0.004**	0.004***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Rm-Rf	0.961***	1.021***	0.993***	0.962***
	(0.040)	(0.049)	(0.042)	(0.049)
SMB	0.173		0.178	0.177
	(0.115)		(0.115)	(0.123)
HML	0.467***		0.310***	0.224***
	(0.115)		(0.074)	(0.089)
RMW	0.155			
	(0.156)			
CMA	−0.257			
	(0.233)			
WML				−0.138***
				(0.076)
Annualized Alphas(percent)	5.170	4.420	5.220	5.980
Adj. R^2	0.809	0.788	0.808	0.813
Num. obs.	199	199	199	199

Panel B: Value weighted exclusion portfolio

	(1)	(2)	(3)	(4)
Alpha	0.006***	0.007***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Rm-Rf	0.871***	0.801***	0.809***	0.817***
	(0.040)	(0.038)	(0.037)	(0.038)
SMB	−0.313***		−0.421***	−0.421***
	(0.113)		(0.116)	(0.111)
HML	0.183*		0.264***	0.287***
	(0.102)		(0.078)	(0.100)
RMW	0.340***			
	(0.143)			
CMA	0.373***			
	(0.139)			
WML				0.036
				(0.064)
Annualized Alphas(percent)	6.850	9.000	9.010	8.810
Adj. R^2	0.785	0.735	0.773	0.772
Num. obs.	199	199	199	199

alternative formulations, including one factor (CAPM), three- and four-factor specifications using the Ken French Global factors.[18]

Column (1) in Panel A of Table 4 reports estimates of the global five-factor Fama-French model. For our purposes, the key result is the alpha estimate, which is a positive, statistically significant alpha, in annualized terms 5.2%. Thus, the premium for the portfolio of "ethically challenged" firms is more than 5%. The finding of a positive alpha is confirmed using the alternative asset pricing specifications in models (2)–(4) in the table, where the alphas vary between 4.4% and 6% in annual terms.

The equally weighted portfolio above measures the expected return difference without regard to company size. Another approach is to think in terms of *economic importance*, a firm's contributions to the economy. To measure this, we consider the value weighted version of Exclusion Portfolio, where the return of each excluded stock is weighted by market capitalization. Panel B of Figure 4 compares the evolution of the value weighted exclusion portfolio to a global market index. Comparing the value weighted with the equally weighted exclusion portfolio, the cumulative return of the value weighted exclusion portfolio is substantially higher. To make a formal performance statement for the value weighted portfolio Panel B of Table 4 reports performance regressions. As one would expect given the cumulative return figure, the alpha estimates are higher for the value weighted portfolio than the equally weighted one. In annual terms, the alpha in the five-factor model is almost 7%. The table also reports estimates of the factor loadings. We note that the estimate of the market beta is below 1, for both the equally weighted and value weighted exclusion portfolios. The exclusion portfolios thus have lower systematic risk than the market. One cause for this is a large number of coal companies in the exclusion portfolio. These companies are in the "Utilities" industry, with corresponding low betas.

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[18]The factors are downloaded from Ken French's homepage. We are grateful to him for making the data available to the research community.

4.2 Investigating sub-portfolios

4.2.1 Are conduct and product based exclusions different?

The fund excludes companies for different reasons, with the main distinction being conduct and product-based exclusions. To investigate differences in reasons for exclusion, we repeat the previous regressions separately for conduct and product based exclusion portfolios.

In Panel A of Table 5 we report regression results for the two subsamples, using both equally and value weighted portfolios. In either case, we find that the alphas of the conduct based exclusion portfolios are double those of the alphas for the product based exclusion portfolios.[19]

4.2.2 The US portfolio

We finally look at the subsample of only US-listed stock. This is because the US market is the most commonly studied single market, and we want to facilitate direct comparisons with studies on the US market.[20]

Panel B of Table 5 shows the results of estimating a Fama French five-factor model (Fama and French, 2015) for the US exclusion portfolios. Note that this estimation uses Ken French's US factors, not his global factors. We again find highly significant alpha estimates, with annualized alpha estimates of 4.9% for the equally weighted and 7.2% for the value weighted US portfolios.

4.3 Is it just short-term price pressure?

We have shown clear evidence that the portfolio of slightly less than 200 stocks excluded from the GPFG have superior returns (alpha). Intuitively, there are two alternative causes of the return difference: (1) Short-term price pressure leading to temporary underpricing, or (2) higher long-term expected returns

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[19]In the appendix we show cumulative return plots, where we show that it is particularly the last few years that seem to be driving the higher alpha estimates for the conduct based portfolio.

[20]See the appendix for some descriptives of the US portfolio.

Table 5: Estimates of alpha for subportfolios

Panel A shows Estimates of the regression $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t + b^{RMW}RMW_t + b^{CMA}CMA_t + \varepsilon_{p,t}$, where $r_{p,t}$ is the return on the exclusion portfolio. We consider two different samples of exclusion portfolios: The stocks excluded based on conduct, or based on product. For each of these samples we calculate equal or value weighted portfolios. The international factors are from Ken Frenchs' homepage. Panel B estimates the same regression for the exclusion portfolio only using stocks with a US primary listing. Standard errors are Newey-West adjusted. Significance levels are indicated as: * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$. All individual returns denominated in USD. Data sources: Ethical Council, GPFG, Ken French and Refinitiv.

Panel A: Conduct and Product-based Exclusion Portfolios.

	Conduct		Product	
	EW	VW	EW	VW
Alpha	0.007*	0.009***	0.003	0.004**
	(0.004)	(0.003)	(0.002)	(0.001)
Rm-Rf	1.061***	0.793***	0.926***	0.935***
	(0.130)	(0.077)	(0.037)	(0.037)
SMB	0.139	−0.269	0.167	−0.280**
	(0.293)	(0.255)	(0.136)	(0.128)
HML	0.967***	0.293	0.295***	0.208*
	(0.214)	(0.165)	(0.107)	(0.107)
RMW	0.231	0.419	0.164	0.345*
	(0.349)	(0.285)	(0.174)	(0.211)
CMA	−1.241***	0.306	0.070	0.305*
	(0.412)	(0.244)	(0.167)	(0.157)
Annualized Alphas(percent)	8.540	11.310	3.370	4.680
Adj. R^2	0.579	0.371	0.766	0.731
Num. obs.	199	199	196	196

Panel B: US Exclusion Portfolio

	Equally Weighted	Value Weighted
Alpha	0.004*	0.006***
	(0.002)	(0.002)
Rm-Rf	0.925***	0.783***
	(0.050)	(0.045)
SMB	0.012	−0.280***
	(0.089)	(0.080)
HML	0.239***	0.168***
	(0.081)	(0.073)
RMW	0.050	0.258***
	(0.117)	(0.106)
CMA	0.073	0.173
	(0.146)	(0.132)
Annualized Alphas(percent)	4.870	7.200
Adj. R^2	0.710	0.644
Num. obs.	200	200

for low-quality ESG firms. Our interest is in (2). We therefore attempt to disentangle these two issues.

To motivate our approach, consider the several studies attempting to estimate (1) for the GPFG's exclusions: Atta-Darkua (2020), Ayoubi and Enjolras (2020) and Eriksen et al. (2020). All of these estimate the short-term effect using an event study, where the measured effect is estimated over a period around the event date (announcement of exclusion). A typical "window" for an event study is a couple of months before and after the event.

Hence, one method that will more directly estimate (2) is to create an exclusion portfolio where the stocks enter the portfolio *after* the final date of the event study. This method is illustrated in Panel A of Figure 5. We consider two alternative lengths of delay: One and two calendar months after the month of announcement. Panel A of Table 6 shows the results. First, we note that the estimates of alpha are still highly significant, albeit slightly lower. For example, in the equally weighted case, the alpha estimate of 5.17% falls to 4.62% if entry into the exclusion portfolio is delayed with one month, and further to 4.32% if delayed with two months. The value weighted case is similar.

We can also look more directly at the short-term effect (1). Consider the results of event studies of exclusions by the GPFG, which look at the announcement returns and find that stocks of excluded firms fall by about 1.4% (Atta-Darkua) or 0.3–0.5% (Eriksen et al.). We can do something similar using our portfolio construction method, by constructing a portfolio where stocks enter the portfolio some time before the announcement, and leave some after. This is the "Around" Exclusion Portfolio illustrated in Panel B of Figure 5. We choose three months before and after the month of announcement as window. The results of estimating the alpha of this portfolio are shown in Panel B, columns (1) and (2) of Table 6. We find highly significant negative alpha estimates, in annualized terms around −10%. This fits with the event study evidence. Note that the $\overline{R}^2$ falls with this specification, which is to be expected, as the "Around" Exclusion Portfolio contains much fewer stocks than the Exclusion Portfolio.

Finally, to show that the announcement effect is a temporary one, we use company returns in the period *before* the announcement by the GPFG, as illustrated in Panel C of Figure 5. If the excess returns reflect properties of

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Figure 5: Illustrating alternative portfolio constructions

The figures illustrate three alternative portfolio constructions. Panel A illustrates the delay of the entry of the excluded portfolio by a number of months after the month in which exclusion is announced. This is the Delayed Execution Portfolio. Panel B illustrates a portfolio construction using a number of months before and after the month of exclusion announcement. This is the "Around" Exclusion Portfolio. Panel C illustrates the creation of a portfolio a number of months before the GPFG announce their exclusion. This is the "Before" Exclusion Portfolio.

Panel A: Delayed Exclusion Portfolio
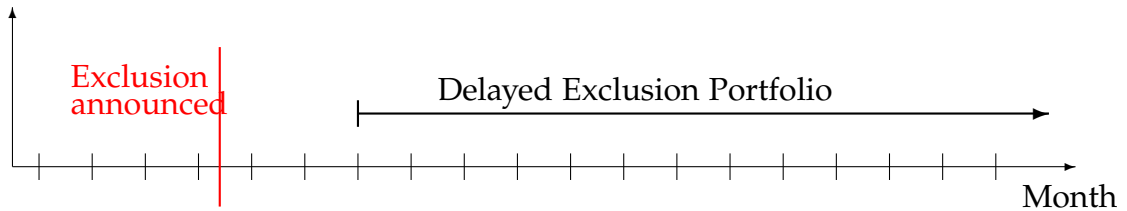
Panel B: "Around" Exclusion Portfolio
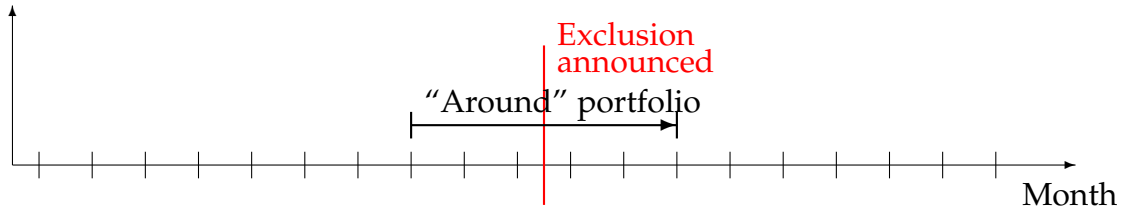
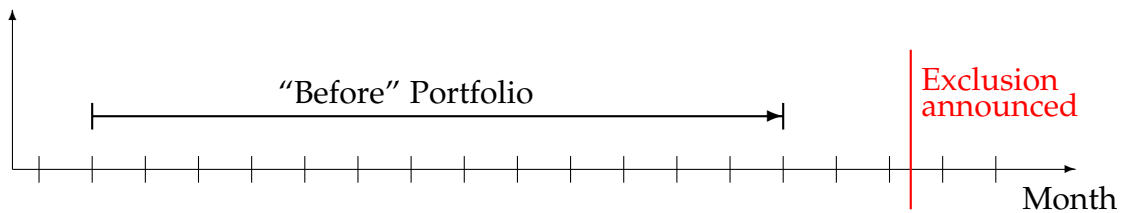## Panel C: "Before" Exclusion Portfolio

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Table 6: Alpha estimations, delayed entry into exclusion portfolio

The columns report estimates of the regression $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t + b^{RMW}RMW_t + b^{CMA}CMA_t + \varepsilon_{p,t}$, where r_{pt} is the return of the exclusion portfolio, r_{ft} the risk free rate, SMB, HML, RMW, CMA and WML the Ken French factors. The equally weighted portfolio is constructed from shares excluded from the GPFG, but the entry into the exclusion portfolio is delayed with either one month (columns (1)-(2)) or two months (columns (3)–(4)) . Data is from 2005 to 2021. The international asset pricing factors are from Ken French's data page. Standard errors are Newey-West adjusted. Annualized alphas are calculated from monthly α_i as Annual $\alpha_i = (1 + \alpha_i)^{12} - 1$. Significance levels are indicated as: * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$. All individual returns are denominated in USD. Data sources: Ethical Council, GPFG, Ken French and Refinitiv.

Panel A: Delayed Exclusion Portfolios

	1 month delay		2 month delay	
	ew	vw	ew	vw
Alpha	0.004**	0.005***	0.004**	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Rm-Rf	0.964***	0.870***	0.961***	0.870***
	(0.044)	(0.043)	(0.045)	(0.043)
SMB	0.212*	−0.283***	0.195	−0.291***
	(0.128)	(0.112)	(0.132)	(0.115)
HML	0.468***	0.204*	0.466***	0.191*
	(0.113)	(0.104)	(0.104)	(0.092)
RMW	0.210	0.417***	0.200	0.410***
	(0.180)	(0.188)	(0.172)	(0.177)
CMA	−0.213	0.412***	−0.212	0.433***
	(0.233)	(0.136)	(0.216)	(0.129)
Annualized Alphas(percent)	4.620	6.420	4.320	6.040
Adj. R^2	0.790	0.753	0.799	0.764
Num. obs.	199	199	198	198

Panel B: "Around" and "Before" Exclusion Portfolios

	"Around" Portfolio		"Before" Portfolio	
	ew	vw	ew	vw
Alpha	−0.008*	−0.010*	0.004	0.004
	(0.005)	(0.005)	(0.003)	(0.004)
Rm-Rf	1.264***	1.057***	0.813***	0.794***
	(0.122)	(0.121)	(0.080)	(0.085)
SMB	1.215***	0.855***	0.157	0.362
	(0.422)	(0.450)	(0.209)	(0.291)
HML	1.213***	0.787***	0.227	0.010
	(0.420)	(0.292)	(0.162)	(0.209)
RMW	1.451***	1.042**	−0.682***	−0.654*
	(0.474)	(0.538)	(0.281)	(0.483)
CMA	−1.267***	−0.774*	−0.504*	0.082
	(0.678)	(0.430)	(0.243)	(0.361)
Annualized Alphas(percent)	−9.450	−11.011	5.073	5.412
Adj. R^2	0.590	0.440	0.524	0.392
Num. obs.	182	179	222	196

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the *companies* in question, and the low ESG/bad ethics is observable, other investors may be excluding the firm even if the GPFG has not yet announced its divestment. It is therefore of interest to do an alpha estimate for this portfolio. The alpha estimates for this "Before" Exclusion Portfolio are shown in Panel B, columns (3) and (4) of Table 6. While the alpha estimates are not significant, the point estimates are similar to those of the Exclusion portfolios. The lack of significance may be due to the limited number of stocks in the "Before" portfolio.

4.4   The green return premium

Let us now summarize the analysis of this section. We have shown that portfolios of firms excluded by the GPFG have a consistently significant positive alpha in the region of 5% in annual terms. We have shown this result is robust. In addition to the aggregate portfolio, we have shown similar results for the portfolios grouped by exclusion reason, and the US portfolio separately.[21]

In terms of interpretation, this alpha is actually a brown return premium. The implied green return premium is the negative of this. We have thus estimated a negative green return premium of approximately -5% in annual terms. The estimate is negative, in line with most of the literature discussed earlier, lending support to the non-pecuniary type of model. It is larger in

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[21]We have also performed other robustness tests, which we will not show explicitly, just mention the key findings. The analyses are provided in the separate Appendix. First, we have looked at the timing of when stocks enter or exit the exclusion portfolio. In addition to the analysis delaying the entry into the exclusion portfolio, we have also done the estimations including the month of the exclusion, without seeing any major changes in the alpha estimates. We also look at keeping stocks in the exclusion portfolio after their exclusion is revoked, without a major effect on portfolio performance. Secondly, we split the estimation period into two subperiods, 2005–2015 and 2016-2021. We find that in the later period, the alpha estimates are still positive but lower and not always significant. We, however, note that this period only contains six years, which means the sample period is relatively short. Thirdly, we look at whether the group of coal companies has a different effect on returns. Constructing an exclusion portfolio without the coal companies we find similar alpha estimates to the returns in the paper. We also construct a portfolio of just coal companies. This is again similar to the whole portfolio. Finally, in the value weighted portfolio there is one company, Walmart, that has a very large weight in the portfolio in the early part of the period. We have therefore redone the analysis removing Walmart from the value weighted portfolio. This does not change our inferences.

magnitude than most estimates in the literature. We believe this result reflects the sample of the "worst offenders."

5 Trading off costs and benefits of reversing exclusions

We now turn to our second empirical investigation, looking at the firms that managed to get exclusions revoked. To understand our approach, consider the decision problem faced by a corporation. An excluded corporation can potentially make changes to operations to remove the causes of exclusion. If for example a company is excluded because of its production of cluster munitions, it could close down this production line, which could lead the ethical council to revoke the exclusion. In making this decision, the company is trading off the cost (loss of profit from the cluster munition production) with the benefit (cheaper capital for new investment).

Our analysis will use the actual cases of the fund revoking its exclusions. Can we show that these firms have either lower costs of removing the cause of exclusion, or larger benefits (need for capital)? Let us start by giving some background on the Oil Funds decision process.

5.1 Revoking the Oil Fund's exclusions

The oil fund has rescinded a number of exclusions. The first case was in 2006 and involved the firm *Kerr-McGee Corp*, which initially got on the exclusion list due to participation in oil exploration in Western Sahara. Their exclusion was revoked when the company ended its involvement with this oil field. By then, it was too late. In June 2006, Kerr-McGee was acquired by Anadarko Petroleum, which shows another way for firms to get off the list of excluded firms: delisting.

Generally, the mandate for the Counsel of Ethics state that the council shall assess whether the reasons for exclusion still apply and, in light of new information, potentially retract the exclusion decision. Thereby, most of the com-

munication leading to a revocation is initiated by the Ethical Counsel. Investigating the 26 instances where the exclusion has been revoked, the causes of these retractions are: cease of specific activity (e.g. end of an oil contract in a particular area, or end the involvement of cluster munition), change in product mix (e.g. reduction of coal production, or cease of production of specific weapons types), or sale of a subsidiary or part of the company.

Panel A in Table 7 summarizes the revocations and their reasons. The table also summarizes the number of firms that have delisted and the reasons why.

Table 7: Reasons for discontinuations of exclusion

The tables summarize the main reasons why exclusions are revoked and firms delist. Data source: Ethical Council and GPFG.

Panel A: Exclusions revoked

Cause	no
Change in product mix	10
Cease of activity	7
Sale of subsidiary	3
Other reasons	6
Total	26

Panel B: Firms delist

Cause	no
M&A	9
Going private	5
Bankruptcy	1
Total	15

5.2 The time a firm stays excluded

We want to investigate the determinants of exclusion being revoked. We start by modeling the *time period* a firm stays excluded. That means we have to turn to the econometric framework of duration, or survival, analysis. This style of analysis treats the *time* until an event as the object of study. In the

present context, we are interested in the time until a given stock drops out of the exclusion sample. Survival analysis will estimate the likelihood of exit, adjusting for the fact that the sample is right-truncated. The right-truncation is due to the large number of firms still excluded at the end of the sample, whose exit time is still in the future.

In survival analysis, we either work with survival-curves (roughly: the probability of survival till a given time), or hazard-curves (roughly: the probability of exit at a given time). Figure 6 illustrates estimated survival and instantaneous hazard curves for the sample of excluded firms. One observation to make, which is easiest to observe using the estimated hazard curve: the likelihood of exit increases with time in the sample.

For our purposes, the interesting question is whether there are properties of these corporations, linked to the likelihood of exit, which is informative about either corporations *scope* for improving their ESG to avoid exclusion, or their *need* to lower the cost of capital.

5.3 The scope for improving ESG

Let us start by investigating corporations *scope* for improving ESG. To do so, we consider the corporations' ESG scores. While the oil funds exclusions are for specific ethical reasons, these are typically reasons that will also lead to a bad ESG score. We therefore look for a relationship between a firm's ESG score and the likelihood that the firm will have its exclusion revoked.

Formally, we estimate this by asking whether the level of the ESG score at the time of exclusion affects the survival time. This is a classical survival analysis, where we ask whether survival times are affected by initial conditions, and modeled by investigating determinants of a Cox proportional hazard function.[22] As determinants we use the combined ESG Score (TRESGCS) of the firm. We also control for firm size and the source of exclusion (product or conduct-based), as well as control for annual fixed effects.[23] Differentiating

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[22]In the Appendix we provide evidence using alternative functional assumptions to the Cox model.

[23]There is not enough observations to allow for company-level fixed effects.

Figure 6: Survival and Hazard curves for the Exclusion Portfolio

Panel A: Survival curve, adjusting for right-truncation. The broken lines indicates one standard deviation. Panel B: Instantaneous hazard curve (smoothed estimate). Both estimated using the sample of excluded firms, where exit is either a delisting, or the exclusion is revoked. Survival curve estimated using R library `survival`, Instantaneous hazard curve estimated the R library `muhaz`. Data sources: Ethical Council, GPFG and Refinitiv.

Panel A. Survival curve
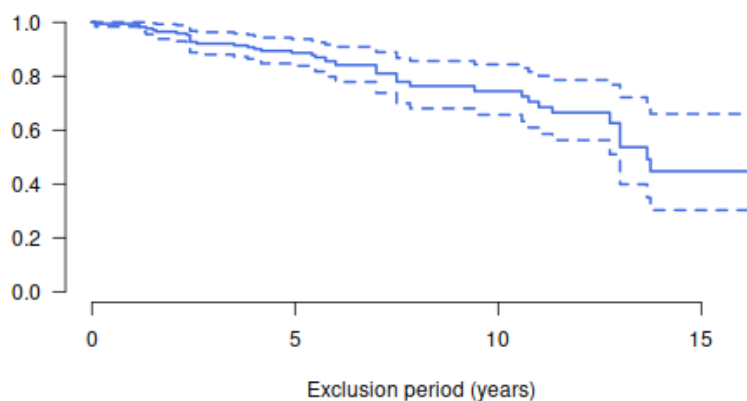
Panel B. Instantaneous hazard curve (smoothed)
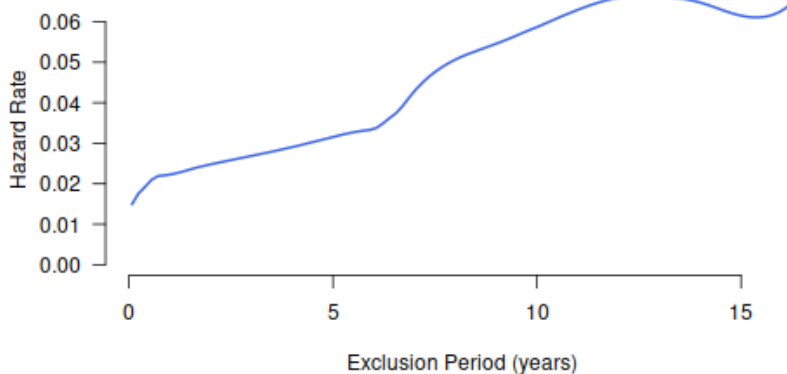
between product and conduct-based firms is relevant because it affects the ease with which firms can change their ESG score. A product-based exclusion, such as coal production, is something the firm will find it hard to do much about without becoming a very different firm, but a conduct-based exclusion, such as employing child labour, is something it is easier to take action on. Note that there are firms for which Refinitiv does not provide ESG scores.

Table 8: Contributions to survival of exclusion

The table summarizes analyses of estimation of contributions to a Cox proportional hazard model. Explanatory variables: *ESG score*: (Refinitiv TRESGCS). *Ind(Conduct)*: Dummy variable equal to one if the exclusion is for a conduct-based reason. *ln(Mkt Cap)*: Firm equity size (the logarithm of the market capitalization at yearend). All values in USD terms. Data sources: Ethical Council, GPFG and Refinitiv.

	(1)	(2)	(3)	(4)
ESG Score	−0.03***	−0.03***	−0.02**	−0.03**
	(0.01)	(0.01)	(0.01)	(0.01)
Ind(Conduct)		0.85**		0.98***
		(0.39)		(0.44)
ln(Mkt Cap)			−0.05	−0.11
			(0.09)	(0.10)
AIC	219.27	217.21	221.05	218.16
R^2	0.03	0.06	0.04	0.07
Max. R^2	0.77	0.77	0.77	0.77
Num. events	28	28	28	28
Num. obs.	150	150	150	150
PH test	0.47	0.76	0.55	0.68

*** $p < 0.025$; ** $p < 0.05$; * $p < 0.1$

Figure 8 shows the results, where the ESG score has a significantly negative coefficient. The interpretation of a negative coefficient is that increasing the explanatory variable in question *decreases* the hazard rate, i.e. it increases the survival time. Thus, a low ESG score leads to a *higher* probability of having the exclusion revoked.

A possible interpretation is that it will be less costly for firms to improve on a low ESG basis. Alternatively that the firm has lots of scope for improvement.

To supplement the survival regressions, we provide some additional de-

scriptives. Figure 7 plots annual average ESG score for firms still excluded by 2021 and for firms that have had their exclusion revoked. The average firm which later got off the exclusion list clearly had a lower ESG rating, particularly in the early part of the period. A word of warning, though. The figure uses ex-post information (whether the stock has dropped off the excluded list) in the grouping. It should, therefore, only be viewed as supportive of the econometric analysis, which does not suffer from an ex-post bias.

Figure 7: ESG scores of Excluded Firms, Revoked and Non-Revoked.

The figure plots the crossectional average ESG score (Refinitiv TRESGCS). The averages are done for all shares (blue circles), shares still excluded by the end of the period (brown crosses), and shares no longer excluded, either by delisting or having the exclusion revoked (green triangles). Data sources: Ethical Council, GPFG and Refinitiv.
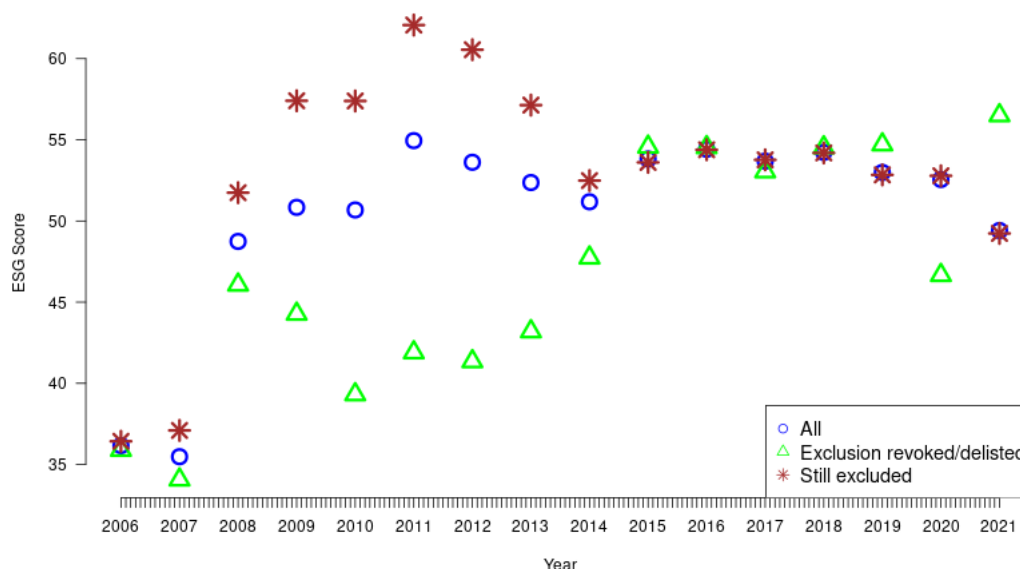
5.4   The need to raise equity capital

Let us now move to another source of information about the companies, their accounts, with their information about firm operations. We are interested in cases where corporations particularly feel a need for lowering their cost of

capital. The obvious case is times when the firm is interacting with capital markets, raising equity (or debt), as the cost of capital directly affects the terms at which new capital can be issued.

We, therefore, look at accounting developments that affect the likelihood of capital raising. Take, for example, revenue growth. High revenue growth will likely lead to investment needs as the firm is increasing in scope. The effects of increases in earnings, on the other hand, are less clear. While increases in earnings may indicate investment needs, high earnings also imply a higher ability to finance investments using retained earnings.

We, therefore, look at whether revenue or earnings growth affects the likelihood that a firm's exclusion is revoked. To estimate this, we can not use the standard survival framework of the previous section, as accounts change every year, leading to time-varying covariates. Instead, we use a method better known in finance, binary choice models. Since accounts are annual, each year we look at the binary event that a firm either stays on the excluded list or not. We stack these annual choices into a probit formulation, using the two mentioned accounting variables: earnings growth and revenue growth. As usual, we consider firm size (market cap) and exclusion cause (conduct/product) as control variables in the estimations.

The results in Panel A of Table 9 show that the coefficient on earnings growth is negative, i.e. that high earnings growth increases the probability that the firm will stay on the list of excluded firms, but this relationship is not significant.

More interesting is the coefficient on revenue growth, where we find a positive and significant coefficient. The implication is that currently high-revenue-growth firms are more likely to get their exclusion revoked.

Again this can be argued for through the cost of capital. High revenue growth is associated with a need for investments and hence new capital. Firms with high capital needs would want to get off the exclusion list, if possible. If these firms have scope for improving ESG (low ESG rating that can be improved), they will want to do it.

Table 9: The need for new capital – estimates

In panel A, the tables report results of probit estimates of determinants of exclusion revoked by the GPFG. Two separate probit estimations:

$$p(\text{Exclusion Revoked}) = \begin{cases} f(\text{EPS growth}, \text{Controls}). \\ f(\text{Revenue growth}, \text{Controls}) \end{cases}$$

In each case, for each year, the dependent variable tests whether a firm stays excluded, or not, that year. The dependent variable is equal to one if a firm's exclusion is revoked in a given calendar year. Explanatory variables are: `EPS growth`: Percentage change in EPS from the previous year to this year. *Revenue growth*: Percentage change in total earnings from the previous year to this year. *ln(Mkt Cap)*: Firm Size – The log of year-end market capitalization, denominated in USD. *Ind(Conduct)*: Dummy variable equal to one if the exclusion is for a conduct-based reason. Estimations (3) and (4) include annual fixed effects (unreported), and are estimated without a constant term. T statistics in parenthesis. Significance levels are indicated as: * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$.

In panel B, the table gives the number of firms in each group that has raised equity capital at least once in the period. For the firms still excluded, the period is the whole exclusion period. For the firms having had the exclusion revoked, it is the period *after* the exclusion is revoked. Data sources: Ethical Council, GPFG and Refinitiv.

Panel A: Probit estimation of determinants of discontinuation of exclusion

	(1)	(2)	(3)	(4)
(Intercept)	−3.55***	−3.47***		
	(1.14)	(1.15)		
Growth EPS	−0.01		−0.01	
	(0.02)		(0.02)	
Growth Revenue		0.43*		0.50*
		(0.26)		(0.30)
Ind(Conduct)	0.65***	0.51***	0.71***	0.55***
	(0.19)	(0.19)	(0.20)	(0.21)
ln(Mkt Cap)	0.06	0.05	0.06	0.07
	(0.05)	(0.05)	(0.05)	(0.06)
Annual fixed effects			X	X
Log Likelihood	−95.29	−95.67	−85.81	−85.48
Num. obs.	981	969	981	969

Panel B: Raising new equity capital

	Firms raising capital	
	Number	Percent
Firms still excluded	56	37.1
Firms with exclusion revoked and not delisted	11	57.9

5.5 Actually Raising Equity Capital

In the previous estimation, we looked at conditions that would lead to a need for raising capital. An alternative investigation is to use data on the actual raising of capital. We have to that end collected data on corporate equity deals, which allows us to identify the firms that raise equity capital.

As a simple investigation, we count the firms issuing equity (without any accounting for the relative size of the capital issue). Panel B of Table 9 summarizes the results. Of the 151 companies that were still excluded at the end of the sample, 37% had raised capital at least once during the period they have been excluded. Of the 21 firms that got off the exclusion list without delisting, 11, or 57%, have raised equity capital in the shorter time after the exclusion was revoked.

We note that the sample is small, and it will be hard to make strong statistical inferences from these data. We still point to this as evidence consistent with the idea that firms try to improve their ESG (and reverse exclusions) when they see that they will need to raise capital.

5.6 Do post-excluded firms actually lower their cost of capital?

The previous analyses have looked at corporate actions, i.e., when do firms attempt to improve their ESG? The next obvious question is: Do they succeed in lowering cost of capital by getting off exclusion lists?

To answer this we construct a "Post Exclusion Portfolio" containing stocks which were previously excluded, but have now been let back in. Panel A of Figure 8 shows the number of stocks in the post-exclusion portfolio over time.

To construct a portfolio representing the revoked firms, we follow our earlier analysis, and construct an Post-Exclusion Portfolio of firms whose exclusions have been revoked by the oil fund. We let stocks enter the Post-Exclusion Portfolio of revoked firms at the end of the calendar month in which their exclusion is revoked, as illustrated in Panel A of Figure 8. In Panel B of Figure 8 we show the cumulative return of the Post-Exclusion Portfolio, compared to a world portfolio. The Post-Exclusion Portfolio actually has lower returns than the world portfolio.
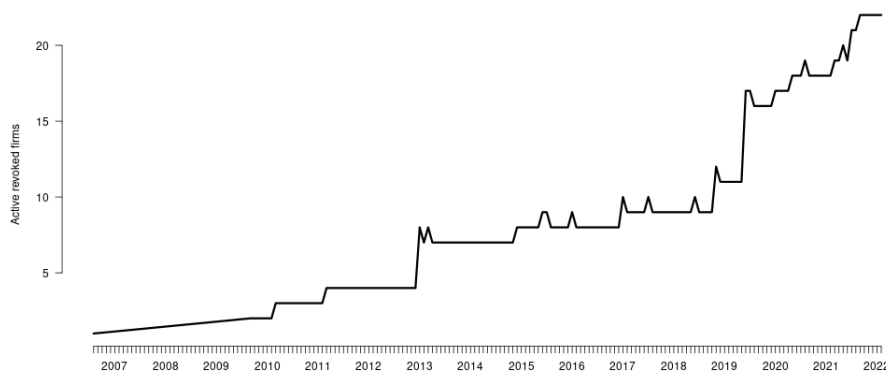
Figure 8: The Post-Exclusion Portfolio

The figure in panel A illustrate our method for constructing the Post-Exclusion Portfolio. The figure in panel B shows the number of firms which have had their exclusion revoked, and remain listed. The post-exclusion portfolio is constructed as an equally weighted portfolio of all firms which have had their exclusions revoked and remain listed, starting the month after the exclusion is rescinded. In panel C we provide cumulative returns illustrating the portfolio evolution. The figure shows the cumulative returns from two investments: The equally weighted post-revocation portfolio (black line), and the world market portfolio provided by Ken French (broken line). Cumulative returns are calculated as $CR_{p,T} = \prod_{t=1}^{T}(1 + r_{p,t})$, where $r_{p,t}$ is the monthly portfolio return. All individual returns are denominated in USD. Data sources: Ethical Council, GPFG, Ken French and Refinitiv.
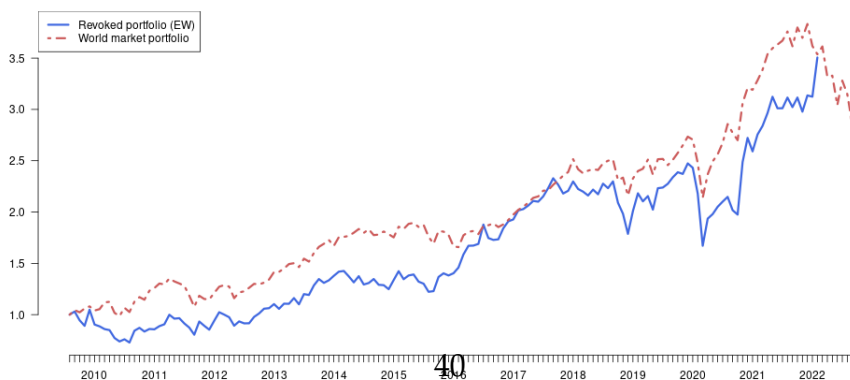
Panel A: Illustrating the construction of the Post-Exclusion Portfolio
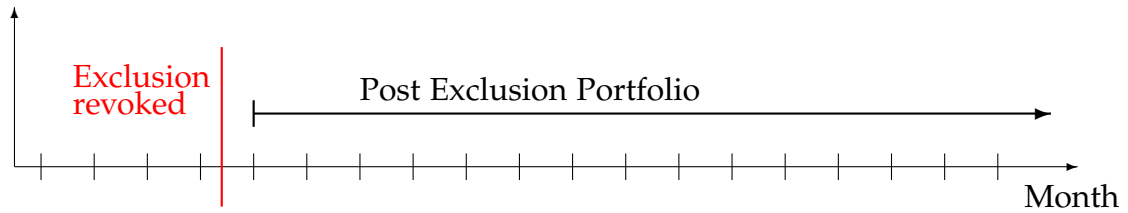
Panel B: Number of stocks with exclusions revoked and still listed

Panel C: Cumulative returns for the Post-Exclusion Portfolio

Again, we conduct a regression analysis to make a formal statement about performance. The regression results in Table 10 show that the Post-Exclusion Portfolio does not have significant alpha. Some point estimates are even negative. Thus, firms that contributed to the superior performance of the Exclusion Portfolio reverts to a "normal" alpha of zero once they get off the exclusion list.

Table 10: Estimates of alpha for the Post-Exclusion Portfolio

The post-exclusion portfolio is constructed from all firms which have had their exclusions revoked and remain listed, starting the month after the exclusion is rescinded. The table shows regressions with the return of the post-revocation portfolio as dependent variable. Each column reports estimates of the regression $(r_{p,t} - r_{f,t}) = \alpha + \beta(r_{m,t} - r_{f,t}) + b^{SMB}SMB_t + b^{HML}HML_t + b^{RMW}RMW_t + b^{CMA}CMA_t + \varepsilon_{p,t}$, where r_{pt} is the return of the post-revocation portfolio, r_{ft} the risk free rate, SMB, HML, RMW, CMA and WML the Ken French factors. The first column shows the results for the equally weighted post-exclusion portfolio, and the second column for the value weighted. Data for 2006–2021. The international asset pricing factors are from Ken French's data page. Standard errors are Newey-West adjusted. Significance levels are indicated as: * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$. All individual returns denominated in USD. Data sources: Ethical Council, GPFG, Ken French and Refinitiv.

	(EW)	(VW)
Alpha	0.000	−0.000
	(0.003)	(0.003)
Rm-Rf	1.119***	1.014***
	(0.074)	(0.070)
SMB	0.375	−0.196
	(0.197)	(0.195)
HML	0.359	−0.148
	(0.167)	(0.185)
RMW	0.176	−0.043
	(0.283)	(0.265)
CMA	0.066	0.329
	(0.341)	(0.259)
Annualized Alphas(percent)	0.350	−0.120
Adj. R^2	0.586	0.676
Num. obs.	150	148

6 Conclusion

We argued that current theoretical models of how ESG considerations affect equilibrium stock returns would lead to differences in expected returns linked to ESG ranking. We used the exclusions by the Norwegian Government Pension Fund Global, the world's largest SWF, to identify a set of firms excluded by large numbers of institutional investors.

Applying a battery of performance tests to portfolios of these firms, we establish that these portfolios have a considerable excess return relative to the predictions of standard asset pricing models, such as the global Fama-French five-factor model. The portfolios of these stocks have highly statistically significant excess returns (alpha) as high as 5% in annual terms. When we compare different reasons for exclusion, the stocks excluded for reasons of conduct have higher returns than product-based exclusions. Also, the alphas are similar for the portfolio of only US-listed stocks. These results are not driven by the returns of small firms, as value-weighted versions of the portfolios have even higher excess returns than the equally weighted ones.

We discussed two possible theoretical approaches that could lead to high returns. First, a short-term price pressure hypothesis that exclusions lead to selling pressure and a short-term underpricing, which will be corrected going forward, and lead to higher returns in the short-term, or second, differences in expected returns, low-quality ESG firms have higher returns. We estimated directly these long-term returns, and found them significant. It can also be argued that the sheer magnitude of the return difference (5%) rules out short-term price pressure as a complete explanation, as the estimates of the one-time shock to stock prices at the time of exclusion announcement is in the region of 1.5% or lower.

We are left to conclude that our results indicate that low-quality ESG firms have a return premium. If we view the exclusions in our sample as the "worst offenders," it means the cost of capital of these firms is in the region of five percent higher than the norm. While this seems like a high number, we do note that it is similar to the ESG premium found by Barber et al. (2021) in a sample of venture capital deals, which identified a difference in the internal

rate of return linked to the ESG properties of the VC firm. It is also similar in magnitude to the "pollution premium" of Hsu et al. (2022).

We relate our results to the theoretical literature supporting differences in long-term return linked to ESG. The theory is driven by the segmentation of providers of funds to the corporate sector. If the fraction of investors willing to provide funds to "bad" ESG firms is low, the premium they can demand supplying funds to these bad ESG firms is high. This incentivizes firms to improve their ESG rating and achieve a lower cost of capital.

We show some evidence of such dynamics. Firms with scope for improving ESG and/or need for capital will attempt to improve ESG, leading to the revocation of the exclusion. This is consistent with an explanation where firms unable to maintain the returns demanded by their current ESG profile take action to change the ESG profile and access a wider investor pool with fewer demands on returns. A confirmation of this is provided by the returns of firms with their exclusions revoked by the GPFG. A portfolio of these firms does not have superior returns post-exclusion.

We conclude by pointing to what we believe are the prime contributions of our research. First, we show the sheer *magnitude* of the return difference linked to ESG. Annual alphas higher than 5% are exceptional. Second, we point to the *speed* by which the increased cost of capital affects returns. Intuitively, one would expect that the effects materialize gradually, as they primarily affect the firm when it interacts with the capital market. However, here, we see the effects materialize immediately, even for firms that have not needed to raise any equity in the whole period we analyze. Third, we point to the *dynamics* of corporate reactions to exclusion. While we admit that our sample of post-excluded firms is small, we still find evidence consistent with firms actively reacting to their exclusions.

We view the corporate finance dimension as the most promising research direction following up our research. Understanding how firms react to ESG-related shocks to their cost of capital is also a topic of explicit interest to regulators, for example, in the final design of the EU reporting standards and taxonomy.

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