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The Global Sustainability Footprint of Sovereign Wealth Funds

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Hao Liang
Singapore Management University and ECGI
Luc Renneboog
Tilburg University, CentER and ECGI

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This paper is developed based on a research project by Tilburg University's Master of Science in Finance students on the role of sovereign wealth funds around the world, under the supervision of Liang and Renneboog. The authors are grateful to Jules de Besser, Daan de Vries, Odette Mutsaers, Jasper Stiphout, Jasper Verhoeven for their excellent research assistance in the project.

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Abstract

With the emergence of sovereign wealth funds (SWFs) around the world managing equity of over $8 trillion, their impact on the corporate landscape and social welfare are being scrutinized. This study investigates whether and how SWFs incorporate environmental, social, and governance (ESG) considerations in their investment decisions in publicly listed corporations, as well as the subsequent evolution of target firms' ESG performance. We find that SWF funds do consider the level of past ESG performance as well as recent ESG score improvement when taking ownership stakes in listed companies. These results are driven by the SWF funds that do have an explicit or implicit ESG policy and are most transparent, and by SWF originating from developed countries and countries with civil law origins. In relation to engagement, we find by means of two natural experiments with exogenous shocks (the Deep Water Horizon catastrophe and Volkwagen Diesel scandal) that the ESG scores do not change significantly more for firms in which SWFs have ownership stakes. This potentially suggests that SWFs in general do not actively steer their target firms towards higher levels of ESG.

Keywords: sovereign wealth funds, institutional ownership, corporate social responsibility, socially responsible investments, sustainability, shareholder engagement, ESG, environmental policy, social policy, corporate governance, exogeneous shock

JEL Classifications: G11, G18, G15, G28, Q01, M14

Hao Liang
Assistant Professor of Finance
Singapore Management University, Lee Kong Chian School of Business
50 Stamford Road
Singapore 178899, Singapore
phone: +65 6828 0662
e-mail: hliang@smu.edu.sg

Luc Renneboog*
Professor of Corporate Finance
Tilburg University, School of Economics and Management, Department of Finance
Warandelaan 2
5037 AB Tilburg, The Netherlands
phone: +31 134 668 210
e-mail: luc.renneboog@uvt.nl

*Corresponding Author

The Global Sustainability Footprint of Sovereign Wealth Funds[1]

Hao Liang
Singapore Management University

And

Luc Renneboog
Tilburg University

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[1] Hao Liang is at the Lee Kong Chian School of Business of Singapore Management University: hliang@smu.edu.sg; Luc Renneboog is at the Department of Finance of Tilburg University: Luc.Renneboog@uvt.nl. Acknowledgments: This paper is developed based on a research project by Tilburg University's Master of Science in Finance students on the role of sovereign wealth funds around the world, under the supervision of Liang and Renneboog. The authors are grateful to Jules de Besser, Daan de Vries, Odette Mutsaers, Jasper Stiphout, Jasper Verhoeven for their excellent research assistance in the project.

The Global Sustainability Footprint of Sovereign Wealth Funds

1. Introduction

Over the last 15 years and especially around the time of the financial crisis, interest in and attention to the investment policies of sovereign wealth funds (SWFs) have grown. According to the SWF Institute, global assets under management by SWFs have exceeded $8 trillion, and the Norway Government Pension Fund Global manages over $1 trillion of wealth. While SWFs have been in existence for many decades,[2] it has attracted attention only until recent years, especially since the global financial crisis (Das, 2009). The purchase of a $3 billion in equity in the Blackstone Group in 2007 by China Investment Corporation (CIC)—the SWF of China—sparked public interest (Bortolotti, et al., 2009). Several Asian and Persian Gulf-based SWFs bought $60 billion of newly issued equity in large American and European banks in 2008, thereby playing a critical stabilizing role in the aftermath of the crisis. Still, the lack of transparency and political motivations lead host country governments and firms to react cautiously to SWFs' investments (Mezzacapo, 2009). As SWFs are government-owned, they do not need to exclusively focus on financial returns, but can also add a stakeholder perspective to their investment goals. Examples of SWF who explicitly have a corporate social responsibility (CSR) perspective include the Norwegian Oil fund, as well as the SWFs of New-Zealand and France (United Nations Environment Programme, 2017). It is challenging to investigate SWFs considering that many lack transparency and differ significantly in terms of their purpose, geographical focus, and funding source, etc. (Bernstein, Lerner, & Schoar, 2009; Monk, 2011; Gangi et al., 2019).

Since the global financial crisis of 2007-2008, more than 30 new SWFs have been established, such as the Turkey Wealth Fund in 2016 and the Japan Investment Corporation in 2018. Currently, SWFs are among the largest investors in the world, with Norway's Government Pension Fund Global (or Norges Bank Investment Management) controlling more than $1 trillion in assets under management (AUM) (SWF Institute, 2019).

Do SWFs, which typically aim at accumulating national wealth for the future generations thus have a long-term investment horizon without short-term liabilities (PricewaterhouseCoopers, 2016), have a stronger focus on stakeholder welfare rather than mere shareholder return orientation, compared to other institutional investors? Given their focus on the long-term and immunity from pursuing short-term financial returns, it is reasonable to expect that SWFs may be in a prime position to focus on long-term corporate and societal sustainability by taking environmental, social, and governance (ESG) issues into account in their investment decisions. Such a stakeholder-orientation does not necessarily mean a sacrifice to shareholder returns, as a modest positive relation between socially responsible investing (SRI) and corporate financial performance has on average been

[2] The first SWF was the French Caisse des Dépots et Consignations that was founded in 1816 (Hildebrand, 2007). The oldest, still prevailing SWF was established in 1953 as the Kuwait Investment Authority (KIA) (Alhashel, 2015).

documented in academic research. However, aside from some case studies on specific funds, extensive research on the tradeoff between ESG-focus and pursuit of financial returns by SWFs is still scarce.

This paper examines relationship between SWFs' investments and the ESG practice at the ownership stake level. We distinguish between SWFs' selection (i.e., whether the ESG performance of potential target firms affects SWF investment decisions) and engagement (i.e., whether SWF investment affects the ESG performance of target firms). To this end, we also distinguish between SWFs with an explicit ESG policy and those without. Specifically, we aim to answer the following research questions: (1) Do SWFs incorporate ESG considerations in their investment decisions? (2) If so, does the effect differ across types of SWFs (e.g. by SWFs' countries of origin)? (3) Do SWFs also engage the target firm at the level of CSR. In other words, do SWFs' investment lead to an improvement of the ESG performance of the target firms?

Using a global sample of 24 SWFs (representing over 80% of the total AUM by SWFs globally) that invest in 7,693 listed firms over the period of 2009 to 2018, we find that about half of the SWFs with a high level of transparency formally disclose their ESG policies in their annual statements, which are related to higher value-weighted ESG ratings of the public equity portion of their portfolio. At the portfolio company level, the ESG score of target firms is a strong predictor of its SWF ownership (both of the probability of being invested in and of the ownership stakes held). This relation holds not only for the aggregate ESG score but also for each component score. The ESG relation to SWF ownership is driven by SWFs originating from developed countries and civil law countries and by SWF that explicitly adopt an ESG policy.

To disentangle the selection effect from the engagement effect, we exploit the occurrence of some exogenous shocks (namely, the Deepwater Horizon oil spill catastrophe and the Volkwagen diesel scandal) which primarily influence the incentive to engage rather than the selection. We then conduct a difference-in-difference analysis around those events. We do not find evidence that SWF ownership increases the ESG performance of the firms belonging to the industries concerned, even when we focus on the constituents of the E, S, and G subscores. Therefore, our results show no evidence of engagement of SWFs in the ESG policy of target firms, and instead suggest that SWFs seem to select companies with better ESG performance to invest.

The remainder of this paper is organized as follows: Section 2 comprises the literature review on SWFs and corporate ESG issues. Sections 3 discusses the data, the sample selection and descriptive statistics. as well as the empirical methodology. Section 5 presents the results. Section 6 concludes.

2. Sovereign Wealth Funds: Types and Purpose

2.1. Definition, Purpose and Proliferation of SWFs

Whereas SWFs have been in existence for many decades, the term 'Sovereign Wealth Fund' was only recently coined as distinct investment entities, 'neither traditional public pension funds nor reserve assets supporting currencies, but a different type altogether' (Rozanov, 2005). Formally, SWFs are special purpose investment

funds or arrangements that are owned by the general government, usually created from balance of payments surpluses, official foreign currency operations, the proceeds of privatizations, governmental transfer payments, fiscal surpluses, and/or receipts resulting from resource exports (SWF Institute).[3] SWFs are operated mostly for macroeconomic purposes by holding, managing, or administering assets to achieve financial objectives, and employ a set of investment strategies that include investing in foreign financial assets. Das (2009) defines SWF as a fund owned and ran by the government of a sovereign nation that manages national savings, budget surplus and excess foreign exchange reserves by investing them globally into corporate stocks and bonds and other financial instruments. Similarly, Gieve (2008) considers SWFs as government investment vehicles that manage foreign assets with a higher risk tolerance and higher expected return than for central bank foreign currency reserves.

According to the SWF Institute (February 2019), 78 large SWFs hold assets worth over $8.1 trillion, which accounts for more than 10% of assets under management (AUM) worldwide. The SWF landscape is concentrated as the top 10 SWFs own about two thirds of the total AUM by all SWFs, and the top 20 funds hold 89%. SWFs are holding shares in more than 20% of the listed firms around the world (Fernandes, 2009), and they account not only for about 2% of the worldwide market capitalization but also of the global bond markets (Gieve, 2008). According to the SWF Institute, the AUM of SWFs has more than doubled since 2007. This strong growth has been fueled by increases in oil prices, financial globalization and national budget surpluses. The SWF Institute expects the total AUM of SWFs to reach $13 trillion over the coming decade.

SWFs are usually created as a result of national budget surpluses which have accumulated due to favorable economic conditions (Rozanov, 2005). In case of resource-rich countries, the funds are recurrently replenished with revenues from commodities, primarily oil and gas, which are owned or taxed by the state (Rataj, 2018). Chambers et al. (2011) discuss several reasons for resource rich countries to establish SWFs. Firstly, founding a SWF can be a device for resource-rich countries to avoid that too high a distribution of funds by a government would discourage of citizens from working and developing their human capital. Secondly, a SWF can overcome the "Dutch disease", a scenario in which a sudden increase in wealth (usually due to the discovery of natural resources) triggers rapid inflation of domestic prices and a stronger currency that decreases international competitiveness, resulting in de-industrialization. These reasons have been supported by the strong correlation between the number of new SWFs and the evolution of oil prices (Amar, 2016). In Latin America, SWFs are often replenished by a positive trade balance due to exports even while countries are facing budget deficits, which signifies that those SWFs contain essentially "borrowed reserves" (Das, 2009).

The main objectives of SWFs include stabilizing government and export revenues, accumulating savings for future generations in resource-rich countries to offset the future lack of natural resources, and/or to managing foreign reserves (Alhashel, 2015). For example, the purpose of the world's largest and best performing SWF,

[3] In order to address issues with the proliferation of definitions and lack of regulation, The International Working Group (IWG) of Sovereign Wealth Funds gathered in October 2008 to adopt a set of Generally Accepted Principles and Practices (GAPP) for SWFs; in short, the "Santiago Principles". Their purpose is to identify a framework that properly reflects appropriate governance and accountability rules as well as the conduct of investment practices by SWFs on a prudent and sound basis.

the Norway Government Pension Fund-Global (NGPF-G), as stated in the Government Pension Fund Regulation, is to serve as "an instrument for ensuring that a reasonable portion of the country's petroleum wealth benefits future generations". More generally, Mohseni-Cheraghlou (2017) state that SWFs have as primary objective to maximize financial returns and minimize risks and losses, while also taking into account the additional objective of long-term development and stability of their own countries.[4]

2.2. Regulation and Governance of SWFs

As SWFs are substantial state-owned entities actively investing in global assets, they create a friction between market capitalism and state capitalism. The former is concerned with maximizing investment returns whereas state capitalism focuses on maximizing the value of a country's economy as a whole (Gilson & Milhaupt, 2009). Expansionary investment policies and a lack of transparency give rise to suspicions about the motives behind their investments and their potential contribution to economic, financial, or political disruption (Truman, 2017). To underline the need for greater transparency and accountability, Truman first published a "SWF scoreboard" in 2007 (which was updated in 2009, 2012 and 2016) to provide a benchmark to compare different funds. This scoreboard is based on 33 elements from four categories: structure, governance, accountability and transparency, and behavior of the fund. The author argues that the international investment activities of governments have achieved a sufficient scale and scope, and as a result, an internationally agreed standard is needed to guide the management by governments of their cross-border investments (Truman, 2007, 2009). The SWF scoreboards and the GAPP were intended to exert some pressure on the SWFs such that they increase their transparency and accountability (Truman, 2017). While the GAPP cannot be legally enforced, most countries have regulations that can terminate SWF deals on the basis of a supposed threat to national security (Alshashel, 2014). For example, the U.S. has regulatory constraints on SWFs' investments to avoid not only controlling stakes but also to avoid that they exercise significant influence over the U.S. companies in their portfolio.

Gilson & Milhaupt (2009) notice the significant controversy around acquisitions of significant but non-controlling stakes by investors affiliated with foreign governments, and argue that regulation should attempt to reduce national industrial threats while not eliminating any benefits bestowed on the markets by having such players. They suggest that the stakes acquired by SWFs should be non-voting such that they do not have

[4] Other guiding objectives identified by the IWG of SWFs (2008) to underpin the Generally Accepted Principles and Practices (GAPP) are: (i) to help maintain a stable global financial system and free flow of capital and investment; (ii) to comply with all applicable regulatory and disclosure requirements in the countries in which they invest; (iii) to invest on the basis of economic and financial risk and return-related considerations; and (iv) to have in place a transparent and sound governance structure that provides for adequate operational controls, risk management, and accountability. According to GAPP principle 2 (Appendix 2), SWFs should clearly define and publicly disclose their policy purpose. In 2008, the International Monetary Fund (IMF) identified five categories of SWFs based on their purposes: (i) stabilization funds; (ii) savings funds; (iii) reserve investment corporations; (iv) development funds; (v) contingent pension reserve funds. Petrova et al. (2011) recognized a shift in SWF's asset allocations after the global financial crisis and revised the list of the IMF to four categories: (i) macro stabilization; (ii) savings; (iii) reserve investments; (iv) pension reserves. The SWF Institute adds another category to the classification by Petrova et al. (2011): (v) strategic development sovereign wealth funds. The majority of SWFs are either fiscal stabilization funds or savings funds for future generations. There are only a handful of pension reserve funds and even fewer reserve investment corporations. Some SWFs have multiple objectives; development funds for instance do not have a primary commercial objective, but rather promote national economic or development goals, such as domestic asset or firm stabilization or industry job creation.

substantial control yet can still realize financial returns. Epstein & Rose (2009) argue against imposing any additional burden on investment by SWFs, as the enforcement of special restrictions on SWFs is that SWFs will redirect their investments to less restrictive markets. Therefore, a policy of watchful waiting is preferable over an immediate effort to impose special restrictions on SWFs. Rose (2008) identifies agency costs induced by SWFs' passivity in that they decrease the overall shareholder monitoring of management. Also, Kratsas & Truby (2015) suggest that a limited form of regulation may be warranted to ease protectionist pressures and maintain consumer confidence.

To overcome the suspicion created by the friction between state capitalism and market capitalism in which SWFs operate, governance structures are vital. Monk (2011) concludes that SWFs match, mimic, or approximate the management structure and governance practices of Western institutional investors. Also, good governance is important for SWFs aiming at achieving a better performance, as government ownership is often associated with inferior performance compared to private ownership (Wang & Shailer, 2018). Ang (2010) uses four benchmarks to analyze SWF governance: (1) legitimacy (which is closely tied to transparency and accountability); (2) integrated policy benchmark (which is tied to the government's fiscal and other macro policies); (3) governance structure and performance measures; and (4) recognition of long-run externalities. Take NGPF-G, one of the largest and best performing SWFs worldwide, as an example. Truman (2010) ranks the NGPF-G the highest (97%) in terms of structure, governance, and transparency on his SWF scoreboard. In relation to the fund's transparency, Chambers et al. (2011) concludes that in order to earn support and public understanding, especially through financial downturns, the NGPF-G aims to be very transparent.[5] On the topics of transparency and accountability, the NGPF-G obtained a score of 98% in 2012 (Bagnall & Truman, 2013).

2.3. Value Creation, Investor Behavior and Strategies of SWFs

In terms of SWFs' investing behavior, Alhashel (2015) finds evidence supporting the notion that SWFs are mainly driven by economic motives (and not political ones), as they behave as economic entities maximizing their financial returns. Also, Epstein & Rose (2009) argue that SWFs act as model investors and are unlikely to invest opportunistically. Kratsas & Truby (2015) and Avendaño & Santiso (2009) find that SWF investment decisions do not differ greatly from those of other asset managers (e.g., mutual funds), thus the fear of SWFs' politically motivated investment decisions seems to be unfounded. Along this line, Knill et al. (2012) argue that SWFs prefer to invest in nations with which they have weaker political relations.

With regards to their investment strategies, SWFs tend to be opaque. Chhaochharia & Laeven (2009) show that SWFs largely invest to diversify away from the main industries at home, but bias their investments toward

[5] For example, it provides much more information on strategy, investment philosophy, results and risk than most SWFs and pension funds in jurisdiction. The Norges Bank publishes quarterly financial reports and an annual listing of all investments. External consultant reports and Strategy Council's recommendations are published. Also, the Ministry provides to Parliament detailed annual reports including information on investment returns, strategy, and implementation of ethical guidelines.

financially constrained firms in countries that share the same culture. This suggests that the determinants of SWF investment strategies are not entirely driven by profit maximizing objectives. Fotak et al. (2008) find evidence that SWFs almost always purchase minority stakes directly from target companies, of which roughly half are unlisted and very frequently located in the SWF's home country. In terms of country focus, Fernandes (2009) documents that SWFs invest mostly in large profitable firms with broad analyst coverage and located in countries with high investor protection and strong corporate governance. He also concludes that SWFs invest more than proportionally in countries with a higher degree of economic development, larger and more liquid financial markets, institutions that offer better protection of legal rights, and a more stable macroeconomic environment. Occasionally, SWFs seem to engage in 'contrarian' investment behavior, i.e. increasing their acquisitions in countries where crises hit. Kotter & Lel (2011) find a bias of SWF investments towards firms facing financial difficulties. In terms of sector preference, Mohseni-Cheraghlou (2017) show that the most popular sectors SWFs invest in are the financial and real estate sectors because of their greater liquidity, and the energy sector for its strategic importance.

Existing studies also find conflicting evidence on whether SWFs play a passive or active role in target firms. According to Rose (2008), Kotter and Lel (2011), and Ghahramani (2013), most SWFs appear to be passive investors. This may also result from the fact that many countries have adopted regulations that prevent foreign investment funds from acquiring controlling stakes in domestic firms. However, Mehrpouya et al. (2009), Dewenter et al. (2010) and Alhashel (2015) find that SWFs seem to behave increasingly more as active investors. SWFs' activism is described as "defensive" activism, namely, actively monitoring the target firm, not seeking ways to force value-creating changes, but preventing losses from mismanagement (Rose, 2014).

The long-run performance of SWFs' equity investments tends to be poor due to imperfect portfolio diversification and poor corporate governance (Chhaochharia & Laeven, 2009). Bortolotti et al. (2015) show that the announcement-period abnormal returns of SWFs equity investments in publicly traded firms are positive, but the reaction is weaker than for comparable stock purchases by private investors. Additionally, they find that targets suffer from declining return on assets (ROA) and sales growth over the subsequent three years. Knill et al. (2011) also find a positive short-term effect on target firms' returns, but a negative one-year effect following SWF acquisitions. SWF investment is believed to reduce risk but the reduction is still not sufficiently large to justify the lower return. Other studies supporting the positive short-term response to SWF investment are by Kotter & Lel (2009) and Dewenter et al. (2009), who show that the announcement CARs are higher when the SWF investor is more transparent.

Fernandes (2014) reports that companies experience increases in value both at the time of and after large investments by SWFs by showing a highly significant improvement of operating performance (return on equity (ROE), ROA and EBITDA-to-Assets ratio) for companies receiving large SWF investments. It is suggested that the channels towards this superior performance are higher levels of CEO turnover in target firms, increased ability to raise more capital, and increases in their proportion of foreign sales.

2.4. Relationship between SWFs and CSR

By nature, SWFs act as long-term investors with the aim of leaving a legacy and safeguarding national wealth for future generations. Therefore, it is reasonable to expect that SWFs' investment policy is geared towards more responsible firms which have de facto policies aiming at sustainability. Due to their size and significant market power, SWFs have the potential to catalyze change with regard to eliminating pollution, improving working conditions, pursuing gender equality, and reducing corruption.

In addition, responsible and sustainable investing has been increasingly becoming part of the societal preferences, and by investing the state's assets, SWFs need to respond to societal demand. The Public Funds Investment Policy Survey of Mullen & Rose (2018) covering the policies of the 26 largest SWFs discloses that 15% of the SWFs are subject to ESG restrictions prohibiting the fund from unethical investing; 8% take into account ESG in their investment policy, and 15% face asset class restrictions. In addition, 58% disclose a code of ethics to ensure that investments are made in accordance to the fund's policies and any other relevant regulations.

Moreover, with regard to the relationship between CSR and corporate financial performance, Gerard (2018) reviews the CSR literature and formulates a general consensus that ESG has a positive impact on equity and bond performance. Stronger CSR leads to higher corporate value, higher equity returns and lower risk. However, due to increasing ESG awareness, the performance edge of CSR investments has largely disappeared as broader awareness of the importance of ESG concerns is recognized in the stock prices such that a portfolio strategy to reach consistently superior returns may be precluded. The positive correlation between ESG and corporate financial performance is supported by Friede et al. (2015) who examine ESG and corporate financial performance across over 2,000 academic studies since 1970. 62.6% of reviewed studies indicate a positive correlation between ESG factors and financial performance whereas only 10% display a negative relationship. Another meta-study by Clark et al. (2015) concludes that 80% of the 200 academic studies categorized reveal that prudent sustainability practices have a positive influence on investment performance, 90% of the studies on the cost of capital show that sound sustainability standards lower firms' cost of capital, and 88% disclose that solid ESG practices result in better operational performance. Additionally, some find that active ownership enables investors to influence corporate behavior and benefit from improvements in sustainable business practices (Barko, Cremers, and Renneboog, 2018).

From an investor perspective, investing in high ESG portfolio usually does not yield superior expected returns. For instance, Renneboog et al. (2008) find that socially responsible investments (SRI) funds underperform their domestic benchmarks by -2.2% to -6.5%, but in terms of risk-adjusted returns most SRI funds' performance is not statistically different from that of conventional funds. They do not find evidence of a "smart money" effect driving the results as SRI investors are unable to identify the funds that will outperform in the future. Similarly, the meta-study by Friede et al. (2015) concludes that portfolio studies, comprising those on mutual funds,

indices and long-short-portfolios, exhibit a weaker relation between ESG and financial performance in comparison to firm-level studies. Possible explanations are that many ESG funds follow a mix of negative and positive ESG screening, which attracts a broad array of value-driven and profit-seeking investors. As a result, intensive screening limits the investment universe of SRI funds and the fact that SWFs may try to unify different ESG perspectives may come at a cost. Moreover, it is shown that active fund management is costly in terms of fees which may wipe out a possible ESG alpha.

Overall, SWFs may have multiple incentives to care about their portfolio companies' ESG practices. First, as SWFs are long-term investors aiming to create and safeguard an inheritance for future generations. Second, responsible investing has increasingly become part of the societal preferences. Third, research shows that ESG is positively related to corporate financial performance and SWFs may try to exploit this using an ESG-based strategy. In the next sections, we formally test the relationship between SWF ownership and portfolio companies' ESG performance.

3. Data

3.1. Sample and variable description

We adopt a definition of SWF that contains the core characteristics included in the plethora of definitions, namely that SWFs are investment vehicles ran by governments, invest globally and do not have explicit pension liabilities (Capapé & Blanco, 2013). Specifically, SWFs are more specifically defined as: (1) investment funds rather than operating companies; (2) entities wholly owned by a sovereign government, yet organized separately from a central bank or ministry of finance; (3) funds making both international and domestic investment in different risky assets; (4) funds with the pursuit of a commercial return as their main objective; and (5) wealth funds rather than pension funds in the sense that the proceeds do not stem from pensioners' contributions and that these have hence no liabilities to individual citizens. This definition yields a list of 140 funds (see Table 1). However, many funds are opaque and do not provide any data on their holdings. Our primary data source for SWF investments is FactSet, in which we only find holdings data for a sample of 24 SWFs. The 24 retained SWFs as shown in Table 1 represent 83.75% of the total AUM by SWFs globally and have invested in 7693 listed firms over the period of 2009 until 2018.

In Table 1, we also show each fund's inception year, region of origination, origin of the funding (i.e., commodity or non-commodity; Boubakri et al., 2013, 2016), size (AUM as collected from the Sovereign Wealth Fund Institute, the fund's website or its annual report), legal origin of the home country (La Porta et al., 2008), level of economic development of the home country (developed, emerging, frontier economy), the Transparency score (Stone & Truman, 2016), and the presence of a CSR policy. To identify the presence of an ESG policy, we analyze annual reports and web page of SWFs on statements about responsible investing objectives (environmental, social and governance issues) and search for key words such as "Responsible", "Sustainability", "Ethics", "ESG", "CSR", etc.

The total AUM of all SWFs identified in the list in Table 1 amounts to USD 8,484 billion and the subsample of 24 SWFs for USD 7,105 billion. Figure 1 shows that, geographically, SWFs are most prominent in the Middle East (many of which are oil-exporting countries) and in Asia (mostly export-led countries), particularly China. Approximately half of the SWFs come from emerging countries and only a small number are from "frontier countries" (based on SWF Institute's classification; see Figure 2 and Table 1). Figure 3 shows the legal origin of the sample SWFs: SWFs primarily originate from English common law countries and the SWFs originating from socialist law countries are all from China. About 60% of the SWFs source their funds from the government's sales of commodity resources (Figure 4). Only about one third of SWFs are highly transparent according to Truman's transparency scores (Figure 5).

[Insert about here Table 1 and Figures 1-5]

The coverage of the holding (ownership) data of the SWFs prior to 2009 is not complete and many of the target firms do not have an ESG score[6] (collected from Thomson Reuters' Asset4 ESG ratings) at that time. For this reason, our sample period spans the period of 2009 to 2018 (nevertheless, we also show results for the full sample period of 2004-2018 for robustness). Availability of equity ownership data for the 24 SWFs leads to a sample of 7,784 target firms. When we restrain the sample to all firm-years for which ESG scores are available in Asset4, we retain 30,879 firm-year observations. For 25,507 firm-years (or 82.6%), SWF ownership can be collected. FactSet's source for ownership of U.S. and Canadian traded equities are mandatory quarterly 13F filings with the SEC. For non-North American equities, institutional ownership is collected from national regulatory agencies, stock exchange announcements, company proxies or annual reports.

It is important to note that although SWFs invest in multiple asset classes, we only analyze their positions in public equity (investments in listed companies) because price and ESG information on their other investments such as private equity, bonds, real estates, commodities is usually not available. The ownership data enables us to construct the listed equity portfolio of SWFs and study the role of their presence in the ownership structure of target firms.

3.2. Control Variables

When studying the determinants of an SWF investment decision in a target firm, we also consider a set of control variables. First, as Chhaochharia & Laeven (2009), Kotter & Lel (2011) and Fernandes (2009) document

[6] The score ranges from 0 to 100 and comprise three pillars (E, S, and G) each counting for about one third. The environmental pillar is based on subscores related to resource use, emissions, environmental innovation; the social pillar concentrates on workforce, human rights, community orientation, and product responsibility; the governance pillar evaluates management quality, shareholder involvement and CSR strategy. Additionally, firms are penalized when involved in a scandal captured by means of 23 ESG controversy topics. The data is processed by over 150 content research analysts and incorporates over 400 ESG metrics for 178 critical ESG measures in the ESG scoring, based upon more than 400 data points, ratios and analytics. The ESG data is retrieved from company reports covering over 7,000 public companies globally, which in most cases disclose ESG information on a yearly basis. Out of the 7,000 firms that are assigned an ESG score, approximately 2,300 firms are located in North-America, 1,200 in Europe, 970 in Asia (excl. Japan), 430 in Japan, 450 in Oceania, 370 in Latin-America and approximately 230 firms are located in Africa.

that SWFs prefer to invest in large organizations, we take the logarithm of market capitalization ($\log MCAP$) of a portfolio company as a proxy for firm size. Second, firm performance is measured by return on assets (ROA), sales growth ($Sales\ Growth$), annual stock returns ($Annual\ Return$), and the market-to-book ratio of equity ($Market\ to\ Book\ ratio$). In addition to firm's financial performance, we also control for operational efficiency ($Operating\ Margin$) which captures how much profit a company generates by on a dollar of sales, the value of sales relative to assets ($Asset\ Turnover\ ratio$), the goodwill to assets ratio ($Goodwill\ to\ Assetse\ ratio$) which captures the know-how and uniqueness of the target firm (Kotter & Lel, 2011), and the capital expenditure to sales ratio ($Capex\ to\ Sales\ ratio$) is used as a proxy for the target firm's investment intensity. We also control for dividend yield ($Div\ Yield$) to proxy for payout policy of target firms, the capital structure ($Leverage$), the ratio of cash to total assets ($Cash\ Assets\ ratio$), and the fixed charge coverage ratio ($Fixed\ Charge\ Coverage\ ratio$) that measures the ability to pay all fixed charges or expenses by means of the EBIT.

3.3. *Descriptive Statistics*

The summary statistics of SWFs' holdings (ownership in target firms) are displayed in Table 2. The statistics show that the number of firms in the sample in which SWFs have an ownership stake increases significantly during our sample period, from 4872 (63.33%) in 2009 to 7209 (93.71%) in 2018. Also, the average ownership stake SWFs have in their target firms increases throughout the sample period, from 1.18% in 2009 to 2.07% in 2018. Additionally, the number of firms of which SWFs hold 1% or more of the ownership increases rapidly, from 1206 (15.68%) firms in 2009 to 4739 (61.60%) firms in 2018. The total number of firm-year observations in the sample in which SWFs have 1% or more ownership in the firm amounts to 32.60% of the firm-years. However, this amount rapidly decreases when the ownership threshold increases. For example, the firm-year observations in the sample in which SWFs have a stake of 5% or more ownership in the target firm is only 3.57% and a stake of 10% or more only accounts for 1.50% of the total observations. Overall, we can state that SWF ownership during the period from 2009 to 2018 rapidly increased in many of the firms included in the sample, through either buying new firms or buying more shares in the companies already included in their portfolios. The descriptive statistics of the dependent and independent variables are presented in Table 3.

[Insert about here Tables 2 and 3]

3.4. Methodology

Our unit of empirical analysis is at the holding-level, i.e., a firm that receives an SWF investment. We first test the relation between the level of investment by an SWF (i.e., SWF ownership) in a target firm and the firm's (change in) ESG performance. As the level of investment by SWF in a portfolio company is conditional on the SWF's decision to invest in the company in the first place (i.e., a SWF first decides to invest in a company, then decides how much to invest in the company), there may be a potential selection bias if we directly regress firm-level ESG ratings on firm-level SWF ownership. In order to take into account of such potential selection bias,

we first estimate a Heckman selection model. This is essentially a two-stage model, with the first stage testing the determinants of whether to invest in a firm or not (i.e., a selection model, which is a probit regression with the dependent variable as a dummy capturing whether or not the SWF takes a stake in the target), and the second stage testing how much the SWF invests in the firm in terms of ownership stakes (with the dependent variable being a continuous variable capturing the percentage SWF ownership stakes).[7] The models are firm-level random effects in combination with year- and sector fixed-effects and standard errors are clustered at the firm-level. The independent variables include the level ESG score of target firms and the changes in ESG performance, in addition to a set of control variables, all of which are lagged by one year. The estimated equations are shown as follows, whereby the definitions of the variables are given in Appendix 1:

$$\begin{aligned}\%/Dum\ SWF\ Ownership_{i,t} = {} & \alpha + \beta_{1a} ESG\ score_{i,t-2} + \beta_{1b} Change\ in\ ESG\ score_{i,(t-2,t-1)} + \\ & \beta_2 \log(MCAP)_{i,t-1} + \beta_3 ROA_{i,t-1} + \beta_4 Sales\ Growth_{i,t-1} + \beta_5 Annual\ Return_{i,t-1} + \\ & \beta_6 Market\ to\ Book\ ratio_{i,t-1} + \beta_7 Operating\ Margin\ ratio_{i,t-1} + \\ & \beta_8 Asset\ Turnover\ ratio_{i,t-1} + \beta_9 Goodwill\ to\ Assets\ ratio_{i,t-1} + \\ & \beta_{10} Capex\ to\ Sales\ ratio_{i,t-1} + \beta_{11}\ Div\ Yield_{i,t-1} + \beta_{12} Leverage_{i,t-1} + \\ & \beta_{13}\ Cash\ Assets\ ratio_{i,t-1} + \beta_{14} Fixed\ Charge\ Coverage\ ratio_{i,t-1} + \varepsilon_{i,t} \quad (1)\end{aligned}$$

In addition, we also test whether SWFs put a higher emphasize on one particular ESG pillar relative to the others, by replacing the general ESG score in Equation (1) by the Environment, Social, and Corporate Governance subscores respectively in multivariate panel models.

While the above equations focus on selection, i.e., whether a fund selects target firms based on firms' ESG performance, it may be that the ESG scores are affected by the existing SWF ownership, which would be an engagement effect. The selection versus engagement effects boil down to an endogeneity issues to which our models may be liable and would prevent causal claims. In order to address this issue, we use exogenous events leading to a shock in ESG score. We use a difference-in-difference method based on two major global ESG shocks, namely the Deepwater Horizon Oil Spill in April 2010 and the Volkswagen Emissions Scandal in September 2015. In the difference-in-difference regressions, we use 15 ESG subscores from Asset4, which are more granular measures of a firm's ESG performance, because these measures (such as product safety indicates) are more sensitive to the above shocks. We study the effect of the shocks on a sample of publicly listed firms active in the above-mentioned industries and with a market capitalization of at least $500 million. Additional firms that do not have SWF ownership and fit the sample criteria are added to the database to form the control group. The key variable of interest is the interaction between an event dummy and an SWF ownership dummy.

4. Results

[7] We also conduct a set of robustness tests using probit models with dummies taking the value of 1 if SWFs take at least an ownership stake of 0.5%, 1%, 2% or larger.

4.1. ESG Statements by SWFs

In order to gain the first insights on the relationship between SWFs and ESG, we study SWF statements concerning ESG investment policies of the SWFs managing more than $100 billion (which represents 15 SWFs owning 96.42% of all AUM covered in our sample). The websites, and if available annual reports and ESG reports of the SWFs are analyzed by searching for keywords such as: "Responsible," "Sustainability," "Ethics," "ESG," "CSR," etc. Subsequently, we also examine the statements of each SWF using a similar approach based on these keywords. Seven out of the 15 analyzed SWFs disclose the use of ESG metrics in their investment decision process. In terms of ethical investing, the NGPF-G is considered a pioneer as they not only select target firms that meet their ethical guidelines, but also explicitly claim to exercise their ownership rights to engage in target firms in order to improve their ESG policy. Also, the South-African PIC has an extensive ESG policy and aims at meeting their investment objectives while investing for sustainable growth, inclusivity, and transformation. PIC uses ESG metrics to measure investee companies' ESG compliance and identify areas for engagement. They engage in target firms' ESG issues through shareholder activism via proxy-voting. The NZSF has a stated climate change strategy factoring in the risks and opportunities stemming from climate change in their investment strategies and ownership practices. Besides these three SWFs, we also discovered that the HKMA, GIC, TH, KIC, and AFF explicitly state that they incorporate ESG measures in their investment decision process. A common belief among the SWFs with an ESG policy is that effective management of ESG risks and opportunities supports return maximization. CIC does not state a specific ESG policy but mentions respect local social norms and public opinion. SAMA is active in social projects supporting education and research on autism.

We calculate the value-weighted ESG score per SWF per year based on target firms' ESG ratings, the market value of the ownership stake an SWF has in a target firm, and the market value of their portfolio in a specific year. We show the value-weighted ESG scores of the NGPF-G, GIC, PIC, NZSF, KIA, PSF, and KIC in Table 4. On average, the SWFs have a value-weighted ESG score of 48, which is slightly higher than the average ESG score of the sample (by almost 2 points). The average value-weighted ESG score of all SWFs combined per year varies between 45 in 2009 to 53.55 in 2016. Overall, the value-weighted ESG scores of the individual SWFs seem in line with their disclosed statements concerning CSR on websites and reports. The NZSF, PIC, and NGPF-G have a relatively high ESG score of 50 or above. In spite of their explicit ESG statements, PSF and KIC have lower weighted-average ESG scores than the sample average.

[Insert about here Table 4]

4.2. Multivariate Results

4.2.1. Selection of Target Firms

In the Heckman selection models of Panel A of Table 5, the dummy variable SWF ownership (with 1 representing an investment in a target firm and 0 otherwise) is the dependent variable of the first-stage probit regression, and the percentage SWF ownership, a continuous variable, is the dependent variable of the second-

stage OLS regression. Columns (1) and (2) show the first- and second-stage results from the Heckman model estimation for the full sample (from 2004 to 2018), and Columns (3) and (4) show the results from the same test on the subsample coverig the post-crisis period (2009-2018). The independent variable of interest is the lagged ESG score, which in almost all regressions has a positive coefficient that is significant at the 1% level for both stages across Columns (1)-(4). This indicates that firms with higher ESG ratings are more often a target firm of an SWF, and SWFs take larger ownership stakes in those firms. The insignificant inverse Mill's ratio indicates that there may not be a selection bias as the error terms of both equations are not significantly correlated. Columns (5)-(8) of Panel A also show results from (probit) random effects models explaining SWF investments above the 0.5%, 1% and 2% ownership levels in target firms and confirm that better ESG performance is associated with higher likelihood of SWFs making such investments.

In Panel B, we explore the cross-country variations in the effects reported in Panel A. We note that a firm's ESG score is positively and significantly correlated with its SWF ownership in both stages of the Heckman model if the SWF is from a developed economy, whereas it is only significant in the second-stage for SWFs from emerging economies and only significant in the first-stage for SWFs from frontier economies. Focusing on the legal origin subsamples, for SWFs originating from both common- and civil law countries, the ESG score of a firm is positively and significantly correlated with SWF ownership in both stages of the Heckman model and the parameter estimates are similar in both subsamples. In Panel C, we compare the results for the subsample of SWFs that have an explicit ESG policy (Columns (1)-(2)) with those for the subsample without ESG statements (Columns (3)-(4)). Expectedly, we find that the ESG score has a much stronger correlation with the SWF's decision to invest and the ownership stakes for the SWFs with an explicit ESG policy. In other words, SWFs seem to put their money where their mouth is. The relation between firm ESG performance and SWF investment is also strong for Transparent SWFs (Columns (5)-(6)). We also perform a few robustness tests whereby we exclude the NGPF-G and PIC SWFs from the sample as these two funds have explicit ESG focus in their investment policies and represent a vast part of the firm-year observations. We note that in (Columns (7)-(8)), as expected, the elimination of these funds reduces the relation between ESG and SWF ownership, but ESG still predicts the likelihood of a firm being targeted by SWF (i.e., significance in the first stage). Focusing solely on the ownership data of the NGPF-G, the ESG activist Norwegian fund (Columns (9) and (10)), we observe a significant positive effect in both stages of the model.

Table 6 (Panel A) exhibits the multivariate panel regression results with percentage SWF ownership as the dependent variable and both the absolute ESG score (i.e., the level of ESG) and the change of ESG score from *t-2* to *t-1* as explanatory variables for different sample periods and subsamples. The first two models in Columns (1) and (2) point out that not only the levels of ESG (measured at t-2) but also the subsequent changes in ESG affect the SWFs' investment decision and the size of the investment. The probit random effects models in Columns (3)-(5) show that changes in ESG lead to a significant increase in investments of more than 1% (of the equity) in target firms. In Panel B, we find that it is mainly the SWFs from developed countries (Column (1)) that invest in firms with high ESG scores and respond to ESG performance increases. This is not the case

for SWFs from emerging or frontier countries (Columns (2)-(3)). The coefficients of lagged level ESG score and lagged changes in ESG score of civil law SWFs are positive and significant, but those of the subsample including SWFs from common law countries are not. This is in line with Liang and Renneboog (2017) who show that firms in civil law countries are more sensitive to ESG issues. Expectedly, when comparing SWFs with and without an ESG policy, the former respond more strongly to both levels and changes in firms' ESG. Panel C of Table 6 confirms the results of Table 5.[8]

[Insert Tables 5 and 6 about here]

4.2.2. Engagement with Target Firms

While the above analysis focuses on selection (i.e., how a firm's ESG performance affects its SWF's decision to invest in it), we also examine the effects of SWF engagement as it may be that an SWF investment affects the ESG policy of firms which will then be reflected in the ESG scores. To do so, ideally, we could have a setting which exogenously intensifies the costs or benefits of ESG in the portfolio company to existing investors but does not directly drives their decision to invest in or divest the company. As most SWFs invest in the market index whereas the ESG scores are also given to companies on major equity indices (i.e., public companies with large market capitalization), completely divesting companies from their portfolios is not usually feasible. As a result, the change in the correlation between SWF ownership and its portfolio companies' ESG scores following an exogenous "shock" mostly reflects whether the SWF actively engages with target companies. Therefore, we employ a difference-in-difference analysis exploiting some exogenous shocks to ESG issues. We focus on two major environmental shocks: the Deepwater Horizon oil spill and the Volkswagen Emissions Scandal. The former refers to the BP oil platform that exploded in the Gulf of Mexico, and created a shockwave in the oil and gas extraction and petroleum refining industries. The latter refers to the disclosure that Volkswagen had installed devices in their diesel engines to manipulate test results in order to cheat in the emissions tests in the U.S., leading to a shock in the motor vehicles and passenger car bodies industry. We use detailed ESG measures (the components of the general ESG score), which are expected to capture aspects that are most affected by the shock, as dependent variables in the difference-in-difference regressions. We estimate the difference-in-difference regressions for different SWF ownership (holding a stake of any size, or stakes of minimal levels at e.g. 0.5%) for different samples (all SWFs, or only the most prominent SWFs in terms of CSR commitment and size such as NGPF-G and NZSF). We are primarily interested in the interaction term *Dum SWF* × *Post-Year* that captures the difference in the average change in the ESG measures from before to after the event for firms

[8] When we repeat the analysis in Tables 5 and 6 replacing the total ESG score by the Environmental, Social, and Corporate Governance subcomponent scores, we find that the lagged ESG subscore coefficients are all positive and statistically significant, which suggests that SWFs invest primarily in firms with higher levels of E, S and G practice, but that there is no bias towards specific E, S, and G pillars. The results for the ESG subscores are also upheld when we use different sample periods (2004-2018 or 2009-2018) and different SWF ownership dummies (0.5%, 1%, 2%). The E, S, and G pillar scores are also significant and positive for the subsample including SWFs originating from developed countries, whereas they are insignificant for the subsamples with SWFs from emerging and frontier countries.

with SWF ownership relative to firms without SWF ownership. The dummy SWF ownership estimates the mean difference in the ESG measure between firms with and without SWF ownership prior to the event. The event dummy estimates the average change in the more granular ESG measures before and after the event for the firms without SWF ownership. Engagement of SWFs on ESG policies of target firms can be assumed when the interaction dummy is significant and positive.

Panel A of Table 7 exhibits the results from analyzing the Deepwater Horizon shock for the whole sample of all SWFs. We use a range of subcomponent ESG variables capturing different aspects of a firm's ESG engagement from the Asset4 database. These variables include management commitment towards best practice corporate governance principles ("CGSR" as named in the Asset4 database), effectiveness of a firm's processes geared towards long term shareholder value ("CGVS"), measures proportionate management compensation ("CGCP"), principles related to a well-balanced membership of the board ("CGBS"), the presence of board committees ("CGBF"), effectiveness towards creating value-added products and services upholding the customer's security ("SOPR"), reputation protecting public health and respecting business ethics ("SOCO"), guaranteeing the freedom of association and excluding child, forced or compulsory labour ("SOHR"), maintenance of diversity and equal opportunities in the workforce ("SODO), provision of high-quality employment benefits and job conditions (SOEQ), commitment to healthy and safe workplace (SOHS), investment in training and development for the workforce (SOTD), effectiveness towards reducing environmental emission (ENER), R&D investment in eco-efficient products or services (ENPI), and the efficient use of natural resources in the production process (ENRR) (more detailed definitions are provided in the Appendix 3 with variable definitions). The Deepwater Horizon shock mostly concerns environmental issues, and other ESG variables (such as those measuring social and governance issues) are included as placebo tests for comparison.

First, we note that the event has a strong, significant and lasting impact on most of the subcomponent ESG variables. Second, however, we observe that none of the interaction terms between an SWF ownership stake and the period subsequent to the shock are significant for different subcomponent ESG scores as any of the dependent variables, which implies that firm's with an SWF investment and belonging to the sector of the oil and gas extraction and petroleum refining do not change their ESG polities relatively more than firms without such a stake and being part of the same industry. When we limit the sample to the Norwegian (NGPF-G) and New Zealand (NZSW) SWFs, the results do not differ (Panel B). The interaction term is not significant either when we limit the impact period to the years 2010 and 2011 (when the event happened), nor when we test the impact of larger SWF stakes (a holding of 0.5% of the equity or larger).

The difference-in-differences results for the Volkswagen shock as shown in Table 8 also yield an insignificant effect of the interaction dummy for companies in the industry of motor vehicles and passenger cars. In line with the analysis of the Deepwater Horizon shock, the dummy capturing the period of the diesel scandal and the subsequent period is significant, which shows that the shock has a significant impact on the industry but the

SWF ownership does not lead firms to change their ESG policy more. Various tests on the impact period, the SWF sample, and the size of the SWF ownership do not yield different results.

Overall, results from these tests suggest that there is no strong evidence that SWF engagement affects the ESG policy of target firms. In other words, the positive correlation between a firm's ESG rating and its ownership held by an SWF is more likely to be driven by the preference of SWFs in selecting high ESG companies to invest, rather than actively improving the company's ESG performance.

[Insert Tables 7 and 8 about here]

5. Conclusions

This study investigates the relationship between SWFs and their portfolio companies' ESG scores. One striking starting observation is that SWFs are quite heterogeneous with regard to their size, organizational structure, funding sources, legal status, investment policies, number of equity investments and size of average equity investment. Also, the vast majority of the SWFs lack transparency and hardly disclose any information with regard to their operations and ESG policies.

In order to gain some insight into how SWFs leave sustainability footprints across the world, partially through their investment in public equity, we collect statements concerning SWFs' ESG policy from their websites and reports. About half of the SWFs with a high level of transparency disclose statements on their ESG policies. The Norwegian SWF (NGPF-G) and the Public Investment Corporation (PIC) of South Africa state that they not only include ESG as a determinant to select target firms but also actively engage with firms within their investment portfolio to improve their ESG policies. These funds do indeed have a higher value-weighted ESG score than the SWFs without an explicit ESG policy.

The results from the Heckman selection models (as well as probit panel regressions) provide further evidence that SWFs take the ESG performance of target firms into account in their investment decision process. The positive relationship between SWF ownership and ESG scores of target firms is in line with the existing literature suggesting that the objective of SWFs is to maximize financial returns and minimize risk and losses while taking into account long-term development and stability (Mohseni-Cheraghlou, 2017). Gerard (2018), Friede et al. (2015), Clark et al. (2015), and Ferrell, Liang and Renneboog (2016) support that taking ESG scores into account as investment determinant is positively related to corporate financial performance.

Delving one level deeper into the E, S, and G subscores, we find that SWFs do not focus on one particular subfield of corporate responsibility and sustainability, but each of the three ESG pillars are an important investment determinant of SWFs. The ESG relation to SWF ownership is driven by SWFs originating from developed countries and civil law countries and by SWF that explicitly adopt an ESG policy. This is consistent with studies as Aggarwal & Goodell (2018) and Aizenman & Glick (2009) finding that national culture, norms, and governance have a significant impact on SWF governance. Additionally, Liang & Renneboog (2017) show that a firm's CSR rating and its country's legal origin are strongly correlated.

While we have found that ESG is a selection criterion in SWFs' investment decisions, we also study whether SWF engagement leads to changes in the ESG performance of target firms. For this reason, we exploit the occurrence of some exogenous shocks in difference-in-differences regressions. We do not find evidence that SWF ownership increases the ESG performance of the firms belonging to the industries concerned, even when we focus on the constituents of the E, S, and G subscores. So, our results show no evidence of engagement of SWFs towards improving the ESG performance of target firms. This is in line with the findings of Alhashel (2015) and Rose (2014) stating that SWFs primarily behave passively and monitor target firms, not to seek ways to force value-creating changes, but to prevent losses from mismanagement. Also, the survey by Mullen & Rose (2018) indicate that SWFs use ESG score as a selection criterion to include or exclude target firms in their portfolio, but do not actively engage in target firms in order to improve their ESG policy.

With regard to the generalizability of our results, we would like to point out a few caveats. Due to a lack of transparency by the bulk of SWFs, the analysis is limited to only 24 funds (although these funds stand for more than 80% of the total AUM of SWFs). In addition, even for the most transparent SWFs, we can only study SWFs' equity investments and not the investments in other asset classes (such as private equity, bond investments, real estate etc.) which are not disclosed and most of which do not have an ESG rating. It should also be noted that the results are driven by some dominant funds. For example, the NGPF-G accounts for 62.40% of the AUM of our sample. Another limitation in this research is that the execution of an event study to test for engagement of SWFs is not possible as the exact dates of the SWF investment and ESG rating are not available in the databased employed. Nevertheless, our findings highlight how SWFs, being among the most important global institutional investors, leave their ESG footprints across the world.

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Appendix 1: Variable Definitions

This table presents the definitions of main- and control variables.

Main Variables	
SWF Ownership	% Ownership stake SWFs have of a target firm
ESG	ESG score of target firm
Delta ESG	Difference in ESG score compared to ESG score of the previous year.
Control Variables	
Annual Return	Return calculated using the current adjusted price and the adjusted price one year ago. Displayed as percentage.
Log(Market Value)	Logarithm of market value in millions.
Dividend Yield	The ratio of a company's annual dividend divided by their share price. Displayed as percentage.
Leverage	Leverage ratio, calculated by dividing a firm's debt by the firm's equity Displayed as percentage.
Sales Growth	Annual growth in sales. Displayed as percentage.
Cash Assets ratio	Cash & cash equivalents divided by total assets. Displayed as percentage.
ROA	Calculated by dividing a company's annual earnings by its total assets, ROA is displayed as a percentage.
Operating Income	Annual sales minus total operating expenses.
Intangible Assets	Intangible assets on the balance sheet of a company.
CAPEX	Capital expenditures on the balance sheet of a company
Total Assets	Total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
Market to Book ratio	Market to book ratio of firm, calculated as market value of equity divided by book value of equity. Displayed as percentage.
ROE	Net income divided by book value of equity. Displayed as percentage.
Sales	The annual revenue a firm generates from the sale of its products.
E-Index	Proxy of corporate governance from Bebchuck et al. (2008). This form of the E-Index is constructed using a point-system based on if firms have a staggered board, supermajority, poison pill and/or golden parachute in place.

Appendix 2: Acronyms

CSR	Corporate social responsibility
CIC	China Investment Corporation
ESG	Environmental, social, and governance
GAPP	Generally Accepted Principles and Practices
GIC	Government of Singapore Investment Corporation
AUM	Assets under management
IWG	The International Working Group
NGPF-G	Norway Government Pension Fund-Global
NZSF	New Zealand Superannuation Fund
APF	Alaska Permanent Fund
AFF	Australian Future Fund
KIC	Korea Investment Corporation
TH	Temasek Holdings
KIA	Kuwait Investment Authority
HKMA	Hong Kong Monetary Authority
SRI	Socially responsible investing (or sustainable, responsible and impact investing)
PSF	(Texas) Permanent School Fund
PIC	Public Investment Corporation
SWF	Sovereign wealth fund

Appendix 3: Asset4 Subcomponent Score Definitions

Asset4 (Datastream code)	ESG Pillar	Name	Description
CGSR	Corporate Governance	Shareholders /Shareholder Rights	The shareholders/shareholder rights category measures a company's management commitment and effectiveness towards following best practice corporate governance principles related to a shareholder policy and equal treatment of shareholders. It reflects a company's capacity to be attractive to minority shareholders by ensuring them equal rights and privileges and by limiting the use of anti-takeover devices.
CGVS	Corporate Governance	Integration/Vision and Strategy	The integration/vision and strategy category measures a company's management commitment and effectiveness towards the creation of an overarching vision and strategy integrating financial and extra-financial aspects. It reflects a company's capacity to convincingly show and communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes.
CGCP	Corporate Governance	Board of Directors/Compensation Policy	The board of directors/compensation policy category measures a company's management commitment and effectiveness towards following best practice corporate governance principles related to competitive and proportionate management compensation. It reflects a company's capacity to attract and retain executives and board members with the necessary skills by linking their compensation to individual or company-wide financial or extra-financial targets.
CGBS	Corporate Governance	Board of Directors/Board Structure	The board of directors/board structure category measures a company's management commitment and effectiveness towards following best practice corporate governance principles related to a well balanced membership of the board. It reflects a company's capacity to ensure a critical exchange of ideas and an independent decision-making process through an experienced, diverse and independent board.
CGBF	Corporate Governance	Board of Directors/Board Functions	The board of directors/board functions category measures a company's management commitment and effectiveness towards following best practice corporate governance principles related to board activities and functions. It reflects a company's capacity to have an effective board by setting up the essential board committees with allocated tasks and responsibilities.
SOPR	Social	Customer /Product Responsibility	The customer/product responsibility category measures a company's management commitment and effectiveness towards creating value-added products and services upholding the customer's security. It reflects a company's capacity to maintain its license to operate by producing quality goods and services integrating the customer's health and safety, and preserving its integrity and privacy also through accurate product information and labelling.
SOCO	Social	Society /Community	The society/community category measures a company's management commitment and effectiveness towards maintaining the company's reputation within the general community (local, national and global). It reflects a company's capacity to maintain its license to operate by being a good citizen (donations of cash, goods or staff time, etc.), protecting public health (avoidance of industrial accidents, etc.) and respecting business ethics (avoiding bribery and corruption, etc.).

SOHR	Social	Society /Human Rights	The society/human rights category measures a company's management commitment and effectiveness towards respecting the fundamental human rights conventions. It reflects a company's capacity to maintain its license to operate by guaranteeing the freedom of association and excluding child, forced or compulsory labour.
SODO	Social	Workforce /Diversity and Opportunity	The workforce/diversity and opportunity category measures a company's management commitment and effectiveness towards maintaining diversity and equal opportunities in its workforce. It reflects a company's capacity to increase its workforce loyalty and productivity by promoting an effective life-work balance, a family friendly environment and equal opportunities regardless of gender, age, ethnicity, religion or sexual orientation.
SOEQ	Social	Workforce /Employment Quality	The workforce/employment quality category measures a company's management commitment and effectiveness towards providing high-quality employment benefits and job conditions. It reflects a company's capacity to increase its workforce loyalty and productivity by distributing rewarding and fair employment benefits, and by focusing on long-term employment growth and stability by promoting from within, avoiding lay-offs and maintaining relations with trade unions.
SOTD	Social	Workforce /Training and Development	The workforce/training and development category measures a company's management commitment and effectiveness towards providing training and development (education) for its workforce. It reflects a company's capacity to increase its intellectual capital, workforce loyalty and productivity by developing the workforce's skills, competences, employability and careers in an entrepreneurial environment.
SOHS	Social	Workforce /Health & Safety	The workforce/health & safety category measures a company's management commitment and effectiveness towards providing a healthy and safe workplace. It reflects a company's capacity to increase its workforce loyalty and productivity by integrating into its day-to-day operations a concern for the physical and mental health, well-being and stress level of all employees.
ENER	Environmental	Emission Reduction	The emission reduction category measures a company's management commitment and effectiveness towards reducing environmental emission in the production and operational processes. It reflects a company's capacity to reduce air emissions (greenhouse gases, F-gases, ozone-depleting substances, NOx and SOx, etc.), waste, hazardous waste, water discharges, spills or its impacts on biodiversity and to partner with environmental organisations to reduce the environmental impact of the company in the local or broader community.
ENPI	Environmental	Product Innovation	The product innovation category measures a company's management commitment and effectiveness towards supporting the research and development of eco-efficient products or services. It reflects a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed, dematerialized products with extended durability.
ENRR	Environmental	Resource Reduction	The resource reduction category measures a company's management commitment and effectiveness towards achieving an efficient use of natural resources in the production process. It reflects a company's capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.

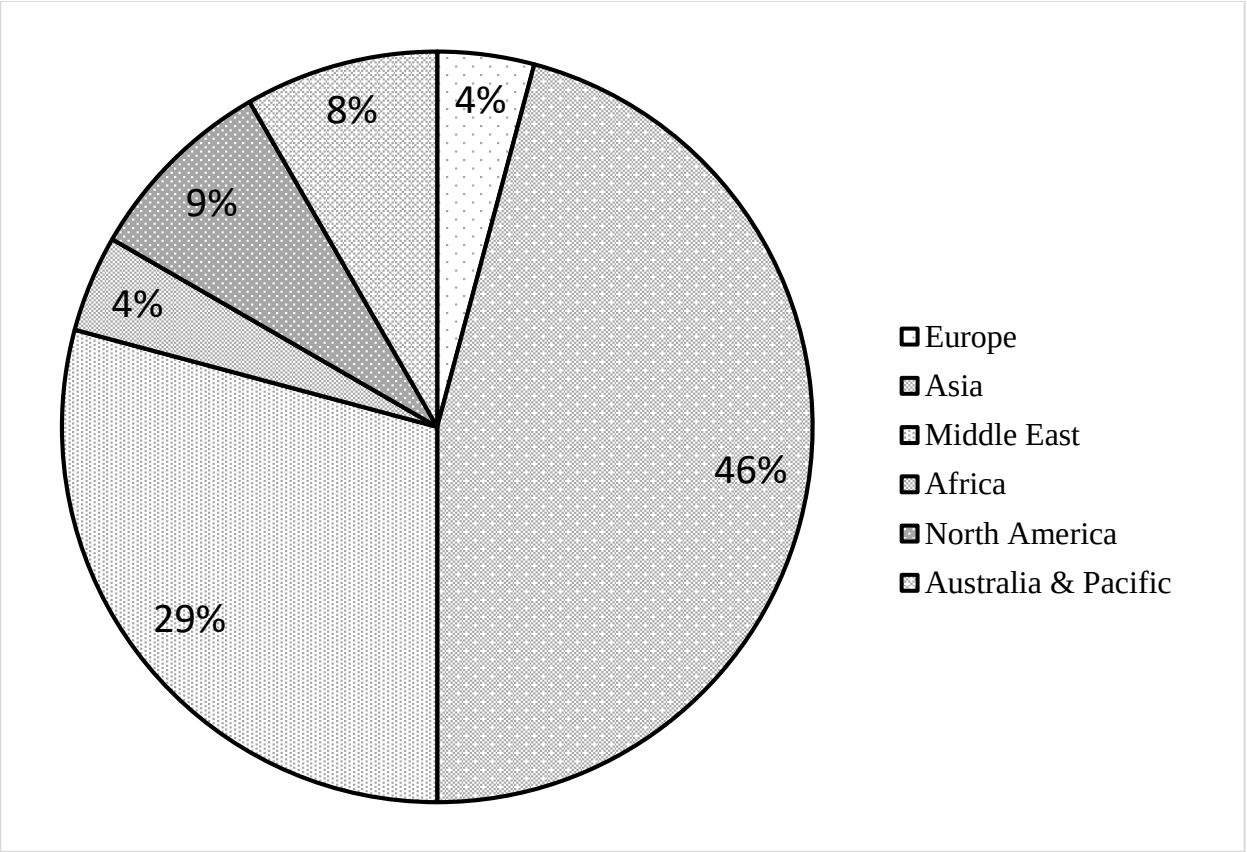

Figure 1. Regions of Sample SWFs (number of SWFs)

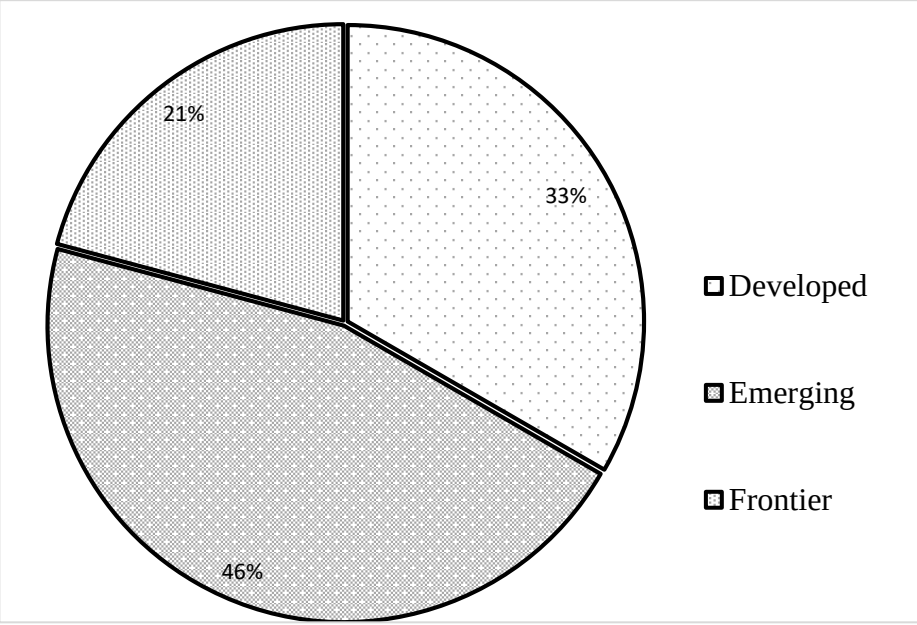

Figure 2. Economic Development of Sample SWFs' Home Country (based on number of SWFs)

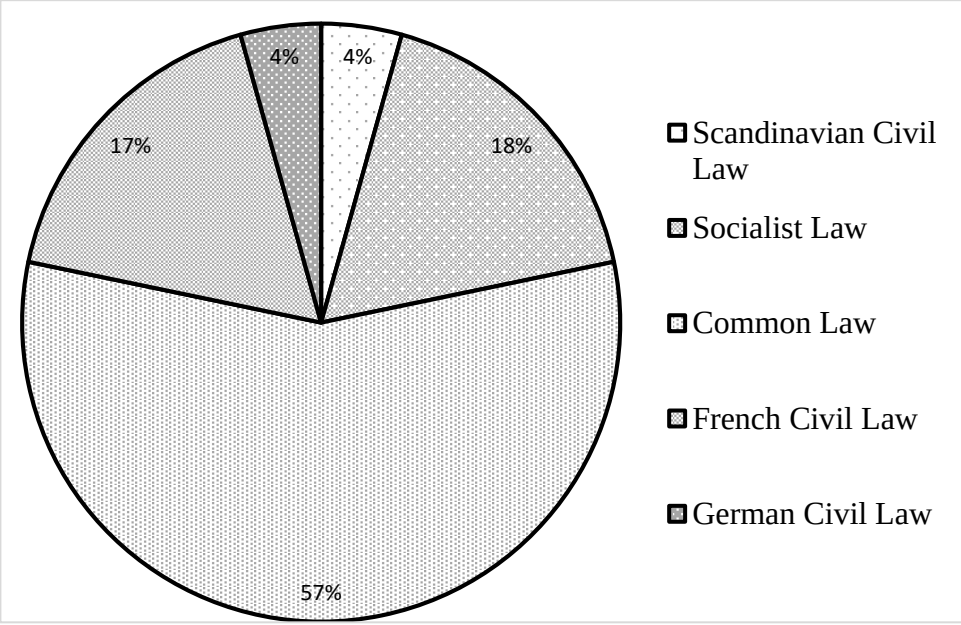

Figure 3. Legal Origin of SWFs in Sample by Number of SWFs

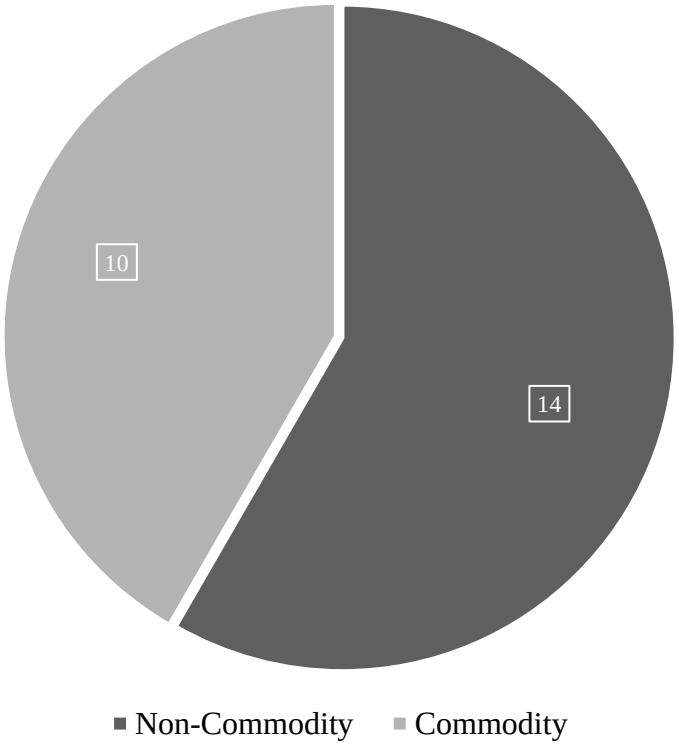

Figure 4. Source of Funding

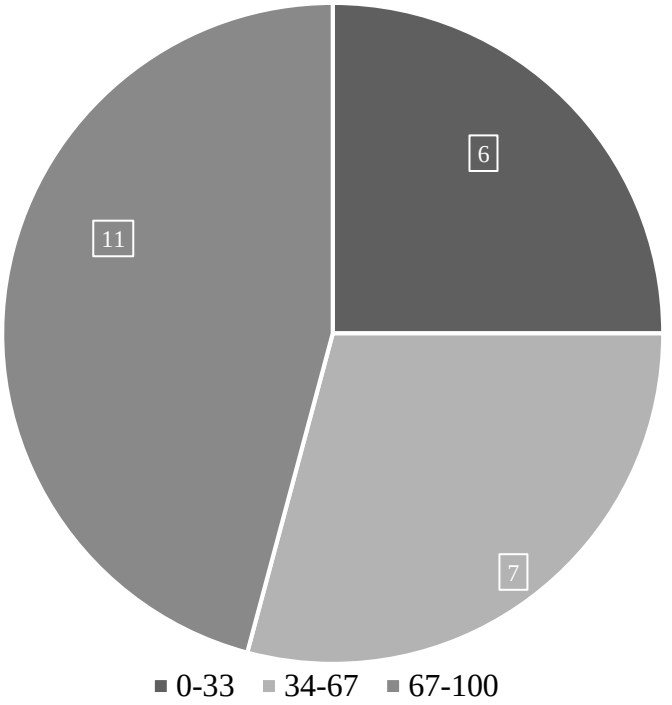

Figure 5. Truman's Transparency Score

Table 1. List of Sovereign Wealth Funds by Assets under Management

SWF name * = included in sample	Abbreviation	Inception year	Origin	Purpose	AuM (Billions USD)	Percentage AuM of List	Country	Region	Legal Origin	Economic Development
Government Pension Fund Global / Norges Bank Investment Management*	GPFG/NBIM	1990	Commodity	Saving	1,059.080	11.7518%	Norway	Europe	Scandinavian Civil Law	Developed
China Investment Corporation*	CIC	2007	Non-Commodity	Reserve Investment	941.417	10.4462%	China	Asia	Socialist Law	Emerging
Abu Dhabi Investment Authority*	ADIA	1976	Commodity	Reserve Investment	696.660	7.7303%	UAE (Abu Dhabi)	Middle East	Common Law	Emerging
Kuwait Investment Authority*	KIA	1953	Commodity	Reserve Investment	592.000	6.5690%	Kuwait	Middle East	French Civil Law	Frontier
SAMA Foreign Holdings*	SAMA	1952	Commodity	Reserve Investment	515.600	5.7212%	Saudi Arabia	Middle East	Common Law	Emerging
Hong Kong Monetary Authority Investment Portfolio*	HKMA	1993	Non-Commodity	Macrostabilisation	509.353	5.6519%	Hong Kong	Asia	Common Law	Developed
SAFE Investment Company*	SAFE	1997	Non-Commodity	Macrostabilisation	439.837	4.8805%	China	Asia	Socialist Law	Emerging
GIC Private Limited (Gov't of Singapore Investment Corporation)*	GIC	1981	Non-Commodity	Reserve Investment	390.000	4.3275%	Singapore	Asia	Common Law	Developed
Temasek Holdings*	TH	1974	Non-Commodity	Reserve Investments	374.896	4.1599%	Singapore	Asia	Common Law	Developed
National Social Security Fund*	NSSF	2000	Non-Commodity	Saving	341.354	3.7878%	China	Asia	Socialist Law	Emerging
Qatar Investment Authority*	QIA	2005	Commodity	Reserve Investment	320.000	3.5508%	Qatar	Middle East	French Civil Law	Emerging

Public Investment Fund/Sanabil Investments	PIF/Sanabil	1971	Commodity	Development	290.000	3.2179%	Saudi Arabia	Middle East	Common Law	Emerging
Investment Corporation of Dubai*	ICD	2006	Commodity	Reserve Investment	233.801	2.5943%	UAE (Dubai)	Middle East	Common Law	Emerging
Mubadala Investment Company (formerly Mubadala Development Company until 2017)	MDC	2002	Commodity	Development	226.484	2.5131%	UAE (Abu Dhabi)	Middle East	Common Law	Emerging
Public Investment Corporation*	PIC	1911	Non-Commodity		143.390	1.5911%	South Africa	Africa	Common Law	Emerging
Korea Investment Corporation*	KIC	2005	Non-Commodity	Reserve Investment	134.100	1.4880%	South Korea	Asia	German Civil Law	Emerging
Australian Future Fund*	AFF	2006	Non-Commodity	Saving	103.390	1.1472%	Australia	Australia & Pacific	Common Law	Developed
National Development Fund (of Iran) [formerly Oil Stabilization Fund until 2011]	NDF	2000	Commodity	Saving	91.000	1.0098%	Iran	Middle East	French Civil Law	no data
Her Majesty the Queen in Right of the Province of Alberta as represented by AIMco					83.003	0.9210%	Canada (Alberta)	North America	Common Law	Developed
Bpifrance	BPIfrance	2009	Non-Commodity		72.360	0.8029%	France	Europe	French Civil Law	Developed
Samruk-Kazyna JSC	S-K JSC	2008	Non-Commodity	Macrostabilisation, Development	71.344	0.7917%	Kazakhstan	Asia	French Civil Law	Frontier
Russian National Welfare Fund	RNWF	2004	Commodity	Macrostabilisation	68.550	0.7606%	Russia	Europe	Socialist Law	Emerging

Alaska Permanent Fund*	APF	1976	Commodity	Saving	66.165	0.7342%	USA (Alaska)	North America	Common Law	Developed
Libyan Investment Authority	LIA	1981	Commodity	Macrostabilisation, Saving, Development	60.000	0.6658%	Libya	Africa	French Civil Law	no data
Brunei Investment Agency*	BIA	1983	Commodity	Reserve Investment	60.000	0.6658%	Brunei	Asia	Common Law	Frontier
Kazakhstan National Fund	KNF	2000	Commodity	Macrostabilisation	57.628	0.6395%	Kazakhstan	Asia	French Civil Law	Frontier
(Texas) Permanent School Fund*	PSF	1854	Commodity	Saving	46.521	0.5162%	USA (Texas)	North America	Common Law	Developed
Emirates Investment Authority	EIA	2007	Commodity	Reserve Investment	45.000	0.4993%	UAE (Federal)	Middle East	Common Law	Emerging
Turkey Wealth Fund	TWF	2016			40.000	0.4439%	Turkey	Middle East	French Civil Law	Emerging
State Oil Fund of the Republic of Azerbaijan	SOFAZ	1999	Commodity	Macrostabilisation, Saving	38.988	0.4326%	Azerbaijan	Asia	French Civil Law	no data
Khazanah Nasional (Berhad)*	KN	1993	Non-Commodity	Reserve Investment, Development	32.728	0.3632%	Malaysia	Asia	Common Law	Emerging
Nuclear Waste Disposal Fund	NWDF	2017			26.958	0.2991%	Germany	Europe	German Civil Law	Developed
New Zealand Superannuation Fund*	NZSF	2001	Non-Commodity	Saving	25.069	0.2782%	New Zealand	Australia & Pacific	Common Law	Developed
Ireland Strategic Investment Fund (formerly National Pensions Reserve Fund)	ISIF/NPRF	2001	Non-Commodity	Development	24.522	0.2721%	Ireland	Europe	Common Law	Developed
New Mexico State Investment Council / New Mexico State Investment Office Trust Fund [Severance Tax Permanent Fund part of this]	NMSIC	1973	Commodity	Reserve Investment	23.247	0.2580%	USA (New Mexico)	North America	Common Law	Developed

Permanent University Fund (managed by UTIMCO)	PUF	1876	Commodity	Development	21.770	0.2416%	USA (Texas)	North America	Common Law	Developed
Fund for Reconstruction and Development	FRD	2006	Non-Commodity		20.000	0.2219%	Uzbekistan	Asia	French Civil Law	no data
State General Reserve Fund*	SGRF	1980	Commodity	Saving, Reserve Investment, Development	18.100	0.2008%	Oman	Middle East	French Civil Law	Frontier
Alberta Heritage (Savings Trust) Fund	AHSTF	1976	Commodity	Saving, Reserve Investment	17.600	0.1953%	Canada (Alberta)	North America	Common Law	Developed
Timor Leste Petroleum Fund	TLPF	2005	Commodity	Macrostabilisation	16.799	0.1864%	Timor Leste	Australia & Pacific	French Civil Law	no data
Mumtalakat Holding Company	MHC	2006	Non-Commodity	Reserve Investment	15.199	0.1687%	Bahrain	Middle East	Common Law	Frontier
Social and Economic Stabilization Fund / Economic and Social …	SESF	1985	Commodity	Macrostabilisation	14.769	0.1639%	Chile	Latin America	French Civil Law	Emerging
Russian Direct Investment Fund	RDIF	2011	Non-Commodity	Development	13.000	0.1443%	Russia	Europe	Socialist Law	Emerging
Pension Reserve Fund	PRF	2006	Non-Commodity	Macrostabilisation, Saving	10.155	0.1127%	Chile	Latin America	French Civil Law	Emerging
Permanent Wyoming Mineral Trust Fund	PWMTF	1974	Commodity	Macrostabilisation, Saving	8.023	0.0890%	USA (Wyoming)	North America	Common Law	Developed
CDP Equity (formerly known as Italian Strategic Fund)		2011	Non-Commodity	Development	6.763	0.0750%	Italy	Europe	French Civil Law	Developed
Oman Investment Fund	OIF	2006	Commodity	Reserve Investment	6.000	0.0666%	Oman	Middle East	French Civil Law	Frontier
Heritage and Stabilization Fund	HSF	2007	Commodity	Macrostabilisation, Saving	5.875	0.0652%	Trinidad & Tobago	Latin America	Common Law	Frontier

North Dakota Legacy Fund	NDLF	2011	Commodity	Saving	5.791	0.0643%	USA (North Dakota)	North America	Common Law	Developed
Fiscal Stabilization Fund	FSF	1999	Non-Commodity	Macrostabilisation	5.770	0.0640%	Peru	Latin America	French Civil Law	Emerging
Solidium Oy		2008			5.762	0.0639%	Finland	Europe	Scandinavian Civil Law	Developed
Pula Fund	PF	1993	Commodity	Reserve Investment	5.517	0.0612%	Botswana	Africa	Common Law	Frontier
China-Africa Development Fund*	CADF	2007	Non-Commodity	Reserve Investment	5.000	0.0555%	China	Asia	Socialist Law	Emerging
Fundo Soberano de Angola	FSDEA	2012	Commodity	Reserve Investment	4.270	0.0474%	Angola	Africa	French Civil Law	no data
Colombia Savings and Stabilization Fund	CSSF	1995	Commodity	Macrostabilisation, Saving	3.470	0.0385%	Colombia	Latin America	French Civil Law	Emerging
Alabama Trust Fund	ATF	2000	Commodity	Saving	3.116	0.0346%	USA (Alabama)	North America	Common Law	Developed
Federal Holding and Investment Company		2006			2.690	0.0298%	Belgium	Europe	French Civil Law	Developed
Japan Investment Corporation	JIC	2018			2.680	0.0297%	Japan	Asia	German Civil Law	Developed
Utah State School and Institutional Trust Funds Office	SITFO	1896	Non-Commodity		2.491	0.0276%	USA (Utah)	North America	Common Law	Developed
Idaho Endowment Fund Investment Board	IEFIB	1969	Non-Commodity		1.884	0.0209%	USA (Idaho)	North America	Common Law	Developed
Hellenic Corporation of Assets and Participations	HCAP	2016			1.555	0.0173%	Greece	Europe	French Civil Law	Emerging
Nigeria Sovereign Investment Authority	NSIA	2011	Commodity	Reserve Investment, Development	1.470	0.0163%	Nigeria	Africa	Common Law	Frontier
Louisiana Education Quality Trust Fund	LEQTF	1986	Commodity	Development	1.417	0.0157%	USA (Louisiana)	North America	Common Law	Developed

Fondo de Ahorro de Panama	FAP	2012	Non-Commodity	Macrostabilisation, Saving	1.396	0.0155%	Panama	Latin America	French Civil Law	Frontier
Oklahoma Tobacco Settlement Endowment Trust		2000	Non-Commodity		1.360	0.0151%	USA (Oklahoma)	North America	Common Law	Developed
Fund for Productive Industrial Revolution (FINPRO)	FINPRO	2012	Non-Commodity	Development	1.200	0.0133%	Bolivia	Latin America	French Civil Law	no data
Senegal Strategic Investment Fund - FONSIS	SSIF	2013	Non-Commodity	Development	1.000	0.0111%	Senegal	Africa	French Civil Law	Frontier
Western Australian Future Fund	WAFF	2012	Commodity	Saving	0.923	0.0102%	Australia	Australia & Pacific	Common Law	Developed
Development Fund for Iraq	DFI	2003	Commodity	Development	0.900	0.0100%	Iraq	Middle East	French Civil Law	no data
Palestine Investment Fund*	PIF	2003	Non-Commodity	Development	0.856	0.0095%	State of Palestine	Middle East	no data	Frontier
Colorado School Trust Endowment		2001	Non-Commodity		0.824	0.0091%	USA (Colorado)	North America	Common Law	Developed
Sharjah Asset Management	SAM	2008			0.793	0.0088%	UAE (Sharjah)	Middle East	Common Law	Emerging
Revenue Equalization Reserve Fund	RERF	1956	Commodity	Macrostabilisation	0.609	0.0068%	Kiribati	Australia & Pacific	Common Law	no data
Ghana Petroleum Funds	GPF	2011	Commodity	Macrostabilisation, Saving	0.556	0.0062%	Ghana	Africa	Common Law	Frontier
Oil Revenue Stabilization Fund of Mexico	ORSFM	2000	Commodity	Macrostabilisation	0.540	0.0060%	Mexico	Latin America	French Civil Law	Emerging
Native Hawaiian Trust Fund					0.409	0.0045%	USA (Hawaii)	North America	Common Law	Developed
National Development and Social Fund		2015	Non-Commodity		0.366	0.0041%	Malta	Europe	no data	no data

Luxembourg Intergenerational Sovereign Fund	FSIL	2014			0.230	0.0026%	Luxembourg	Europe	French Civil Law	Developed
State Capital Investment Corporation*	SCIC	2005	Non-Commodity	Development	0.188	0.0021%	Vietnam	Asia	French Civil Law	Frontier
Fund for Future Generations	FFG	2006	Commodity	Saving	0.166	0.0018%	Equatorial Guinea	Asia	French Civil Law	no data
Tuvalu Trust Fund		1987	Non-Commodity		0.161	0.0018%	Tuvalu	Australia & Pacific	no data	no data
Sovereign Fund of the Gabonese Republic (Gabon Sovereign Wealth Fund)	GSWF	2012	Commodity	Development	0.143	0.0016%	Gabon	Africa	French Civil Law	no data
National Investment Corporation	NIC	2012	Commodity	Saving	0.126	0.0014%	Kazakhstan	Asia	French Civil Law	Frontier
Uganda Petroleum Fund		2015	Commodity		0.117	0.0013%	Uganda	Africa	Common Law	no data
Agaciro Development Fund	AGDF	2012	Non-Commodity	Macrostabilisation, Development	0.059	0.0007%	Rwanda	Africa	French Civil Law	no data
National Fund for Hydrocarbon Reserves	NFHR/FNRH	2006	Commodity	Macrostabilisation, Saving	0.034	0.0004%	Mauritania	Africa	French Civil Law	no data
FEM - Macroeconomic Stabilization Fund	FEM	2003	Commodity	Macrostabilisation	0.003	0.0000%	Venezuela	Latin America	French Civil Law	no data
Bhutan Economic Stabilization Fund		2018			0.001	0.0000%	Bhutan	Asia	Common Law	no data
Fonds stratégique d'investissement / Strategic investment fund	FSI	2008	Non-Commodity	Development			France	Europe	French Civil Law	Developed
Russian Reserve Fund	RRF	2004	Commodity	Macrostabilisation			Russia	Europe	Socialist Law	Emerging
Revenue Regulation Fund	RRF	2000	Commodity	Macrostabilisation			Algeria	Africa	French Civil Law	no data

Sovereign Wealth Fund of Brazil	SFB	2008	Non-Commodity	Macrostabilisation, Saving, Development			Brazil	Latin America	French Civil Law	Emerging
Bayelsa Development and Investment Corporation	BDIC	2012	Non-Commodity	Development			Nigeria	Africa	Common Law	Frontier
Fiscal Stability Fund	FSF	2010	Commodity	Macrostabilisation			Mongolia	Asia	German Civil Law	no data
Papua New Guinea Sovereign Wealth Fund	PNGSWF	2012	Commodity	Macrostabilisation, Saving, Development			Papua New Guinea	Australia & Pacific	Common Law	no data
Turkmenistan Stabilization Fund	TSF	2008	Commodity	Macrostabilisation			Turkmenistan	Asia	French Civil Law	no data
West Virginia Future Fund	WVFF	2019	Commodity	Saving, Development			USA (West Virginia)	North America	Common Law	Developed
Fondo Mexicano del Petroleo para la Estabilizacion y el Desarrollo	FMP	2014	Commodity	Macrostabilisation, Development			Mexico	Latin America	French Civil Law	Emerging
International Petroleum Investment Company	IPIC	1984	Commodity	Reserve Investment			UAE (Abu Dhabi)	Middle East	Common Law	Emerging
Excess Crude Account	ECA	2004	Commodity				Nigeria	Africa	Common Law	Frontier
Istithmar World (Dubai World)		2003	Commodity				UAE (Dubai)	Middle East	Common Law	Emerging
RAKIA (RAK Investment Authority)	RIA	2004	Commodity	Development			UAE (Ra's al Khaymah)	Middle East	Common Law	Emerging
Government Pension Fund Norway	GPF	1967					Norway	Europe	German Civil Law	Developed
Oregon Common School Fund	CSF						USA (Oregon)	North America	Common Law	Developed
Abu Dhabi Investment Council	ADIC	2007	Commodity	Reserve Investment, Development			UAE (Abu Dhabi)	Middle East	Common Law	Emerging

Oil Revenue Stabilization Account		2002	Commodity	Reserve Investment			Sudan	Africa	Common Law	no data
DIFC Investments	DIFC	2006	Commodity				UAE (Dubai)	Middle East	Common Law	Emerging
Dubai International Capital	DIC	2004	Commodity				UAE (Dubai)	Middle East	Common Law	Emerging
National Development Fund (FONDEN)		2005	Commodity	Development			Venezuela	Latin America	French Civil Law	no data
Queensland Investment Corporation		1991	Non-Commodity	Development			Australia	Australia & Pacific	Common Law	Developed
Victorian Funds Management Corporation		1994	Non-Commodity	Saving, Development			Australia	Australia & Pacific	Common Law	Developed
National Development Fund of the Executive Yuan		1973	Non-Commodity				Taiwan	Asia	German Civil Law	Emerging
National Stabilization Fund		2000	Non-Commodity	Macrostabilisation			Taiwan	Asia	German Civil Law	Emerging
1Malaysia Development Berhad (previously: Terengganu Investment Authority)		2008	Non-Commodity	Development			Malaysia	Asia	Common Law	Emerging
Fonds National d'Investissements	FNI	2000					Algeria	Africa	French Civil Law	no data
Government Petroleum Insurance Fund		1986	Commodity				Norway	Europe	Scandinavian Civil Law	Developed
Shanghai Financial Holdings		2007	Non-Commodity				China	Asia	Socialist Law	Emerging
Fonds des générations		2006	Commodity				Canada	North America	Common Law	Developed

Poverty Action Fund		1998	Non-Commodity				Uganda	Africa	Common Law	no data
Compact Trust Fund of Micronesia		2004	Non-Commodity				Micronesia	Australia & Pacific	no data	no data
RMI Trust Fund		2004	Non-Commodity				Marshall Islands	Australia & Pacific	no data	no data
Phosphate Royalties Stabilization Fund		1968	Commodity				Nauru	Australia & Pacific	no data	no data
Tonga Trust Fund		1988	Non-Commodity				Tonga	Australia & Pacific	no data	no data
National Oil Account		2004	Commodity	Development			Sao Tomé and Principe	Africa	French Civil Law	no data
Guyana Natural Resource Fund		2019					Guyana	Latin America	Common Law	no data
Savings and Stabilization Fund	SSSF	2018	Commodity				Suriname	Latin America	French Civil Law	no data
Ontario First Nations Sovereign Wealth		2018					Canada (Ontario)	North America	Common Law	Developed
Polish Development Fund	PFR	2016					Poland	Europe	Socialist Law	Emerging
Israeli Citizen's Fund		n/a					Israel	Middle East	Common Law	Developed
Misr Fund		n/a					Egypt	Middle East	French Civil Law	Emerging
Saudi Technology Development and Investment Company (Taqnia)		2011					Saudi Arabia	Middle East	Common Law	Emerging

Table 2: Number of listed firms with ownership stakes by SWFs

Year	Firms in Sample	Firms with SWF Ownership	Percentage of total sample	Firms with >1% SWF Ownership	Percentage of total sample	Average SWF Ownership
2009	7693	4872	63.3303%	1206	15.6766%	1.182%
2010	7693	5238	68.0879%	1721	22.3710%	1.524%
2011	7693	4949	64.3312%	1381	17.9514%	1.165%
2012	7693	5113	66.4630%	1526	19.8362%	1.298%
2013	7693	5105	66.3590%	1754	22.7999%	1.474%
2014	7693	5413	70.3627%	2351	30.5602%	1.654%
2015	7693	5747	74.7043%	2803	36.4357%	1.695%
2016	7693	6154	79.9948%	3338	43.3901%	1.737%
2017	7693	6821	88.6650%	4170	54.2051%	1.874%
2018	7693	7209	93.7086%	4739	61.6015%	2.068%

Table 3. Summary Statistics of Main and Control Variables

This table reports summary statistics on the main variables and control variables for the period 2009-2018. Market Capitalization is displayed in Million USD. To mitigate the impact of outliers, continuous variables are Winsorized at the top and bottom 1 percentile. All variables are defined in the Variable Definition section.

	Obs.	Mean	St. Dev.	Min	P25	Median	P75	Max
Main Variables								
% SWF Ownership	30879	1.433	2.760	0.000	0.242	0.797	1.523	74.310
Δ *SWF Ownership*	30866	0.120	1.259	-39.655	-0.050	0.008	0.247	74.299
ESG score	30879	46.694	16.779	7.060	34.050	44.710	59.080	95.660
Δ *ESG*	27893	0.878	12.199	-66.650	-3.590	0.720	5.560	62.610
E score	30860	53.774	31.680	8.300	19.750	56.440	86.730	95.520
S score	30792	53.642	31.158	3.680	22.550	56.420	84.800	98.140
G score	30799	47.394	30.589	1.030	16.930	49.220	75.640	98.200
Control Variables								
Annual Return (%)	30210	11.473	45.452	-75.000	-13.951	6.166	29.411	259.383
Market Capitalization (USD millions)	30575	8245,712	12534,550	21,290	1629,120	3641,480	8527,360	63647,090
Dividend Yield (%)	30602	2.494	2.393	0.000	0.640	1.980	3.670	11.540
Leverage (debt to equity ratio)	30760	104.047	167.894	-184.400	19.220	55.275	117.320	1055.600
ROA (%)	30274	5.307	8.829	-40.350	1.650	4.790	8.810	34.630
Sales Growth (%)	30182	10.756	31.337	-47.810	-1.420	5.735	15.300	261.230
Cash Assets ratio (%)	25051	36.540	23.544	0.920	17.710	31.920	52.180	97.170
Market to Book ratio (equity)	30069	2.685	3.054	-0.540	1.050	1.710	3.080	19.360
Fixed Charge Coverage ratio (%)	26003	85.292	429.644	-112.890	2.690	6.860	20.330	3930.470
Operating Margin ratio (%)	30587	11.277	31.471	-260.460	5.044	11.295	21.589	63.773
Capex to Sales ratio (%)	30587	12.638	28.085	0.000	2.023	4.339	10.390	215.062
Asset Turnover ratio (%)	21899	2.288	1.525	0.000	1.286	1.958	2.897	8.383

Table 4. Value-Weighted ESG Score per SWF per Year

This table reports the value-weighted ESG score for the SWFs in the sample having at least 100 holdings each year. The value-weighted ESG scores is calculated based on the market value of a target firm and the SWF ownership stake in this firm. By multiplying the ownership stake and the firm's market value, we calculate the value of the ownership stake. By doing so for all firm-year observations and summing the value of the ownership stakes per year we generate the value of the portfolio of a SWF each year. The stakes are than value-weighted by dividing the value of the ownership stake in the target firm by the value of the portfolio of the SWF that year. Subsequently, by multiplying the ESG score of the firm in that year times the weight of the ownership stake that year, the value-weighted ESG score of each SWF each year is determined.

Year	NGPFG	# Obs.	GIC	# Obs.	PIC	# Obs.	NZSF	# Obs.	KIA	# Obs.	PSF	# Obs.	KIC	# Obs.
2009	48,25	3538	46,79	158	44,50	105	49,45	1369	43,19	100	40,89	431	41,94	121
2010	49,68	3801	49,88	155	53,47	112	56,21	2781	44,30	105	41,38	461	44,05	127
2011	47,73	3810	46,51	143	51,78	102	54,29	2947	43,83	127	38,63	348	40,20	115
2012	49,23	3822	49,45	165	57,94	109	53,45	3106	47,78	136	42,29	364	44,04	216
2013	48,98	3766	49,02	194	54,60	111	49,65	3214	48,62	137	41,01	392	41,70	184
2014	47,17	4109	49,98	215	48,13	119	47,91	3288	47,03	147	40,76	409	42,89	226
2015	49,81	4426	53,32	222	52,13	120	49,56	3404	50,34	172	45,22	427	46,35	210
2016	55,91	4671	57,09	265	55,28	130	54,28	3527	54,59	171	47,19	459	50,52	279
2017	52,51	4869	51,52	300	49,34	129	51,55	3735	48,93	131	45,39	487	47,14	268
2018	50,12	5185	48,79	325	40,45	153	48,64	3747	46,75	122	42,84	513	43,83	322
Average	*49,94*		*50,24*		*50,76*		*51,50*		*47,54*		*42,56*		*44,27*	

Table 5: The Effect of Portfolio Company's ESG Performance on SWF Ownership

This table displays the Heckman method regressions in Panels A, B, and C. The dependent variable is either a continuous percentage of SWF ownership in a target firm or a dummy of specific percentages ownership of SWFs. The primary variable that is of interest is the level ESG score. Besides this, multiple control variables are added in the regression. The main- and control variables are defined in the Variable Definitions section. The regression includes year-level and industry level fixed-effects or a probit panel regression with firm-level random effects in combination with year and sector fixed effects and clustered standard errors. The results of the regression using multiple subsamples are displayed. Control variables are winsorized at the top and bottom 1 percentile. The t-statistics are in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Panel A: Samples including all SWF ownership data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	*All SWFs*	*All SWFs*	*All SWFs*	*All SWFs*	*All SWFs*	*All SWFs*	*All SWFs*
Period:	*2004-2018*		*2009-2018*		*2009-2018*	*2009-2018*	*2009-2018*
Model:	*Heckman Model*				*Probit Panel Random-Effects Model*		
Dependent Variable:	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum 0.5% Own.*	*Dum 1% Own.*	*Dum 2% Own.*
ESG Score (t-1)	0.011***	0.009***	0.013***	0.010***	0.004**	0.004***	0.005***
	(7.70)	(7.29)	(8.27)	(5.50)	(2.33)	(2.90)	(2.60)
Log(Market Capitalization) (t-1)	0.209***	-0.162***	0.115***	-0.182***	0.083**	-0.067**	-0.189***
	(11.10)	(-7.76)	(5.49)	(-8.38)	(2.50)	(-2.08)	(-4.70)
ROA (t-1)	-0.0014	0.012***	-0.000	0.015***	0.002	0.015***	0.014***
	(-0.44)	(4.30)	(-0.04)	(4.51)	(0.56)	(4.36)	(3.23)
Sales Growth (t-1)	-0.0005	0.002**	0.000	0.002**	-0.000	-0.001	-0.001
	(-0.73)	(2.18)	(-0.015)	(1.97)	(-0.56)	(-1.39)	(-0.95)
Annual Return (t-1)	-0.000	0.001	0.000	0.001*	0.001	0.002***	0.001
	(-0.68)	(1.49)	(0.54)	(1.66)	(1.10)	(3.49)	(1.55)
Market to Book ratio (t-1)	-0.035***	0.027***	-0.037***	0.030***	-0.023**	-0.030***	0.004
	(-4.77)	(3.64)	(-4.38)	(3.14)	(-1.96)	(-2.62)	(0.34)
Operating Margin ratio (t-1)	-0.001	0.001	-0.001	0.002	0.001	-0.001	0.003
	(-1.07)	(1.35)	(-0.65)	(1.45)	(0.92)	(-0.23)	(1.01)
Asset Turnover ratio (t-1)	0.055***	-0.012	0.055***	-0.013	-0.009	0.023	0.021
	(3.14)	(-0.79)	(2.60)	(-0.71)	(-0.31)	(0.81)	(0.65)
Goodwill to Assets ratio (t-1)	0.000	0.000	0.001	0.000	0.001***	0.001***	0.001**
	(0.92)	(0.46)	(1.60)	(0.23)	(3.65)	(3.84)	(2.54)
Capex to Sales ratio (t-1)	0.000	-0.001	0.001	-0.001	-0.001	-0.005***	-0.003*
	(0.23)	(-0.60)	(0.85)	(-0.51)	(-0.93)	(-3.62)	(-1.75)
Dividend Yield (t-1)	-0.010	0.083***	-0.007	0.084***	0.018	0.037***	0.043***
	(-0.99)	(9.40)	(-0.66)	(8.55)	(1.48)	(3.41)	(3.08)

Table 5 (Continued): The Effect of Portfolio Company's ESG Performance on SWF Ownership

Leverage (t-1)	0.000	-0.000*	0.000	-0.000*	-0.000	-0.000	-0.000
	(1.31)	(-1.80)	(0.06)	(-1.65)	(-1.07)	(-0.27)	(-1.25)
Cash Assets ratio (t-1)	0.002	-0.006***	0.001	-0.007***	-0.003*	-0.003**	-0.006***
	(1.44)	(-6.15)	(0.94)	(-6.37)	(-1.76)	(-2.11)	(-2.95)
Fixed Charge Coverage ratio (t-1)	0.000	-0.000***	0.000	-0.000***	-0.000	-0.000	-0.000
	(1.26)	(-4.64)	(1.22)	(-4.26)	(-1.11)	(-0.22)	(-1.54)
Constant	-1.145***	1.198***	0.563**	1.822***	0.024	-0.237	-1.923***
	(-5.85)	(3.36)	(2.00)	(5.74)	(0.07)	(-0.70)	(-4.26)
Lambda		-0.711		-0.601	-	-	-
		(-1.09)		(-0.50)	-	-	-
Firm RE	No		No		Yes	Yes	Yes
Year FE	Yes		Yes		Yes	Yes	Yes
Industry FE	Yes		Yes		Yes	Yes	Yes
Firm-Level Clustered Std. Error	No		No		Yes	Yes	Yes
No. Observations	19,150	19,150	16,187	16,187	16,187	16,187	16,187
No. of Clusters					2,583	2,583	2,583
Wald Chi-Squared	1722		1087		1309	1514	714.5

Table 5 (Continued): The Effect of Portfolio Company's ESG Performance on SWF Ownership

Panel B: Sub Samples based on Economic Development or Legal Origin (Sample Period 2009-2018)										
Sample	*Developed SWFs*		*Emerging SWFs*		*Frontier SWFs*		*Civil Law SWFs*		*Common Law SWFs*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent Variable:	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*
ESG Score (t-1)	0.013***	0.005***	-0.000	0.019***	0.006***	0.004	0.0084***	0.005***	0.010***	0.006***
	(9.11)	(6.71)	(-0.37)	(3.73)	(5.15)	(0.28)	(7.91)	(6.02)	(11.70)	(3.29)
Lambda		0.242		-0.440		1.955		-0.605*		0.238
		(0.60)		(-0.10)		(0.62)		(-1.75)		(0.53)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes	
No. Observations	16,187	16,187	16,187	16,187	16,187	16,187	16,187	16,187	16,187	16,187
Wald Chi-Squared	1343		819.2		194.3		1430		785.9	
Panel C: Subsamples based on disclosed ESG statements, Truman's transparency scoreboard, and SWF ownership data										
Sample	*ESG policy SWFs*		*non-ESG SWFs*		*Transparent SWFs*		*Excl. NGPF-G & PIC*		*NGPF-G*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent Variable:	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*	*Dum SWF Own.*	*% SWF*
ESG Score (t-1)	0.013***	0.011***	0.002**	-0.018	0.011***	0.004***	0.007***	-0.001	0.009***	0.004***
	(6.65)	(9.57)	(2.52)	(-0.49)	(8.35)	(5.90)	(8.20)	(-0.71)	(8.04)	(5.64)
Lambda		1.142		-10.590		-0.497		-0.028		-0.919***
		(1.30)		(-0.53)		(-1.33)		(-0.12)		(-3.21)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes	
No. Observations	16,187	16,187	16,187	16,187	16,187	16,187	16,187	16,187	16,187	16,187
Wald Chi-Squared	1171		29.79		1416		220.6		1672	

Table 6. The Effects of Portfolio Company's Past ESG Level and Change on SWF Ownership

This table reports the multivariate (probit) panel regression in panels A, B, and C. The dependent variable is either a continuous percentage of SWF ownership in a target firm or a dummy of a specific percentage ownership of SWFs. The main variables of interest are level ESG score at t=2 and change in ESG score between t=1 and t=2. Besides this, multiple control variables are added in the regression. The main- and control variables are defined in the Variable Definitions section. The regression includes firm-level fixed effects or firm-level random effects in combination with year and sector fixed effects, and clustered standard errors. The results of the regression using multiple subsamples are displayed. Control variables are winsorized at the top and bottom 1 percentiles. The t-statistics are in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Panel A: Samples including all SWF ownership data					
Sample	*All SWFs*	*All SWFs*	*All SWFs*	*All SWFs*	*All SWFs*
	(1)	(2)	(3)	(4)	(5)
Period:	*2004-2018*	*2009-2018*	*2009-2018*	*2009-2018*	*2009-2018*
Model:	*Panel Fixed-Effects Model*		*Probit Panel Random-Effects*		
Dependent Variable:	*% SWF Ownership*		*Dum 0.5%*	*Dum 1% Own.*	*Dum 2% Own.*
ESG Score (t-2)	0.007***	0.004*	0.005**	0.007***	0.008***
	(3.96)	(1.86)	(2.09)	(3.20)	(3.55)
ΔESG Score (t-1, t-2)	0.004***	0.002*	0.002	0.003**	0.004**
	(4.45)	(1.77)	(1.04)	(2.15)	(2.26)
Control variables	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No	No
Firm RE	No	No	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
Sector FE	No	No	Yes	Yes	Yes
Firm-Level Clustered Std. Error	Yes	Yes	Yes	Yes	Yes
No. Observations	20,013	17,387	14,930	14,930	14,930
No. of Clusters	2,681	2,679	2,379	2,379	2,379
Adjusted R-Squared	0.019	0.004			
Wald Chi-Squared			1154	1415	687.8

Panel B: Sub Samples based on Economic Development or Legal Origin					
Sample	*Developed SWFs*	*Emerging SWFs*	*Frontier SWFs*	*Civil Law SWFs*	*Common Law SWFs*
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	*% SWF Ownership*				
ESG Score (t-2)	0.005***	-0.002	0.000	0.004***	-0.000
	(4.77)	(-1.05)	(0.45)	(4.47)	(-0.20)
ΔESG Score (t-1, t-2)	0.002***	-0.000	-0.000	0.002***	-0.000
	(3.65)	(-0.71)	(-0.92)	(3.49)	(-0.60)
Control variables	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Firm-Level Clustered Std. Error	Yes	Yes	Yes	Yes	Yes
No. Observations	17,387	17,387	17,387	17,387	17,387
No. of Clusters	2,679	2,679	2,679	2,679	2,679
Adjusted R-Squared	0.009	0.001	0.002	0.008	0.001

Panel C: Subsamples based on disclosed ESG statements, Truman's transparency scoreboard, and SWF ownership data					
Sample	*ESG Policy SWFs*	*non-ESG SWFs*	*Transparent SWFs*	*Excl. NGPF-G & PIC*	*NGPF-G*
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	*% SWF Ownership*				
ESG Score (t-2)	0.006***	-0.001	0.005***	-0.001	0.004***
	(4.70)	(-0.98)	(4.56)	(-0.65)	(5.15)
ΔESG Score (t-1, t-2)	0.002***	-0.000	0.002***	-0.000	0.002***
	(3.09)	(-0.35)	(3.27)	(-0.06)	(3.67)
Control variables	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Firm-Level Clustered Std. Error	Yes	Yes	Yes	Yes	Yes
No. Observations	17,387	17,387	17,387	17,387	17,387
No. of Clusters	2,679	2,679	2,679	2,679	2,679
Adjusted R-Squared	0.008	0.001	0.010	0.001	0.010

Table 7: Difference-in-Difference Analysis - DeepWater Horizon Shock

This table reports the multivariate Deep Water Horizon difference-in-difference panel regression. The dependent variable is a deeper-level ESG measure. The main variables of interest are the interaction dummy, event dummy, and SWF ownership dummy, as described in section X. Multiple control variables are added in the regression. The main- and control variables are defined in the Variable Definitions section. The sample period is 2004-2018. The regression includes firm-level fixed effects and clustered standard errors. The panels report different event dummies, lasting and not lasting, different SWF Ownership dummies, 0% and 0.5%, and different samples, including all SWF ownership data and only including the NGPF-G and NZSF ownership data. The t-statistics are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A: Including all SWF ownership data - Difference-in-Difference Deep Water Horizon - Dum 0% SWF Ownership - Lasting effect															
Sample	*Firms: Publicly listed - Oil and Gas Extraction or Petroleum refining and Related Industries - Mcap min. 500M USD*														
Dependent Variable	*CGSR*	*CGVS*	*CGCP*	*CGBS*	*CGBF*	*SOPR*	*SOCO*	*SOHR*	*SODO*	*SOEQ*	*SOHS*	*SOTD*	*ENER*	*ENPI*	*ENRR*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dum SWF Ownership	-0.069	12.280***	-5.101*	4.539	-2.621	2.648	-0.282	-2.764	0.758	2.491	8.977**	1.396	-1.677	-5.279*	2.769
	(-0.01)	(2.66)	(-1.69)	(1.24)	(-0.94)	(0.70)	(-0.07)	(-0.60)	(0.17)	(0.46)	(2.15)	(0.25)	(-0.42)	(-1.76)	(0.81)
Event (Post-2010)	6.872*	15.330***	-1.543	5.998**	1.111	7.426*	4.330	10.430***	12.550***	13.470***	12.150***	12.350***	9.338***	4.125	12.510***
	(1.67)	(4.33)	(-0.60)	(2.13)	(0.42)	(1.91)	(1.35)	(3.12)	(4.64)	(3.30)	(3.75)	(4.02)	(3.78)	(1.24)	(4.22)
Dum SWF × Post-2010	6.865	-5.915	8.494**	-3.393	3.833	3.247	5.682	-3.143	2.666	-5.978	-2.903	-1.762	0.0865	1.019	-4.900
	(1.37)	(-1.37)	(2.50)	(-0.97)	(1.08)	(0.66)	(1.29)	(-0.65)	(0.77)	(-1.15)	(-0.72)	(-0.45)	(0.03)	(0.21)	(-1.29)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,141
Number of firms	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
Adjusted R-Squared	0.094	0.142	0.042	0.018	0.008	0.085	0.089	0.058	0.192	0.087	0.094	0.140	0.119	0.038	0.114

Table 7 (Continued): Difference-in-Difference Analysis - DeepWater Horizon Shock

Panel B: Only Including NGPF-G and NZSF Ownership Data - Difference-in-Difference Deep Water Horizon - Dum 0% SWF Ownership - Lasting effect															
Sample	*Firms: Publicly listed - Oil and Gas Extraction or Petroleum refining and Related Industries - Mcap min. 500M USD*														
Dependent Variable	*CGSR*	*CGVS*	*CGCP*	*CGBS*	*CGBF*	*SOPR*	*SOCO*	*SOHR*	*SODO*	*SOEQ*	*SOHS*	*SOTD*	*ENER*	*ENPI*	*ENRR*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dum SWF Ownership Event (Post-2010)	0.716	12.26***	-5.100*	4.546	-2.591	2.685	-0.460	-2.690	0.405	2.216	8.771**	1.222	-2.061	-4.908	2.605
	(0.141)	(2.63)	(-1.67)	(1.23)	(-0.92)	(0.70)	(-0.11)	(-0.58)	(0.09)	(0.40)	(2.06)	(0.21)	(-0.50)	(-1.63)	-0,75
	7.056*	15.22***	-1.501	5.962**	1.140	7.413*	4.290	10.470***	12.460***	13.390***	12.030***	12.290***	9.262***	4.256	12.450***
	(1.72)	(4.31)	(-0.58)	(2.13)	(0.43)	(1.91)	(1.35)	(3.16)	(4.61)	(3.29)	(3.71)	(4.03)	(3.77)	(1.28)	(4.21)
Dum SWF × Post-2010	6.579	-5.820	8.456**	-3.362	3.803	3.253	5.745	-3.190	2.800	-5.860	-2.762	-1.688	0.214	0.845	-4.821
	(1.31)	(-1.35)	(2.50)	(-0.97)	(1.08)	(0.66)	(1.30)	(-0.66)	(0.81)	(-1.13)	(-0.69)	(-0.43)	(0.062)	(0.18)	(-1.27)
Control var.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,141
No. of firms	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
Adj. R2	0.094	0.141	0.042	0.018	0.008	0.085	0.089	0.058	0.192	0.087	0.094	0.140	0.120	0.037	0.114

Table 8. Difference-in-Difference Analysis – Volkswagen Diesel Scandal

This table reports the multivariate Volkswagen difference-in-difference panel regression. The dependent variable is a deeper-level ESG measure. The main variables of interest are the interaction dummy, event dummy, and SWF ownership dummy, as described in section 5.4.2. Besides this, multiple control variables are added in the regression. The main- and control variables are defined in the Variable Definitions section. The sample period is 2004-2018. The regression includes firm-level fixed effects and clustered standard errors. The panels report different event dummies, lasting and not lasting, different SWF Ownership dummies, 0% and 0.5%, and different samples, including all SWF ownership data and only including the NGPF-G and NZSF ownership data. The t-statistics are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A: Including all SWF ownership data - Difference-in-Difference Volkswagen - Dum 0% SWF Ownership - Lasting effect															
Sample	*Firms: Publicly listed - Motor Vehicles and Passenger Car Bodies Industry - Mcap min. 500M USD*														
Dependent Variable	*CGSR*	*CGVS*	*CGCP*	*CGBS*	*CGBF*	*SOPR*	*SOCO*	*SOHR*	*SODO*	*SOEQ*	*SOHS*	*SOTD*	*ENER*	*ENPI*	*ENRR*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dum SWF Ownership	27.250***	6.444	13.540	-1.936	10.900*	-14.35***	11.450*	-3.679	2.767	16.450	23.050*	10.360	0.588	3.400	-2.370
	(5.56)	(0.95)	(1.60)	(-0.55)	(1.80)	(-5.13)	(1.87)	(-1.15)	(1.04)	(1.58)	(1.70)	(1.00)	(0.13)	(0.62)	(-0.46)
Event (Post-2015)	15.650	16.75***	4.272	4.025	-2.792	12.440***	17.400**	6.079	11.230**	14.980**	14.580***	16.510***	17.090***	7.822*	11.970*
	(1.67)	(2.94)	(1.29)	(0.84)	(-0.56)	(3.00)	(2.67)	(0.82)	(2.08)	(2.64)	(4.82)	(5.54)	(3.56)	(1.95)	(1.93)
Dum SWF x Post-2015	-4.752	-5.720	-5.826	-2.177	5.824	-4.406	-6.954	8.285	1.373	-6.610	-3.306	-5.978	-6.653	2.173	-0.535
	(-0.48)	(-0.87)	(-1.48)	(-0.40)	(1.06)	(-0.90)	(-0.96)	(0.96)	(0.23)	(-1.03)	(-0.78)	(-1.26)	(-1.14)	(0.43)	(-0.07)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	460	460	460	460	460	460	460	460	460	460	460	460	460	460	460
Number of firms	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Adj. R-Squared	0.084	0.141	0.030	-0.003	0.016	0.050	0.077	0.078	0.170	0.056	0.100	0.137	0.168	0.100	0.091

Table 8 (Continued). Difference-in-Difference Analysis – Volkswagen Diesel Scandal

Panel B: Only Including NGPF-G and NZSF Ownership Data - Difference-in-Difference Volkswagen - Dum 0% SWF Ownership - Lasting effect															
Sample	*Firms: Publicly listed - Motor Vehicles and Passenger Car Bodies Industry - Mcap min. 500M USD*														
Dependent Variable	*CGSR*	*CGVS*	*CGCP*	*CGBS*	*CGBF*	*SOPR*	*SOCO*	*SOHR*	*SODO*	*SOEQ*	*SOHS*	*SOTD*	*ENER*	*ENPI*	*ENRR*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dum SWF Ownership	27.250***	6.444	13.54	-1.936	10.90*	-14.35***	11.45*	-3.679	2.767	16.450	23.050*	10.360	0.588	3.400	-2.370
	(5.56)	(0.95)	(1.60)	(-0.55)	(1.80)	(-5.13)	(1.87)	(-1.15)	(1.04)	(1.58)	(1.70)	(1.00)	(0.13)	(0.62)	(-0.46)
Event (Post-2015)	15.650	16.750***	4.272	4.025	-2.792	12.440***	17.400**	6.079	11.230**	14.980**	14.580***	16.510***	17.090***	7.822*	11.970*
	(1.67)	(2.94)	(1.29)	(0.84)	(-0.56)	(3.00)	(2.67)	(0.82)	(2.08)	(2.64)	(4.82)	(5.54)	(3.56)	(1.95)	(1.93)
Dum SWF × Post-2015	-4.752	-5.720	-5.826	-2.177	5.824	-4.406	-6.954	8.285	1.373	-6.610	-3.306	-5.978	-6.653	2.173	-0.535
	(-0.48)	(-0.87)	(-1.48)	(-0.40)	(1.06)	(-0.90)	(-0.96)	(0.96)	(0.23)	(-1.03)	(-0.78)	(-1.26)	(-1.14)	(0.43)	(-0.07)
Control var.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	460	460	460	460	460	460	460	460	460	460	460	460	460	460	460
Number of ID	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Adj. R-Squared	0.084	0.141	0.030	-0.003	0.016	0.050	0.077	0.078	0.170	0.056	0.100	0.137	0.168	0.100	0.091

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