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Delegated Gender Diversity

Finance Working Paper N° 814/2022
February 2022

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Keywords: board gender diversity, institutional investors, investor demand, sustainable investing

JEL Classifications: G3, G23, M14

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1. Introduction

Gender diversity and equality on corporate boards has been hotly debated in recent years. Despite the growing emphasis on gender equality in top business positions and the academic evidence indicating that female directors have unique skills (Kim and Starks, 2016), women still only account for 6% of CEOs and 19% of top executives in publicly listed firms worldwide. To increase the presence of women in top business positions, many jurisdictions have mandated a minimum number of female directors on corporate boards in public corporations. Norway was the first country in the world to pass legislation specifying corporate board gender representation. The Norwegian Parliament passed a regulation in December 2003 that required all publicly listed Norwegian companies to have at least 40 percent female directors. Since then, a wave of board gender quota legislation has swept across the world. As recently as 2018, California became the first US state to introduce a board gender quota, requiring California-based firms to have at least two (for five-member boards) or three (for boards with six or more directors) female directors by the end of 2021.

Despite the global movement to promote board gender diversity, scholars find that government-mandated gender quotas are often associated with a significant drop in firm value, attributed to the short-term undersupply of capable female candidates (Hwang et al., 2021). These findings raise questions on the role of governments and regulators in promoting board gender equality and the trade-off between shareholder value and social outcomes. Governments act as agents of their citizens and have a "delegated philanthropy" mission to promote social outcomes through laws and regulations, even if these come at the cost of economic efficiency and shareholder value (Benabou and Tirole, 2010; de Bettignies and Robinson, 2018). Governments are, however, also able to influence market outcomes indirectly via investment vehicles such as sovereign wealth funds (SWFs) (Bernstein, Lerner, and Schoar, 2013; Megginson and Fotak, 2015). Different from direct government-mandated regulations, SWFs have a dual objective to not only promote social outcomes but also to deliver sustainable financial returns (Aguilera et al., 2021; Briere et al., 2018).

In this paper, we exploit this unique characteristic of SWFs to revisit the value implications of board gender diversity. We investigate the announcement by Norway's SWF, Norges Bank Investment

Management (NBIM), on February 15, 2021, that it would require its portfolio firms to set targets for female board representation at 30% or more. In its announcement, NBIM stated that it would start voting against nomination committees that failed to meet the 30% threshold and that, in extreme cases, noncompliance would result in the divestment of the holding. NBIM is one of the largest asset managers in the world, and its campaign had a large impact on investor expectations about board gender diversity in global equity markets, affecting more than 9,200 listed firms across 74 countries. Such significant influence may drive other investors' trading behavior, and could therefore have profound implications on NBIM's portfolio companies.

The literature provides mixed evidence on the impact of board gender diversity on firm value. The prevailing view holds that female directors have unique skills and risk appetites that complement the skillsets of male directors, resulting in a diversity premium. However, studies supporting this skillset view mostly focus on self-initiated, rather than government-mandated, board gender diversity actions (Kim and Starks, 2016). Another stream of the literature takes a supply-side perspective and focuses on government-mandated board gender diversity, stating that forced gender quotas can lead to a shortage of qualified female candidates for directorships. Firms that must meet quotas may have to appoint less capable directors (Hwang et al., 2021; Greene at al., 2020), or they may have to overburden existing directors, both of which lead to value destruction and investor exits. This reduction in firm value has been documented in the context of Norway's 2003 gender quota (Ahern and Dittmar, 2012; Matsa and Miller, 2013; Bøhren and Staubo, 2014, 2016; Yang et al., 2019) and California's 2018 gender quota (Hwang et al., 2021; von Meyerinck et al., 2021; Greene et al., 2020). It should be noted that evidence from both strands of the literature has been subject to methodological concerns, often relating to selection and timing issues. As a result, other studies find no significant relation between female board representation and financial performance around self-initiated campaigns (Post and Byron, 2015; Pletzer et al., 2015) or around Norway's government-mandated quota (Eckbo et al., 2021; Ferreira, 2015).

In this paper, we offer a new perspective on the relation between board gender diversity and firm value. We argue that board gender diversity can increase firm value by attracting institutional capital to the firm. Gender equality on corporate boards, together with many other environmental,

social, and governance (ESG) issues, is increasingly at the top of institutional investors' agendas, driven by the growing amount of capital concentrated in socially responsible investment (SRI) funds (Bialkowski and Starks, 2016, Heath et al., 2021) and institutional investors' desire to appeal to shareholders' sustainability preferences. In their search for ESG performance, investors target not only firms that already have balanced boards but also those that have potential to increase board diversity, so as to showcase to shareholders that they are forward looking in terms of ESG (Dyck et al., 2019; Barzuza, Curtis, and Webber, 2020). Firms that are expected to increase board gender diversity are then more likely to attract investment by SRI investors and ESG-focused funds. We refer to this as the investor demand view of board gender diversity. Different from the skillset view, this view states that gender diversity increases firm value not by improving cash flows and operating performance but by decreasing the firm's discount rate and lowering the cost of capital, as it can obtain financing more easily (Rau, Sandvik, and Vermaelen, 2021).

We test the investor demand view in a global setting by using NBIM's board diversity campaign announcement as a shock to investor expectations about female board representation in NBIM's portfolio firms. NBIM's announcement provides a number of advantages relative to campaigns by commercial investors, such as BlackRock, Vanguard, and State Street, who launched similar board gender diversity campaigns in 2017 (Lublin and Krouse, 2017; Krouse, 2018; McNabb, 2017; Gormley et al., 2021). First, the 30% female board representation requirement is a significant threshold relative to the requirements imposed by other institutional investors. For example, State Street targeted firms with zero female directors in its 2017 Fearless Girl campaign, and BlackRock targeted firms with fewer than two female directors in its March 2017 campaign. NBIM's announcement therefore provides a more granular measure of a firm's female director shortfall and enables us to compare firms with large, small, and zero shortfalls.

Second, as one of the largest asset managers globally, NBIM holds almost 1.5 percent of all shares in the world's listed companies and can therefore exert significant influence over global equity markets. Due to its broad holdings, its campaign can be considered as an exogenous shock to investors' expectations about female board representation in many firms around the world. This is less likely to be the case for campaigns by other asset managers such as index investors, whose ownership is often

endogenously correlated with firm characteristics that predict a firm's inclusion in major equity indices, including market capitalization and profitability. The international scope of NBIM's portfolio also enables us to investigate cross-country variation in the effect of female board representation, which is relatively scarce in the literature.[1]

Third, NBIM's unique position as a sovereign wealth fund implies that it carries a dual objective of delivering sustainable financial returns for its shareholders and promoting nonfinancial social welfare. Given Norway's tradition of advancing board gender equality via mandated quota, NBIM's campaign may be considered more credible by investors and shareholders relative to campaigns by commercial investors whose fiduciary duty is primarily to maximize financial returns. Moreover, as an important player in the global investment community, NBIM has significant influence on other investors' actions (Aguilera et al., 2021).

Using an international sample of 8,806 NBIM-held firms in a portfolio regression setting, we find significantly positive returns in a [0,+1]-window around NBIM's announcement. This positive effect is driven entirely by firms with a female board representation shortfall (i.e., those with less than 30% female board members). Firms without a shortfall earn returns insignificantly different from zero. After controlling for industry, country, and firm- and board-level characteristics in cross-sectional regressions, we similarly find that shortfall firms earn 0.15% to 0.31% higher returns relative to firms without a shortfall. The return difference increases with the size of the shortfall and is strongest for firms that were targeted by the campaign, i.e., firms with large market capitalizations and firms based in Europe and North America. We confirm these findings in a regression discontinuity setting, where we focus on firms with female board representation within a 5% bandwidth around the 30% threshold. These positive returns for shortfall firms are in stark contrast with the evidence on government-mandated diversity quota, which generally finds significantly negative announcement returns.

We next investigate whether these results reflect a lower cost of capital resulting from an increase in investor demand. We first confirm that CARs around NBIM's announcement are significantly positive for firms with low non-index institutional ownership (low-IO firms), which have

[1] Although some studies investigate quota-induced board gender diversity in international samples (e.g. Kuzmina and Melentyeva, 2021), most studies focus on U.S. firms or other single-country samples.

the most potential to attract additional institutional demand. In contrast, firms with high institutional ownership (high-IO firms) earn significantly negative returns, potentially indicating that investors switch from high-IO to low-IO firms. Consistent with this conjecture, we find that low-IO firms with female director shortfalls experience an increase in institutional holdings that is 0.20% to 0.55% higher relative to low-IO firms without a shortfall, and that these increases in institutional holdings are driven by SRI fund investment, whereas IO decreases are driven by non-SRI funds. These effects are particularly large for low-IO shortfall firms with high NBIM ownership. Correspondingly, institutional ownership decreases in high-IO firms with low levels of NBIM ownership. Further corroborating our hypothesis that investor demand increases firm value by decreasing firms' cost of capital, we also find a larger decrease in the implied cost of capital for shortfall firms, concentrated among firms with low IO.

We then rule out the possibility that the positive returns for shortfall firms reflect the skillset view or the supply of skilled female directors. First, if female directors contribute to better decision-making, we would expect to find higher returns in better governed firms. However, we do not find evidence that our results are driven by firms with high governance scores. Second, if adding skilled female directors directly increases value, we would expect to find higher returns for firms in countries with a higher supply of skilled female directors. Instead, we find that the higher returns for shortfall firms are concentrated among firms in countries with a *smaller* supply of skilled female directors.

Next, we consider the credibility of NBIM's campaign by investigating whether NBIM's voting aligns with its board diversity guidelines. We confirm that, in firms with a female director shortfall, NBIM is 3.4% more likely to vote in favor of female directors and is more likely to oppose management when doing so. In additional robustness tests, we confirm our main findings in a propensity-score matched sample, where we match every NBIM firm with a control firm, and we show that our results hold for various CARs definitions, shortfall definitions, and various subsamples.

We also investigate whether an SWF-initiated campaign differs from other investor-initiated campaigns. To do so, we analyze the 2017 board gender diversity campaigns by the Big Three, i.e., BlackRock, Vanguard and State Street, which resulted in firms adding at least 2.5 times as many female directors (Gormley et al., 2021). Although we find that firms with a female director shortfall (relative

to the Big Three's requirements) experienced positive abnormal announcement returns, this effect is driven by *high-IO* firms rather than low-IO firms. These positive returns are concentrated among high-IO firms that continued to have a female director shortfall after the Big Three's campaigns, with these firms also attracting more institutional capital. In contrast, high-IO firms that resolved their shortfall experienced a decline in IO. This is consistent with a separating equilibrium in which campaigns by commercial institutions lead profit-seeking investors to target less diverse firms, whereas ESG-focused investors target firms with expected increases in board gender diversity.

Our findings illuminate an important yet underexplored channel through which board gender diversity can affect firm value. While the literature mostly focuses on supply-side factors, such as female directors' unique skills and the supply of qualified females, we focus on the demand side by studying investors' buying-in behavior. Our paper therefore contributes to the growing literature on how shareholder advocacy (e.g. Aggarwal et al., 2019; Gertsberg et al., 2021) and institutional investor preferences (e.g. Gormley et al., 2021; Rau et al., 2021) can increase female board representation. We contribute to this literature by studying the value implications of investor-initiated campaigns and their impact on investor behavior.

Our findings also relate to studies on investor demand for SRI and its real effects. A growing literature shows that some investors will forgo financial returns in exchange for investments that align with their social preferences (Riedl and Smeets, 2017; Barber, Morse, Yasuda, 2021; Bauer, Ruof, and Smeets, 2021). In addition, several studies document that SRI funds attract significant capital inflows (e.g., Bialkowski and Starks, 2016; Hartzmark and Sussman, 2019), and that they tend to select firms with higher ESG standards (Heath et al., 2021). We go a step further and focus on one of the most contentious ESG issues, board gender diversity, to demonstrate that socially responsible investors indeed flow to firms that are expected to improve their ESG practices, a strategy that is commonly dubbed "ESG momentum" (Agarwal and Ouaknine, 2019; Giese et al., 2019; Antoncic et al., 2020). We further demonstrate that investors' buying-in behavior can have real effects on firms by lowering the cost of capital, an important mechanism that has received relatively little attention in the literature (El Ghoul et al., 2011; Naaraayanan, Sachdeva, Sharma, 2021; Pastor et al., 2020).

2. Data and Univariate Statistics

2.1 Data and Sample Selection

To investigate the value implications of NBIM's board gender diversity campaign, we calculate abnormal announcement returns for NBIM's portfolio firms. NBIM released a position paper on Monday, February 15, 2021, in which it stated that boards where either gender has less than 30% representation should set gender diversity targets and report on progress made to meet these targets. In addition, it said it would start voting against nomination committees of firms with fewer than two women on the board, starting with large- and mid-cap firms in the United States and Europe. In extreme cases, the fund would divest from firms that failed to comply with its gender diversity targets.

To calculate the change in firm value around NBIM's announcement, we first estimate returns using a portfolio-regression approach to account for the cross-sectional correlations in returns when many firms are affected at the same time. We define the event date as February 15, 2021. For five markets in our sample, February 15 was a nontrading day. For these countries, we define the event date as the next available trading day: February 16 for the United States, Canada, and China, and February 17 for Brazil and Taiwan. Following the approach in Eckbo et al. (2021), we estimate daily abnormal returns (ARs) for portfolios of NBIM-held firms using the following regression.

$$r_t = \alpha + ARd_t + \beta r_{wt} + \varepsilon_t \quad (1)$$

r_t is the daily equal-weighted portfolio return, converted to US dollars using the daily exchange rate, in excess of the daily three-month US Treasury bill rate. d_t is a dummy variable that equals one for observations in the [0,+1] event window and zero for observations in the [-200,-3] estimation window. The estimation window ends on Wednesday February 10, two trading days before the event day, and we require that firms have at least 100 return observations in the estimation window and at least one return observation in the [0,+1] event window. We include the next trading day in the event window to account for the timing of the release in global markets. r_{wt} is the daily return of the local market index, converted to US dollars, in excess of the three-month US Treasury bill rate, where we use the value-weighted return of each country's main market index as a proxy for the local market return. We assign

firms to countries based on the location of their primary listing. Cumulative abnormal returns (CARs) are then obtained by multiplying the coefficient on *AR* by the number of days in the event window.

We also perform cross-sectional OLS regressions, which enable us to exploit firm-level variation in board structure and ownership, estimated using the following specification.

$$CAR[0,+1]_i = \alpha + \beta Shortfall_i + \gamma Controls_i + \delta_j + \theta_c + \epsilon. \quad (2)$$

Different from the above portfolio regressions, to calculate CARs, we first estimate daily ARs as the observed return minus the expected return using a CAPM model, where we estimate expected returns over the [-200,-3] window. We then compute CARs around NBIM's announcement by taking the sum of the daily ARs over the [0,+1] event window. The vector $Controls_i$ includes a set of firm-level variables, such as the size of NBIM's position in the firm *(% Held by NBIM*), firm size (*Total Assets (ln)*), and profitability (*ROA*); board-level variables, such as number of directors on the board (*Board Size*) and the ratio of independent directors on the board (*% of Independent Directors*); ownership held by institutional investors *(% Total Institutional Ownership*); and the firm's corporate governance quality (*Refinitiv Governance Score*). δ_j is a vector of industry fixed effects based on two-digit SIC industry codes, and θ_c is a vector of country fixed effects.

Our main variable of interest is *Shortfall*, an indicator variable for whether the firm has less than 30% female directors on its board. To construct this variable, we obtain data on firms' board composition from FactSet, CapitalIQ, and Bloomberg. For each firm, we calculate the percentage of female directors using the 2020 end-of-year board composition. In additional tests, we also use several alternative definitions for female director shortfall, such as the percentage difference between NBIM's 30% threshold and the firm's current female board representation (*% Shortfall*).

As our investor demand view crucially depends on a firm's institutional shareholdings, we control for firms' institutional ownership (IO) as well as NBIM's holding. NBIM holding data is obtained from NBIM's website, and institutional ownership is obtained from FactSet. We measure institutional ownership as the firm's non-index institutional ownership, i.e., total IO minus the holdings by index investors, where we use the Big Three's holdings as a proxy for index investor holdings. Changes in institutional ownership by index investors are unlikely to be the result of changes in the

firm's board composition, and we want to ensure we are not capturing changes in IO driven by the Big Three's 2017 board gender diversity campaigns. In additional tests, we focus on NBIM's voting behavior in the 2020 and 2021 annual general meetings. Data on voting by NBIM are obtained from NBIM's website, where the fund publishes its voting intentions two days before a general meeting occurs. Management voting outcomes are also retrieved from NBIM's website.

Our initial sample consists of all 9,440 publicly listed firms held by NBIM. We retain all firms with accounting and financial data for the 2020 financial year in Compustat and with ownership data for 2020 in FactSet. After dropping firms with missing financial, accounting, or ownership data or missing returns on February 15 or 16 (or a combination of these), we end up with a sample of 8,806 firms. The majority of excluded firms went public or were delisted shortly before or after February 15, so we cannot estimate abnormal returns or obtain accounting and ownership data in Compustat and FactSet.

The firms in our sample span 65 countries and 69 two-digit SIC industries. The sample distribution by country and industry can be found in Internet Appendix Tables IA.1 and IA.2. In absolute numbers, our sample firms tend to have their primary listing in the United States (26%), Japan (17%), and Korea (5%). In terms of market capitalization, NBIM's portfolio consists mainly of firms listed in the United States (55%), Japan (7%), and the United Kingdom (6%). The most important industries in absolute numbers and in terms of market capitalization are chemicals and allied products, business services, and electronic equipment. Importantly, this sample distribution echoes the reported holdings on NBIM's website.

2.2 Summary Statistics

Table 1 reports summary statistics for the 8,806 NBIM-held firms in our sample. Panel A reports their board characteristics. On average, firms in NBIM's portfolio have 19% female board members, equivalent to an average shortfall of 11% relative to the 30% quota recommended in the campaign. The majority of NBIM firms (74%) have fewer than 30% female board members. In addition, 43% of NBIM firms have fewer than two women on the board, and 23% have none. The average firm in the sample has nine board members, with about half of these as independent directors.

In Panel B, we investigate firms' institutional ownership structure. NBIM holds, on average, a 1.15% stake in an average firm in its portfolio. This is slightly lower than the 1.5% average portfolio holding reported by NBIM, because small-cap and newly listed firms, which have relatively higher NBIM ownership stakes, are more likely to have missing data in our sample. Total institutional ownership averages 35%, consisting of 6% ownership by the Big Three and 29% ownership by other investors. Domestic institutions account for 24% of IO, and foreign institutions account for 6%. Because NBIM is a universal investor, there is a large overlap in portfolio holdings between NBIM and index investors, such as BlackRock, State Street, and Vanguard: 91% of the firms in our sample have at least one of the Big Three funds as investors. In Panel C, we consider governance and other firm-level variables. The average firm in our sample has total assets of US$14.2 million, total equity of US$4 million, and a market capitalization of US$11.6 million. Average ESG and governance scores (on a scale of -50 to +50) are close to zero, with neither score deviating more than 2 from the industry average, which is set to zero by default.

In Table IA.3 in the Internet Appendix, we compare board-, firm-, and industry-level characteristics for firms with and without a female board representation shortfall. We find that firms without a shortfall have on average 39% female directors, whereas those with a shortfall have on average 12%. Of the 6,553 firms with a shortfall, 57% (3,735 firms) have fewer than two women on the board. Firms with a shortfall are smaller and have smaller boards, fewer independent directors, and lower institutional and Big Three ownership. The latter result is consistent with the results of Gormley et al. (2021), Rau et al. (2021), and Heath et al. (2021), who find that the Big Three and SRI funds push for gender diversity in their portfolio firms. We also find that firms with a shortfall have below-average ESG scores, whereas those without a shortfall have above-average ESG scores.

[Insert Table 1 about here]

3. Results

3.1 Announcement Returns: Portfolio Regressions

We first investigate the market reactions to NBIM's announcement on February 15, 2021, using a portfolio regression analysis. Time-series portfolio regressions address the potential contemporaneous

cross-correlation of returns when investigating market reactions to the same event. All firms in our sample are held by NBIM and are therefore affected by the campaign announcement. We follow the approach in Jaffe (1974) and Eckbo et al. (2021) by forming equal-weighted calendar time portfolios. As outlined in Section 2.1, we calculate average daily ARs r_t, starting 200 trading days before the event date and ending at day +1, for a portfolio of NBIM-held firms. We then estimate the calendar-time portfolio's abnormal return using Equation (1), where d_t is a dummy variable set equal to one for observations in the event window [0,+1] and zero for observations in the estimation window [-200,-3]. The coefficient on *AR* therefore captures the average daily abnormal portfolio return in the event window.

In columns (1) to (3) in Table 2, we show the coefficient estimates for the [0,+1] event window, where CAR[0,+1] = 2*AR* and p-values are calculated as $2\sigma_{AR}$ from the time-series regression. We find that NBIM firms earn, on average, one basis point (0.01%) abnormal returns (column (1)), significant at the 5% level. However, we find in column (2) that this effect is driven entirely by firms with less than 30% female directors. Firms with more than 30% female board representation do not earn significant abnormal returns (column (3)). We find similar results in column (4), where we exclude day +1 from the event window. We confirm in column (5) that NBIM firms do not show abnormal returns in the lead-up to the announcement, as CARs over the [-2,-1] event window differ insignificantly from zero.

[Insert Table 2 about here]

3.2 Cross-Sectional Regression Results

Next, we investigate the market reactions to NBIM's announcement in a cross-sectional analysis using OLS regressions. This firm-level analysis allows us to investigate whether market reactions depend on firm-, industry-, and country-level characteristics. In Table 3, we estimate our baseline OLS specification as in Equation (2). We vary the sample based on firm characteristics that NBIM announced would be targeted first in the press release accompanying its position paper. Specifically, NBIM announced it would start by "voting against appointments to nomination committees of companies that do not have at least two women on the board," focusing on "developed markets and large and mid cap

companies in the U.S. and Europe" (Fouche, 2021). The dependent variable in all models is the firm's CAR in the [0,+1]-day event window, where t_0 is the announcement day, February 15, or the next trading day in markets where February 15 was a nontrading day. The main independent variable of interest in columns (1)–(3) is *Shortfall,* an indicator for whether the firm had less than 30% female directors.

Consistent with the portfolio regression results in Table 2, we find, in column (1), that firms with a female director ratio below 30% (shortfall firms) experience 0.15% higher CARs over the two-day window following NBIM's announcement, compared to those with at least 30% female directors. The magnitude of the effect more than doubles when we restrict our sample to large firms (market capitalization above $5 million, column (2)) or to U.S. and European firms (column (3)). In column (4), we replace the *Shortfall* dummy with the shortfall percentage (*% Shortfall*). We find that every percentage increase in *% Shortfall* (i.e., decrease in female board representation) increases CARs by 0.7 basis points, and a one standard deviation increase in *% Shortfall* (15.27%) is associated with 0.107% higher CARs. In column (5), we replace *Shortfall* with a binary indicator for having fewer than two female directors on the board, as these firms would be targeted first in the 2021 voting season. We indeed find that firms with fewer than two female directors earn 0.24% higher CARs than those with more than two female directors. The coefficients on the control variables indicate that returns increase with firm size, but they decrease with profitability. Conditional on firm size, larger boards have lower CARs. In addition, board independence is negatively correlated with announcement returns, and the industry-adjusted *Governance Score* is positively correlated with returns. Higher levels of institutional ownership are negatively related to CARs. This comports with the investor demand hypothesis: high-IO firms have limited room for adding new capital, reflected in lower returns around NBIM's diversity announcement.

[Insert Table 3 about here]

3.3 Evidence from a Narrow Bandwidth Sample

Next, we want to ensure that the CARs indeed capture investors' reaction to NBIM's board gender diversity announcement. We therefore conduct our tests on a sample of firms with female director ratios

within a small bandwidth around the 30% threshold. That is, we restrict the sample to firms with more than 25% but less than 35% female directors on the board. In doing so, we compare firms with female director ratios that marginally fall short of the required 30% cutoff to those that are marginally above 30%. This is arguably akin to a random assignment of female director ratios to firms, reducing concerns that their stock market returns are correlated with other firm characteristics. We then replicate our analysis in Table 3 for this narrow-bandwidth sample and present the results in Table 4. As before, we find that firms with a female director shortfall earn 0.166% higher returns in the [0,+1] window around NBIM's announcement (column (1)), with every percentage increase in *Shortfall* increasing returns by 1.2 basis points (column (4)). The effect becomes considerably larger for firms that were targeted in the announcement, increasing to 0.21% for large-cap firms (column (2)), 0.36% for U.S. and European firms (column (3)), and 0.35% for firms with fewer than two women on the board (column (5)).

[Insert Table 4 about here]

3.4. Testing the Institutional Investor Demand Channel

3.4.1 Announcement Returns

The results in Tables 3 and 4 show a positive relation between having a female director shortfall and announcement returns; i.e., firms with fewer female directors earn higher CARs. This is consistent with board gender diversity increasing firm value to the extent that firms with less than 30% female directors are expected to add female board members (an assumption we explore in more detail in Section 3.7). Adding female board members may then attract more institutional holdings, especially from socially responsible investors. To test this investor demand channel, we next focus on firms' institutional ownership level. The investor demand channel predicts that, all else equal, firms with a lower level of institutional ownership and a female director shortfall are more likely to attract institutional investors following NBIM's announcement. As changes in index investors' and particularly the Big Three's holdings should not be affected by changes in the firm's board composition, we exclude the Big Three holdings from our definition of institutional ownership.

We first investigate how firm-level CARs differ based on the size of firms' female director shortfall and their level of (non-Big Three) institutional ownership (IO) in a univariate analysis. In

Figures 1a and 1b, we report average CARs where we group firms based on their female director shortfall (15%–30% shortfall, 1%–15% shortfall, 0%–15% excess, and 15%–70% excess) and their level of institutional ownership (low (below-median) IO and high (above-median) IO), for the full sample (Figure 1a) and the sample of U.S. and European firms (Figure 1b).[2] We find that low-IO firms consistently earn positive returns, regardless of their female board representation, whereas high-IO firms consistently earn negative returns. Although in the full sample CARs for low-IO shortfall firms are slightly lower than for low-IO firms without a shortfall (Figure 1a), they are considerably higher in the sample of U.S. and European firms (Figure 1b), consistent with our results in Tables 3 and 4. CARs therefore tend to reflect firms' potential for attracting additional institutional ownership: they are higher for low-IO firms than for high-IO firms, and, within the low-IO sample, they are highest for firms with the largest shortfall. The higher returns for excess firms in the full sample may reflect a signaling channel, in which firms in non-Western economies obtain external confirmation of their board diversity efforts.

[Insert Figures 1a and 1b about here]

Next, we test the investor demand channel in a regression analysis in Table 5. We partition our sample into a low-IO (Panel A) and a high-IO group (Panel B) based on the median Non-Big Three IO holdings (21.31% as reported in Table 1). We find in Panel A that low-IO firms with a female director shortfall earn higher returns than those without a shortfall, with the effect being driven by firms specifically targeted by NBIM's campaign: large-cap shortfall firms earn 0.54% higher returns (column (2)), US and European shortfall firms earn 0.29% higher returns (column (3)), shortfall firms with fewer than two women earn 0.23% higher returns (column (5)), and every percentage increase in *Shortfall* increases returns by 0.5 basis points (column (4)). In Panel B, however, we find that high-IO firms with a female director shortfall do not earn higher returns (columns (1)–(5)). These results suggest that a firm's pre-announcement institutional ownership level can explain its market reaction to NBIM's announcement, consistent with the investor demand view.

[Insert Table 5 about here]

[2] The graph for the sample of large-cap firms resembles that for the sample of U.S. and European firms in Figure 1b (available on request).

3.4.2 Change in Institutional Ownership

We next test the investor demand channel more directly by investigating the percentage change in institutional ownership for NBIM-held firms following NBIM's announcement. In Panel A of Table 6, we regress the percentage change in (non-index investor) institutional ownership in the three quarters following NBIM's announcement on the *Shortfall* indicator for the sample of low-IO firms. We find that low-IO firms with a shortfall experience a higher increase in institutional ownership relative to those without a shortfall (column (1)). The change in IO is highest for firms targeted in NBIM's announcement: large-cap shortfall firms' IO increases by 0.39% more (column (2)), US and European shortfall firms' IO increases by 0.55% more (column (3)), IO for shortfall firms with fewer than two women increases by 0.20% more (column (5)), and every percentage increase in *Shortfall* increases IO by 0.8 basis points (column (4)). As institutional investment for low-IO firms without a shortfall remains virtually constant in the three quarters following the announcement (the percentage change of 0.2 basis points is not significantly different from zero), this effect is economically sizeable. In Panel B, we consider the sample of high-IO firms only. Here we do not find evidence that IO increases for firms with a shortfall: if anything, we find that high-IO firms with fewer than two women on the board experience a decrease in IO of -0.58% in the three quarters following the announcement (column (5)).[3]

[Insert Table 6 about here]

3.4.3 Types of Institutional Ownership

The above findings indicate that NBIM-held firms with less than 30% female directors and low institutional ownership are most likely to attract institutional capital following NBIM's announcement. We next investigate which types of institutional investors drive these results. If the announcement incentivizes shortfall firms to add female directors, the expected increase in board gender diversity is likely to attract additional institutional capital from investors that value ESG more and that benefit more from NBIM's push for board diversity.

[3] In additional tests, we rule out that these results are driven by outliers with large increases in IO by estimating a logit model where the dependent variable is an indicator for whether the firm experienced an increase in IO. We confirm that firms with a female director shortfall are more likely to experience an increase in IO and that the effect is driven by low-IO shortfall firms. In contrast, high-IO shortfall firms are not significantly more likely to increase their IO.

We first investigate whether the change in IO for shortfall firms is driven by domestic or foreign investors. In Panel A of Table 7, we find that the higher IO increases for shortfall firms are driven by foreign investors in low-IO firms (column (3)), with no significant differences for high-IO firms and for domestic institutional owners (columns (1)-(2) and (4)-(6)). This is consistent with the literature documenting that foreign institutional investors can promote positive changes in terms of innovation and price efficiency, as they provide complementary information and stronger monitoring, compared to domestic institutional investors (Bena et al., 2017; Kacperczyk, Sundaresan, Wang, 2021). In addition, relative to domestic investors, foreign investors may be more likely to follow the lead of a major foreign investor such as NBIM.

In Panel B, we investigate the size of NBIM's ownership position. NBIM has more voting power, and therefore a larger influence, in firms where it holds a larger ownership stake. If investors expect that NBIM is more likely to increase female board representation in firms where it has a larger position, we should expect the increase in IO to be driven by firms with high NBIM ownership. We define high NBIM ownership as being above the sample median (i.e., having about 1% stakes held by NBIM). We find that the increase in ownership by institutional investors is concentrated in firms with high NBIM ownership (column (1)), with the effect more than doubling in the sample of low-IO firms (column (3)). In contrast, firms with low NBIM ownership experience a decrease in IO (column (2)), with this effect being driven by the high-IO firms (column (6)). These results indicate that investors take into account the likelihood of NBIM succeeding in adding female board members. Moreover, they shed additional light on the results in column (5) of Table 6, by showing that investors switch from high-IO firms with low NBIM ownership to low-IO firms with high NBIM ownership.

Next, we distinguish institutional investors based on their ESG focus. If investors expect NBIM's announcement to result in higher female board representation in shortfall firms, the increase in IO should be most pronounced for SRI investors that adopt an ESG momentum strategy. We obtain data on funds' holdings from CRSP, which limits the sample to U.S.-listed firms and funds. We define SRI funds as those that have a Morningstar sustainability mandate or that are a member of the U.S. Forum for Sustainable and Responsible Investment. For every U.S.-listed firm in our sample, we then calculate the total market value of holdings by SRI and non-SRI funds, respectively, as a fraction of the

firm's market capitalization. To ensure the results are comparable to those in Panels A and B, the dependent variable in the odd (even) columns in Panel C reflects the % change in ownership by SRI (non-SRI) funds from December 2020 to September 2021. Consistent with ESG-focused funds selecting firms that are likely to increase board gender diversity, we find that SRI funds increase their ownership by 0.076% (column (1)) following NBIM's announcement. Because the sample is limited to U.S.-listed firms, we cannot distinguish firms based on their level of IO: almost all U.S.-listed firms are high-IO firms in our full sample. We therefore distinguish firms based on whether they experience an increase (columns (3)-(4)) or a decrease (column (5)-(6)) in IO in the three quarters following the announcement. We find that increases in IO are driven by higher SRI fund investment (column (3)), whereas decreases in IO are driven by lower non-SRI fund investment (column (6)).[4]

An increase in ownership by SRI funds could reflect more investment by existing investors, or it could reflect new SRI funds entering the firm. In Internet Appendix Table IA.4, we investigate whether the *number* of SRI funds increases in shortfall firms following NBIM's announcement. We find that shortfall firms are 1.1% more likely to experience in an increase in the number of SRI funds (column (1)), rising to 5.5% if institutional ownership increased following the announcement (column (3)). There are however no significantly different changes in the number of non-SRI funds (columns (2), (4), and (6)), indicating that decreases in IO are driven by decreases in ownership by existing funds, rather than funds leaving the firm.

[Insert Table 7 about here]

3.4.4 Change in Cost of Capital

A key mechanism through which attracting more institutional capital can add firm value is by reducing the firm's cost of capital. That is, the cost of capital for firms with a female director shortfall and low IO should decrease more, compared to those with high IO and those without a shortfall, a mechanism that we refer to as the discount rate channel. To test whether NBIM's announcement resulted in a

[4] While the increase in ownership by SRI funds is relatively small in absolute terms, it is economically sizeable relative to the unconditional mean of SRI ownership. When defining the change in IO in relative terms, we find that the increase in ownership by SRI funds represents a relative increase of 27% (full sample) up to 52% (low-IO sample). The 0.61% decrease in ownership by non-SRI funds, on the other hand, reflects a relative decrease of 2.8%.

decrease in firms' cost of capital, we calculate the implied cost of capital (ICC) following Hou, van Dijk, and Zhang (2012). This approach generates forecasted earnings using a cross-sectional model based on the firm's historical accounting and financial information, and has the benefit of not relying on analyst forecasts to estimate expected earnings, allowing us to retain our full sample. We then calculate the percentage change in the ICC before and after NBIM's announcement as the difference between the 2021 ICC (estimated using the post-announcement market value of equity) and the 2020 ICC (estimated using the pre-announcement market value of equity), and regress the percentage change in ICC on the *Shortfall* indicator.

In Table 8, we find that shortfall firms have a 0.84% greater reduction in their ICC (column (1)). When we split the sample into low-IO firms (column (2)) and high-IO firms (column (3)), we again find that the effect is concentrated in low-IO firms only. We also split the sample into firms that experienced an increase in IO after NBIM's announcement (column (4)) and those that experienced a decrease (column (5)). We find that the effect is concentrated in those with an IO increase, i.e., those that attracting more institutional shareholdings. All these results remain robust when we replace the Hou et al. (2012) measure with alternative ICC measures based on past earnings and residual income following Li and Mohanram (2014). Collectively, these results confirm the investor demand hypothesis by showing that NBIM-held firms that are more likely to attract institutional capital from SRI investors indeed experience a greater reduction in their cost of capital.

[Insert Table 8 about here]

3.5 Alternative Channels – Director Skillset View and Director Supply

Although our result so far are consistent with the investor demand channel, they may also align with the director skillset view if firms with low IO are most likely to add female directors with unique skills. To further distinguish the investor demand view from the director skillset view, we next investigate whether the positive stock market reactions for shortfall firms are concentrated among firms with better governance and ESG performance. If female directors bring unique skills that contribute to better decision-making and improve firm value, we expect better governed firms to already have high female director ratios before NBIM's announcement. We first compare the pre-announcement female director

ratios for high- and low-governance firms, where we measure governance quality using firms' governance score and ESG score from Refinitiv ESG. In Table IA.5 in the Internet Appendix, we find that the average female director ratio in firms with above-median governance scores is 26% (equivalent to a 4% shortfall), whereas the average female director ratio is 15% (a 15% shortfall) for firms with below-median governance scores. We also find that 58% of high-governance firms have a shortfall, and 82% of low-governance firms have a shortfall, with similar results for high- and low-ESG firms. These findings are inconsistent with the director skillset view: if board gender diversity directly contributes to better decision-making, better-governed firms would have hired more female directors before NBIM's campaign. Although they have more female directors than firms with worse governance, the majority of firms still fall below the 30% threshold.

In Panel B, we interact the *Shortfall* indicator with firms' governance and ESG performance. We do not find evidence that better-governed firms earn higher returns following NBIM's announcement, regardless of whether they have a female director shortfall (columns (1)–(3)). If anything, we find that high-ESG firms with a female director shortfall earn lower returns than low-ESG firms with a shortfall in the low-IO sample (column (4)). This is possibly because the latter type of firm attracts institutional investors who focus on improving overall ESG rather than only board gender diversity.

Next, we test whether our results are driven by the supply of skilled female directors. Most studies investigating government-mandated gender quotas attribute the negative returns associated with the quota to a limited supply of qualified female directors (Dittmar and Ahern, 2012; Greene et al., 2020; von Meyerinck et al., 2021). We therefore consider country-level factors that proxy for the supply of skilled female directors. If female director supply is constrained, firms face high search and hiring costs, and they may need to appoint underqualified female directors to meet the quota. If the director supply channel explains our results, we expect that returns around NBIM's announcement are lower for firms with less than 30% female directors in countries with fewer skilled female director candidates. In contrast to most of the literature, the international scope of NBIM's portfolio enables us to exploit cross-country variation in female director supply. We proxy for the supply of female directors by considering

female participation in the labor force, the percentage of female employers, the percentage of female CEOs, the number of female directors, and the percentage of females with at least a bachelor's degree.

We construct subsamples of firms with below- and above-median skilled female director supply in Internet Appendix Table IA.6, where the dependent variable in Panel A is the firm's [0,+1] CARs. We consistently find that, across almost all proxies for skilled female director supply, the positive effect of having a female director shortfall is concentrated in countries with a *low* supply of skilled females. This contrasts with the director supply channel, which predicts higher returns for firms in countries with more skilled female directors. Instead, these results likely reflect that approximately 40% of low-supply countries are developing countries with on average lower female director ratios and lower IO levels, so firms in these countries have more potential for adding institutional capital. We find a similar result when considering the percentage change in IO as the dependent variable in Panel B. Again, firms with a female director shortfall experience an increase in IO only in the countries with a below-median supply of skilled femaless (the only exception is the supply of female CEOs in column (6)). Overall, these results indicate that our findings are not likely to be driven by the director supply or the director skillset channel.

3.6. The Effectiveness of NBIM's Announcement

An important assumption underlying the investor demand view is that NBIM's portfolio firms indeed increase their female board representation following the announcement. Due to the recency of the campaign announcement, data on the change in female director ratios in NBIM-held firms are not yet available. Instead we look at the voting behavior of NBIM after the announcement. As of 2020, NBIM publishes its voting intentions and voting records on its website. This enables us to investigate whether NBIM is indeed more likely to vote against director nominations in firms with a female director shortfall. To this end, we focus on NBIM's voting behavior for male and female director elections at its portfolio companies' annual meetings. We investigate voting patterns by NBIM and the management of the firm at the director level in Table 9. We consider univariate statistics in Panel A, where we find that NBIM voted "for" ("against") for 94.56% (4.56%) of female directors and 92.95% (5.33%) of male directors. These results suggest that NBIM is marginally more likely to support the election of female

directors. In a slight contrast, management voted "for" ("against") for 98.37% (0.25%) of female directors and 97.90% (0.20%) of male directors.

In columns (1) and (2) of Panel B, we regress the percentage of NBIM "for" and "against" votes, respectively, on the interaction between *Shortfall* and an indicator for female directors (*Female Director*). We find that NBIM is 3.4% more likely to vote in favor of a female director in a shortfall firm and that it is 2.1% less likely to vote against the election of a female director. Interestingly, we observe an opposite pattern for management voting behavior in columns (3) and (4), although the economic effects are much smaller.

These findings are consistent with the results of Briere et al. (2018), who find that NBIM is more likely to oppose management on governance and ESG issues, relative to other institutional investors. We therefore further investigate whether NBIM is more likely to oppose management in electing female directors. In Panel C, we find that NBIM is more likely to oppose management in firms with a female director shortfall for both male and female director nominees, but the effect is larger for female nominees. Overall, these results confirm the assumption that NBIM actively votes in favor of female directors in firms that do not meet its 30% threshold.

[Insert Table 9 about here]

4. Robustness and Post-Hoc Tests

We conduct several tests to check the robustness of our baseline results by varying the definition of the CARs event window, employing a propensity-score matching approach, and by using a variety of alternative subsample specifications. We then compare the effects with those for the 2017 diversity campaigns by the Big Three investors to see whether SWF-initiated campaigns differ from investor-initiated campaigns in driving market returns and institutional shareholdings.

4.1 Robustness Tests

4.1.1 Alternative Event Windows

In Panel A of Table 10, we first investigate whether our results are affected by changing the event window around the release of NBIM's position paper. In column (1), we include day -1 in the event

window to account for information leakage or pre-announcement anticipation effects. Our results remain virtually unchanged. This is unsurprising, as the announcement was made on a Monday, so there were (at least) two calendar days between day -1 and the event day. In columns (2) and (3), we focus on the ARs at days 0 and +1, respectively, and find that the coefficient on *Shortfall* remains positively significant for both days. We include day +2 in the event window in column (4) and find no evidence for a reversal to the mean the following trading day. We consider a pseudo-event window in column (5), where we calculate CARs over a [-2,-1] event window. If there were no pre-announcement anticipation effects, we should not see any significant differences in returns for firms with female board representation above or below 30%. We indeed find that the *Shortfall* coefficient is not significantly different from zero, reducing concerns that we may be capturing an event other than NBIM's announcement.

4.1.2 Propensity-Score Matching

Although NBIM's holdings cover the majority of publicly listed firms worldwide, a potential concern is that firms in NBIM's portfolio differ from non-NBIM held firms on characteristics that also affect market reactions following the NBIM's announcement. We therefore conduct propensity-score matching in Panel B of Table 10, where we match each NBIM firm to a non-NBIM firm in the same country and industry with the closest propensity score in terms of female board representation, institutional ownership, firm size, ROA, governance score, board size, and board independence. We set the model caliper at 0.01 and match without replacement. We find appropriate matches for 3,956 firms, resulting in a matched sample consisting of 7,912 observations (3,956 "treated" NBIM firms and 3,956 non-NBIM firms). In column (1) of Panel B, we find that the *Shortfall* coefficient is only significant for NBIM firms. This reduces concerns that our results are driven by unobservable differences between NBIM and non-NBIM firms. In columns (2)–(5), we consider subsamples based on firm characteristics as in Table 3, also further distinguishing firms based on their level of institutional ownership. Confirming our results in Tables 3 and 5, we find that the positive effect of having a female director shortfall is concentrated in NBIM firms with low IO.

4.1.3 Additional Robustness Tests

We explore various other subsamples in Panel C of Table 10. First, we exclude firms that have their primary listing on Nasdaq (column (1)). On February 12, one trading day before the release of NBIM's position paper, Republican members of the US Senate asked the SEC to disapprove Nasdaq's proposed rule to require at least one female director for its listed firms. Nasdaq eventually filed an amendment to the rule on February 26, which was published by the SEC on March 10. If markets expected Nasdaq to amend its rule after the Republicans' letter to the SEC on February 12, announcement returns on February 16 (the next trading day in the United States) may reflect the potential *rejection* of Nasdaq's gender diversity rule, rather than the release of NBIM's position paper. We find that excluding the 852 firms in our sample that have their main listing on Nasdaq does not affect the significance or magnitude of our baseline results (column (1)). In columns (2) and (3) we investigate whether our results for the U.S. and European-listed firms in Table 3 are driven by either of the two regions. We find that the coefficient on *Shortfall* is significantly positive in both subsamples, although the effect is slightly larger in the U.S. subsample. In column (4), we repeat our baseline regression using an indicator for whether the firm had no women on the board and find that firms with no female directors earn 0.194% higher returns relative to those with at least one female director. In column (5), we change the cutoff for low- and high-IO firms to 50% of ownership, instead of the sample median. As in our main results, we find that shortfall earns experience an increase in IO, whereas there is no significant difference for firms with IO above 50% (not reported).

[Insert Table 10 about here]

4.2. Evidence from Board Gender Diversity Campaigns by the Big Three

Does an SWF-initiated campaign differ from other investor-initiated campaigns? As an SWF from a country with a history of mandating female board representation, NBIM carries a delegated philanthropic mission, which means it aims to promote the social preferences of its shareholders (Briere et al., 2018). That is, relative to those initiated by commercial investors, NBIM's campaign is less likely to be motivated by profit and is more likely to attract investment by like-minded investors, such as SRI funds. NBIM's portfolio covers many of the listed firms around the world that are also covered by other

investors. However, commercial investors typically prioritize financial returns, as they have a fiduciary duty to their own investors. In addition, they may be divided in their investment decision: whereas socially minded investors may increase their holdings in firms with greater ESG, pure profit seekers may decrease their holdings in such firms and instead invest in firms that mainly focus on profitability.

To test the differences between SWF-initiated and commercial investor-initiated campaigns, we repeat our baseline results for the 2017 board gender diversity campaigns by the Big Three, i.e., BlackRock, Vanguard and State Street.[5] These campaigns resulted in the Big Three's portfolio firms adding at least 2.5 times as many female directors by 2019 (Gormley et al., 2021). We test both the stock market reaction around the campaign announcements and the percentage change in IO following the campaigns from 2016 to 2020. As before, we define IO as a firm's total institutional ownership as of 2016, excluding holdings by the Big Three to remove their self-selection effect, and we define *Shortfall* based on a firm's 2016 end-of-year board composition, relative to each asset manager's requirements (i.e., no female directors for State Street's announcement, fewer than two female directors for BlackRock's, and less than 30% female directors for Vanguard's).

We find in Panel A of Table 11 that a firm's female director shortfall is, on average, positively correlated with [0,+1] CARs and negatively correlated with the percentage change in IO. These effects are entirely driven by firms with *high* IO rather than those with low IO, as we do not find significant results for CARs or IO changes in low-IO firms. This sharply contrasts with the results in the NBIM setting, where we find that *Shortfall* relates positively to both CARs and % IO Change and that these effects are concentrated in firms with low IO.

In Panel B, we focus on the sample of high-IO firms only to further investigate why they drive the positive stock market returns. To this end, we distinguish firms based on whether they resolved their female director shortfall by 2020. The first two columns report the results for CARs and the % IO Change for firms that resolved their shortfall by 2020, and the last two columns report the results for those that did not resolve their shortfall. We find in columns (1) and (3) that the higher CARs for high-

[5] State Street announced its Fearless Girl campaign on the eve of International Women's Day, March 7, 2017, targeting firms without any female directors. BlackRock announced its intent to focus on gender diversity in July 2017 and expressed that it would normally expect to see at least two women directors on every board. Vanguard's CEO announced on August 31, 2017, that it was joining the 30% club and that its voting would consider whether companies were making "meaningful progress" on promoting gender diversity.

IO firms are driven by firms that still have a shortfall in 2020 and that therefore did not add female directors, despite pressure from the Big Three. When considering the percentage change in IO, we find that these firms also see an increase in IO (column (4)). High-IO firms that resolved their shortfall, however, experience a decrease in IO (column (2)).

In untabulated results, we find the opposite effects for the % IO Change in firms with low IO, suggesting that institutional investors may switch from high-IO firms to low-IO firms for those that improve their board gender diversity and from low-IO firms to high-IO firms for those that do not. These results potentially indicate that high-IO firms that retained their director shortfall despite the campaigns were more profit-focused, and therefore attracted profit-seeking institutional investors. Their higher CARs thus do not reflect the expected increase in SRI fund holdings but rather reflect the increase in traditional profit-seeking fund holdings and the potentially higher profitability relative to their female-friendly peers. In other words, different from NBIM's gender diversity campaign, the Big Three's campaigns led to a separating equilibrium in which socially responsible firms attract socially minded investors while profit-oriented firms attract profit seekers.

[Insert Table 11 about here]

5. Conclusion

The debate over the business case for board gender diversity has attracted much attention globally. Many commentators suggest that gender diversity in the corporate boardroom improves firm performance because of the different points of view and experience it offers. However, the academic literature provides ambiguous evidence for this claim.

We illuminate this important issue and provide a justification for the business case of board gender diversity, albeit from a different perspective. We argue that increased board gender diversity can create value for the firm not necessarily by improving operating performance and cash flows but by reducing the cost of capital and attracting more institutional investors, which we refer to as the investor demand view. To address the empirical challenge that the level of female representation on the board is endogenous and subject to selection bias, we explore a board gender diversity campaign by the world's

largest sovereign wealth fund, NBIM, which launched a campaign in February 2021 in which it required its portfolio firms to have at least 30% female board representation. NBIM carries a delegated philanthropy mission; i.e., it invests on behalf of Norwegians whose social preferences may differ from the investors of commercial asset management funds. Moreover, it holds the vast majority of listed companies around the world, largely alleviating selection bias.

We find that the average [0,+1] CARs following the campaign announcement are significantly higher for firms with a female board representation shortfall relative to those without a shortfall. This effect is strongest for firms specifically targeted by NBIM's campaign, i.e., those that are larger, listed in Europe and the United States, and that have fewer than two female directors. Consistent with the investor demand hypothesis, we find that returns increase as firms' potential for attracting institutional capital increases. Returns are positive for firms with low institutional ownership and increase as the female director shortfall increases, whereas they are negative for firms with high institutional ownership. Moreover, we find that low-IO firms with a female director shortfall experienced significantly higher increases in institutional ownership following NBIM's announcement, driven by SRI fund investment, but this is not the case for high-IO firms. Low-IO shortfall firms also experienced a significant reduction in their cost of capital, suggesting that they have a greater improvement in their access to finance.

We further confirm that NBIM is more likely to vote in favor of female director nominees following the announcement, and we rule out that our results are driven by the director skillset and director supply channels. We also confirm our findings using a regression-discontinuity setting and propensity-score matching and show that they are robust to various event windows and subsample tests. Finally, we contrast these results with those for the 2017 board gender diversity campaigns by the Big Three asset managers. We find that the positive stock market reactions to the Big Three's campaigns were driven by high-IO shortfall firms that did not close their gender gap, suggesting that a commercial investor-initiated campaign may lead to capital reallocation between compliant and noncompliant firms by different types of investors, unlike an SWF-initiated campaign.

Perhaps the most important policy implication of our findings is that there is still a business case for board gender diversity. However, this is mainly through a discount rate channel (attracting

investors buying in), rather than the widely believed cash flow channel (better decision-making on the board). Unlike government-mandated gender quotas, which may lead firms to add less qualified directors, institutional investor demand can incentivize firms to increase board gender diversity without sacrificing firm value. However, the type of campaign initiator matters, as different initiators imply different patterns of capital reallocation by SRI and conventional investors. In this regard, our study illuminates how to combine government and market forces in promoting gender equality and other social issues to achieve to Pareto improvement in society.

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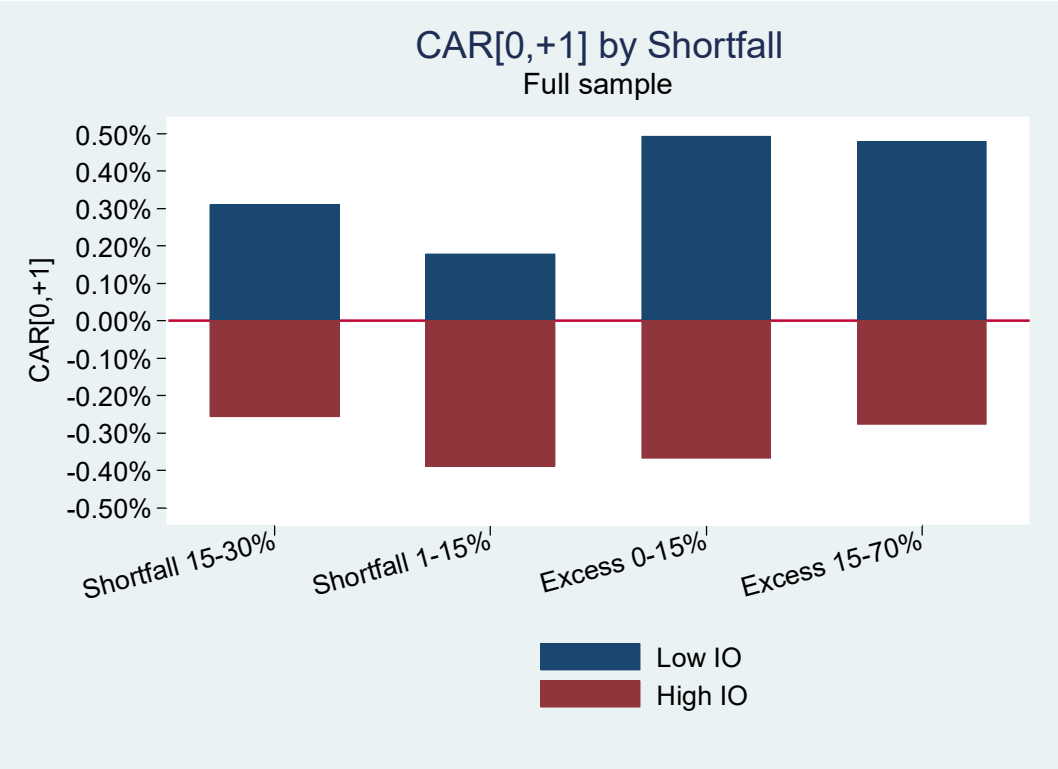

Figure 1a: CAR[0,+1] by Shortfall, Full Sample
This figure shows the average [0,+1] CARs by size of the female director shortfall, for firms with below-median institutional ownership (Low IO) and above-median institutional ownership (High IO).

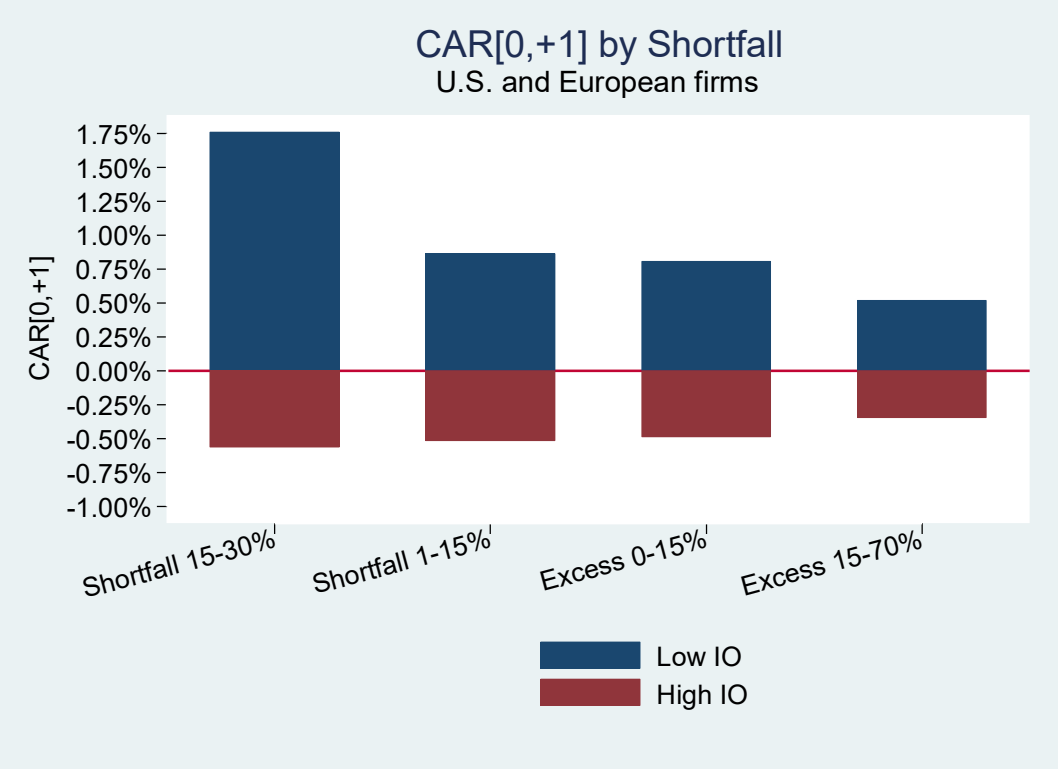

Figure 1b: CAR[0,+1] by Shortfall, U.S. and European Firms
This figure shows the average [0,+1] CARs by size of the female director shortfall, for U.S. and European firms with below-median institutional ownership (Low IO) and above-median institutional ownership (High IO).

Table 1: Summary Statistics

This table shows summary statistics for the 8,806 NBIM-held firms in our sample. Variable definitions are in Appendix Table A. Continuous variables are winsorized at the 1% and 99% level. All firm-level variables are measured at the end of the 2020 financial year.

	N	Mean	Median	St. Dev	Min	Max
Panel A: Board Characteristics						
% of Women on Board	8,806	19.08	17.65	15.27	0	100
% Shortfall	8,806	10.92	12.35	15.27	-70	30
< 2 Women on Board	8,806	.4304	0	.4952	0	1
Shortfall Y/N	8,806	.7441	1	.4364	0	1
No Women on Board	8,806	.2309	0	.4214	0	1
Board Size	8,806	9.17	9	3.1652	1	32
% Independent Directors	8,806	48.24	44.44	25.50	0	100
Panel B: Institutional Ownership (IO) Structure						
% Held by NBIM	8,806	1.15	.96	1.00	.001	25.75
% Total IO	8,806	35.69	24.62	30.31	.004	100
% Non-Big Three IO	8,806	29.12	21.31	23.89	.001	100
% Big Three IO	8,806	6.57	2.90	8.42	0	44.08
% Domestic IO	8,638	24.38	17.40	20.18	0	100
% Foreign IO	7,908	5.60	3.54	7.20	0	100
% Change Total $IO_{Q4\ 2020,\ Q3\ 2021}$	8,806	-.0839	-.0038	4.18	-96.13	60.92
% Change Non-Big Three $IO_{Q4\ 2020,\ Q3\ 2021}$	8,806	-.3856	-.1915	4.32	-94.36	60.61
Big Three Ownership Y/N	8,806	.9137	1	.2805	0	1
Panel C: Firm-Level Characteristics and Governance						
Total Assets in USD (Mil)	8,806	14,200	2,357.88	52,900	2.8093	2,301,159
Total Equity in USD (Mil)	8,806	4,118	991.96	15,000	-528.47	778,043
Market Value in USD (Mil)	8,806	11,600	1,832.50	85,300	2.500	5,030,000
EBIT in USD (Mil)	8,806	606.11	98.59	3,399.08	-7320	153,030
ROA	8,806	5.08	4.91	7.83	-27.64	28.86
Refinitiv ESG Combined Score	8,806	-2.16	0	14.99	-49.89	42.95
Refinitiv Governance Score	8,806	.6694	0	17.87	-49.86	47.91

Table 2: Portfolio Regressions

This table reports results accounting for the cross-sectional dependence of returns following the approach in Eckbo et al. (2021), where daily abnormal returns (ARs) are estimated using the following regression: $r_t = \alpha + ARd_t + \beta r_{wt} + \varepsilon_t$ where r_t is the daily equally-weighted portfolio return, converted to USD using the daily exchange rate, of all NBIM portfolio firms in excess of the daily 3-month U.S. treasury bill rate, d_t is a dummy variable set equal to one for observations in the event window and zero for observations in the estimation window, and r_{wt} is the daily return of the local market index, converted to USD, in excess of the 3-month U.S. treasury bill rate. The sample consists of daily return observations in the 200-day estimation window ending on February 10, 2021 and the event window. Firms in the sample must have at least 100 return observations in the estimation period. The cumulative abnormal return is obtained by multiplying the coefficient on AR by the number of days in the event window. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The sample consists of all NBIM portfolio firms in columns (1), (4), and (5), NBIM firms with a shortfall in column (2), and NBIM firms without a shortfall in column (3).

Event Window:		CAR[0,+1]		$AR_{t=0}$	CAR[-2,-1]
	(1)	(2)	(3)	(4)	(5)
Sample	*All Firms*	*Shortfall*	*No Shortfall*	*All Firms*	*All Firms*
$CAR_{event\ window}$	0.010**	0.010**	0.008	0.008**	0.0002
	(0.004)	(0.004)	(0.006)	(0.003)	(0.004)
Observations	8,806	6,553	2,253	8,803	8,802

Table 3: Main Results – NBIM Announcement Characteristics

This table shows cross-sectional OLS estimations where the dependent variable is the firm's [0,+1] CAR around NBIM's announcement. The main independent variables are measures of the firm's female director shortfall based on the 2020 end-of-year board composition, including an indicator for having a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*, column (1)), the difference between the percentage of female directors and the 30% threshold (*% Shortfall*, column (4)), and an indicator for having fewer than 2 female directors on the board (*< 2 Women on Board*, column (5)). The sample consists of all firms in columns (1), (4), and (5), a sample of large-cap (defined as having a market capitalization in terms of USD above 5 million) firms in column (2), and firms with their main listing in the US and Europe in column (3). All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep. Var.: CAR[0,+1]	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap > US$5 Mil*	*US & Europe*	*Full*	*Full*
Shortfall Y/N	0.145*	0.309**	0.314***		
	(0.082)	(0.126)	(0.095)		
% Shortfall				0.007***	
				(0.003)	
< 2 Women on Board					0.244***
					(0.083)
% Held by NBIM	0.054	-0.002	-0.008	0.054	0.053
	(0.042)	(0.048)	(0.033)	(0.036)	(0.036)
Total Assets (ln)	0.154***	0.327***	0.213***	0.156***	0.153***
	(0.028)	(0.044)	(0.036)	(0.024)	(0.024)
ROA	-0.016***	0.031***	-0.019**	-0.016***	-0.016***
	(0.005)	(0.010)	(0.008)	(0.004)	(0.004)
Board Size	-0.042**	-0.021	-0.058**	-0.041***	-0.031**
	(0.021)	(0.025)	(0.023)	(0.013)	(0.013)
% Independent Directors	-0.006**	-0.006	-0.007**	0.011***	-0.006***
	(0.003)	(0.005)	(0.003)	(0.002)	(0.002)
Refinitiv Governance Score	0.011***	0.011***	0.017***	-0.006***	0.011***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
% Total Institutional Ownership	-0.016***	-0.020***	-0.022***	-0.016***	-0.016***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Constant	-0.453	-2.270***	-0.303	-0.463**	-0.470**
	(0.290)	(0.460)	(0.370)	(0.224)	(0.223)
Observations	8,806	2,473	3,866	8,806	8,806
R-squared	0.105	0.184	0.154	0.105	0.105
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Table 4: Regression Discontinuity Design (RDD)

This table shows an RDD-style test for a sample of firms with female board membership between 25% and 35%. The dependent variable is the firm's [0,+1] CAR around NBIM's announcement. The main independent variables are measures of the firm's female director shortfall based on the 2020 end-of-year board composition, including an indicator for having a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*, column (1)), the difference between the percentage of female directors and the 30% threshold (*% Shortfall*, column (4)), and an indicator for having fewer than 2 female directors on the board (*< 2 Women on Board*, column (5)). The sample consists of all firms in columns (1), (4), and (5), a sample of large-cap (defined as having a market capitalization in terms of USD above 5 million) firms in column (2), and firms with their main listing in the US and Europe in column (3). All specifications include control variables for the size of NBIM's holdings, firm size (excluded in column (2)), ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep. Var.: CAR[0,+1]	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap>US$5 Mil*	*US & Europe*	*Full*	*Full*
Shortfall Y/N	0.166*	0.211*	0.362***		
	(0.085)	(0.118)	(0.095)		
% Shortfall				0.012*	
				(0.007)	
< 2 Women on Board					0.350**
					(0.151)
% Held by NBIM	0.032	-0.078	0.031	0.025	0.031
	(0.041)	(0.055)	(0.034)	(0.036)	(0.040)
Total Assets (ln)	0.186***		0.209***	0.136***	0.185***
	(0.036)		(0.053)	(0.035)	(0.036)
ROA	-0.018**	0.013	-0.023**	-0.019**	-0.019**
	(0.008)	(0.011)	(0.009)	(0.008)	(0.008)
Board Size	-0.094***	0.014	-0.085**	-0.075***	-0.071**
	(0.030)	(0.069)	(0.033)	(0.025)	(0.027)
% Independent Directors	0.008***	0.014*	0.015***	0.006**	0.008***
	(0.002)	(0.008)	(0.004)	(0.003)	(0.002)
Refinitiv Governance	-0.004	-0.007	-0.009***	-0.000	-0.004
Score	(0.003)	(0.005)	(0.003)	(0.003)	(0.003)
% Total Institutional	-0.009***	-0.019***	-0.015***	0.002	-0.009***
Ownership	(0.003)	(0.005)	(0.003)	(0.004)	(0.003)
Constant	-1.082***	0.963***	-0.719	-1.308***	-0.992**
	(0.381)	(0.309)	(0.472)	(0.367)	(0.377)
Observations	3,856	1,155	2,164	3,856	3,856
R-squared	0.117	0.194	0.156	0.136	0.117
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Table 5: Institutional Ownership and CARs

This table shows cross-sectional OLS estimations for subsamples of low-IO (non-Big Three institutional ownership below the sample median, Panel A) and high-IO (non-Big Three institutional ownership above the sample median, Panel B), where the dependent variable is the firm's [0,+1] CAR around NBIM's announcement. The independent variables are measures of the firm's female director shortfall based on the 2020 end-of-year board composition, including an indicator for having a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*, column (1)), the difference between the percentage of female directors and the 30% threshold (*% Shortfall*, column (4)), and an indicator for having fewer than 2 female directors on the board (*< 2 Women on Board*, column (5)). The sample consists of all firms in columns (1), (4), and (5), a sample of large-cap (defined as having a market capitalization in terms of USD above 5 million) firms in column (2), and firms with their main listing in the US and Europe in column (3). All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Low IO Subsample					
Dep.Var.: CAR[0,+1]	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap >US$5 Mil*	*US & Europe*	*Full*	*Full*
Shortfall Y/N	0.040	0.538*	0.294*		
	(0.121)	(0.293)	(0.164)		
% Shortfall				0.005*	
				(0.003)	
< 2 Women on Board					0.233*
					(0.121)
Observations	4,401	961	1,018	4,401	4,401
R-squared	0.136	0.223	0.178	0.136	0.137
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Panel B: High IO Subsample					
Dep.Var.: CAR[0,+1]	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap >US$5 Mil*	*US & Europe*	*Full*	*Full*
Shortfall Y/N	0.174	0.178	0.199		
	(0.111)	(0.133)	(0.133)		
% Shortfall				0.005	
				(0.004)	
< 2 Women on Board					0.165
					(0.124)
Observations	4,390	1,491	2,845	4,390	4,390
R-squared	0.122	0.241	0.114	0.122	0.122
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Table 6: % Change in Institutional Ownership

This table shows cross-sectional OLS estimations for subsamples of low-IO (non-Big Three institutional ownership below the sample median, Panel A) and high-IO (non-Big Three institutional ownership above the sample median, Panel B), where the dependent variable is the average percentage change in institutional ownership in the three quarters following NBIM's announcement, relative to the 2020 end-of-year level of ownership. The independent variables are measures of the firm's female director shortfall based on the 2020 end-of-year board composition, including an indicator for having a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*, column (1)), the difference between the percentage of female directors and the 30% threshold (*% Shortfall*, column (4)), and an indicator for having fewer than 2 female directors on the board (*< 2 Women on Board*, column (5)). The sample consists of all firms in columns (1), (4), and (5), a sample of large-cap (defined as having a market capitalization in terms of USD above 5 million) firms in column (2), and firms with their main listing in the US and Europe in column (3). All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Low IO Subsample					
Dep.Var.: % Change in IO	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap >US$5 Mil*	*US & Europe*	*Full*	*Full*
Shortfall Y/N	0.354***	0.389*	0.545*		
	(0.133)	(0.226)	(0.272)		
% Shortfall				0.008**	
				(0.004)	
< 2 Women on Board					0.202*
					(0.107)
Observations	4,401	961	1,018	4,401	4,401
R-squared	0.071	0.112	0.152	0.070	0.071
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Panel B: High IO Subsample					
Dep.Var.: % Change in IO	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap >US$5 Mil*	*US & Europe*	*Full*	*Full*
Shortfall Y/N	-0.137	-0.366	-0.089		
	(0.161)	(0.323)	(0.187)		
% Shortfall				-0.005	
				(0.007)	
< 2 Women on Board					-0.577***
					(0.154)
Observations	4,390	1,491	2,845	4,390	4,390
R-squared	0.062	0.112	0.070	0.063	0.062
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Table 7: % Change in Institutional Ownership: Ownership Types

Panels A and B show cross-sectional OLS estimations for the full sample (columns (1)-(2)), the low-IO sample (columns (3)-(4)), and high-IO sample (columns (5)-(6)). In Panel A, the dependent variable is the average percentage change in IO by foreign (domestic) owners in the three quarters following NBIM's announcement, relative to the 2020 end-of-year level of foreign (domestic) ownership. In Panel B, the dependent variable is the average percentage change in non-Big Three IO, and the sample consists of firms with high (above-median) NBIM ownership in columns (1), (3), and (5) and firms with low (below-median) NBIM ownership in columns (2), (4), and (6). In Panel C, the sample consists of all U.S.-listed firms in columns (1) and (2), U.S. firms with an increase in IO in columns (3) and (4), and U.S. firms with a decrease in IO in columns (5) and (6). The dependent variable in the even (uneven) columns is the % change in ownership by SRI (non-SRI) funds in the three quarters following NBIM's announcement, relative to the 2020 end-of-year ownership. In all three panels, the main independent variable is an indicator for having a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*), and control variables include the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as industry FE. Panels A and B additionally include country FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Foreign vs Domestic IO

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: % Change in IO	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic
Sample	*Full*		*Low IO*		*High IO*	
Shortfall Y/N	-0.091	0.028	0.228*	-0.020	-0.230	0.085
	(0.135)	(0.078)	(0.116)	(0.058)	(0.192)	(0.121)
Observations	8,806	8,806	4,401	4,401	4,390	4,390
R-squared	0.045	0.041	0.070	0.036	0.064	0.052
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: NBIM Ownership

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: % Change in IO	High Pos.	Low Pos.	High Pos.	Low. Pos.	High Pos.	Low Pos.
Sample	*Full*		*Low IO*		*High IO*	
Shortfall Y/N	0.392*	-0.367***	0.757**	0.129	0.174	-0.603***
	(0.223)	(0.117)	(0.329)	(0.091)	(0.287)	(0.176)
Observations	4,197	4,594	1,677	2,704	2,509	1,870
R-squared	0.071	0.060	0.158	0.073	0.079	0.085
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: SRI vs Non-SRI Funds

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: % Change in IO	SRI	Non-SRI	SRI	Non-SRI	SRI	Non-SRI
Sample	*Full*		*IO Increase*		*IO Decrease*	
Shortfall Y/N	0.076***	-0.192	0.132***	0.273	0.039	-0.605**
	(0.027)	(0.616)	(0.042)	(0.927)	(0.033)	(0.280)
Observations	2,248	2,248	836	836	1,403	1,403
R-squared	0.053	0.114	0.114	0.172	0.063	0.127
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Implied Cost of Capital

This table shows OLS estimations where the dependent variable is the percentage difference in the firm's 2021 implied cost of capital (ICC) relative to the 2020 ICC. All ICC calculations follow Hou, van Dijk, and Zhang (2012), using a cross-sectional model to estimate expected earnings based on historical earnings, dividends, and accruals and calculating an equally-weighted average of 3 different ICC measures. The 2020 ICC is calculated using the firm's 2020 average market value of equity, and the 2021 ICC is calculated using the firm's 2021 post-announcement market value of equity. We use the full sample in column (1), low-IO (below-median IO) firms in column (2), high-IO (above-median IO) firms in column (3), and firms which experienced an increase or a decrease in IO in the three quarters following the announcement, respectively, in columns (4) and (5). The main independent variable is an indicator for whether the firm had a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*). All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep.Var.: % Change in ICC	(1)	(2)	(3)	(4)	(5)
Sample	*Full sample*	*Low IO*	*High IO*	*IO Increase*	*IO Decrease*
Shortfall Y/N	-0.839***	-1.560**	-0.456	-1.331**	-0.473
	(0.314)	(0.700)	(0.392)	(0.537)	(0.554)
Observations	8,806	4,401	4,390	3,600	5,191
R-squared	0.044	0.061	0.055	0.072	0.045
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Table 9: NBIM Voting

Panel A shows univariate statistics for NBIM's and management's voting behaviour in the 2020 and 2021 annual general meetings of its portfolio firms. Votes for female director nominees are shown in column (1), votes for male director nominees are shown in column (2), with column (3) showing the difference in means. Panel B shows OLS estimations where the dependent variable is an indicator for whether NBIM (columns (1) and (2)) or management (columns (3) and (4)) voted "For" (columns (1) and (3)) or "Against" (columns (2) and (4)) a director. The main independent variable is the interaction between the *Shortfall* indicator and an indicator for a female board nominee. Panel C shows OLS estimations where the dependent variable is an indicator for whether NBIM voted "For" (columns (1) and (2)) or "Against" (columns (3) and (4)) a board nominee. The sample consists of female board nominees in columns (1) and (3), and male board nominees in columns (2) and (4). The main independent variables are an indicator for whether management voted in the opposite direction (i.e. "Against" in columns (1) and (2), or "For" in columns (3) and (4)), interacted with an indicator for whether the firm has a female director shortfall. All specifications in Panel B control for director FE, firm FE, and year FE, and all specifications in Panel C control for firm FE and year FE. Definitions of all variables are in Appendix A. Standard errors are clustered by director. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Univariate Statistics

	(1) Female Dir. (N=15,292)	(2) Male Dir. (N=61,066)	(3) *Diff (F – M)*
% NBIM Votes "For"	94.56%	92.95%	*1.61%***
% NBIM Votes "Against"	4.56%	5.33%	*-0.76%***
% Mgmt Votes "For"	98.37%	97.90%	*0.47%***
% Mgmt Votes "Against"	0.25%	0.20%	*0.05%*

Panel B: Multivariate Regressions

Dep. Var.:	(1) NBIM Votes "For"	(2) NBIM Votes "Against"	(3) Management Votes "For"	(4) Management Votes "Against"
Shortfall Y/N × Female Director	0.034***	-0.021*	-0.004*	0.005***
	(0.013)	(0.012)	(0.002)	(0.001)
Observations	45,809	45,809	45,809	45,809
R-squared	0.814	0.804	0.982	0.799
Director FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Panel C: *NBIM vs Management*

Dep. Var.:	(1)	(2)	(3)	(4)
	NBIM Votes "For"		NBIM Votes "Against"	
Sample	*Female*	*Male*	*Female*	*Male*
Management Votes Opposite	-0.918***	-0.870***	-0.626***	-0.538***
	(0.057)	(0.041)	(0.038)	(0.027)
Shortfall Y/N × Management Votes Opposite	0.236***	0.180***	0.089**	0.074**
	(0.080)	(0.050)	(0.044)	(0.030)
Observations	13,749	60,625	13,749	60,625
R-squared	0.556	0.416	0.570	0.412
Director FE	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 10: Robustness Tests

Panel A shows OLS estimations following the baseline estimation in equation (2), where the dependent variable is the firm's CAR in a [-1,+1] (column (1)), t=0 (column (2)), t=1 (column (3)), [0,+2] (column (4)), or [-2,-1] (column (5)) window. Panel B shows OLS estimations for a matched sample where NBIM firms are matched to non-NBIM firms using 1:1 nearest-neighbourhood matching based on firm size, ROA, board size, independent directors, governance, and institutional ownership, as well as country and industry. The dependent variable is is the firm's [0,+1] CAR and the main independent variables are indicators for whether the firm has a female director shortfall (*Shortfall Y/N*) and an indicator for treated (*NBIM*) firms. The sample consists of all firms in column (1), low-IO and high-IO large-cap firms in columns (2) and (3), respectively, and low-IO and high-IO US and European firms in columns (4) and (5), respectively. Panel C shows OLS estimations for various subsamples, where the dependent variable is the firm's [0,+1] CAR in columns (1)-(4) and the % Change in IO in column (5). The independent variable is an indicator for whether the firm had a shortfall (columns (1)-(3), (5)) or whether it had no women on the board (column (4)). The sample consists of firms that have their main listing not on NASDAQ (column (1)), US and Canadian firms (column (2)), European firms (column (3)), all firms in column (4), and firms with IO below 50% in column (5). All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE (excluded in column (2), Panel C) and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Different CARs

	(1)	(2)	(3)	(4)	(5)
Dep. Var.:	CAR[-1,+1]	$AR_{t=0}$	$AR_{t=1}$	CAR[0,+2]	CAR[-2,-1]
Shortfall Y/N	0.170**	0.070*	0.086*	0.169*	-0.103
	(0.082)	(0.037)	(0.048)	(0.098)	(0.077)
Observations	8,806	8,806	8,806	8,802	8,802
R-squared	0.092	0.079	0.080	0.122	0.068
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Panel B: Matched Sample

Dep. Var.: CAR[0,+1]	(1)	(2)	(3)	(4)	(5)
Sample	*Full*	*Market Cap>US$5Mil*		*US & Europe*	
Subsample		Low IO	High IO	Low IO	High IO
Shortfall Y/N	-0.102	0.066	1.461***	-0.025	-0.171
	(0.108)	(0.282)	(0.520)	(0.460)	(0.207)
NBIM	-0.147	-0.965*	0.924	-0.001	-0.842***
	(0.148)	(0.533)	(0.567)	(0.454)	(0.200)
Shortfall Y/N x NBIM	0.287**	1.467***	-1.435**	1.041*	0.357
	(0.128)	(0.427)	(0.687)	(0.549)	(0.270)
Observations	7,910	675	513	895	2,317
R-squared	0.047	0.102	0.256	0.091	0.106
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Panel C: Other Robustness Tests

	(1)	(2)	(3)	(4)	(5)
Dep. Var.:		CAR[0,+1]			% Change in IO
Sample	*Excl. NASDAQ*	*US & Can.*	*Europe*	*Full*	*IO < 50%*
Shortfall Y/N	0.177**	0.249*	0.187*		0.261**
	(0.088)	(0.133)	(0.107)		(0.122)
No Women on Board Y/N				0.194**	
				(0.079)	
Observations	7,954	2,196	1,586	8,806	6,800
R-squared	0.103	0.332	0.105	0.105	0.051
Control Variables	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	Yes	Yes	Yes

Table 11. Effects of Big Three's Board Gender Diversity Campaigns

Panel A shows OLS estimations where the dependent variable is a firm's [0,+1] CAR around diversity campaign announcements by the Big Three, where the event is March 7th 2017 for State Street's portfolio firms, March 13th 2017 for BlackRock's portfolio firms, and August 31st 2017 for Vanguard's portfolio firms, in columns (1)-(3). The dependent variable in columns (4)-(6) is the percentage change in non-Big Three institutional ownership from Q4 2016 to Q4 2020. The sample consist of all Big-Three portfolio firms in columns (1) and (4), firms with low IO (below-median IO) in columns (2) and (5), and firms with high IO (above-median IO) in columns (3) and (6). In Panel B, the dependent variable is the [0,+1] CAR in columns (1) and (2) and the percentage change in IO in columns (2) and (4), for a sample of firms that no longer had a female director shortfall in 2020 in columns (1) and (2), and a sample of firms that still had a female director shortfall in 2020 in columns (3) and (4). The main independent variable in both panels is an indicator for whether a firm had a female director shortfall relative to each fund's requirements in Q4 of 2016. All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: All firms

	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var.:	CAR[0,+1]			% Change in $IO_{16,20}$		
Sample	*Full sample*	*Low IO*	*High IO*	*Full sample*	*Low IO*	*High IO*
Shortfall in 2016 Y/N	0.155***	0.071	0.226***	-0.918***	0.005	-1.503***
	(0.055)	(0.058)	(0.072)	(0.207)	(0.330)	(0.256)
Observations	22,302	11,150	11,146	22,302	11,150	11,146
R-squared	0.031	0.042	0.036	0.232	0.152	0.205
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: High IO firms

	No Shortfall in 2020		*Shortfall in 2020*	
	(1)	(2)	(3)	(4)
Dep.Var.:	CAR[0,+1]	% Change in $IO_{16,20}$	CAR[0,+1]	% Change in $IO_{16,20}$
Shortfall in 2016 Y/N	0.066	-0.842***	0.495***	2.542**
	(0.055)	(0.305)	(0.172)	(0.973)
Observations	7,492	7,492	3,648	3,648
R-squared	0.050	0.240	0.065	0.212
Control Variables	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Appendix A: Variable Definitions

CAR[0,+1]	Cumulative abnormal returns (CARs) from day t_0 to t_{+1}, where t_0 is the release of NBIM's gender diversity position paper on February 15th 2021, benchmarked relative to the CAPM-based market returns of the main index of the firm's country of primarily listing. Source: own calculations.
CAR[-1,+1]	CARs from day t_{-1} to t_{+1}, where t_0 is the release of NBIM's gender diversity position paper on February 15th 2021, benchmarked relative to the CAPM-based market returns of the main index of the firm's country of primarily listing. Source: own calculations.
$AR_{t=0}$	Abnormal returns (ARs) on t_0, the day of the release of NBIM's gender diversity position paper on February 15th 2021, benchmarked relative to the CAPM-based market returns of the main index of the firm's country of primarily listing. Source: own calculations.
CAR[-2,-1]	CARs from day t_{-2} to t_{-1}, where t_0 is the release of NBIM's gender diversity position paper on February 15th 2021, benchmarked relative to the CAPM-based market returns of the main index of the firm's country of primarily listing. Source: own calculations.
% of Women on Board	The % of female board members as of the end of the 2020 financial year. Source: FactSet.
% Shortfall	The difference in % between 30% and the firm's pre-announcement percentage of female board members, ranging from -70% to +30%. Source: FactSet.
< 2 Women on Board	A dummy variable equal to one for firms with less than 2 women on the board, and zero otherwise. Source: FactSet.
Shortfall Y/N	A dummy variable equal to one for firms with female board representation below 30%, and zero otherwise. Source: FactSet.
No Women on Board	A dummy variable equal to one for firm with a 30% shortfall or no women on the board, and zero otherwise. Source: FactSet.
Board Size	The number of directors on the board at the end of the 2020 financial year. Source: FactSet.
% Independent Directors	The share of independent directors on the board at the end of the 2020 financial year, in percentage terms. Source: FactSet.
% Held by NBIM	The percentage of shares held by NBIM on day t_0. Source: NBIM Website.
% Total Institutional Ownership (IO)	The total percentage of shares held by institutional investors at the end of the 2020 financial year, in percentage terms. Source: FactSet.
% Non-Big Three IO	The percentage of shares held by institutional investors other than the Big Three (State Street, BlackRock, and Vanguard) at the end of the 2020 financial year, in percentage terms. Source: FactSet.
% Big Three IO	The percentage of shares held by the Big Three fund investors (State Street, BlackRock, and Vanguard) at the end of the 2020 financial year, in percentage terms. Source: FactSet.
% Domestic IO	The percentage of shares held by domestic non-Big Three institutional investors, where location is based on the firm's main listing. Source: FactSet.
% Foreign IO	The percentage of shares held by foreign non-Big Three institutional investors, where location is based on the firm's main listing. Source: FactSet.
% Change in Total IO	The % difference in total IO between the Q4 2020 and the average post-announcement level of IO (i.e. average of end-of-Q1, end-of-Q2, and end-of-Q3 IO). Source: FactSet.
% Change in Non-Big Three IO	The % difference in non-Big Three IO between the Q4 2020 and the average post-announcement level of IO (i.e. average of end-of-Q1, end-of-Q2, and end-of-Q3 IO). Source: FactSet.
Low IO	A dummy variable equal to one for firms with below-median non-Big Three institutional ownership. Source: own calculations and FactSet.
Big Three Ownership Y/N	A dummy variable equal to one if the firm has at least one of the Big Three investors among its shareholders. Source: FactSet.
Total Assets (ln)	The logarithm of the total assets of the firm at the end of the 2020 financial year in millions of USD. Source: Compustat.

Market Value	The total market value of the firm calculated as the total number of shares outstanding as of December 2020, multiplied by the end-of-year share price. Source: Compustat.
ROA	Calculated as the ratio of EBIT and Total Assets, both in terms of USD, using the end-of-year 2020 values. Source: Compustat.
Refinitiv ESG Combined Score	The firm's demeaned ESG Score as reported by Refinitiv, ranging from -50 to +50. Source: Thomson Reuters Refinitiv.
Refinitiv Governance Score	The firm's demeaned Governance Score as reported by Refinitiv, ranging from -50 to +50. Source: Thomson Reuters Refinitiv.
% Change in Implied Cost of Capital (ICC)	The % difference in the firm's 2020 ICC (calculated using the firm's average value of market equity in 2020) and the firm's 2021 ICC (calculated using the firm's average value of market equity after Feb 15th, 2021). The ICC is calculated following the approach in Hou, van Dijk, and Zhang (2012) by taking the average of 4 ICC calculations and by forecasting expected earnings using a cross-sectional model based on historical earnings, assets, dividend payments, and accruals. Source: Hou, van Dijk, and Zhang (2012), own calculations.
Low (High) Governance/ESG Score	A dummy variable equal to one with firms with Governance or ESG scores below (above) the sample median. Source: Thomson Reuters Refinitiv.
% of Labour Force, Female	The % of a country's total labour force that is female. Source: World Bank.
% of Female Employers	The % of employers that are female as a fraction of total female employment. Source: World Bank.
% of Firms with Female CEO	The % of firms with a female CEO. Source: World Bank.
Nr. of Female Directors	The number of female directors (in 000s) in the country. Source: World Bank.
% of Females with BSc Degree	The % of the total 25+ population that is female and has obtained at least a Bachelor's degree. Source: World Bank.
NBIM (Management) Votes "For"	A dummy variable equal to one if NBIM (Management) voted "For" the election of a nominated director in the 2020 or 2021 annual general meeting. Source: NBIM Website.
NBIM (Management) Votes "Against"	A dummy variable equal to one if NBIM (Management) voted "Against" the election of a nominated director in the 2020 or 2021 annual general meeting. Source: NBIM Website.
Management Votes Opposite	A dummy variable equal to one if Management voted opposite to NBIM in the election of a nominated director: i.e. Management voted "Against" if NBIM voted "For", or Management voted "For" if NBIM voted "Against". Source: NBIM Website.
NBIM	A dummy variable equal to one for firms held by NBIM, and zero for matched control firms. Source: NBIM website.

INTERNET APPENDIX

Delegated Gender Diversity

Table IA.1: Sample Distribution by Primary Listing Country

This table shows the sample distribution of the NBIM firms in our sample, based on the country of primary listing.

Panel A: Nr. of Holdings

Country	Freq.	Percent	Country	Freq.	Percent
United Arab Emirates	20	0.23	Korea	485	5.51
Austria	32	0.36	Kuwait	11	0.12
Australia	305	3.46	Liechtenstein	2	0.02
Bangladesh	20	0.23	Sri Lanka	15	0.17
Belgium	53	0.6	Lithuania	6	0.07
Bahrain	2	0.02	Luxembourg	21	0.24
Brazil	148	1.68	Latvia	4	0.05
Botswana	2	0.02	Morocco	23	0.26
Canada	15	0.17	Mexico	62	0.7
Switzerland	132	1.5	Malaysia	147	1.67
Chile	36	0.41	Nigeria	13	0.15
China	396	4.5	Netherlands	77	0.87
Colombia	10	0.11	New Zealand	47	0.53
Czech Republic	2	0.02	Oman	2	0.02
Germany	185	2.1	Peru	4	0.05
Denmark	42	0.48	Philippines	36	0.41
Estonia	5	0.06	Poland	120	1.36
Egypt	31	0.35	Portugal	17	0.19
Spain	78	0.89	Qatar	12	0.14
Finland	49	0.56	Romania	7	0.08
France	191	2.17	Russia	34	0.39
Great Britain	359	4.08	Saudi Arabia	25	0.28
Greece	30	0.34	Sweden	160	1.82
Hong Kong	84	0.95	Singapore	87	0.99
Croatia	8	0.09	Slovenia	7	0.08
Hungary	6	0.07	Thailand	125	1.42
Indonesia	79	0.9	Tunisia	11	0.12
Ireland	32	0.36	Turkey	34	0.39
Israel	75	0.85	Taiwan	442	5.02
India	315	3.58	United States	2,265	25.72
Italy	130	1.48	Vietnam	41	0.47
Japan	1,494	16.96	South Africa	86	0.98
Kenya	12	0.14	**Total**	**8,806**	**100**

Table IA.1 Continued.

Panel B: Market Capitalization and % of NBIM Portfolio

Country	Market Cap (US$ Mil)	% of NBIM Portfolio	Country	Market Cap (US$ Mil)	% of NBIM Portfolio
United Arab Emirates	736.8	0.07%	Korea	14,403.5	1.37%
Austria	1,206.5	0.12%	Kuwait	272.3	0.03%
Australia	17,133.0	1.63%	Liechtenstein	24.2	0.00%
Bangladesh	215.3	0.02%	Sri Lanka	92.9	0.01%
Belgium	4,283.9	0.41%	Lithuania	24.6	0.00%
Bahrain	173.0	0.02%	Luxembourg	2,611.0	0.25%
Brazil	4,605.7	0.44%	Latvia	2.2	0.00%
Botswana	2.6	0.00%	Morocco	124.6	0.01%
Canada	297.0	0.03%	Mexico	2,324.0	0.22%
Switzerland	42,013.9	4.00%	Malaysia	2,460.3	0.23%
Chile	750.4	0.07%	Nigeria	45.7	0.00%
China	10,838.0	1.03%	Netherlands	34,626.8	3.30%
Colombia	220.6	0.02%	New Zealand	1,525.2	0.15%
Czech Republic	64.6	0.01%	Oman	3.9	0.00%
Germany	34,907.1	3.33%	Peru	6.8	0.00%
Denmark	8,677.3	0.83%	Philippines	915.6	0.09%
Estonia	8.3	0.00%	Poland	1,406.0	0.13%
Egypt	489.9	0.05%	Portugal	1,063.7	0.10%
Spain	11,841.4	1.13%	Qatar	556.7	0.05%
Finland	5610.0	0.53%	Romania	433.8	0.04%
France	39,259.8	3.74%	Russia	2,052.4	0.20%
Great Britain	63,850.0	6.09%	Saudi Arabia	186.4	0.02%
Greece	317.2	0.03%	Sweden	15,681.8	1.49%
Hong Kong	7,880.2	0.75%	Singapore	3,505.5	0.33%
Croatia	31.2	0.00%	Slovenia	92.1	0.01%
Hungary	79.6	0.01%	Thailand	2,782.6	0.27%
Indonesia	1,313.6	0.13%	Tunisia	13.2	0.00%
Ireland	10,606.3	1.01%	Turkey	543.2	0.05%
Israel	1,695.3	0.16%	Taiwan	16,783.2	1.60%
India	10,678.5	1.02%	United States	580,300.4	55.31%
Italy	9,373.9	0.89%	Vietnam	559.7	0.05%
Japan	69,892.8	6.66%	South Africa	4,534.4	0.43%
Kenya	99.5	0.01%	**Total**	**1,049,111.9**	**100.00%**

Table IA.2: Sample Distribution by 2-digit SIC Industry

This table shows the sample distribution by 2-digit SIC industry of the NBIM firms in the sample.

Panel A: Nr. of Holdings

Industry	Freq.	Pct.	Industry	Freq.	Pct.
Agricultural Production – Crops	19	0.22	Transportation by Air	78	0.89
Agricultural Production – Livestock	3	0.03	Transportation Services	80	0.91
Agricultural Services	2	0.02	Communications	219	2.49
Fishing, Hunting, and Trapping	5	0.06	Electrical, Gas, and Sanitary Services	272	3.09
Metal Mining	73	0.83	Wholesale Trade – Durable Goods	153	1.74
Coal Mining	3	0.03	Wholesale Trade – Nondurable Goods	101	1.15
Oil and Gas Extraction	58	0.66	Building Materials, Gardening Supplies	22	0.25
Nonmetallic Minerals	12	0.14	General Merchandise Stores	83	0.94
General Building Contractors	98	1.11	Food Stores	67	0.76
Heavy Construction	96	1.1	Automotive Dealers, Service Stations	56	0.64
Special Trade Contractors	38	0.43	Apparel and Accessory Stores	48	0.54
Food and Kindred Products	333	3.79	Furniture and Homefurnishings Stores	38	0.43
Tobacco Products	2	0.02	Eating and Drinking Places	92	1.04
Textile Mill Products	40	0.45	Misc. Retail	133	1.51
Apparel and Other Textile Products	72	0.82	Depository Institutions	495	5.62
Lumber and Wood Products	35	0.4	Nondepository Institutions	123	1.4
Furniture and Fixtures	30	0.34	Security and Commodity Brokers	207	2.35
Paper and Allied products	84	0.95	Insurance Carriers	200	2.27
Printing and Publishing	51	0.58	Insurance Agents, Brokers, Service	19	0.22
Chemical and Allied Products	849	9.64	Real Estate	339	3.85
Petroleum and Coal Products	73	0.83	Holding and Other Investment Offices	403	4.58
Rubber and Misc. Plastics	102	1.16	Hotels and Other Lodging	52	0.59
Leather and Leather Products	23	0.26	Personal Services	12	0.14
Stone, Clay, and Glass Products	113	1.28	Business Services	786	8.92
Primary Metal Industries	172	1.95	Auto Repair, Services, and Parking	18	0.2
Fabricated Metal Products	95	1.08	Motion Pictures	28	0.32
Industrial Machinery and Equipment	454	5.15	Amusement and Recreation Services	80	0.91
Electronic & Other Electric Equipment	586	6.65	Health Services	85	0.97
Transportation Equipment	257	2.92	Legal Services	5	0.06
Instruments and Related Products	265	3.01	Educational Services	41	0.47
Misc. Manufacturing Industries	53	0.6	Social Services	4	0.05
Railroad Transportation	18	0.2	Engineering and Mgmt Services	111	1.26
Local and Interurban Passenger Transit	19	0.22	Other Services	3	0.03
Trucking and Warehousing	48	0.54	Non-Classifiable Establishments	101	1.15
Water Transportation	71	0.81	**Total**	**8,806**	**100**

Table IA.2 Continued.

Panel B: Market Capitalization and % of NBIM Portfolio

Industry	Market Cap (US$ Mil)	% of NBIM PF	Industry	Market Cap (US$ Mil)	% of NBIM PF
Agricultural Production – Crops	304.9	0.03%	Transportation by Air	3,146.0	0.30%
Agricultural Production – Livestock	87.7	0.01%	Transportation Services	5,769.8	0.55%
Agricultural Services	1,191.8	0.11%	Communications	31,951.1	3.05%
Fishing, Hunting, and Trapping	30.7	0.00%	Electrical, Gas, and Sanitary Services	27,489.1	2.62%
Metal Mining	16,454.3	1.57%	Wholesale Trade – Durable Goods	6,620.5	0.63%
Coal Mining	8.2	0.00%	Wholesale Trade – Nondurable Goods	3,893.1	0.37%
Oil and Gas Extraction	2,201.5	0.21%	Building Materials, Gardening Supplies	5,502.6	0.52%
Nonmetallic Minerals	495.8	0.05%	General Merchandise Stores	8,228.8	0.78%
General Building Contractors	4,553.5	0.43%	Food Stores	3,666.8	0.35%
Heavy Construction	4,185.1	0.40%	Automotive Dealers, Service Stations	3,733.1	0.36%
Special Trade Contractors	793.1	0.08%	Apparel and Accessory Stores	4,117.1	0.39%
Food and Kindred Products	41,785.3	3.98%	Furniture and Homefurnishings Stores	1,358.4	0.13%
Tobacco Products	513.4	0.05%	Eating and Drinking Places	6,117.5	0.58%
Textile Mill Products	445.8	0.04%	Misc. Retail	32,338.5	3.08%
Apparel and Other Textile Products	8,499.4	0.81%	Depository Institutions	70,960.3	6.76%
Lumber and Wood Products	1,624.9	0.15%	Nondepository Institutions	9,392.3	0.90%
Furniture and Fixtures	789.2	0.08%	Security and Commodity Brokers	18,260.5	1.74%
Paper and Allied products	6,408.6	0.61%	Insurance Carriers	32,579.8	3.11%
Printing and Publishing	2,014.7	0.19%	Insurance Agents, Brokers, Service	1,461.8	0.14%
Chemical and Allied Products	110,167.1	10.50%	Real Estate	29,250.5	2.79%
Petroleum and Coal Products	37,163.5	3.54%	Holding and Other Investment Offices	34,258.3	3.27%
Rubber and Misc. Plastics	10,232.9	0.98%	Hotels and Other Lodging	1,788.9	0.17%
Leather and Leather Products	2,434.6	0.23%	Personal Services	526.2	0.05%
Stone, Clay, and Glass Products	5,726.4	0.55%	Business Services	190,677.8	18.18%
Primary Metal Industries	4,847.1	0.46%	Auto Repair, Services, and Parking	536.1	0.05%
Fabricated Metal Products	4,628.2	0.44%	Motion Pictures	2,728.5	0.26%
Industrial Machinery and Equipment	35,732.7	3.41%	Amusement and Recreation Services	6,366.3	0.61%
Electronic & Other Electr. Equipment	91,788.7	8.75%	Health Services	4,227.8	0.40%
Transportation Equipment	25,145.6	2.40%	Legal Services	559.1	0.05%
Instruments and Related Products	36,103.1	3.44%	Educational Services	7,848.6	0.75%
Misc. Manufacturing Industries	3,121.4	0.30%	Social Services	247.1	0.02%
Railroad Transportation	3,985.5	0.38%	Engineering and Mgmt Services	11,286.1	1.08%
Local & Interurban Passenger Transit	1,339.1	0.13%	Other Services	10.6	0.00%
Trucking and Warehousing	2,768.2	0.26%	Non-Classifiable Establishments	13,075.6	1.25%
Water Transportation	1,565.5	0.15%	**Total**	**1,049,111.9**	**100%**

Table IA.3: Univariate Statistics by Shortfall

This table shows summary statistics for subsamples of firms with (column (1)) and without (column (2)) a female director shortfall. Column (3) shows the difference in means across the two subsamples. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Continuous variables are winsorized at the 1% and 99% level. Variable definitions are provided in Appendix A.

	(1) No Shortfall N = 2,253	(2) Shortfall N = 6,553	(3) Difference
Panel A: Board Characteristics			
% of Women on Board	39.37	12.10	27.27***
% Shortfall	-9.37	17.90	-27.27***
< 2 Women on Board	0.01	0.57	-0.56***
No Women on Board	0.00	0.31	-0.31***
Nr. of Board Members	9.67	8.99	0.67***
% Independent Directors	58.32	44.77	13.55***
Panel B: Ownership Structure			
% Held by NBIM	1.41	1.06	0.35***
% Total IO	48.54	31.28	17.26***
% Non-Big Three IO	39.22	25.65	13.57***
% Big Three IO	9.32	5.63	3.68***
% Domestic IO	32.80	21.48	11.32***
% Foreign IO	7.48	4.94	2.54***
% Change Total $IO_{Q4\ 2020,\ Q3\ 2021}$	0.01	-0.12	0.13
% Change Non-Big Three $IO_{Q4\ 2020,\ Q3\ 2021}$	-0.34	-0.40	0.06
Big Three Ownership Y/N	0.88	0.86	0.02*
Panel C: Firm-Level Characteristics and Governance			
Total Assets in USD (Mil)	17,340	13,107	4,233**
Total Equity in USD (Mil)	4,536	3,975	561
Market Value in USD (Mil)	16,134	10,081	6,053**
EBIT in USD (Mil)	667.76	584.72	83.03
ROA	5.17	5.05	0.12
Refinitiv ESG Combined Score	1.54	-3.44	4.98***
Refinitiv Governance Score	6.35	-1.28	7.63***
Refinitiv Social Score	7.23	-1.43	8.66***
Refinitiv Environment Score	-2.95	-7.01	4.06***

Table IA.4: SRI vs Non-SRI Funds – Extensive Margin

This table reports marginal effects for a logit model where the dependent variable in the even (uneven) columns is an indicator for whether the number of SRI (non-SRI) fund investors in the firm increased between December 2020 and September 2021. The sample consists of all U.S.-listed firms in columns (1)-(2), U.S. firms with an increase in IO in columns (3)-(4), and U.S. firms with a decrease in IO in columns (5)-(6). The main independent variable is an indicator for whether the firm had a female director shortfall relative to NBIM's 30% requirement (*Shortfall Y/N*). Control variables include the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var.: D[Increase in Nr. of Funds]	SRI	Non-SRI	SRI	Non-SRI	SRI	Non-SRI
Sample	*Full*		*IO Increase*		*IO Decrease*	
Shortfall Y/N	0.011**	0.011	0.055***	0.017	-0.012	0.013
	(0.005)	(0.008)	(0.006)	(0.013)	(0.010)	(0.008)
Observations	1,836	1,711	546	597	1,023	975
R-squared	0.110	0.266	0.139	0.358	0.157	0.285
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.5: Alternative Channels – The Role of ESG and Governance

Panel A shows univariate statistics of firms' female board representation in terms of the % of female directors and the % shortfall in female directors relative to NBIM's 30% requirement, for firms with low (below-median) and high (above-median) governance scores (columns (1) and (2)) or ESG scores (columns (4) and (5)). Columns (3) and (6) show the difference in means for firms' female board representation based on governance scores and ESG scores, respectively. Panel B shows OLS regressions where the dependent variable is is the firm's [0,+1] CAR around NBIM's announcement for the full sample (columns (1) and (2)) and for firms with low IO (columns (#) and (4)). The main independent variables are an indicator for whether the firm has a female director shortfall (*Shortfall Y/N*), interacted with an indicator for having a high (above-median) governance score (columns (1) and (3)) or ESG score (columns (2) and (4)). All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Univariate Tests

	(1) Low Gov. Score	(2) High Gov. Score	*(3) Diff.*	(4) Low ESG Score	(5) High ESG Score	*(6) Diff.*
% of Female Directors	15.63% (0.193)	25.99% (0.256)	*10.36%*** *(0.327)*	16.50% (0.185)	26.07% (0.292)	*9.57%*** *(0.352)*
Observations	5,876	2,930		6,434	2,372	
	(1) Low Gov. Score	(2) High Gov. Score	*(3) Diff.*	(4) Low ESG Score	(5) High ESG Score	*(6) Diff.*
% of Firms with Shortfall	82.54% (0.495)	58.12% (0.912)	*24.42%*** *(0.952)*	80.68% (0.492)	57.42% (1.015)	*23.26%*** *(1.018)*
Observations	5,876	2,930		6,434	2,372	

Panel B. Regression Results

Sample:	*Full sample*		*Low IO sample*	
Dep. Var.: CAR[0,+1]	(1)	(2)	(3)	(4)
Shortfall Y/N	0.113	0.100	0.114	0.126
	(0.111)	(0.099)	(0.139)	(0.121)
High Governance Score	0.175		0.209	
	(0.129)		(0.224)	
Shortfall Y/N × High Governance Score	-0.040		-0.341	
	(0.135)		(0.265)	
High ESG Score		0.010		0.170
		(0.109)		(0.174)
Shortfall Y/N × High ESG Score		-0.068		-0.438**
		(0.119)		(0.208)
Observations	8,806	8,806	4,401	4,401
R-squared	0.102	0.101	0.136	0.136
Control Variables	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Table IA.6: Alternative Channels – Skilled Female Director Supply

Panel A shows OLS regressions where the dependent variable is is the firm's [0,+1] CAR around NBIM's announcement for subsamples of firms with a low (below-median) or high (above-median) supply of skilled female directors. Panel B shows OLS regressions where the dependent variable is the average percentage change in institutional ownership in the three quarters following NBIM's announcement, relative to the 2020 end-of-year level of ownership. In both panels, the proxies for skilled female director supply consist of the % of the labour force that is female (columns (1) and (2)), the % of female employers (columns (3) and (4)), the % of firms with a female CEO (columns (5) and (6)), the nr. of female directors (in thousands, columns (7) and (8)), and the % of females with a BSc degree or higher (columns (9) and (10)). The main independent variable is an indicator for whether the firm has a female director shortfall (*Shortfall Y/N*), All specifications include control variables for the size of NBIM's holdings, firm size, ROA, board size, independent directors, governance score, and total institutional ownership, as well as country FE and industry FE. Definitions of all variables are in Appendix A. Standard errors are clustered by 2-digit SIC industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: CARs Results										
Dep. Var.: CAR[0,+1]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Skilled Female Dir. Supply Proxy:	% of Labour Force, Female		% of Female Employers		% of Firms with Female CEO		Nr. of Female Directors (000s)		% of Females with BSc Degree	
Subsample	Low	High	Low	High	Low	High	Low	High	Low	High
Shortfall Y/N	0.293**	0.127**	0.187*	-0.147	0.147***	-0.022	0.181**	0.052	0.223*	0.109
	(0.130)	(0.058)	(0.094)	(0.105)	(0.050)	(0.111)	(0.075)	(0.080)	(0.126)	(0.081)
Observations	4,380	4,417	5,864	2,927	4,436	4,364	4,444	4,355	4,435	4,358
R-squared	0.117	0.126	0.144	0.088	0.118	0.132	0.144	0.117	0.132	0.111
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: % Change in IO										
Dep. Var.: % Change in IO	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Skilled Female Dir. Supply Proxy:	% of Labour Force, Female		% of Female Employers		% of Firms with Female CEO		Nr. of Female Directors (000s)		% of Females with BSc Degree	
Subsample	Low	High	Low	High	Low	High	Low	High	Low	High
Shortfall Y/N	0.357***	-0.058	0.154**	-0.128	0.090	0.121*	0.352*	-0.306*	0.281***	-0.089
	(0.106)	(0.141)	(0.065)	(0.077)	(0.095)	(0.063)	(0.180)	(0.163)	(0.076)	(0.161)
Observations	4,380	4,417	5,865	2,928	4,436	4,364	4,037	4,763	4,435	4,358
R-squared	0.070	0.067	0.054	0.086	0.065	0.091	0.071	0.108	0.074	0.067
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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