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

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Abstract

We investigate the consequences of ethically motivated portfolio exclusions. The divestments by Norway's "Oil Fund," the world's largest SWF, provide a sample of stocks facing widespread exclusions by institutional investors. We find that the portfolio of excluded firms have significantly superior performance (alpha) of about 5%. Looking at the time of exclusion, we note that while theory suggest that an increase in the cost of capital should drive the stock price down, we find little evidence of that. In fact, stock prices are increasing while the fund is dumping its stake. The implied corporate cost of being excluded is small, as shown by the few firms that take action to reverse their exclusion. The cost is not trivial, though, as we evaluate the incentives for getting the exclusion revoked, and 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. In fact, firms that get off the exclusion list do not have superior performance going forward.

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1 Introduction

The implications of ethically motivated portfolio exclusions by institutional investors is a long standing research issue in sustainable finance. The best known asset pricing theories (Pástor et al., 2021; Pedersen et al., 2021) imply that firms which are often excluded by institutions have higher returns. Arbitrage arguments by e.g. Berk and van Binsbergen (2024) however limits the suggested return difference.

Proponents of exclusions, on the other hand, argue that exclusions serve to discipline companies. By avoiding activities that lead to exclusions firms stay away from business areas that seemingly offer high short-term returns, but may for example have negative climate consequences (and low long-term returns).

In this paper we use the exclusions by the Norwegian Sovereign Wealth Fund GPFG ("The Oil Fund") to add to this literature. The GPFG was for much of the period we analyze the worlds' largest sovereign wealth fund, and have had a policy of publicly announcing exclusions. We use this twenty-year history of exclusions to speak to four different issues in the academic debate: First, is there a return difference linked to ethical (ESG) issues? Second, how do stock markets react to divestments and announced exclusions? Third, to what extent do corporations react to exclusions? Fourth, do corporations gain (in cost of capital terms) by acting to reverse exclusions?

We start by providing an estimate of a green return premium using the exclusions by GPFG. We believe using these exclusions are particularly pertinent 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. Our data sample starts in 2004, which gives us the long sample period necessary for accurately estimating returns (Merton, 1980). The GPFG exclusions are decided upon by a committee set up by the Norwegian Ministry of Finance which needs to show clear evidence that a given firm violates ethical norms before exclusions are effected. The ethical committee investigates each firm, often communicating with the firm, before recommending exclusion. This leads us to argue that the GPFG's exclusions are a list of "worst offenders."[1] We find that we, in agreement with much of the relevant literature, estimate a negative green return premium. The estimate for this particular sample is in the region of -5% in annualized terms.

Unlike many other institutional investor exclusions, the divestments by the GPFG are publicly announced, which gives us an unique opportunity to evaluate stock market reactions to divestments and announced exclusions. Our tool for this investigation is an event study around the time exclusions are announced.

Earlier analyses[2] have looked at the immediate reaction (CAR) a couple of days around GPFG announcements, and identified a fall in stock prices. We expand on these analyses by looking at longer term event studies. Earlier analyses ignore the fact that the fund only announces an exclusion *after* it has divested its holdings. The full effect of the exclusion will also incorporate the selling pressure resulting from the (so far unannounced) divestment, which is happening in the month *before* the exclusion is announced.

In the month prior to the announcement, we find that prices are *increasing* by approximately one and a half percent. The announcement pushes this down to about one percent before it reverses and ends up at a three percent increase one month after the announcement of the divestment.

The event study is about the stock market's reaction to exclusions. What about corporate reactions? To investigate these, we exploit the GPFG's decisions to revoke their exclusions. From 2005 to 2021, 26 of the GPFG's 189 exclusions have been revoked. To get the ethical committee to change their recommendation, a firm must have taken action to remove the offending activities. What pushes these firms to take action? Is it

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

[2] See Atta-Darkua (2022), Ayoubi and Enjolras (2020), and Nguyen et al. (2024).

is a tradeoff of costs (of the actions necessary to remove the cause of exclusion) with benefits (for example, a lower cost of capital)?

We note that only 14% of the exclusions have been revoked. Hence, the clear majority of exclusions are *not* revoked. Nevertheless, it is enough cases to make it interesting to understand the actions of the firms that manage to get their exclusions revoked.

We perform several 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.

Second, we look at the cost of capital issue. Higher costs of capital will primarily hurt when firms raise *new* capital, either through a SEO or a debt issue. We find that firms with high revenue growth – likely to need to raise capital – are also those more likely to get their exclusion revoked. Additionally, we look at the number of deals where firms raise new equity, and find that firms that got their exclusion revoked are more likely to raise new equity capital. These results are consistent with the idea that firms react to shocks to the cost of capital and attempt to fight staying excluded.

Finally, we use the companies who have had their exclusions rescinded to ask: What happens to the green premium of these companies after they are "let back in the warmth"? Comparing the returns of a portfolio of these stocks before and after their exclusion is revoked, we find that their returns fall back immediately to a insignificant excess return (alpha), from a 5.6% (annualized) alpha, while excluded.

The structure of the paper is as follows. Section 2 gives an overview of the issues and sets up the hypotheses we test. Section 3 gives some background on the Norwegian Government Pension Fund Global (GPFG). Section 4 discusses the data sources and gives some summary statistics. Section 5 demonstrates that portfolios of excluded firms provide superior performance and use this to provide an estimate of a green return premium. Section 6 evaluates the stock price reaction to exclusion. Section 7 investigates corporate reactions to exclusions and, in particular, investigates firms who have had their exclusion revoked. Section 8 asks what happens to the green return premium if stocks' exclusions are revoked. We finally offer a short conclusion. A separate Internet Appendix provides additional supportive analysis.

2 Hypothesis development

We start by giving some institutional and theoretical background before developing the hypotheses to be tested.

2.1 Institutional Investors

Our analysis is concerned with the effect of the decisions of institutional investors. The chief reason to concentrate on this segment is their importance in terms of share of the world portfolio. More and more of the world's equity is held by mutual funds and ETFs.

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).[3] 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 its portfolio decisions. The investor's investment universe needs 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.[4] 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.

2.2 Green return premium (greenium)

The most important theoretical issues for our research concerns return differences between high-quality and low-quality ESG firms, often called "greenium." To simplify

[3]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*.

[4]Dimson et al. (2023), Jagannathan et al. (2022), Lewellen and Lewellen (2022), and Slager et al. (2023) provides empirical evidence. Broccardo et al. (2023) provides theoretical arguments.

the discussion, let us label the stocks with high-quality ESG rankings "green" and those with low-quality ESG ratings "brown."[5] There are two theoretical approaches to generating 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, which could be due to brown stocks' prices not endogenizing 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 may 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]

This first argument is framed in a traditional risk-return framework. The second type of argument moves beyond this, by introducing non-pecuniary preferences, where the ESG component of a firm directly affects utility functions. For example, one allows the (dis)utility from owning stock in a company employing child labour to 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 the 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. Firms will 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.

[5]Note that a green/brown categorization is often limited to sustainability criteria. In our discussion, we use it in the more extended sense of ESG criteria.

[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).

[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 Heinkel et al. (2001), Pedersen et al. (2021) and Zerbib (2022). See also recent surveys by (Gillan et al., 2021, Section 5.2) and Hong and Shore (2023).

In an article that explicitly models this tradeoff in the context of climate risk, Hong et al. (2023) model the equilibrium return difference between green and brown stocks. 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 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 (2024). 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 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.[9] By the Berk and van Binsbergen argument, if there is a green return premium, it will be small in magnitude.

However, Avramov et al. (2022), points to a moderating effect to the ESG-return relationship: ESG classification uncertainty. Empirical evidence shows that the various ESG ranking providers do not agree on their ESG rankings (Berg et al., 2022b,a). This introduces noise in any ESG-return relationship estimation.

Let us 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.[10] 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, show that funds that endorse the United Nations Principles for Responsible Investment (PRI) underperforms other hedge funds by, on average, 2.45% per annum.[11] van der Beck (2021) argues that returns from sustainable investing are strongly driven

[9]An alternative way to make this argument is to say that share demand is elastic (Ahern, 2014).

[10]Surveys of empirical studies of ESG and performance include Friede et al. (2015), Coqueret (2021), Whelan et al. (2021), and Atz et al. (2023).

[11]There is some discussion as to what 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 greenwashing, particularly in the US context.

by price pressure from flows toward sustainable funds.

Our research complements this literature by looking directly at the stocks in question, without the additional layer of the institutional investors. As such, it is closer to a second strand of the research literature, which uses individual stocks, and looks at links between stock returns and company ESG properties. A 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 investigate 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. Most of the literature uses historical returns to estimate the green return premium. An exception is Eskildsen et al. (2024), who uses measures of expected returns to estimate greenium. They find a negative estimate, but of smaller magnitude than most empirical estimates.

2.2.1 Hypotheses group 1 - Green return premium

This leads us to the first of the hypotheses we consider. We posit that the stocks excluded by the oil fund represent firms that are typically excluded from institutional investor portfolios. If we construct a portfolio of the excluded firms, it represents the returns of "brown" stocks. An estimate of the excess return for this portfolio (relative to an asset pricing model) will be an estimate of the return difference between brown and green stocks.

A key difference between our research and the "sin"-type of investigations discussed above is that we only look at a small group of excluded firms, not the entire cross-section 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. 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. To implement the estimation of greenium, we 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.

We note that our results complement earlier studies that investigate the returns of the stocks excluded by the GPFG. A recent study[12] 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.

2.3 Stock price reactions to exclusion

The market's reaction to the GPFG selling off and announcing exclusion of a stock will depend on whether this updates the market's belief that that stock is in the "bad ESG" group. Suppose we posit that the exclusion by the GFPG leads the market to increase the probability of exclusion. We should then see the market updating that company's cost of capital. That increase in the cost of capital should induce a fall in the stock price. This reasoning leads us to our second test: Evaluating the stock price evolution at the point of exclusion. The obvious way of testing it is through an event study centered on the day the GPFG exclusion is announced.

But we are not only interested in the price drop at the announcement. As interesting is the price evolution in the period leading up to the announcement. To explain that it is necessary to understand the process for deciding on exclusions from the GPFG. The exclusion is decided by the Ethical Council, which is a separate entity set up by the Norwegian Ministry of Finance. The ethical council decides upon the exclusion, and informs the GPFG when the exclusion will be announced. The GPFG then need to sell its holdings in short order. The fund's average ownership is 1.5% of outstanding shares in the companies in which they are invested.[13] This ownership share is being sold off, leading to substantial selling pressure. This selling pressure may lead the market to revise beliefs about exclusions.

[12] Beck and Fidora (2008) and Dewenter et al. (2010) were early studies.

[13] Source: The Funds Annual Report 2023, pg 23.

2.3.1 Hypotheses group 2 - The stock market reaction around exclusion announcements

Our second set of hypotheses is concerned with the stock price behavior around the time an exclusion is announced. The analysis will be performed with an event study. Our event study will look at stock price evolution both in

A. The short period before the exclusion is announced, which we implement as one month.

B. The announcement date.

For both periods the hypothesis to be tested is that there is a permanent negative price reaction.

2.3.2 Prior studies

This part of our study is related to several recent event studies of the exclusion announcements by the oil fund (Atta-Darkua, 2022; Ayoubi and Enjolras, 2020; Nguyen et al., 2024). They all estimate negative announcement price effects, but only investigate a short window of a few days around the announcement.[14]

Our analysis complements these studies by using a longer time period, but more importantly, add to them by also considering the price pressure hypothesis in the period before the announcement.

2.4 Corporate reactions to exclusion

Our third empirical investigation looks at the firm's reactions to an exclusion. In particular, do they act to reverse the exclusion?

To develop our hypotheses, 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. In making this decision,

[14] Atta-Darkua (2022) uses data from 2004–2017, and find an estimate of $CAR(-1,5) = -1.72\%$. Ayoubi and Enjolras (2020) uses data in the period 2006–2018, and estimate $CAR(-1,1) = -0.986\%$. Nguyen et al. (2024) uses data in the period 2004–2021 and estimate $CAR(-1,1) = -0.20\%$. Note that this last study also include announcements of *observations* (cases where the fund announces that they are evaluating the firm for possible future exclusions.

the company is trading off the cost (loss of profit from the cluster munition production) with the potential benefits.[15]

We will use the cases where exclusions are reversed to investigate this. As we will show later, for an exclusion to be reversed, firms must have taken a positive action to remove the cause of exclusion, for example by shutting down a product line. Can we show that the sample of firms getting the exclusion reversed is consistent with such a tradeoff theory?

In the theoretical models, the benefit boils down to a lower cost of capital for new investment. There are however other possible issues the corporations may factor in. For example, the exclusion announcement may lead to consumer boycotts and other reputational cost that actually hurts corporate cash flow. Another issue is executive compensation. If exclusions lead to drops in stock prices, executive options will fall in value. Executives will then have an incentive to argue for the importance of reversing exclusions.

2.4.1 Hypotheses group 3 - The corporate reaction to exclusions

Hypotheses that follow from a balancing of costs of actions necessary to reverse the exclusion, and benefits of a lower cost of capital:

A The easier it is for the firm to take the necessary actions (lower cost) to reverse the exclusion, the higher the probability of exclusion being reversed.

B The higher the benefit of a lower cost of a capital, the higher the probability of exclusion being reversed. In testing this hypothesis we will use the company's need for capital as a proxy for the benefit of a low cost of capital.

Hypotheses that follow from executives worrying about their executive option values:

C Companies with higher sensitivity of options to stock price declines (delta) are more likely to see exclusions being reversed.

[15]The literature on whether/how firms react to ESG pressure, be it from the public, or its owners, is limited. For example Becht et al. (2023) looks at social media divestment campaigns against oil and gas producers. 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.

2.5 What happens to a green return premium if exclusions are rescinded?

Our final group of hypotheses considers stocks whose exclusion is revoked. If the GPFG exclusion is revoked, it is a result of public information that the direct reason for exclusion no longer applies. Other institutional investors observe the same information, and are also likely to remove this company from their exclusion lists. We can then expect the market to reward the company with a new, lower cost of capital that reflects the improved corporate ESG ranking. This leads to our fourth group of hypotheses:

2.5.1 Hypotheses group 4 - The green return premium of stocks whose exclusion is revoked

If a stock exclusion is revoked, its green return premium going forward is zero.

3 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.[16]

The fund's purpose is to manage Norway's considerable resource wealth stemming from oil and gas production in the North Sea. The fund translates the oil and gas in the North Sea into a well-diversified financial portfolio invested outside of Norway. The fund started investing in equity in 1998, with a 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. 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 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

[16] 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).

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"[17]

3.1 Exclusions

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.[18] 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.

In the autumn of 2002, the Norwegian government appointed a public committee to propose ethical guidelines for the fund. 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, which is also the starting point of our sample. The primary function of the Council 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),

[17]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.

[18]Note that the Ministry of Finance adjusts the target index for the asset allocator 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.

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). 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).

To illustrate the process of exclusions, let us use the case of Wal-Mart. Historically, this is probably the most visible exclusion by the GPFG.[19] Wal-Mart was excluded June 6, 2006 on the basis of violations of human rights, where the list of violations included child labour, gender discrimination, suppression of unionization and hazardous working conditions. At the time Wal-Mart was already targeted by institutional investors, to the degree that Wal-Mart saw it necessary in January of 2005 to place a full-page ad in US newspapers like the *Wall Street Journal* and *New York Times*, with a letter from their CEO countering criticism of the company. In the period before the exclusion, the ethical council interacted with Wal-Mart. This does not seem to have gone too well, as in the ethical councils recommendation to the ministry they write[20] "there are no indications that the company is planning to change their conduct." When Wal-Mart was excluded, it made a big splash. The American ambassador to Norway even made visits to the Norwegian Ministry of Finance to complain.

The Ethical Council publishes its announcement after Norges Bank has agreed. The process provides the fund time to divest before the exclusions is officially announced.[21]

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.[22] The 189 excluded firms is a very small number compared to the fund's

[19] Much of these details are from Ang (2008).

[20] Advise from the ethical council to the ministry in a letter of 15 nov 2005. (Our translation.)

[21] 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.

[22] The ethical council also announces that some firms are placed on observation, with a warning they may face future exclusion. We do not include these cases, as they are very few. In the period of our study only 22 firms were on the observation list.

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.

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.[23]

3.2 Revoking exclusions

Through continued dialogue with the excluded firms, the Ethical Council can revoke the decision to exclude in the event of a change in operations for the excluded company. Of the 189 excluded firms, 26 have had their exclusion revoked and again been allowed to enter the GPFG portfolio.

It is here helpful to go into some detail. Table 2 provides the detailed reasons for all revoked exclusions. As the table shows, the typical reason for exclusions to be reversed is to stop the company's involvement in offending activities. For example, the first exclusion was reversed in 2006. It 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. Another well known example is Wal-Mart, the largest company excluded. At the time of the exclusion in 2006, the ethical council cited a number of outstanding lawsuits on labour issues, mostly involving attempts to limit unionization, as well as issues with child labour in the supply chain. When the exclusion was revoked, all these lawsuit had been settled. Wal-Mart had also instituted certification and audit procedures for its supply chain to guard against among others child-labour issues.

There is only one example of a reversal that does not involve active measures from the company. That is the case of Dongfeng Motor Group. The company was excluded because they supplied military material to Myanmar. Myanmar was at the time under sanctions by the UN Security Council. When these sanctions were lifted, in 2014, the exclusion of Dongfeng was revoked.

For the rest, the active measures necessary for exclusions to be lifted are costly for the companies involved. They have to close production lines, or sell off subsidiaries. To return to the Wal-mart example, the necessary certification and audition activities for a company with this wide a product range will be very costly. What is less clear

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

is to what degree these costs are triggered by the company's exclusion by the GPFG. Wal-Mart's certification work against child labour, for example, could also have been motivated by threatened boycotts by consumers.

3.3 How standard are the GPFG exclusions?

To close our discussion of the GPFG, let us consider how similar these exclusions are to those of other institutional investors. The majority of exclusions are product based. These products (tobacco, weapons, etc.) are by now standard exclusion reasons among institutional investors.

As for the conduct based exclusions, there is more judgement involved. For a number of these, such as Wal-Mart, GPFG was one of the early movers, certainly in terms of publicly announcing their exclusion. GPFG is widely acknowledged as an example in the financial industry, due to its transparency, among others with respect to their ESG decisions. Many institutional investors do not publicly announce their exclusions, making it hard to judge how widespread the GPFG exclusions are followed. We do know that all larger Norwegian banks and pension funds follow the exclusions announced by the ethical council.[24] Also, most banks have some exclusion policies. For example, while SEB, Danske Bank, BlackRock, and Morgan Stanley HSBQ have similar robust exclusion criteria in writing, their published lists of excluded companies is not identical to the list followed by the NBIM.

Hence we don't know to what degree this exact set of conduct-based exclusions is acted upon outside of Norway. We however 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 engagement, GPFG is part of a network of institutional investors cooperating to influence firms on environment and social issues (Dimson et al., 2023). Finally, the criteria used by the GPFG in their exclusions are similar to criteria published by other large institutional investors and investor groupings.[25]

[24] In the appendix we give a list of these funds.

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

4 Data

4.1 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. 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. In Panel A of Figure 1 we give an overview of the exclusions over time. The number of exclusions has been increasing gradually, except for a major jump in 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 (coal based exclusions are shown separately in the figure).

4.2 Equity data

The basis for our analysis is 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). Table 3 provides some data descriptives. In addition, Panel B of Figure 1 provide 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.

4.3 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 several flavors. As our measure of the corporate ESG score, we select the `TRESGCS` score, which combines the self-reported scores with additional information on company controversies. The ESG score is between 0 and 100, increasing in ESG quality. ESG scores are not available for all companies. We have been able to identify the scores of 144 companies. Panel C of the table provides some descriptives for the company ESG scores of excluded firms' portfolios.

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 D of Table 3 provides some descriptive statistics for these measures.[26]

We further 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.

Finally, we construct a proxy for the sensitivity of executive options to changes in stock prices. This is approximated as the delta of a generic at-the-money call with one-year maturity.[27]

5 Estimating the green return premium

This section analyses Hypothesis 1, the green return premium. Does the portfolio of excluded firms have exceptional returns? To estimate that we construct Exclusion Portfolios. We let a stock enter the Exclusion Portfolio the at 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. We consider two methods to calculate portfolio returns: equally weighted and value weighted, where the latter uses market capitalizations as weights. Table 4 gives descriptive statistics for various portfolio returns.

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):[28]

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

where the factors are international versions of the corresponding US factors (Fama

[26]For the changes in earnings we remove cases where the initial EPS is close to zero, to avoid extreme values.

[27]The delta is calculated as $\Delta_c = N(d_1)$, where $d_1 = \left(r + \frac{1}{2}\sigma^2\right)/\sigma$, N the cumulative normal distribution function, r an estimate of the risk free rate, and σ the option volatility. We use the US one-year treasury rate as a proxy for the risk-free rate on this one-year option. The option volatility is estimated from daily dollar returns for the three years leading up to the estimation date. The delta is evaluated at the time of the exclusion announcement by the GPFG.

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

and French, 2015).[29] Column (1) in Panel A of Table 5 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 this portfolio of "ethically challenged" firms is more than 5%.

To show robustness, we also report a number of alternative formulations, including one-factor (CAPM), three- and four-factor specifications. 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. 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 Table 5 reports performance regressions using value weighted returns. 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 related companies in the exclusion portfolio. Many of these companies are utilities, with corresponding low betas.

The fund excludes companies for different reasons, with the main distinction being conduct and product-based exclusions. In Table 6 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.[30]

The results can be summarized as showing that portfolios of firms excluded by the GPFG have a significant positive alpha in the region of 5% in annual terms. In terms of the more common green premium, which is the negative of this estimate, our results imply negative green return premium of approximately -5% in annual terms. The estimate is negative, in line with most of the literature, lending support to the non-pecuniary type of model. It is larger in magnitude than most estimates in the literature, possibly reflecting the sample of the "worst offenders." [31]

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

[30]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.

[31]We have performed a larger number of additional robustness tests, which we will not show explicitly,

6 Stock price reaction to exclusion

We now turn to the second set of hypotheses, concerning stock price reactions around the time of the GPFG exclusion announcement. We perform an event study. Some care is necessary in constructing the event study, as these are events happening in a diverse set of equity markets, and it is necessary to make them comparable. The obvious concern is currency. If one runs these as separate event studies in each market, the estimated excess returns would be in different currencies. Our maintained asset pricing model is thus an international CAPM, [32] denominated in dollars.

$$E[r_{i,t}] = r_{f,t} + \beta_i(E[r_{m,t}] - r_{f,t}),$$

where $r_{i,t}$ is the dollar return of the stock, $r_{f,t}$ the US risk free rate, and $r_{m,t}$ is the return on a world market index. As market index we use Ken French's index of global developed markets. As risk free rate we use the Ken French estimate.

The method of calculation is standard (MacKinlay, 1997). To calulate a Cumulative Abnormal Return one picks a starting point m days before the exclusion announcement, ending n days after the announcement ($CAR(-m, n)$). $\widehat{\beta}_i$ is estimated using a three-year pre-period of daily (dollar) returns. This beta is then used in the calculation of abnormal returns

$$AR_{i,t} = r_{i,t} - \left(r_{f,t} + \widehat{\beta}_i(r_{m,t} - r_{f,t})\right)$$

which are aggregated into cumulative abnormal returns: $CAR_{i,t} = \sum_{j=-m}^{t} AR_{i,j}$. The event date (day 0) is the announcement of the exclusion. The two hypotheses we

just mention the key findings. The analyses are provided in a separate Internet Appendix. First, we have looked at the timing of when stocks enter or exit the exclusion portfolio. In addition to 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. We also construct a portfolio of the excluded firms two years *before* the oil funds exclusion. While not significant, the point estimates of alpha are of a similar magnitude to the post-exclusion portfolio. Further, 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. We have also done the analysis separately on just the US companies in the portfolio. Here we also find a significantly positive alpha. We also 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, Wal-Mart, which has a very large weight in the early part of the period. We have therefore redone the analysis removing Wal-Mart from the value weighted portfolio. This does not change our inferences.

[32] We have also done the calculations using a market model as an alternative to the CAPM. The results are in the Internet Appendix.

investigate both specify a permanent fall in stock prices linked to the exclusion by the GPFG. The first starts with the one-month period leading up to the announcement, and the second with the day of announcement.

We calculate two event studies, one starting on trading day -20, the other starting on day -1. In both cases we extend the cumulation till trading day 40 (roughly two calendar months). The evolution of these CARs are presented in Figure 2, Panels A and B.

Looking at the one-month CAR picture in Panel A, we see prices drifting upward until the announcement date. At the announcement date there is a short-term dip in prices, before prices drift upward further. At the of the period the CAR has reached 4%. For the one-day CAR picture in Panel B we see the immediate drop, but after 40 trading days the CAR has reached a positive 2%. These figures clearly contradict any notion that there is a permanent drop in stock prices.[33]

The event study in Panel B is consistent with the evidence in extant event studies (Atta-Darkua, 2022; Ayoubi and Enjolras, 2020; Nguyen et al., 2024), which all start at date -1, and find significantly negative CARs (either $CAR(-1,1)$ or $CAR(-1,5)$).

Where we add to the extant studies is by looking at the month prior to the exclusion announcement, and extending the post period for two months. In particular the extension to the longer post-period is the important result, because it lets us conclude that price changes following exclusions are not permanent.

One possible objection to our results is the use of a world market portfolio. Event studies are typically done relative to a local market index. To show the robustness to this we do the estimation for only the exclusions of the US companies. The corresponding event studies using only the US stocks are shown in Panels C and D. While there are some differences in terms of levels, they give the same conclusions.

7 Corporate reactions to exclusions

Our third set of hypotheses are concerned with corporate reactions to exclusions. To analyze the various hypotheses we need to employ a number of different econometric methods. Our analysis will be partial, there is no single framework where all the proposed mechanisms can be tested. We instead look at this hypothesis by hypothesis.

[33] While an event study typically present a large number of test statistics for the various CAR estimates, it turns out to be unnecessary for our purposes, it is sufficient to illustrate the results using this CAR. The standard test statistics are included in an Internet Appendix.

7.1 The company cost of improving ESG

We start by investigating Hypothesis 3.A, which states that the probability of revoking the exclusion is linked to the cost of taking the necessary actions to revoke the exclusion. For this particular hypothesis, we model it in the econometric context of modelling the *time period* a firm stays excluded. That means we 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 sample being 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 3 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.

To proxy for the ease with which firms can improve their ESG, 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.

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 the analysis test whether survival times are affected by initial conditions, and modelled by investigating determinants of a Cox proportional hazard function.[34] As determinants, we use the firm's combined ESG Score (TRESGCS). We also control for firm size and the source of exclusion (product or conduct-based), as well as control for annual fixed effects. Differentiating 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. A conduct-based exclusion, however, such as employing child labour, is easier to take action on.

Figure 7 shows the results. We find that the ESG score has a significantly negative

[34] In the appendix, we provide evidence using alternative functional assumptions for the Cox model.

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 descriptives. Figure 4 plots the 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.

7.2 The cost of corporate capital channel

We now turn to Hypothesis 3.B, the cost of capital channel. We look at the cost-of-capital issue in an indirect way, by looking at the times cost of capital matters most to a corporation, namely the times when the corporation need to interact with the capital markets to raise new capital. We look at measures of the need for new capital, and ask: Are firms that need new capital more likely to get their exclusion reversed?

7.2.1 Growth-driven need for capital

One way to assess capital needs is to look at corporate growth. Growing companies are more likely to need new capital. 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 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.

We include firm size (market cap) and exclusion cause (conduct/product) as control variables in the estimations.

The results in Panel A of Table 8 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. We note that here too we find that conduct-based exclusions are more likely to be revoked.

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 they will want to do it.

7.2.2 Actually Raising Equity Capital

In the previous estimation, we looked at conditions that would lead to a need for raising capital. An alternative investigation of Hypothesis 3.B 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 8 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.

7.3 Executive compensation

We finally consider Hypothesis 3.C, concerning the actions of corporate executives. As discussed, executives will be concerned if exclusions affect stock prices, as a price drop will affect the value of executive options. To test the hypothesis we introduce a measure of option sensitivity to changes in stock price (option delta) as a predictive

variable in the duration analysis performed in section 7.1. The estimation including option sensitivity as an explanatory variable is shown in the last column of Table 7. The coefficient on option sensitivity is not significant, and it even has the wrong sign, as it is positive. In this analysis, a positive coefficient has the interpretation that it increases the time till exit. So we conclude that we don't find effects linked to the sensitivity of corporate options, and reject Hypothesis 3.C.

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

The final analysis concerns Hypothesis 4. We investigate what happens to the cost of capital of firms that get off exclusion lists. To answer this, we construct a "Revoked Portfolio" containing previously excluded stocks. To construct this portfolio representing the revoked firms, we let stocks enter the Revoked Portfolio at the end of the calendar month in which their exclusion is revoked.

We again conduct a regression analysis to make a formal statement about performance. The regression results in Panel A of Table 9 shows that the Revoked Portfolio does not have significant alpha. Some point estimates are even negative. The relevant comparison is what these stocks did while they were excluded. Therefore, we also look at the constituent stocks in the Revoked portfolio but construct the portfolio of these stocks before their exclusion is revoked, i.e. while they are still excluded. In Panel B of Table 9 we show the results. Here we find that the portfolio of these stocks had a significantly positive alpha of 5.6% in annualized terms. These results show that firms which contributed to superior performance of the Exclusion Portfolio reverts to a "normal" portfolio alpha of zero once they get off the exclusion list.

9 Conclusion

We used the exclusions by the Norwegian Government Pension Fund Global, the world's largest SWF, to identify a set of firms excluded by institutional investors. We use these firms to look at four separate issues.

First, we use the returns of excluded firms to estimate the return differential of excluded vs non-excluded firms. Applying a battery of performance tests to portfolios of excluded firms, we establish that these portfolios have a considerable excess return relative to the predictions of standard asset pricing models. 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 alphas than product-based exclusions. The returns of small firms do not drive these results, as value-weighted versions of the portfolios have even higher excess returns than the equally weighted ones. Translating this into an estimate of "greenium," this implies a negative five percent annualized greenium.

Second, we look at the stock price reaction to an exclusion by the GPFG, using an event study of (-1 to $+2$) months. Earlier research have found a negative announcement effect around the GPFG's exclusions. While we confirm a short-term negative effect a couple of days around the announcement, we temper this by observing that over the three month period we analyze the stock price is actually drifting upwards. This result is inconsistent with an increase in company cost of capital triggered by the GPFG exclusions.

Third, we investigate company reactions to exclusions. We consider the firms that have acted to reverse their exclusions. First, only 14% of the firms in the sample had their exclusion revoked, so it does not seem like a strong incentive. On the other hand, many of these firms may not be able to change enough to get the exclusion reversed. Coal related firms, for example, have little opportunity, at least in the short term, to move into other lines of business. This is consistent with the observation that the majority of exclusions revoked are linked to conduct based criteria.

We ask why those few firms pay the cost necessary to reverse the GPFG exclusion. We identified a number of hypotheses, linked to the cost of changing ESG, the marginal benefit of a lower cost of capital, and effects on executive options. Our results show that the ESG rating at the time of exclusion matters. Lower-ranked ESG firms seem to find it easier to get the exclusion revoked. We also investigated the cost of capital channel by asking whether firms that got their exclusion revoked were more likely to need capital. Here we investigate both corporate growth-motivated capital needs, and actual raising of equity capital, and identified a link between our proxies for capital needs and the likelihood that the exclusion is revoked. Finally, we do not find any support for an executive option-linked hypothesis.

Fourth, we look what happens to the green premium when firms' exclusions are revoked. We compare the alpha of the portfolio of revoked firms before (while they are still excluded) and after the exclusion is revoked. It falls from significant 5.6% (in annual terms) to close to zero and insignificant.

What are the implications of the above results? How can we reconcile the large magnitude of the (negative) greenium of this sample with the lack of price reaction at the announcement of the exclusions? A plausible explanation is that the exclusion by the GPFG in itself contains little additional information. The basis for their exclusions

are public sources about the company's activities, something which is also available to everybody else. The information in the exclusion announcement is about the GPFG's *evaluation* of this public information. The event study results indicated that even the selling off by an owner owning 1.5% of the company's stock before announcing their exclusion does little to shift the markets evaluation of price.

This perspective is also relevant for our last result, that the green premium disappears when exclusions are revoked. The ethical council has used public information about companies to determine that the cause of exclusion is no longer there. This is a confirmation that the corporations have changed, it is not just about the GPFG judgement. Hence the ESG-linked aspect of the firms operations has changed, and an ESG-linked premium may no longer be there, which is what the fall in alpha post-exclusion imply.

Our results have implications for political discussion about exclusions. These discussions often make the case for achieving political goals through exclusions affecting the cost of capital. Our results show that in most cases, exclusions have little consequences for stock prices, and hence for incentives. There are however some cases where the is scope for exclusions to influence firm changes, either because the costs to the firm of doing it are low, or the firm has urgent need of capital. For these firms it pays to get off the exclusion list, as evidenced by the lowering of cost of capital in the post-exclusion period. In terms of the political discussion, the take home may be that if the goal is to bring about corporate change, broad exclusions will have little effect, but more targeted exclusions may be more effective. To change broad industries, more targeted regulation may be necessary (Pedersen, 2024).

We view the corporate finance dimension as the most promising research direction following up our research. What firms react to conduct-related exclusions? Understanding how firms react to ESG-related shocks 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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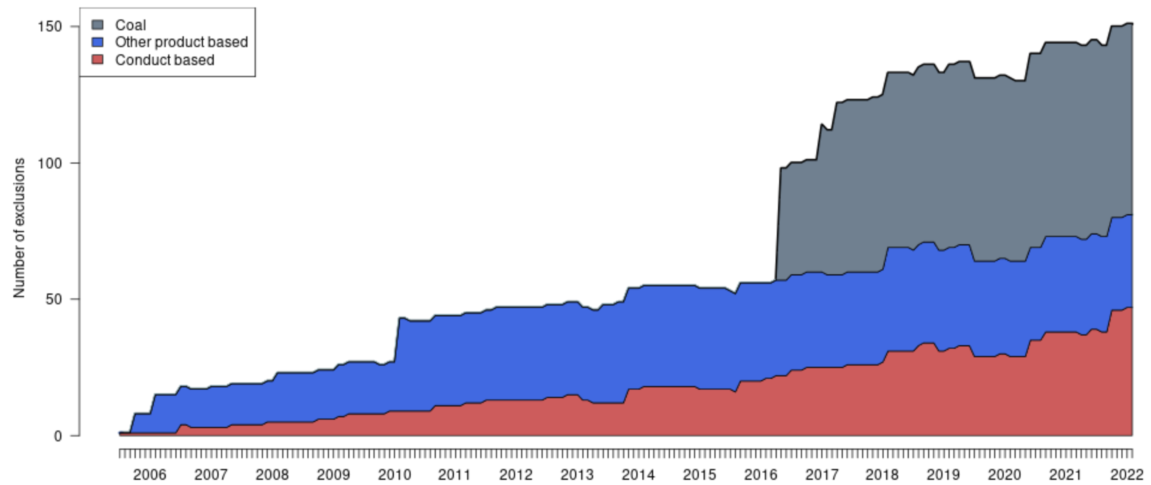
Figure 1: The number of excluded shares over time and the size distribution of companies excluded

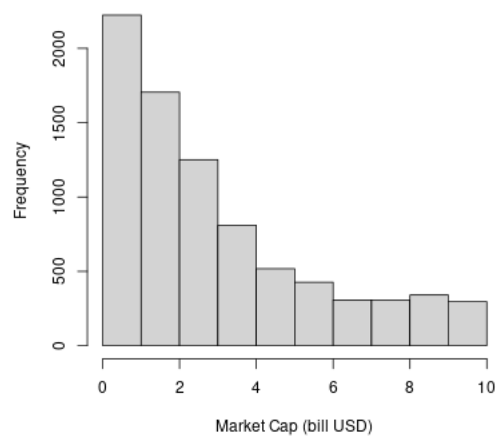
The figure in panel A shows the number of stock returns in the exclusion portfolios, broken down by product-based and conduct-based. The product-based category is further broken down by coal-based and other product-based exclusions. Panel B illustrates the distribution of equity market capitalization (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 excluded firms. Values in US dollar terms. Data from the Ethical council, GPFG and Refinitiv.

Panel A: The number of excluded shares over time



Panel B: Distribution of firm size (Market capitalization)

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



B.2: Mkt Cap $>$ 10 bill USD

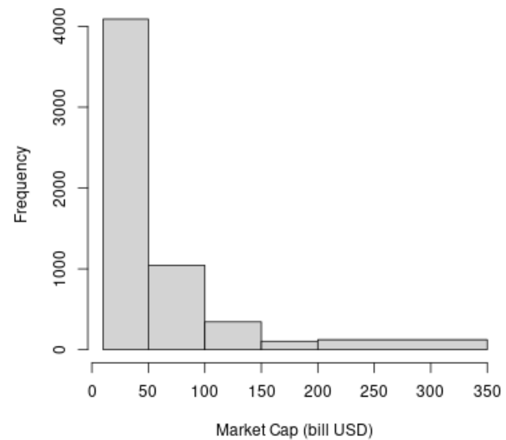
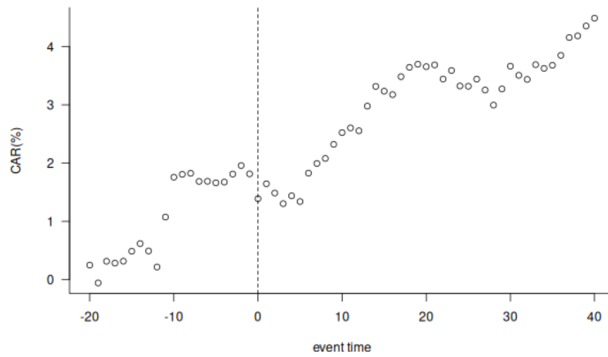


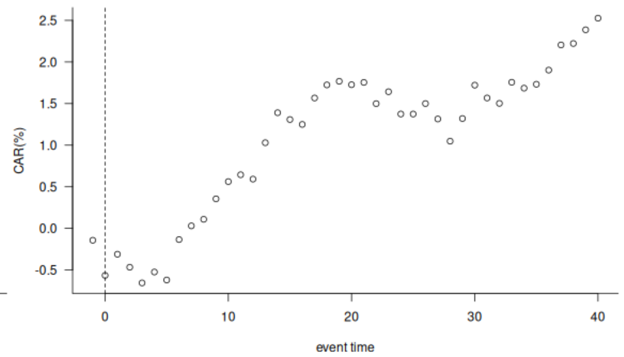
Figure 2: Event Study of Exclusion Announcement

The figures show the results of event studies of the oil fund's exclusions announcements. The figures plots averages across firms of cumulative abnormal returns (CAR). All returns are calculated from the perspective of an US investor, denominated in USD. Abnormal returns AR are calculated as $AR_{i,t} = r_{i,t} - \left(r_{f,t} + \widehat{\beta}_i(r_{m,t} - r_{f,t})\right)$, where $r_{i,t}$ is the dollar return of the stock, $r_{f,t}$ the US risk free rate, and $r_{m,t}$ is the return on a market index. In panels A and B the abnormal return (AR) is calculated using a world market index, Ken French's index of global developed markets. In panel C and D the market index is the S&P 500. As risk free rate we use the Ken French estimate. The parameter $\widehat{\beta}_i$ is estimated using a three-year pre-period using daily returns. The CAR is aggregated from abnormal returns as $CAR_{i,t} = \sum_{j=-20}^{t} AR_{i,j}$ The event date is the announcement of the exclusion. In panels A and C we start estimation one calendar month before the event date and end it two calendar months after. In panels B and D we start estimation one day before the event date and end it two calendar months after. See the Internet Appendix for details. Panel A and B uses all exclusions. Panels C and D only uses exclusions of US companies. CAR in percent.

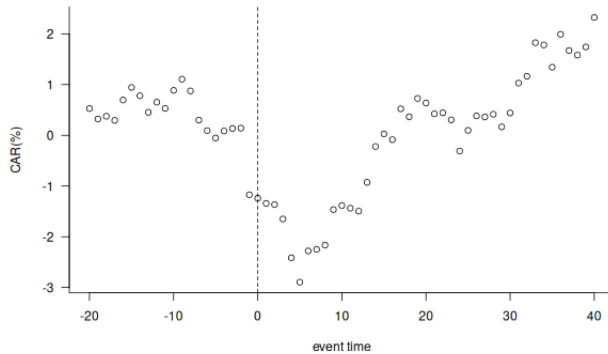
Panel A: Event study (-20,40)



Panel B: Event study (-1,40)



Panel C: US Event study (-20,40)



Panel D: US Event study (-1,40)

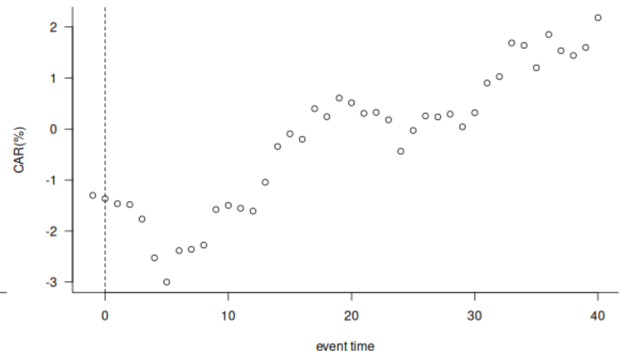
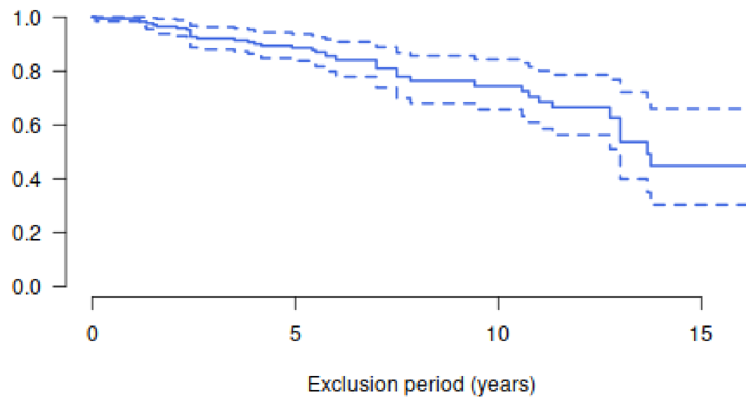


Figure 3: Survival and Hazard curves for the Exclusion Portfolio

Panel A: Survival curve, adjusting for right-truncation. The broken lines indicate one standard deviation. Panel B: Instantaneous hazard curve (smoothed estimate). Both are 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)

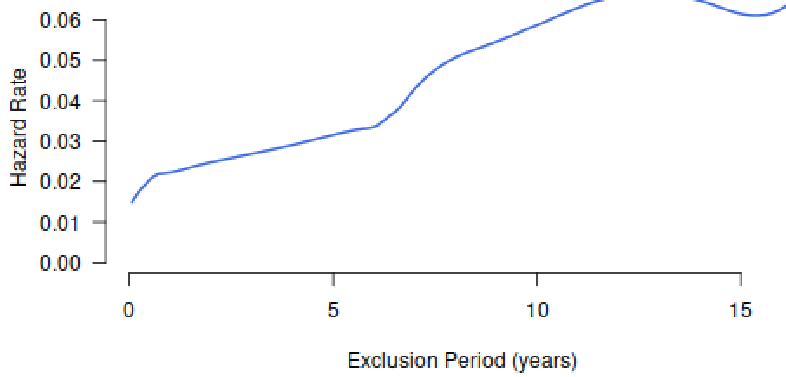


Figure 4: ESG scores of Excluded Firms, Revoked and Non-Revoked.

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.

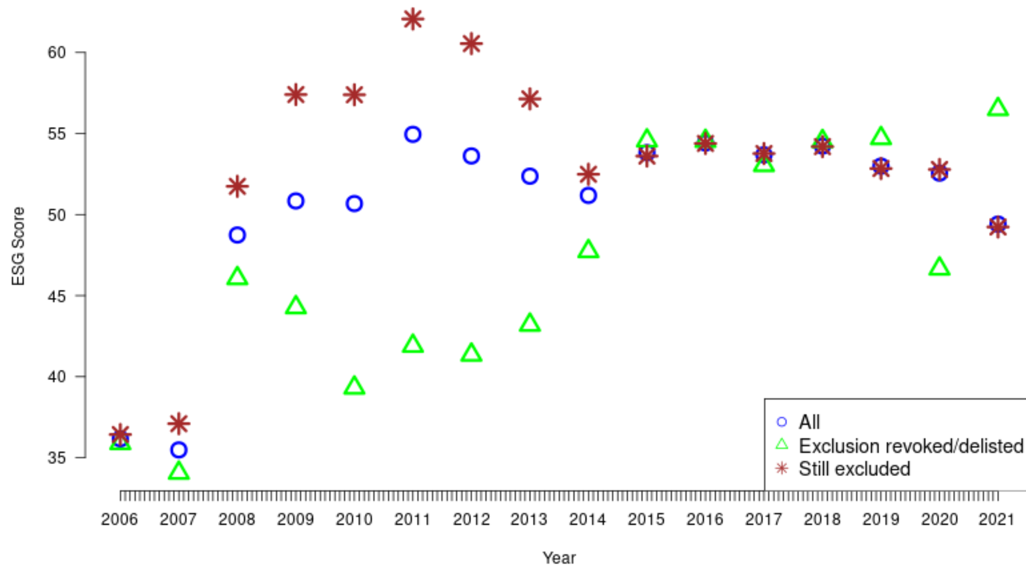


Table 1: Reasons for exclusions

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: Overview of reasons for exclusions to get revoked

The tables summarize the causes for exclusions to be revoked. Panel A looks at the more common causes, and lists the companies for which that cause apply. Panel B gives the reasons for the remaining companies, with details for each company. Data source: Ethical Council and GPFG.

Panel A - Reasons for exclusions to be revoked. Grouped by reason for exclusion

- *Cluster munitions production* was one of the first reasons for exclusion. The following companies had their exclusion revoked when they no longer were involved in such production: General Dynamics Corp, Hanwha Corp, L3 Communications Holdings, Raytheon Co, and Thales SA.
- *Nuclear munitions production* was also one of the first criteria that lead to exclusion. The following companies had their exclusion revoked when they no longer were involved in such production: AECOM, BAE systems, Finmeccanica SPA. Serco Group PLC, and United Technologies Corp.
- *Coal production*. Companies where more than 30% of revenues are from Coal-related activities were excluded starting in 2016. The following companies had their exclusion revoked when their coal-related activities went below 30%: Anglo American Plc, Drax Group Plc, and Empire District Electric Company.
- *Western Sahara*. Companies that were involved in activities in the disputed area of Western Sahara were excluded. The following companies had their exclusion revoked when they were no longer involved in Western Sahara: Cairn Energy Plc, Kosmos Energy Ltd, FMC Corp, Kerr-McGee Corp, Nutrien Ltd, and San Leon Energy Plc.
- *Tobacco*. The tobacco criterian was introduced in 2010, where companies involved in production of tobacco were excluded. The following companies which no longer produce tobacco have had their exclusions revoked: Grupo Carso SAB de CV, and Mativ Inc.

Table 2: (Continued)

Panel B. Reasons for exclusions to be revoked. Individual companies

- *Africa Israel Investments Ltd* was in 2010 excluded for involvement in construction projects in the occupied territories in the West Bank. The exclusion was revoked in 2020 when this activity ceased.
- *Atal SA* is a Polish company that was excluded in 2018 due to employment of North Korean labourers. Poland in 2019 confirmed all North Korean labourers had left the country, and the company exclusion was revoked in 2021.
- *Dongfeng Motor Group Co. Ltd* is a Hong Kong company that was excluded for supplying military materiel to Myanmar. The Myanmar criterion was reversed after the Security Council lifted sanctions on the country, and Dongfel Motor Group's exclusion was revoked in 2014.
- *DRD Gold Ltd.*, an US mining company, was excluded in 2009 due to mining in Papua New Guinea and Fiji. These mines were sold by the company, and the exclusion was revoked in 2009.
- *IJM Corp* was excluded due to the risk of the company being responsible for severe environmental damage through its conversion of tropical forest into oil palm plantations. In 2021, IJM Corp divested its stake in its plantations business. The exclusion of IJM was revoked in 2021.
- *Precious Shipping Plc* and *Thoresen Thai Agencies Plc* were both excluded due to their participation in beaching, sending old ships to be broken down on beaches in Bangladesh. For both companies this activity was stopped, and their exclusions were revoked.
- *Rio Tinto Plc* was excluded in 2008 due to serious environmental damage caused by operations at the Grasberg mine in Indonesia. In 2018, Rio Tinto sold all its interests in the mine. The exclusion was therefore reversed in 2019.
- *Singapore Technologies Engineering Ltd.* was the first exclusion from the GPGF in 2002, on grounds of production of anti-personnel landmines. The exclusion was revoked in 2023 when this production ceased.
- *Texwinca Holdings Co* is a Chinese company that produces textiles and garments. In 2018 the Council on Ethics recommended to exclude the company on the grounds of systematic labour rights abuses at two garment factories wholly owned by the company Megawell, in which Texwinca held 50 per cent of the shares. Megawell was wound up in 2019, and its two garment factories closed down. The exclusion was then reversed.
- *Wal-Mart Stores Inc* was excluded in 2006. Among the reasons for exclusion was labour relations, where Wal-Mart had outstanding ligation with a number of employees, and use of child labour in the supply chain. The exclusion was revoked in 2019. Among the reasons for this was the settlement of the lawsuits with employees, and Wal-Mart's work on certifying their supply chain.

Table 3: Equity and corporate data. Descriptives

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. Returns and values in US dollar terms. Panel B shows Refinitiv's definitions of their ESG score. Panel C provides summary descriptives for the ESG scores for the sample of excluded stocks. Panel D provides descriptives for the measures of earnings and revenue growth for the sample of excluded stocks. Panel D also summarizes estimated deltas of corporate options. The delta is calculated for a one-year at-the-money option. Data sources: Ethical Council, GPFG and Refinitiv.

Panel A: Stock market data – 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: ESG Scores - definitions

TRESGCS	Overall company score based on the reported information in the environmental, social and corporate governance pillars (ESG Score) with an ESG Controversies overlay.

Panel C. ESG Scores – Descriptives

	min	mean	median	max
TRESGCS	4.8	51.4	50.4	89.3

Panel D: Corporate data – Descriptives

	Min	Q1	Median	Mean	Q3	Max
EPS change	-19.3	-0.25	0.06	0.96	0.42	359.3
Revenue change	-0.99	-0.02	0.04	0.08	0.10	11.3
Delta	0.54	0.57	0.58	0.58	0.61	0.69

Table 4: Descriptives, exclusion portfolio returns

Describing portfolio returns for the various exclusion portfolios. All returns in USD. Returns and Excess returns in monthly percentage returns. Sharpe Ratio is $\text{avg}(r_i - r_f)/\text{sd}(r_i - r_f)$. The first column in each table describes the market portfolio, where the market is proxied by the Global market portfolio of Ken French. The other portfolios are exclusion portfolios. All – all exclusions. Conduct, Product, Coal and US exclusions – subsets of exclusions.

Panel A: Equally weighted exclusion portfolio

		EW Exclusion Portfolios				
	Market	All	Conduct	Product	Coal	US
Average return (%)	0.79	1.17	1.44	1.00	1.02	1.24
Std.dev	0.79	5.21	7.73	4.92	4.33	5.06
Average excess return (%)	0.01	1.07	1.35	0.91	0.94	1.14
Sharpe Ratio	0.15	0.21	0.17	0.18	0.22	0.23
n	199	199	199	196	69	199

Panel B: Value weighted exclusion portfolio

		VW Exclusion Portfolios				
	Market	All	Conduct	Product	Coal	US
Average return(%)	0.79	1.37	1.67	1.22	1.27	1.37
Std.dev	0.79	4.23	5.64	4.77	3.47	4.11
Average excess return (%)	0.01	1.28	1.58	1.13	1.19	1.28
Sharpe Ratio	0.15	0.30	0.28	0.24	0.34	0.31
n	199	199	199	196	69	199

Table 5: 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

Table 6: Estimates of alpha for conduct and product-based exclusion portfolios

The table 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 French's homepage. 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.

	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

Table 7: 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). *Delta*: Option delta. All values in USD terms. Data sources: Ethical Council, GPFG and Refinitiv.

	(1)	(2)	(3)	(4)	(5)
ESG Score	-0.03^{***}	-0.03^{***}	-0.02^{**}	-0.03^{**}	-0.02^{**}
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ind(Conduct)		0.73^{*}		0.85^{*}	0.77
		(0.40)		(0.44)	(0.48)
ln(Mkt Cap)			-0.06	-0.11	-0.11
			(0.09)	(0.09)	(0.08)
Delta					4.87
					(5.76)
AIC	218.84	217.97	220.54	219.01	220.49
R^2	0.03	0.05	0.04	0.06	0.06
Max. R^2	0.77	0.77	0.77	0.77	0.77
Num. events	28	28	28	28	28
Num. obs.	149	149	149	149	149
PH test	0.46	0.76	0.55	0.70	0.43

$^{***}p < 0.025$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 8: 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)	-3.38^{***}	-3.32^{***}		
	(1.11)	(1.13)		
Growth EPS	-0.01		-0.02	
	(0.03)		(0.04)	
Growth Revenue		0.40		0.47^{*}
		(0.25)		(0.28)
Ind(Conduct)	0.60^{***}	0.47^{**}	0.67^{***}	0.52^{**}
	(0.19)	(0.19)	(0.20)	(0.20)
ln(Mkt Cap)	0.05	0.05	0.06	0.06
	(0.05)	(0.05)	(0.05)	(0.05)
Annual fixed effects			X	X
Log Likelihood	-99.68	-100.13	-89.16	-89.04
Num. obs.	975	969	975	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

Table 9: The Post-Exclusion Portfolio

The tables show performance analysis on the revoked. The revoked portfolio is constructed from all firms which have had their exclusions revoked and remain listed. Panel A shows performance analysis where stock enter the portfolio 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. Panel B shows the same regressions, but for this portfolio of revoked firms in the period *before* the exclusion is revoked (i.e. while the stocks are still excluded). 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.

Panel A: Performance analysis - revoked portfolio after exclusion lifted

	(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

Panel B: Performance analysis - revoked portfolio before exclusion lifted

	(EW)	(VW)
Alpha	0.005***	0.006***
	(0.002)	(0.002)
Rm-Rf	0.957***	0.866***
	(0.041)	(0.039)
SMB	0.201*	−0.281***
	(0.128)	(0.115)
HML	0.469***	0.186*
	(0.119)	(0.098)
RMW	0.139	0.320**
	(0.161)	(0.145)
CMA	−0.238	0.396***
	(0.240)	(0.144)
Annualized Alphas(percent)	5.630	7.400
Adj. R^2	0.804	0.774
Num. obs.	200	200