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Keywords: gender diversity, directors, institutional ownership, indexing

JEL Classifications: D22, G23, G30, G34, G35

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1. Introduction

Women's representation in corporate leadership has grown in recent years but still lags their representation in the workforce. Although women make up 48% of the US labor force and 40% of managers (ILO 2020), they account for only 5% of public company CEOs and 18% of top executives. To address these imbalances, governments around the world have enacted quotas requiring companies to appoint females to their board of directors. In the US, where as recently as 2016 only 13% of public company's directors were women, California adopted a quota for board gender diversity, and lawmakers in other states have introduced similar proposals. That lawmakers are turning to mandates begs the question: Why don't firms appoint more women directors on their own, and how might they be encouraged to do so without government intervention?

The uptick in female directors in recent years may offer insight into these questions. Figure 1, Panel A, shows the average annual change in the number of female directors on US boards between 2014 and 2019, reflecting the number of women added minus the number that depart from the board. While US firms consistently added 0.08 net female directors in the first half of the period, this number increased in 2017 and tripled by 2019. As a result, women's average representation on corporate boards, shown in Panel B, grew by 50.2% over the last three years, increasing from 13.1% of directors being female in 2016 to 19.7% by 2019.

The increase in female directorships coincided with an influence campaign, conducted in public and private by prominent investors, aimed at increasing women's representation on corporate boards. State Street launched its "Fearless Girl" campaign on the eve of International Women's Day in March 2017, and Blackrock and Vanguard followed suit not long after. Together, these three asset managers—often called "The Big Three" because they have more than $15 trillion under management and account for 75% of all indexed mutual fund and ETF assets—applied concerted pressure on public companies to add more women to their boards. BlackRock and State

Street's campaigns included policies, which they enforced, of voting against directors' reelection at firms they view as making insufficient progress toward a gender-diverse board. In this paper, we use cross-sectional variation in The Big Three's ownership stake to examine the impact of these campaigns and shed light on the factors that limit board diversity.

Using a difference-in-differences estimator, we compare the growth in female directorships across firms with varying degrees of pre-existing Big Three ownership before and after The Big Three began their campaigns. Because The Big Three's voting power and influence increase with their ownership stake, firms with greater Big Three ownership are under greater pressure to respond to their campaigns. The analysis includes year fixed effects to account for secular trends in the number of female directors and firm fixed effects to isolate within-firm changes in directorships coinciding with the timing of The Big Three's campaign.

Our estimates imply that The Big Three's campaigns increased female directorships between 2016 and 2019. During the years of the campaign (2017-2019), one standard deviation greater 2016 Big Three ownership is associated with a 76% increase in the net flow of new female board members and an 11% increase in the overall proportion of female directors. This increase is driven by both fewer female director departures and more new additions. The Big Three's campaigns are also associated with firms adding their first female director: one standard deviation greater Big Three ownership is associated with a nearly one-fifth decline in the number of US companies with no female directors over this period.

The growth in female directors appears to be tied to The Big Three's campaigns. For example, the timing of the increase corresponds to the timing of each asset manager's campaign: the share of a firm's equity held by State Street predicts increases in gender diversity starting in 2017 while the ownership stakes of Vanguard and Blackrock, which started their campaigns only after most companies had held their 2017 director elections, begin predicting more female directors

only in 2018. The increase in female directors is also greater among firms targeted by the individual asset managers' campaigns. State Street focused on firms with no female directors, while BlackRock focused on firms with less than two female directors. The growth in female directorships reflects these two asset managers' differential targeting.

The growth in female directors does not appear to be driven by other firm characteristics that are correlated with Big Three ownership. Because firms with greater Big Three ownership in 2016 also tended to be larger firms, one concern is that the observed patterns instead reflect larger companies coming under greater pressure to add female directors, perhaps in response to the public attention from the "Me Too" movement. However, our findings are robust to controlling for firm size and for whether the firm operates in a business-to-consumer industry, which is particularly sensitive to public scrutiny. The findings are also robust to controlling for corporate culture, which drove an uptick in female directors earlier in the decade (Giannetti and Wang, 2020), and to controlling for California's board gender mandate, which was adopted toward the end of our sample period. Finally, differences in the characteristics of firms with greater Big Three ownership cannot explain our findings on the differential timing and targeting of firms by The Big Three.

The magnitudes of our estimates are substantial. Using our most conservative estimates, which control for differential trends based on firm size, we find that The Big Three's campaigns led firms to add 2.5 times as many female directors in 2019 as they had in 2016, accounting for at least three-fourths of the total 2016-to-2019 increase in the net number of females firms add per year (Figure 1, left panel) and more than a third of the overall increase (right panel). These estimates likely reflect a lower bound, as they assume that The Big Three's campaigns do not cause the differential trends based on firm size. They also do not account for the positive spillover effects of The Big Three's campaigns onto firms in which they own smaller stakes: the campaigns spurred a push to develop a greater pipeline of female directors and led proxy advisory firms and other

investors to follow their lead and demand change as well. The effects of such spillovers are captured by our estimation's year fixed effects and are not reflected in the above magnitudes.

Big Three ownership is also associated with an increase in female directors' likelihood of holding key positions on the board. For firms with greater Big Three ownership in 2016, a given female director is more likely to chair a board committee after 2016, including the nominating and audit committees, and more likely to serve on the nominating committee. In this director-level analysis, we include firm-by-year fixed effects to control for board size and other time-varying, firm-specific factors that might affect the likelihood of a director serving in these roles. These findings suggest that the growth in female directors was not mere tokenism; that is, firms made more than perfunctory changes to satisfy The Big Three's demands for increased gender diversity.

We also analyze what limited firms from increasing board gender diversity prior to the Big Three campaigns. The Big Three justified their campaigns by arguing that firms were being too narrow in how they identified candidates, relying too much on personal connections and candidates' having executive experience (State Street, 2017). Because men are better networked with other men and have more executive experience, both of these criteria have the potential to steer director searches away from women and lead to hysteresis.[1]

Tracing the effects of The Big Three's gender diversity campaigns, we find that these requirements do prevent more women from joining corporate boards. Firms expanded diversity during the campaigns by casting a wider net in their director searches: the new female directors hired were less connected to the CEO and existing board members, and they had less executive experience than the candidates that would otherwise have been selected. For example, one standard

[1] A limited supply of qualified candidates, stemming from sex differences in preferences (Niederle and Vesterlund, 2011) or career interruptions due to childbearing (Miller, 2011; Bertrand, Goldin, and Katz, 2010), might also prevent firms from appointing more women (Boyallian, Dasgupta, and Homroy, 2020). Chief executives and nominating committee members, who are primarily male, might also stereotype or discriminate against women candidates.

deviation greater Big Three ownership is associated with a 75% reduction in the likelihood that a newly added female director is connected to the CEO and a 1.5% decline in the proportion of a firm's directors with CEO experience. Nevertheless, shareholders voted overwhelmingly in support of these females, awarding them even more votes than newly appointed males. We also find no increase in female directors' compensation or busyness, suggesting a limited supply of candidates was not a primary reason why firms added fewer female directors before 2017.[2]

Our results illustrate shareholder advocacy's potential to expand women's participation in corporate leadership in ways that differ from government mandates. Unlike California's quota, which led to tokenism (Hwang, Shivdasani, and Simintzi, 2020), we find that this investor-led initiative upgraded women's role on boards, including chairing the nominating committee. And in contrast to the response to Norway's quota (Seierstad and Opsahl, 2011), firms responding to the Big Three's pressure did not disproportionately hire the same women. By bringing more diverse professional networks into the firm's orbit and increasing women's representation on nominating committees, this investor push could lead to a self-reinforcing cycle of increasing female participation over time (Guldiken et al., 2019; Field et al., 2020; Matsa and Miller, 2011).

Our results also contribute to the ongoing debate regarding the role of indexed investment strategies in corporate governance. The Big Three now collectively hold about 20% of the outstanding equity in large US public companies, raising the importance of them providing effective stewardship. Some argue that these institutions lack the incentive or firm-specific information required to monitor firms effectively (e.g., Schmidt and Fahlenbrach, 2017; Bebchuk and Hirst, 2019; Gilje, Gormley, and Levit, 2020), while others argue that they are motivated monitors who can exert influence on governance issues that are easy to monitor at scale (Appel,

[2] Findings from machine learning and board quotas in France also suggest that firms overlook qualified female candidates (Erel, Stern, Tan, and Weisbach, 2020; Ferreira, Ginglinger, Laguna, and Skalli, 2020).

Gormley, and Keim, 2016; Appel, Gormley, and Keim, 2019; Fisch, Hamdani, and Solomon, 2019; Kahan and Rock, 2019a; Lewellen and Lewellen, 2020). Our findings show that indexed investors can influence firms' governance structures. The Big Three's campaigns successfully targeted an outcome that was easy to monitor with little firm-specific information, suggesting that The Big Three can also play pivotal roles in shaping other broad governance issues.[3]

Finally, while analyzing it is beyond the scope of this paper, the impact of The Big Three's campaign could have important implications for corporate governance going forward. Female directors have the potential to be more independent of management (Adams and Ferreira, 2009), and compared to their male counterparts, the average female director brings different functional expertise (Kim and Starks, 2016), has more benevolent preferences, and assigns less value to security (Adams and Funk, 2012). Gender-diverse boards have also been linked to different corporate outcomes: more gender-diverse boards devote more resources to monitoring executives and show a closer link between CEO turnover and firm performance (Adams and Ferreira, 2009; Schwartz-Ziv, 2017); they are less likely to lay off employees during a recession (Matsa and Miller, 2013); and they are less acquisitive, making fewer bids and acquiring smaller firms (Levi et al., 2014; Chen, Crossland, and Huang, 2016).

The remainder of this paper is organized as follows. Section 2 details the growing importance of The Big Three in US companies' ownership structures and describes their recent campaign for greater gender diversity on corporate boards. Section 3 describes our data, and Section 4 presents our empirical specification and main findings. Section 5 analyzes the potential factors that limit greater gender diversity on corporate boards, and Section 6 concludes.

[3] The Big Three's "check the box" approach to governance, however, raises other concerns. To the extent that the optimal governance structure varies across firms (e.g., Coles, Daniel, and Naveen, 2008; Duchin, Matsusaka, and Ozbas, 2010), a focus on issues that are easy to monitor at scale could lead The Big Three to impose one-size-fits-all policies that do not always represent an improvement for individual firms.

2. The Big Three and Their Campaigns for Gender Diversity

Indexed investment strategies and The Big Three have grown increasingly important over the last two decades. The share of mutual fund and ETF assets that are indexed has increased more than fourfold from around 9% in 1999 to around 38% as of the end of 2019. With The Big Three collectively accounting for 75% of all indexed funds, the growing popularity of indexing has resulted in The Big Three becoming some of the largest investors in many US companies. Between 2017 and 2019, The Big Three collectively held about 12% of the average US firm's outstanding equity and even bigger stakes in large firms. The Big Three also have disproportionate voting power because not all investors vote their shares: among S&P 500 firms, The Big Three account for 20% of ownership and 25% of votes cast (Bebchuk and Hirst, 2019).

In recent years, companies have also come under increasing pressure from advocacy groups, regulators, and some investors to add more female directors on corporate boards. In 2011, CalPERS and CalSTRS, two large public pension funds, set up the Diverse Director Data Source, a database of prospective directors, to make it easier for firms to identify diverse individuals for open director seats. Politicians and regulators, including SEC Commissioner Luis Aguilar in 2010 and President Obama in 2015, encouraged companies to voluntarily adopt a policy of interviewing at least one female or minority candidate for every open directorship (Fisch and Winters, 2016). Furthermore, in 2014, the US chapter of the 30% Club, a global organization that advocates for greater representation of women on corporate boards, was founded with the goal of achieving 30% female directors on S&P 100 boards by 2020 through collaborative and voluntary methods.

Despite this pressure, women's representation on corporate boards remained low as companies often did not heed these early calls for greater diversity. A 2016 survey of US directors found that gender diversity was typically not even on boards' agenda. Male directors, who each had served multiple boards, reported that "gender diversity has never been a stated or implicit goal

at any of the boards I have served on," and "not a single time was there a mention of hiring a woman — it was never brought up. It simply was never a topic" (Wiersema and Mors, 2016).

Amid this general apathy toward gender diversity, State Street became the first of The Big Three to publicly pressure companies to increase board diversity when it announced its "Fearless Girl" campaign on March 7, 2017. In this campaign, State Street announced that it would encourage firms to add female directors. Unlike prior efforts by investors and advocates to promote gender diversity, State Street threatened consequences for companies that failed to make progress, saying it would vote against reelecting board members at companies failing "to take action to increase the number of women on its board" (State Street, 2017). The campaign included an extensive media blitz and was covered widely by social media and the popular and business press.[4]

While State Street did not establish an exact quota that would trigger its new voting policy, it announced that it would focus on firms without any female directors. State Street committed to oppose the reelection of the director who chairs the nominating committee of such firms unless they could convince State Street that they made a significant effort to improve diversity (Lublin and Krouse, 2017). Consistent with this policy, within five months of launching its campaign, State Street voted against the reelection of directors at 400 companies that lacked female directors (Baer and Lublin, 2017). Between March 2018 and February 2019, it voted against another 421 directors at firms with all-male boards; and in September 2019, State Street announced that in 2020 it would begin voting against the entire nominating committee, not just the committee's chair, at firms failing to make meaningful efforts toward gender diversity (Huber and Simpkons, 2019).

BlackRock and Vanguard, the two other members of The Big Three, followed State Street's lead later that year. In July 2017, BlackRock announced its intent to focus on gender diversity by

[4] As part of the campaign, State Street installed a bronze statue of a young girl facing down the iconic charging bull statue located on Wall Street in New York City. State Street reportedly estimated that the media exposure was worth $27–38 million (Vranica, 2017).

highlighting its recent votes against board members at five companies BlackRock viewed as unresponsive to diversity concerns and its votes for eight shareholder proposals that pushed companies to increase board diversity (Hunnicutt, 2017). BlackRock formalized its campaign in February 2018 when it issued new proxy voting guidelines that stated it "would normally expect to see at least two women directors on every board" (BlackRock 2018; p.4), and it sent about 300 letters asking companies that had fewer than two female directors to disclose their approach to board diversity (Krouse, 2018). On August 31, 2017, Vanguard's CEO announced in an open letter that Vanguard was joining the 30% Club and that its voting would consider whether companies were making "meaningful progress" on promoting gender diversity (McNabb, 2017).[5]

It is unclear, however, whether The Big Three's pressure tactics were effective or how much they contributed to the recent uptick in female directors depicted in Figure 1. We now turn to analyzing the impact of these campaigns.

3. Data and Summary Statistics

Our data on corporate board composition are from Boardex for 2013 to 2019, which we use to calculate our outcomes of interest in the three years before (2014-16) and three years after (2017-19) The Big Three's gender diversity campaigns began. Boardex provides information on directors' gender, past employment, and connections using publicly available information, including the mandated disclosures of US publicly traded firms.

We use Boardex to compute various measures of boards' gender diversity. *Female director share* is the share of a firm's directors that are female. *Change in number of females* is the net increase in the number of females on the board relative to the previous year. *Share of directors*

[5] In their announcements, The Big Three said that the diversity campaigns were aimed at improving the board's effectiveness (e.g., see State Street, 2017; Vanguard, 2017; BlackRock, 2018). They may have also been aimed at attracting fund flows from socially minded investors (Barzuza, Curtis, and Webber, 2020).

that are newly hired females is the number of female directors who were not on the board in a previous year, scaled by the total number of directors on the board in the prior year. *Share of existing female directors that depart* is the share of female directors from the previous year who are no longer on the board. *Indicator for > 0 female directors* is an indicator that equals one when a firm has at least one female director.

We also use Boardex to examine newly hired directors' connections to existing directors and past work experience at the time of their appointment. We measure connections between individuals using overlaps in their work history and education.[6] We examine both indicators for a new director being connected to an existing board member, or specifically the CEO, and the number of such connections. For experience, we consider whether a director had prior experience as a CEO or director of a listed or unlisted company before their appointment to the given board.

Prior research suggests that many important board decisions are made in committees, which specialize in specific areas of the board's overall responsibilities (Bilimoria and Piderit, 1994). We use Boardex to identify whether the director is a member or chair of the audit, compensation, or nominating committees, which researchers consider vital to fulfilling boards' monitoring function (Brick and Chidambaran, 2010; Chhaochharia and Grinstein, 2009). We also examine whether a director sits on the executive committee, which has the authority to act on behalf of the full board when immediate actions are required (Xie, Davidson, and DaDalt, 2003), and whether the director chairs any committee or the board itself.

[6] Following Fracassi and Tate (2012), we define a connection as existing between two individuals if they ever worked simultaneously at the same employer or graduated from the same school within one year of each other. Our findings are similar if we use Fracassi and Tate's alternative definition of connections, which also includes cases where the two individuals served at some point as an officer or director at the same club, organization, or nonprofits, even when this service did not overlap in time. Our findings are also robust to defining connections based on work history alone.

Our data on institutional ownership is from Thomson-Reuters' Institutional (13f) Holdings database. We follow Ben-David et al. (2020) to identify The Big Three asset managers: we use the MNGRNO identifiers 90457 and 81540 for Vanguard and State Street, respectively, and for BlackRock, we aggregate the holdings of its six MGRNO identifiers: 9385, 11386, 39539, 56790, 91430, and 12588.[7] For each firm, we scale each of the three institutions' reported ownership by the firm's market value of equity, as reported in CRSP. We measure both ownership and market value of equity at the end of December 2016, before the early-2017 start of The Big Three's campaign. We record institutions that do not report ownership in a given firm as having none. The variable $Big3\%^{2016}$ is the sum of scaled ownership across these three institutions.

In our later analysis, we test our findings' robustness to controlling for firm size and the female friendliness of its culture. For firm size, we use three measures: the market value of equity, which is from CRSP, and the book value of assets and sales, which are from Compustat. We proxy for whether a firm has a female-friendly (unfriendly) culture using its average diversity strength (concern) rating reported in the MSCI ESG KLD STATS database.

Table 1 provides summary statistics for Big Three ownership and our outcome variables of interest. For the average observation in our sample, The Big Three own 13.0% of shares in 2016, and females hold 14.4% of board seats. The average change in the number of females on boards is 0.13: in any given year, about 1 in 8 firms adds a woman to the board. Of the average firm's directors, 2.5% are new female directors; and of the incumbent female directors, 6.2% exit the board each year. For directors' board assignments, 10.0% (38.8%) of directors chair (sit on) the nominating committee. For newly hired directors: 22.3% (9.0%) are connected to an existing board member (the CEO), 42.9% have CEO experience, and 72.7% have been a director before.

[7] In its 13F filings, BlackRock discloses its various subsidiaries' holdings using seven different reporting entities, which Thomson-Reuters aggregates under these six MNGRNO identifiers.

4. Empirical Analysis of Campaigns' Impact on Board Diversity

4.1 Specification

To measure the effect of The Big Three's campaigns, we estimate a difference-in-differences regression model that compares board gender diversity before and after 2016 by the fraction of the firm owned by The Big Three before their campaigns begin. Because The Big Three's voting power and influence increase with their ownership stake, firms with greater Big Three ownership are under greater pressure to respond to their campaigns. Thus if the campaigns were effective, we would expect to see a greater increase in board gender diversity after 2016 for firms with higher Big Three ownership. We estimate:

$$GenderDiv_{it} = \beta Big3_i^{2016} \times Post2016_t + \gamma_1 Zero_i^{2016} \times Post2016_t + \gamma_2 One_i^{2016} \times Post2016_t + \alpha_i + \delta_t + \epsilon_{it}, \quad (1)$$

where *GenderDiv* measures board gender diversity of firm *i* in year *t*, and $Big3^{2016}$ is the share of firm *i*'s equity owned by The Big Three in December 2016. We measure The Big Three's ownership position before their campaigns begin to mitigate endogeneity concerns, including the possibility that The Big Three tilted their portfolios toward gender-diverse firms during the campaigns. *Post2016* is an indicator for years after 2016. Firm fixed effects, α, control for time-invariant differences in firms' commitment to diversity and governance structures (e.g., whether board positions are staggered or classified), and year-fixed effects, δ, control for secular trends in gender diversity on corporate boards.

Even without pressure from The Big Three, firms with all-male boards are most likely to add women (Farrell and Hersch, 2005). This trend could confound our estimates if Big Three ownership in 2016 correlates with a company's existing diversity. We thus allow firms with different baseline levels of board gender diversity to have different diversity trends by including the interaction of *Post2016* with $Zero^{2016}$ and One^{2016}, which are indicator variables for the firm

having zero or one females on their corporate board in 2016, respectively.[8] The coefficient of interest, β, thus measures the differential change in board gender diversity experienced after 2016 by firms with greater Big Three ownership, after accounting for a firm's baseline level of diversity, post-2016 trends associated with that baseline, and overall diversity trends. Finally, we account for potential serial correlation by adjusting the standard errors for clustering at the firm level.

4.2 Baseline Results

We find that firms with greater Big Three ownership increased the gender diversity of their boards during The Big Three's campaigns. Estimates of eq. (1) are reported in Table 2, where each column reports analysis for a different measure of board gender diversity. We find that greater Big Three ownership is associated with a net increase in the number of female directors during the period of The Big Three's campaigns (column 1; $p < 0.001$). The association is sizable: one standard deviation greater Big Three ownership (8.6%) is associated with an annual net increase of about 0.10 females, which is a 76% increase relative to the sample mean (0.13).

The net increase in female directors results from both more women being added to these boards and fewer women leaving them. One standard deviation greater Big Three ownership is associated with a one percentage point increase in the proportion of newly hired directors that are female (column 2), a 40% increase relative to the sample mean (0.025). The same difference in Big Three ownership is associated with a two percentage point decline in the share of existing female directors that depart (column 3), a 33% decrease relative to the sample mean (0.062).

We find similar results when we measure gender diversity using the female share of the board. One standard deviation greater Big Three ownership is associated with a 1.6 percentage point increase in the female share of the board (column 4; $p < 0.001$), which amounts to an 11% increase relative to the sample mean (14.4%). As we would expect, the magnitude of the estimate

[8] Our findings are robust to using alternative ways to specify this control, including interacting *Post2016* with the female share of directors in 2016.

for this stock measure of diversity is smaller than the estimates for the flow measures reported in columns 1-3. Because directors typically serve on boards for multiple years, the board composition at any point in time is shaped by conditions accumulating over several years, unlike our earlier measures of gender diversity that record females' flows into and out of directorships.

Finally, The Big Three's campaigns are associated with a reduction in all-male boards. Using a linear probability model, we find that one standard deviation greater Big Three ownership is associated with a 4.9 percentage point increase in the likelihood of having a female director after 2016 (column 5; $p < 0.001$). This association corresponds to a 17.4% decrease in the likelihood of an all-male board relative to the sample mean (28.1%).

The timing of the increase in women's board participation coincides with The Big Three's campaigns. Figure 1, Panel A, shows that the average year-to-year change in the number of female directors was flat at about 0.08 in 2014, 2015, and 2016. In these pre-campaign years, about 1 in 12 firms added a female director each year. These rates started to increase in 2017 when The Big Three's campaigns began. By 2019, 1 in 4 firms added a female director.

To link these increases more directly to The Big Three's campaigns, we estimate a modified version of eq. (1) in which we interact The Big Three's ownership in 2016 with a full set of year indicator variables instead of *Post2016*. The coefficients on these variables estimate the change in the association between Big Three ownership and female board diversity in each year, relative to 2014, whose interaction with $Big3^{2016}$ is omitted from the specification. Table 3 presents the results. For brevity, we report only estimates for the net change in number of females and the female share of directors in this and subsequent analyses.

The timing of the association between Big Three ownership and increased gender diversity is consistent with The Big Three's campaigns having a causal effect. We find no evidence of an association before the campaigns begin: the estimated coefficients on the 2015 and 2016 interactions are economically small and statistically insignificant. In 2015, for example, one

standard deviation greater Big Three ownership is associated with a 0.0066 increase in the number of female directors (p = 0.631) and a 0.02 percentage point increase in the share of directors that are female (p = 0.885). However, increases in gender diversity are significantly related to Big Three ownership during the campaign years (2017–2019). By 2019, one standard deviation greater Big Three ownership is associated with 0.11 additional females and a 2.4 percentage point increase in the female share of directors. Both of these estimates, which are an order of magnitude larger than those for 2015 and 2016, are statistically significant at the 1% level.

4.3 Heterogeneity Across Campaigns

As described in Section 2, The Big Three launched their diversity campaigns at different times. State Street moved first when it launched the "Fearless Girl" campaign in March 2017. Vanguard announced that it was joining the 30% Club in August 2017, and BlackRock updated its proxy voting guidelines in February 2018. Given that most director elections are held in the second quarter of the year, we would expect to see the effect of State Street's campaign in 2017 but not see Vanguard and BlackRock's effects until the following year.

To investigate the timing of each of The Big Three institution's impact on board gender diversity, we estimate a modified version of eq. (1) in which separate measures of each of the three institution's ownership are interacted with each of two timing measures: an indicator for the year 2017 and an indicator for the years 2018 and 2019. Table 4 reports the results.

Consistent with the timing of each institution's campaign, we find that only State Street's ownership shares are associated with gender diversity in 2017, whereas all three institutions are in 2018 and 2019. Greater State Street ownership is associated with increases in female directors in both 2017 and 2018-2019 (column 1), and the magnitudes are similar: one standard deviation greater State Street ownership (1.73%) is associated with a net addition of about 0.09 and 0.07 females in 2017 and 2018-2019, respectively. Larger Vanguard and BlackRock ownership stakes,

in contrast, do not have a statistically significant association with board diversity in 2017, and the estimated coefficients for the 2018-2019 period are two to three times larger than those for 2017. Because the female share of directors is a stock as opposed to a flow variable, we expect it to show effects with a delay. Consistent with that logic, all three institutions show a significant association with the female share of directors only in 2018-2019 (column 2). Although it is not statistically significant, State Street's 2017 point estimate is larger than the 2017 point estimates for Vanguard and BlackRock.

All of The Big Three asset managers pressured firms to expand board gender diversity, but State Street and BlackRock singled out specific types of companies in their campaigns. State Street targeted firms without any female directors, and BlackRock emphasized its expectation that each board should have at least two females.[9] We next investigate whether each of these institution's ownership is associated with the outcome it targeted. We now modify eq. (1) and estimate two separate models that include each institution's ownership stakes and an interaction of their ownership stake with an indicator for whether that particular institution targeted the company. In particular, we estimate the following:

$$\begin{aligned} GenderDiv_{it} = {} & \zeta_1 StateStreet_i^{2016} \times Post2016_t \\ & + \zeta_2 StateStreet_i^{2016} \times Post2016_t \times Zero_i^{2016} \\ & + \gamma_1 Zero_i^{2016} \times Post2016_t \\ & + \gamma_2 One_i^{2016} \times Post2016_t + \alpha_i + \delta_t + \epsilon_{it}, \end{aligned} \quad (2)$$

[9] For example, State Street's initial announcement of its "Fearless Girl" campaign in March 2017 highlighted that about a quarter of Russell 3000 companies had no women on their board (State Street, 2017). By July 2017, State Street voted against directors at 400 companies that lacked any female directors (Baer and Lublin, 2017). In September 2018, State Street announced that it would update its voting guidelines starting in 2020 to vote against the entire slate of directors on the nominating committee (not just the chair) of companies with no female directors that failed to engage in "successful dialogue" about improving diversity (Whyte, 2018). BlackRock stated its expectation for two female directors explicitly in its Proxy Voting Guidelines (BlackRock, 2018).

and

$$GenderDiv_{it} = \eta_1 BlackRock_i^{2016} \times Post2017_t + \eta_2 BlackRock_i^{2016} \times Post2017_t \times LessTwo_i^{2016} + \gamma_1 Zero_i^{2016} \times Post2017_t + \gamma_2 One_i^{2016} \times Post2017_t + \alpha_i + \delta_t + \epsilon_{it}, \quad (3)$$

where *LessTwo*^{2016} is an indicator for the firm having less than two females on their board in 2016, and *Post2017* is an indicator for years after 2017, when BlackRock's new voting policy was in effect. In the latter specification, we do not need to include a separate interaction for *LessTwo*^{2016}×*Post2017* because it is collinear with *Zero*^{2016}×*Post2017* and *One*^{2016}×*Post2017*. Table 5 reports the results.

Consistent with The Big Three's campaigns being effective, we find greater increases in gender diversity at companies targeted by an institution when that institution's ownership stake is larger. State Street ownership is associated with the largest increases in diversity at companies that did not have any female directors when their campaign began (columns 1 and 4). After 2016, one standard deviation greater State Street ownership (1.73%) is associated with 0.10 additional female directors per year for companies starting with one or more female directors and 0.10+0.05=0.15 additional females for companies with no female directors. Likewise, BlackRock ownership is associated with larger post-2017 increases in gender diversity for companies starting with fewer than two female directors (columns 2 and 5). We find similar results when we include both State Street and BlackRock's ownership stakes in the same estimation (columns 3 and 6).

4.4 Is It Me Too?

Following the exposure of the sexual-abuse allegations against Hollywood producer Harvey Weinstein in early October 2017, the "Me Too" movement directed intense public attention to the issues of sexual harassment against women and gender discrimination in the

workforce (Lins, Roth, Servaes, and Tamayo, 2020). Although the movement itself focused on sexual harassment and abuse, the spotlight on men's role as gatekeepers to positions of power could have led firms to feel pressure to add women to their boards of directors. Such pressure could confound our findings if greater visibility makes larger companies, which have greater Big Three ownership, more sensitive to public scrutiny (2020 Women on Boards, 2019).[10]

To address this issue, we examine whether our findings are affected by the inclusion of controls that allow for different-sized firms to have different trends during the campaigns. We modify eq. (1) to include a control for the interaction of the firm's size in 2016 and the *Post2016* indicator. The firm and year fixed effects absorb the main effects of these variables. Because it is unclear what firm size dimension best proxies for public visibility, we measure size in three alternative ways: market value of equity, book value of assets, and sales. Table 6 reports the results.

The larger increase in female directors for firms with higher Big Three ownership is robust to controlling for differential trends with respect to firm size. We continue to observe a larger post-2016 increase in the number of females added and in the female director share for firms with greater Big Three ownership, regardless of whether a firm's size is measured using its market value of equity (Table 6, columns 1 and 4), book value of assets (columns 2 and 5), or sales (columns 3 and 6). In all cases, the point estimate is statistically significant ($p < 0.001$).

The estimated magnitudes remain large. Using the smallest point estimates in Table 6, which are obtained when measuring size using the market value of equity, one standard deviation greater Big Three ownership (8.6%) is associated with an annual net increase of about 0.045 females, which is a 35% increase relative to the sample mean (0.13). Likewise, one standard

[10] It is also possible that the movement adversely affected women's representation on boards. According to a 2018 survey, 82% of men worried about women falsely alleging harassment at work (Morning Consult, 2018). When men are wary of forging professional relationships with female colleagues, they likely reduce their mentoring of women and slow women's advancement to leadership positions (Elsesser, 2019).

deviation greater Big Three ownership is associated with a 0.9 percentage point increase in females' share of the board, which amounts to a 6% increase relative to the sample mean (14.4%).

Our findings are also robust to controlling for differential trends across industries. Firms that sell products directly to consumers are likely to be more sensitive to public scrutiny and the Me Too movement. In specifications reported in columns 1 and 5 of Table 7, we allow firms in business-to-consumer (B2C) industries to have different post-2016 trends. We define B2C industries using Delgado and Mills' (2020) classification. Our findings are robust to including these controls. In fact, we obtain similar results when we allow every 4-digit Standard Industrial Classification (SIC) code to exhibit its own post-2016 trend (Table 7, columns 2 and 6).

If the Me Too movement, or a general increase in public attention to gender equality issues, motivated firms to diversify their boards, we might expect firms that are already more "female friendly" to lead the charge. Indeed, Giannetti and Wang (2020) find that firms whose corporate culture valued gender equality were more likely to increase board diversity between 2005 and 2016. If firms with greater Big Three ownership in 2016 happen to have more female-friendly cultures, then some of the observed post-2016 increase in their gender diversity could potentially be driven by how firms with such cultures responded to the October 2017 Me Too movement.

To analyze whether Big Three ownership might be standing in for firms' pre-existing views on gender equality, we allow for differential post-2016 trends based on these views. We modify eq. (1) by adding interactions between the *Post2016* indicator and 2016 values for Giannetti and Wang's proxies for the extent to which a company's culture is female-friendly, *Diversity Strengths* and *Diversity Concerns*. Table 7 reports the results.

The change in female directors for firms with higher Big Three ownership is robust to including these controls. Because *Diversity Strengths* and *Diversity Concerns* are available only for larger companies, we first repeat our baseline analysis without these controls on the subsample of firms with non-missing data for these proxies. In this subsample, which is about 60% of our

original sample, we continue to find an association between Big Three ownership and changes in gender diversity after 2016 (Table 7, columns 3 and 7). Adding the controls for a firm's culture has minimal impact on the estimates, which remain of similar magnitude and statistically significant at the 0.1% and 1.0% levels, respectively (columns 4 and 8).

4.5 California's Gender Mandate

In September 2018, California enacted a board gender quota for all publicly traded companies headquartered in the state. All boards were required to have at least one woman by the end of 2019. By the end of 2021, five-member boards must have at least two female directors, and boards with six or more directors need at least three women (California Corporations Code, Section 301.3). Although the mandate surprised many observers and came only after most 2018 board elections, we confirmed that it does not confound our findings. Our findings are robust to allowing firms headquartered in California to exhibit a differential time trend. Board diversity of California firms increases in 2019, the first year the mandate becomes effective, but our estimates of The Big Three's impact are unaffected (see Appendix Table A2).[11]

4.6 Economic Magnitude

Our estimates imply that The Big Three's campaigns are responsible for a large proportion of the recent increase in female directors. Between 2016 and 2019, the average proportion of female directors increases by 6.6 percentage points (see Fig. 1). The year-by-$Big3^{2016}$ coefficients in column 2 of Table 3 indicate that this change is 3.9 percentage points larger with $Big3^{2016}$ at

[11] The 2019 increase in female directors for California reflects firms complying with the quota (see also Greene, Intintoli, and Kahle, 2020; Hwang, Shivdasani, and Simintzi, 2020; von Meyerinck, et al., 2020; Gertsberg, Mollerstrom, and Pagel, 2021). We find that The Big Three's campaigns led California firms to increase female directors beyond what was required by the mandate. When we perform a similar calculation to the one described in the next section but limit the sample to California-headquartered firms, we find that the Big Three campaigns accounted for 38.1% of the of the year-over-year increase in female directors in 2019 relative to 2016.

its mean value of 13.0% than if $Big3^{2016}$ is zero, accounting for about 59% of the increase in female directors in 2019 relative to 2016.[12] Furthermore, applying a similar calculation, the coefficients in column 1 of Table 3 indicate that The Big Three account for all of the increase in the year-over-year change in the number of female directors over this same period.

The magnitudes are a bit lower if we take a more conservative approach and allow for the possibility that some of the association is attributable to other shocks affecting large firms. If we repeat the analysis of Table 3 but include interactions between *ln(MarketCap^{2016})* and year fixed effects to allow for differential trends by firm size, we find that the average female share of directors is 2.3 percentage points higher in 2019 because of Big Three ownership, suggesting about 35% of the overall increase from 2016 to 2019 is attributable to The Big Three. Likewise, we find that the average yearly increase in female directors is 0.13 larger in 2019 with $Big3^{2016}$ at its mean value instead of zero, accounting for 76% of the year-over-year increase in female directors in 2019 relative to 2016. A similar calculation indicates that The Big Three's campaigns account for a third of the decline in all-male boards over this same period.

The above estimates, however, likely understate The Big Three's impact on gender diversity. If The Big Three's campaigns cause part of the differential post-2016 trend for larger firms, then including the controls for this differential trend would cause us to underestimate the impact of The Big Three. The estimation also does not account for spillovers of The Big Three's push onto firms with lower Big Three ownership. Positive spillover effects from The Big Three's campaigns that affect all firms, not just those with greater Big Three ownership, contribute to the year fixed effects rather than our difference-in-differences estimate.

[12] Using the difference in coefficients for 2016 and 2019 from Table 3, column 2, 13.0 percentage point greater Big Three ownership is associated with a $[0.278 - (-0.023)] \times 0.130 = 0.039$ larger increase in the proportion of female directors in 2019 relative to 2016, corresponding to $0.039/0.066 = 59\%$ of the observed increase over those years.

The Big Three's campaigns spilled over to other firms in various ways. The Big Three's advocacy led the proxy advisory firm Institutional Shareholder Services (ISS) to announce in 2018 that they would soon begin recommending that investors vote against the nominating committee's chair at companies with no women directors. ISS's recommendations shape how many institutions vote, particularly those with smaller ownership stakes (Malenko and Shen, 2016). ISS directly attributed its change in policy to the campaigns of BlackRock, State Street, and the 30% Coalition, which Vanguard joined in August 2017 (Mishra, 2018; Papadopoulos, et al., 2018). The Big Three's advocacy also fostered the expansion of programs designed to recruit and train women for board positions and led companies to send more females to enroll in executive education (Murray, 2019). For example, Yale University launched its Women on Boards program, which prepares women to search for corporate board seats, in 2017 and hosted its first cohort in 2018. Such training increases the supply of female directors to firms irrespective of their Big Three ownership.

Based on these analyses, we conclude that The Big Three's campaigns explain between seventy-five and one hundred percent of the year-over-year increase in female directors between 2016 and 2019 and between a third and two-thirds of the overall increase in female directors.

4.7 Female Representation on Board Committees

Although we find that The Big Three's campaigns prompted firms to add female directors, it is not immediately clear if these additions amount to more than mere tokenism. To assess these women's role on the board, we examine the effect of The Big Three's campaigns on females' appointments to key board committees. Female directors tend to be underrepresented on board committees (Nili, 2019; Field et al., 2020), where scholars argue boards' real work is done (Bilimoria and Piderit, 1994; Jiraporn et al., 2009). If committees make the most important decisions, then women are unlikely to be appointed to chair or serve on key committees merely for the sake of tokenism (Kesner, 1988). If the marginal women are appointed to "check the box,"

we would expect to find that the average female director is less likely to chair or serve on such committees after 2016.

To examine how The Big Three's campaigns affected women participation in board committees, we estimate the following director-level linear probability regression model:

$$Committee_{ijt} = \theta_1 Big3_i^{2016} \times Post2016_t \times Female_j + \theta_2 Post2016_t \times Female_j + \theta_3 Big3_i^{2016} \times Female_j + \theta_4 Female_j + \alpha_{it} + \epsilon_{ijt}, \quad (4)$$

where *Committee* is an indicator for whether director *j* at firm *i* in year *t* is a chairperson or member of a particular committee and *Female* is an indicator for whether that director is female. *Female* controls for the average gender difference in committee assignments; its interaction with *Post2016* controls for secular post-2016 changes in female representation that are unrelated to Big Three ownership; and its interaction with $Big3^{2016}$ controls for any differences in assignments at firms with greater Big Three ownership that predated their gender diversity campaigns. To ease the estimates' interpretation, we demean $Big3^{2016}$ by its sample mean so that the coefficient on each control reflects its importance for a firm with the average level of Big Three ownership. The α is a full set of firm-by-year fixed effects. We adjust the standard errors for clustering at the firm level to account for both serial correlation and correlation across observations within a given firm.

The coefficient of interest is θ_1. This coefficient measures the differential increase in the probability of a female director taking a given board role after 2016 at firms with greater Big Three ownership. The firm-by-year fixed effects, which control for board size and other time-varying, firm-specific factors that might affect the likelihood of a director serving in the given role, ensure that θ_1 is estimated using only within-firm-year variation. They also absorb the $Post2016 \times Zero^{2016}$ and $Post2016 \times One^{2016}$ controls included in eq. (1). Table 8 reports the estimates of eq. (4).

Across all of the outcomes we examine, the estimates show no indication of tokenism. None of the nine estimates of θ_1 reported in Table 8 are negative. To the contrary, four of the estimates are positive and statistically significant, suggesting that The Big Three's campaigns led firms to elevate women's role on the board. For example, one standard deviation greater Big Three ownership is associated with female directors being 2.3 percentage points more likely to chair any committee after 2016 (Table 8, column 1; $p = 0.006$), 1.0 percentage points more likely to chair the nominating committee (column 2; $p = 0.061$), and 1.1 percentage points more likely to chair the audit committee (column 3; $p = 0.035$). These increases correspond to 5.9%, 9.7%, and 9.4% of the respective sample averages (39.3%, 10.0%, and 11.8%). Female directors are as likely to chair the compensation committee (column 4) or serve as the boards' chairperson (column 5) after 2016 for firms with greater Big Three ownership as they were before the campaigns.

Female directors at firms with greater Big Three ownership are also more likely to sit on the nominating committee after 2016. We find that one standard deviation greater Big Three ownership is associated with a female director being 1.5 percentage points more likely to serve on the nominating committee after 2016 (column 6; $p = 0.048$), corresponding to a roughly 3.8% increase relative to the sample average (38.8%). Greater Big Three ownership is also associated with increases in female directors' likelihood of sitting on the audit, compensation, and executive committees, but the magnitudes are smaller and not statistically significant (columns 7–9).

These results suggest that The Big Three's push for board gender diversity increased females' influence over future director nominations and board decisions. Contrary to concerns that recent improvements in board diversity reflect tokenism rather than real influence, we find no evidence of this and some indications of the reverse.[13] Moreover, women's appointment to and

[13] Our findings on board assignments contrast from those found following the 2019 California diversity mandate. Hwang, Shivdasani, and Simintzi (2020) find that the female directors added in response to the mandate were given fewer committee responsibilities than other directors. Together, the results suggest that less tokenism results from investor-driven as opposed to mandate-driven increases in diversity.

chairing of the nominating committee could promote even further gender diversity if these women help recruit additional female directors going forward (Guldiken et al., 2019).

5. Factors Limiting Female Board Representation

Before The Big Three launched their campaigns, most boards claimed that a limited pool of suitable female director candidates prevented them from achieving greater diversity in the boardroom (State Street, 2017). Based on two years of study and board engagement on the topic, State Street reached a different conclusion that motivated them to launch their campaign: there were enough qualified women, but boards' nominating practices and behavioral biases undervalue women's contributions. Of the six obstacles State Street (2017, p.1) identified, the top three were:

1. "Excessive reliance on existing director networks and connections that continue to be the primary source for identifying director candidates
2. Requiring that all director nominees have CEO experience to be considered to serve on boards
3. Lack of female representation in leadership positions on boards and in senior management to help guide the companies on their journey to diversify."[14]

In this section, we analyze whether these three factors or a shortage of female candidates limit board gender diversity. Specifically, we assess whether firms expanded gender diversity by pulling the two levers that State Street highlighted (identifying candidates outside their traditional networks and broadening their concept of required experience), and whether the campaigns had the greatest effect on firms that lacked female leadership. We also gauge the supply of female

[14] The other three obstacles identified were: "Limited appreciation for and understanding of the value and need for greater gender diversity within organizations"; "Lack of efforts to address behavioral gender biases inherent in workplace culture and HR-related practices within organizations"; and "Limited organizational support in helping individuals achieve work-life balance, which can stymie the career progression of women, thereby adversely affecting the pipeline of women leaders" (State Street, 2017, p.1).

director candidates by examining shareholder votes and post-2016 changes in female directors' compensation and busyness.

5.1 Connections

We first examine whether The Big Three's campaigns resulted in firms adding female directors who are unconnected to the CEO or existing directors. CEOs and directors use their professional networks to identify and select qualified director candidates for information, efficiency, and agency reasons. First, CEOs and directors can leverage networks to assess potential directors' soft skills that are harder to determine from resumes and interviews. Second, directors in the same network might be more likely to form a team that "gels" and works well together. Third, risk aversion might motivate these leaders to "play it safe" by overly relying on their personal relationships to identify candidates, passing over more qualified candidates with whom they are less familiar and who might "rock the boat" (Gormley and Matsa, 2016). Regardless of the underlying reason, giving preference to in-network candidates can disadvantage females because of both the homophily of professional networks and the gender differences in the educational, organizational, and work experiences on which professional networks are based.

To assess whether The Big Three's pressure campaigns led firms to search for directors outside of their usual network, we use a triple-differences estimation similar to that reported in Table 8. We restrict the sample to new board appointees and estimate a modified version of eq. (4) in which the dependent variable is the number of connections between the new director and the firm's existing directors before his or her hiring. We use the same framework to analyze indicators for the new director being connected to any other director on the firm's board and to the CEO. The specification includes firm-by-year fixed effects to isolate within-firm-year variation and to control for board size and other time-varying, firm-specific factors. Table 9 reports the results.

We find that The Big Three's campaign led firms to hire female directors who were less connected to the firms' existing networks. One standard deviation greater Big Three ownership is associated with a newly hired female director having 0.14 fewer connections to the existing board members after 2016 (Table 9, column 1; $p = 0.038$), a 30.5% decrease relative to the sample average (0.46). We also find fewer connections on the extensive margin: One standard deviation greater Big Three ownership is associated with a newly hired female director being 5.1 percentage points less likely to be connected to any board member after 2016 (column 2; $p = 0.056$) and 6.7 percentage points less likely to be connected to the CEO (column 3; $p = 0.001$). These decreases correspond to 22.8% and 74.7% of the respective sample averages (22.3% and 9.0%).

Consistent with directors moving beyond their existing networks, the females added during The Big Three's campaign were no more likely to come from the firms' executive ranks than other female directors. The Big Three's guidance emphasized that although "there are many ways to achieve board diversity and we support all forms of diversity, … we believe boards should have at least some *independent* female directors" (State Street, 2017, p.2, emphasis added). Consistent with this guidance, we find no indication that firms targeted by the campaigns appointed existing female executives to the board to achieve diversity gains. The point estimate for being an executive director is negative and not statistically significant (column 4; $p = 0.426$).

5.2 Experience

We next examine if pressure from The Big Three's campaigns expanded the professional backgrounds and types of experience that firms considered in selecting new directors. Traditionally, boards prioritized candidates with CEO experience, which limited the pool of female candidates. The Big Three encouraged firms to hire more candidates without CEO experience.

To assess whether their campaigns had this effect, we estimate a modified version of eq. (4) that examines whether newly hired directors have CEO experience. Similarly, we examine

whether the new directors have prior experience serving on a board, which is another prerequisite that female candidates often lack. Table 10 reports the estimates.

We find that firms with higher Big Three ownership hired females with less executive experience after 2016 than they had previously. A one standard deviation greater Big Three ownership is associated with a 5.8 percentage point decline in the likelihood of a newly added female director being a former or current CEO, which corresponds to an 13.6% decrease relative to the sample average of 42.9% (column 1, $p = 0.069$). The point estimate for past board experience is also negative but not statistically significant (column 2).

We next analyze whether The Big Three's campaigns also reduced the proportion of a firm's directors with past executive or director experience. Firms with greater Big Three ownership add female directors after 2016, and the sum of the coefficient estimates on *Female* and *Female*×*Post2016* in Table 10 indicate that newly appointed female directors in this period are 16.3 and 8.3 percentage points less likely than newly appointed male directors to have CEO or director experience, respectively ($p < 0.001$). But whether this reduces a board's overall level of experience depends on whom these directors replace. To assess the impact on boards' overall experience, we estimate firm-panel regressions, similar to eq. (1). Table 11 reports the results.

We find that the proportion of directors with executive experience declines only modestly after 2016 at firms with greater Big Three ownership. One standard deviation greater Big Three ownership is associated with a 0.7 percentage point decrease in the share of directors with CEO experience (Table 11, column 1, $p < 0.001$), corresponding to just 1.5% of the sample mean (46.3%). Furthermore, the share of directors with board experience remained flat (column 2), suggesting that first-time female directors without board experience were appointed to boards in place of male candidates whom also lacked board experience.

Together, these results suggest that, under pressure from The Big Three, firms increased board diversity by widening their searches to more candidates outside of their directors' personal

networks and without executive experience. Firms' relying on their directors' personal networks and prioritizing CEO experience appear to have limited women's appointment to boards before The Big Three's campaigns.

5.3 Lack of Female Representation in Leadership Positions

We also examine whether pressure from The Big Three's campaigns had a larger impact on gender diversity among firms that lacked female representation in leadership positions. If the lack of such leadership hampered firms' ability to diversify their organizations, then we would expect to find the campaigns to have a greater effect on these firms.

To assess this possibility, we use a firm-level triple-differences estimation:

$$\begin{aligned} GenderDiv_{it} = {} & \beta_1 Big3_i^{2016} \times Post2016_t \\ & + \beta_2 Big3_i^{2016} \times Post2016_t \times NoFemaleLeader_i^{2016} \\ & + \beta_3 Post2016_t \times NoFemaleLeader_i^{2016} \\ & + \gamma_1 Zero_i^{2016} \times Post2016_t + \gamma_2 One_i^{2016} \times Post2016_t \\ & + \alpha_i + \delta_t + \epsilon_{it}, \end{aligned} \tag{5}$$

where *NoFemaleLeader* is an indicator for firm *i* not having a female CEO or a female director on the nominating, audit, or compensation committees in 2016. Eq. (5) modifies the difference-in-differences estimation of eq. (1) by testing whether the importance of *Big3* differs for firms lacking female leaders. The interaction of *NoFemaleLeader* with *Post2016* controls for secular post-2016 changes in female representation that are unrelated to Big Three ownership at such firms. We continue to adjust the standard errors for clustering at the firm level. Table 12 reports the estimates.

We find that the Big Three campaigns had greater effects on companies lacking female leaders. After 2016, one standard deviation greater Big Three ownership is associated with 0.09 additional female directors per year for companies that had a female leader in 2016 and 0.09+0.03=0.12 additional females for companies that did not have one, a 33% increase (Table 12,

column 1). Likewise, Big Three ownership is associated with a more than 69% larger increase in female directors' share among companies that lacked a female leader in 2016 (column 2).

This finding suggests that firms with female leadership are more likely to diversify their boards without pressure from shareholder advocacy. The larger impact of The Big Three campaigns at companies lacking female leaders, combined with the impact of their campaigns in elevating female directors to leadership positions (Table 8), suggests that their campaigns could also facilitate a reinforcing cycle of future diversity increases (Matsa and Miller, 2011).

5.4 A Limited Supply of Candidates?

Finally, we examine director compensation, director busyness, and mutual fund voting to assess whether a lack of female candidates was a primary reason why firms added relatively few female directors before 2017. If a shortage of candidates was the main friction, then we would expect The Big Three's campaigns to lead to female directors receiving higher compensation, being hired for multiple positions, and attracting fewer votes from non-Big Three investors.

We do not find evidence of female directors being in short supply. Despite the sharp increase in women's representation on corporate boards, the gender gaps in directors' compensation and numbers of other board seats do not decrease significantly after 2016: the overall effects, measured by the *Female×Post2016* coefficient, are small and have the opposite sign (Appendix Table A3). The differential effects on firms with greater Big Three ownership are also not statistically significant. These estimates suggest that the supply of female directors is relatively elastic (column 1) and that firms were not disproportionately hiring the same individual women (column 2). Furthermore, the newly appointed female directors were also popular with non-Big Three investors: using the ISS Voting Analytics dataset, we find that 95% of non-Big Three mutual funds cast votes in favor of newly appointed female directors after 2016, which is greater than the 91% received by newly appointed male directors (*p*-value of difference < 0.01%; see also Gow, Larcker, and Watts, 2020).

6. Conclusion

Starting in 2017, The Big Three launched public influence campaigns to encourage companies to increase the gender diversity of their boards. As part of the campaign, The Big Three voted against the reelection of directors at hundreds of companies they deemed to be making insufficient progress. We find that these campaigns had a large effect: they led firms to add at least 2.5 times as many female directors in 2019 as they did in 2016. The percentage of all public-company board seats held by women increased by almost 50% between 2016 and 2019, and our estimates imply that The Big Three's campaigns explain a third to two-thirds of this increase.

Furthermore, our estimates suggest that shareholder advocacy can expand women's participation in corporate leadership more fully than government mandates. Whereas mandates often lead to tokenism and firms hiring the same women, the Big Three's campaign led firms to elevate women's role on the board and broaden their pool of candidates.

Our results also shed light on why firms were not adding more women before The Big Three's campaigns. We find that firms' male dominated leadership and their emphasis on past executive experience, rather than a shortage of female candidates, limit the number of women directors on corporate boards. The Big Three's campaigns were effective because they got boards to consider female candidates with non-executive experience and from outside of the professional networks that current board members typically rely on. Their impact was also larger at companies lacking female leaders, which were less likely to add females before The Big Three's campaigns.

Whether female representation on corporate boards will continue to increase is less clear. Even after the large gains from The Big Three's campaigns, women still hold fewer than 1 in 5 board seats. Because women are more represented in women's networks than in men's, the recent growth in female board members could pave the way for further growth in female board membership, even without concerted investor pressure. However, even if hiring practices

prevented women from reaching 20% without pressure campaigns, a different factor could slow their further growth. For example, there being a sufficient supply of female director candidates to reach 20% does not guarantee that there is sufficient supply to reach 40%.

Nevertheless, the impact of The Big Three's campaigns suggests that their shareholdings give them important influence. Institutional investors influence governance through a combination of voice (managerial engagement and voting; e.g., Shleifer and Vishny, 1986; Admati, Pfleiderer, and Zechner, 1994) and exit (selling one's position; e.g., Admati and Pfleiderer, 2009; Edmans, 2009). However, because index funds seek to minimize deviations between their holdings and index weights, institutions that offer index funds have less ability to exit positions, which could limit their ability to influence firms (Levit, 2019). Our findings show that The Big Three can nevertheless use direct intervention to influence corporate governance by pressuring companies to adopt governance reforms that are easy to monitor at scale. These findings suggest The Big Three have the potential to steer other broad-based governance reforms that have become newer targets of their voting campaigns, such as sustainability disclosures, director overboarding restrictions, and board racial diversity (BlackRock, 2021; State Street, 2021).

The Big Three's influence also raises concerns. One-size-fits-all policy prescriptions could destroy value for some firms (Coles, et al., 2008; Duchin, et al., 2010). Such concerns are magnified if self-dealing, attracting fund flows, or staving off regulation motivate their activism (Barzuza, Curtis, and Webber, 2020; Fisch, 2020; Kahan and Rock, 2019b).

Finally, The Big Three's impact on diversity could influence how boards execute their monitoring and advisory functions and ultimately affect shareholder value, women in business more generally, and society as a whole. Sourcing female directors from outside the CEO's professional network could enhance the monitoring of management, but the new women's less connectedness to other directors could also disrupt virtuous board dynamics (Adams and Ferreira,

2009; Fracassi and Tate, 2012). Because female board members bring different values and skills than men (Adams and Funk, 2012; Kim and Starks, 2016), The Big Three's campaigns could also influence how companies are run. Although evidence from European board quotas offers clues (Matsa and Miller, 2013), the effects of investor-driven increases in gender diversity could differ from those resulting from government mandates. More diverse boards could also open other opportunities for women in business or elsewhere in society, though there is limited evidence of these broader effects to date (Ferreira, 2015; Bertrand et al., 2019). How The Big Three's campaigns and the resulting growth in female directors ultimately affect these important outcomes is an interesting topic for future research.

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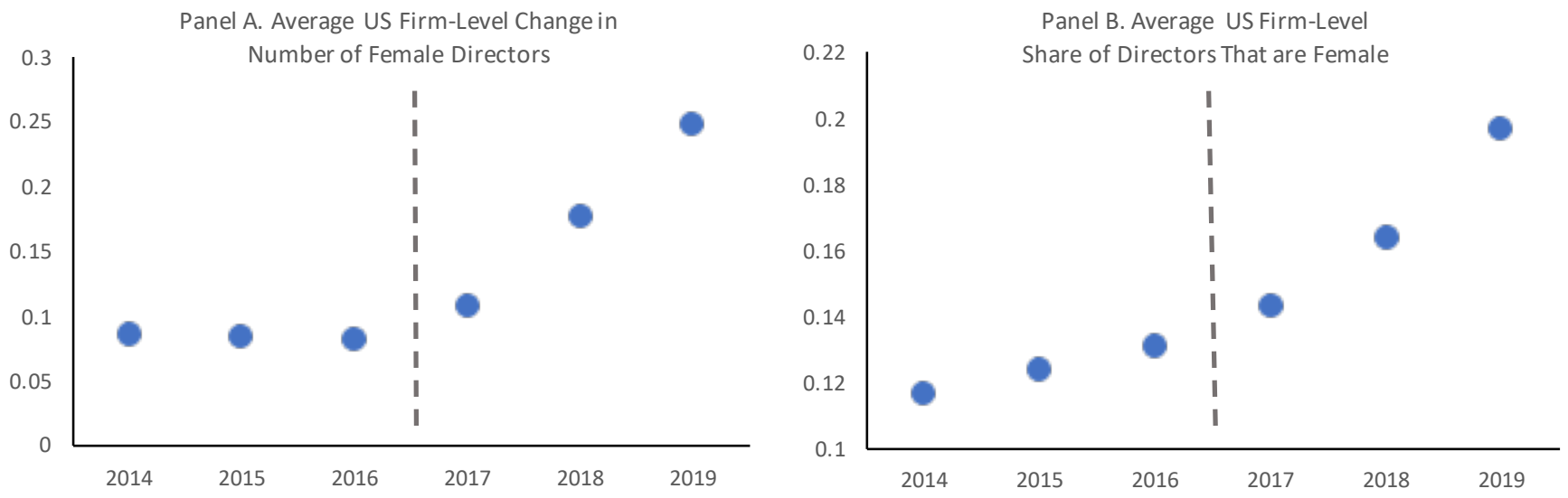

Fig. 1. Female Board Representation by Year in the US, 2014-2019

This figure plots the average annual change in the number of female directors on a firm's board (Panel A) and the average share of a firm's directors that are female (Panel B) by year in the three years before (2014-16) and three years after (2017-19) the Big Three began their gender diversity campaigns. Data on corporate board composition are from Boardex and for US firms with non-missing $Big3^{2016}$ ownership.

Table 1

Summary Statistics

This table presents summary statistics for our dependent variables and explanatory variables of interest. Variables include firm-level ownership variables in December 2016, firm-level female board representation, director-level board assignments, newly-hired director connections, newly-hired director experience, and firm-level board experience. Variable definitions and data sources are described in Table A1.

	Mean	Median	SD	*N*
Firm-level ownership				
Big3 ^{2016}	0.130	0.132	0.086	17,973
StateStreet ^{2016}	0.019	0.017	0.017	17,973
BlackRock ^{2016}	0.062	0.064	0.045	17,973
Vanguard ^{2016}	0.049	0.047	0.031	17,973
Firm-level female board representation				
Change in number of females	0.128	0	0.511	17,315
Share of directors that are newly hired females	0.025	0	0.059	17,315
Share of existing female directors that depart	0.062	0	0.201	11,667
Female director share	0.144	0.143	0.120	17,973
Indicator for >0 female directors	0.719	1	0.450	17,973
Director-level board assignment indicators				
Chairperson of any committee	0.393	0	0.488	157,662
Chairperson of nominating committee	0.100	0	0.300	157,662
Chairperson of audit committee	0.118	0	0.323	157,662
Chairperson of compensation committee	0.115	0	0.319	157,662
Chairperson of board	0.114	0	0.318	157,662
Member of nominating committee	0.388	0	0.487	157,662
Member of audit committee	0.457	0	0.498	157,662
Member of compensation committee	0.434	0	0.496	157,662
Member of executive committee	0.112	0	0.315	157,662
Newly-hired director connections				
Number of connections to existing directors	0.464	0	1.317	8,613
Indicator for connection to existing director	0.223	0	0.416	8,613
Indicator for connection to CEO	0.090	0	0.286	6,001
Indicator for being executive director	0.119	0	0.323	8,613
Newly-hired director experience				
Indicator for CEO experience	0.429	0	0.495	8,986
Indicator for board experience	0.727	1	0.446	8,986
Firm-level board experience				
Share of directors with CEO experience	0.463	0.455	0.193	17,973
Share of directors with other board experience	0.848	0.875	0.169	17,973

Table 2

Female Board Representation and Big Three Ownership During Their Campaigns

This table reports coefficients from firm-panel regressions of female board representation on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*) and an indicator for years after 2016 (*Post2016*), firm fixed effects (FE), year FE, and interactions between *Post2016* and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in a board's number of females (column 1), share of directors that are newly hired females (column 2), share of existing female directors that depart (column 3), share of directors that are female (column 4), and an indicator for having a female director (column 5). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level.

	Dependent variable				
	Change in number of females (1)	*Share of directors that are newly hired females* (2)	*Share of existing female directors that depart* (3)	*Female director share* (4)	*Indicator for > 0 female directors* (5)
$Big3^{2016} \times Post2016$	1.136***	0.117***	-0.236***	0.181***	0.572***
	(0.093)	(0.011)	(-0.056)	(0.018)	(0.068)
Year FE	X	X	X	X	X
Firm FE	X	X	X	X	X
$Zero^{2016} \times Post2016$	X	X	X	X	X
$One^{2016} \times Post2016$	X	X	X	X	X
N	17,315	17,315	11,667	17,973	17,973
R^2	0.169	0.206	0.263	0.833	0.782

Table 3

Timing of Observed Differential Trend in Female Board Representation

This table reports coefficients from firm-panel regressions of female board representation on interactions between a firm's ownership by The Big Three in 2016 (*Big3*) and indicators for each year between 2015 and 2019 (*Year=2015*, *Year=2016*, *Year=2017*, *Year=2018*, and *Year=2019*), firm fixed effects (FE), year FE, and interactions between an indicator for years after 2016 (*Post2016*) and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in a board's number of females (column 1) and share of directors that are female (column 2). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level.

	Dependent variable	
	Change in number of females (1)	*Female director share* (2)
$Big3^{2016} \times Year=2015$	0.077	0.002
	(0.161)	(0.012)
$Big3^{2016} \times Year=2016$	-0.135	-0.023
	(0.166)	(0.017)
$Big3^{2016} \times Year=2017$	0.911***	0.072***
	(0.171)	(0.022)
$Big3^{2016} \times Year=2018$	1.191***	0.193***
	(0.170)	(0.025)
$Big3^{2016} \times Year=2019$	1.282***	0.278***
	(0.190)	(0.028)
Year FE	X	X
Firm FE	X	X
$Zero^{2016} \times Post2016$	X	X
$One^{2016} \times Post2016$	X	X
N	17,315	17,973
R^2	0.170	0.839

Table 4

Female Board Representation by Campaign Year and Big Three Asset Manager Ownership

This table reports coefficients from firm-panel regressions of female board representation on interactions between a firm's ownership by State Street, Vanguard, and BlackRock in 2016 and indicators for the year 2017 (*Year=2017*) and the years 2018-19 (*Year=2018-19*), firm fixed effects (FE), year FE, and interactions between the post-campaign year dummies and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in a board's number of females (column 1) and share of directors that are female (column 2). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level.

	Dependent variable	
	Change in number of females (1)	*Female director share* (2)
$StateStreet^{2016} \times Year=2017$	5.463***	0.133
	(1.537)	(0.122)
$StateStreet^{2016} \times Year=2018\text{-}19$	4.100***	0.379***
	(0.816)	(0.131)
$Vanguard^{2016} \times Year=2017$	0.656	0.086
	(0.678)	(0.068)
$Vanguard^{2016} \times Year=2018\text{-}19$	1.284**	0.256***
	(0.513)	(0.085)
$BlackRock^{2016} \times Year=2017$	-0.263	0.059
	(0.381)	(0.041)
$BlackRock^{2016} \times Year=2018\text{-}19$	0.364	0.187***
	(0.326)	(0.054)
Year FE	X	X
Firm FE	X	X
$Zero^{2016} \times Year=2017$	X	X
$Zero^{2016} \times Year=2018\text{-}19$	X	X
$One^{2016} \times Year=2017$	X	X
$One^{2016} \times Year=2018\text{-}19$	X	X
N	17,315	17,973
R^2	0.171	0.835

Table 5

Heterogeneity with Respect to Firms Targeted

This table estimates the differential post-campaign change in female board representation for firms targeted by State Street and BlackRock. Columns (1) and (4) report coefficients from firm-panel regressions of female board representation on interactions between a firm's ownership by State Street in 2016 (*StateStreet*), an indicator for years after 2016 (*Post2016*), and an indicator for having no female directors in 2016 (*Zero*). Columns (2) and (5) report coefficients from firm-panel regressions of female board representation on interactions between a firm's ownership by BlackRock in 2016 (*BlackRock*), an indicator for years after 2017 (*Post2017*), and an indicator for having less than two female directors in 2016 (*LessTwo*). Each estimation also includes firm fixed effects (FE), year FE, and interactions between the post-campaign year indicator and indicators for having zero (*Zero*) and one (*One*) female director in 2016. Columns (3) and (6) include all explanatory variables. The dependent variables are the change in a board's number of females (columns 1-3) and share of directors that are female (columns 4-6). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

	Dependent variable					
	Change in number of females			*Female director share*		
	(1)	(2)	(3)	(4)	(5)	(6)
$StateStreet^{2016} \times Post2016$	5.700***		5.242***	0.615***		0.407***
	(0.583)		(0.629)	(0.101)		(0.097)
$StateStreet^{2016} \times Post2016 \times Zero^{2016}$	2.716**		1.317	0.962***		0.476*
	(1.097)		(1.169)	(0.241)		(0.244)
$BlackRock^{2016} \times Post2017$		0.811**	0.107		0.234***	0.165***
		(0.388)	(0.409)		(0.063)	(0.061)
$BlackRock^{2016} \times Post2017 \times LessTwo^{2016}$		1.060**	0.798*		0.188**	0.160**
		(0.455)	(0.472)		(0.075)	(0.075)
Year FE	X	X	X	X	X	X
Firm FE	X	X	X	X	X	X
$Zero^{2016} \times Post2016$	X		X	X		X
$One^{2016} \times Post2016$	X		X	X		X
$Zero^{2016} \times Post2017$		X	X		X	X
$One^{2016} \times Post2017$		X	X		X	X
N	17,315	17,315	17,315	17,973	17,973	17,973
R^2	0.170	0.151	0.171	0.832	0.834	0.835

Table 6

Robustness to Controlling for Differential Trends with Respect to Firm Size

This table reports coefficients from firm-panel regressions of female board representation on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*) and an indicator for years after 2016 (*Post2016*), firm fixed effects (FE), year FE, and interactions between *Post2016* and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in a board's number of females (columns 1-3) and share of directors that are female (columns 4-6). Columns (1) and (4) include a control for log market cap in 2016 interacted with *Post2016*. Columns (2) and (5) include a control for log assets in 2016 interacted with *Post2016*. Columns (3) and (6) include a control for log sales in 2016 interacted with *Post2016*. The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level.

	Dependent variable					
	Change in number of females			*Female director share*		
	(1)	(2)	(3)	(4)	(5)	(6)
$Big3^{2016} \times Post2016$	0.524***	0.704***	0.810***	0.101***	0.137***	0.125***
	(0.121)	(0.107)	(0.110)	(0.021)	(0.019)	(0.020)
Year FE	X	X	X	X	X	X
Firm FE	X	X	X	X	X	X
$Zero^{2016} \times Post2016$	X	X	X	X	X	X
$One^{2016} \times Post2016$	X	X	X	X	X	X
$Ln(MarketCap^{2016}) \times Post2016$	X			X		
$Ln(Assets^{2016}) \times Post2016$		X			X	
$Ln(Sales^{2016}) \times Post2016$			X			X
N	17,315	17,195	16,728	17,973	17,852	17,325
R^2	0.172	0.171	0.168	0.834	0.833	0.833

Table 7

Robustness to Controlling for Differential Trends with Respect to Industry and Firm Culture

This table reports coefficients from firm-panel regressions of female board representation on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*) and an indicator for years after 2016 (*Post2016*), firm fixed effects (FE), year FE, and interactions between *Post2016* and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in a board's number of females (columns 1-4) and share of directors that are female (columns 5-8). Columns (1) and (5) include controls for the interaction between *Post2016* and an indicator for whether the firm operates in an industry flagged as a business-to-consumer industry by Delgado and Mills (2020). Columns (2) and (6) include controls for the interaction between *Post2016* and 4-digit SIC industry fixed effects. Columns (3)-(4) and (7)-(8) restrict the sample to non-missing data on how female friendly a firm's culture was in 2016 (*Diversity Strengths* and *Diversity Concerns*), and columns (4) and (8) include controls for the interaction between *Post2016* and measures of how female friendly a firm's culture was in 2016. The sample is restricted to firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level.

	Dependent variable							
	Change in number of females				*Female director share*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Big3^{2016} \times Post2016$	1.106***	1.089***	0.675***	0.581***	0.173***	0.184***	0.063**	0.070***
	(0.097)	(0.100)	(0.165)	(0.163)	(0.019)	(0.019)	(0.027)	(0.026)
Year FE	X	X	X	X	X	X	X	X
Firm FE	X	X	X	X	X	X	X	X
$Zero^{2016} \times Post2016$	X	X	X	X	X	X	X	X
$One^{2016} \times Post2016$	X	X	X	X	X	X	X	X
Indicator for Business-to-Consumer Industry × Post2016	X				X			
4-digit SIC industry FE × *Post2016*		X				X		
$Diversity\ Strengths^{2016} \times Post2016$				X				X
$Diversity\ Concerns^{2016} \times Post2016$				X				X
Sample Restricted to Obs. w/ Non-missing Diversity Data			X	X			X	X
N	16,101	17,177	9,972	9,972	16,726	17,825	10,247	10,247
R^2	0.175	0.196	0.146	0.151	0.834	0.848	0.823	0.825

Table 8

Representation on Board Committees, Gender, and Big Three Ownership

This table reports coefficients from director-panel regressions of board committee assignments on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*), an indicator for years after 2016 (*Post2016*), and an indicator for the director being a female (*Female*). The estimations also include firm-year fixed effects (FE) and controls for *Female*, *Female* × *Big3,* and *Female* × *Post2016*. The dependent variables are indicators for being chairperson of any committee (column 1), the nominating committee (column 2), audit committee (column 3), compensation committee (column 4), or board (column 5), and indicators for being a member of the nominating, audit, compensation, or executive committees (columns 6-9). The sample includes director-firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

	Dependent variable								
	Indicator for being chairperson of…					*Indicator for being member of…*			
	Any cmte. (1)	*Nom. cmte.* (2)	*Audit cmte.* (3)	*Comp. cmte.* (4)	*Board* (5)	*Nom. cmte.* (6)	*Audit cmte.* (7)	*Comp. cmte.* (8)	*Executive cmte.* (9)
$Big3^{2016} \times Female \times Post2016$	0.270***	0.114*	0.130**	0.038	0.037	0.173**	0.013	0.112	0.043
	(0.099)	(0.061)	(0.062)	(0.061)	(0.039)	(0.087)	(0.092)	(0.093)	(0.048)
Female × Post2016	-0.025***	-0.001	-0.021***	0.004	-0.006**	0.001	-0.005	-0.005	0.009***
	(0.008)	(0.005)	(0.005)	(0.005)	(0.003)	(0.007)	(0.008)	(0.007)	(0.003)
$Female \times Big3^{2016}$	-0.279***	-0.076	-0.069	-0.094	-0.098**	-0.105	-0.006	0.052	-0.156***
	(0.103)	(0.066)	(0.075)	(0.068)	(0.047)	(0.096)	(0.111)	(0.104)	(0.058)
Female	-0.010	0.008	0.000	-0.009	-0.095***	0.065***	0.060***	0.038***	-0.055***
	(0.008)	(0.006)	(0.006)	(0.006)	(0.004)	(0.008)	(0.009)	(0.009)	(0.005)
Firm-Year FE	X	X	X	X	X	X	X	X	X
N	157,662	157,662	157,662	157,662	157,662	157,662	157,662	157,662	157,662
R^2	0.065	0.041	0.016	0.023	0.028	0.193	0.064	0.092	0.439

Table 9

Connections of Newly Appointed Directors, Gender, and Big Three Ownership

This table reports coefficients from director-panel regressions of connections between newly appointed directors and the existing board on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*), an indicator for years after 2016 (*Post2016*), and an indicator for the director being a female (*Female*). The estimations also include firm-year fixed effects (FE) and controls for *Female*, *Female* × *Big3,* and *Female* × *Post2016*. The dependent variables are the number of connections to existing directors at the time of appointment (column 1), indicators for being connected to an existing director on the board (column 2) or CEO (column 3) at time of appointment, and an indicator for being an executive at the firm (column 4). The sample includes director-firm-year observations for all newly appointed directors from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

	Dependent variable			
	Number of connections to existing directors (1)	*Indicator for connection to existing director* (2)	*Indicator for connection to CEO* (3)	*Indicator for being executive director* (4)
Female × *Big3* ^{2016} × *Post2016*	-1.654**	-0.594*	-0.785***	-0.202
	(0.795)	(0.310)	(0.246)	(0.253)
Female × *Post2016*	0.055	0.059**	0.032	-0.018
	(0.072)	(0.026)	(0.021)	(0.020)
Female × *Big3* ^{2016}	1.720***	0.467*	0.565***	-0.074
	(0.582)	(0.241)	(0.201)	(0.211)
Female	-0.212***	-0.106***	-0.076***	-0.110***
	(0.053)	(0.021)	(0.016)	(0.016)
Firm-Year FE	X	X	X	X
N	8,613	8,613	6,001	8,613
R^2	0.632	0.509	0.550	0.362

Table 10

Experience of Newly Appointed Directors, Gender, and Big Three Ownership

This table reports coefficients from director-panel regressions of newly appointed directors' past work experience on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*), an indicator for years after 2016 (*Post2016*), and an indicator for the director being a female (*Female*). The estimations also include firm-year fixed effects (FE) and controls for *Female*, *Female* × *Big3,* and *Female* × *Post2016*. The dependent variables are indicators for having past CEO (column 1) or board (column 2) experience at time of appointment. The sample includes director-firm-year observations for all newly appointed directors from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

	Dependent variable	
	Indicator for CEO experience (1)	*Indicator for board experience* (2)
$Female \times Big3^{2016} \times Post2016$	-0.680*	-0.113
	(0.374)	(0.381)
$Female \times Post2016$	-0.005	-0.011
	(0.031)	(0.030)
$Female \times Big3^{2016}$	0.326	0.141
	(0.289)	(0.320)
Female	-0.158***	-0.072***
	(0.023)	(0.024)
Firm-Year FE	X	X
N	8,986	8,986
R^2	0.416	0.460

Table 11

Average Board Experience and Big Three Ownership During Their Campaigns

This table reports coefficients from firm-panel regressions of average board experience on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*) and an indicator for years after 2016 (*Post2016*), firm fixed effects (FE), year FE, and interactions between *Post2016* and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the share of directors with CEO experience (column 1) and share of directors with experience on another board (column 2). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level.

	Dependent variable	
	Share of directors with CEO experience	*Share of directors with other board experience*
	(1)	(2)
$Big3^{2016} \times Post2016$	-0.082***	0.009
	(0.025)	(0.022)
Year FE	X	X
Firm FE	X	X
$Zero^{2016} \times Post2016$	X	X
$One^{2016} \times Post2016$	X	X
N	17,973	17,973
R^2	0.859	0.837

Table 12

Heterogeneity with Respect to Female Representation in Leadership Position

The table reports coefficients from firm-panel regressions of female board representation on interactions between a firm's ownership by The Big Three in 2016 (*Big3*), an indicator for years after 2016 (*Post2016*), and an indicator for having not having a female in a key leadership position in 2016 (*NoFemaleLeader*). *NoFemaleLeader* is an indicator for companies without a female CEO or a female on the nominating, audit, or compensation committees in 2016. Each estimation also includes firm fixed effects (FE), year FE, and interactions between *Post2016* and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in the number of female directors since the previous year (column 1) and share of directors that are female (column 2). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

	Dependent variable	
	Change in number of females (1)	*Female director share* (2)
$Big3^{2016} \times Post2016$	1.002***	0.146***
	(0.126)	(0.023)
$Big3^{2016} \times Post2016 \times NoFemaleLeader^{2016}$	0.339*	0.101**
	(0.183)	(0.037)
Year FE	X	X
Firm FE	X	X
$Zero^{2016} \times Post2016$	X	X
$One^{2016} \times Post2016$	X	X
$NoFemaleLeader^{2016} \times Post2016$	X	X
N	17,315	17,973
R^2	0.168	0.835

Table A1 – Variable Definitions

Variable Names	Definitions
Assets^{2016}	Total assets measured 2016 fiscal year end, from Compustat.
Big3^{2016}	Share of the firm owned by the Big 3 institutions: sum of StateStreet^{2016}, BlackRock^{2016} and Vanguard^{2016}. Specifically, we compute ownership at the security level (permno) and aggregate to the firm level (permco).
BlackRock^{2016}	Blackrock's ownership in a firm (from Thomson Reuters 13F) divided by its market value of equity (from CRSP) measured at the end of 2016.
CaliforniaHQ	Indicator for firm is headquartered in California, from Compustat.
Change in number of females	Net increase in the number of females on the board relative to the previous year. Source: Boardex
Diversity concerns^{2016}	Average concerns rating on firm's diversity in 2016, from MSCI.
Diversity strengths^{2016}	Average strengths rating on firm's diversity in 2016, from MSCI.
Female	Indicator for board member is female. Source: Boardex
Female director share	Number of female directors on the board scaled by board size. Source: Boardex
Indicator for > 0 Female Directors	Indicator for firm has at least one female director. Source: Boardex
Indicator for B2C industry	Indicator for 6-digit NAICS code industries with at least 35% of output sold as Personal Consumption Expenditure (PCE), classified based on the 2002 U.S. benchmark input-output (IO) accounts of the Bureau of Economic Analysis. Source: Delgado and Mills (2020)
Indicator for being executive director	Indicator for director is an executive in the company. Source: Boardex
Indicator for board experience	Indicator for director had prior experience as a director on a board (of a public or private company). Source: Boardex
Indicator for CEO experience	Indicator for director had prior experience as a CEO. Source: Boardex
Indicator for chairperson of board	Indicator for director is board chair. Source: Boardex
Indicator for chairperson of any committee	Indicator for director is a chair of a board committee. Source: Boardex
Indicator for chairperson of audit committee	Indicator for director is a chair of audit committee. Source: Boardex
Indicator for chairperson of compensation committee	Indicator for director is a chair of compensation committee. Source: Boardex
Indicator for chairperson of nominating committee	Indicator for director is a chair of nominating committee. Source: Boardex

Indicator for connection to CEO	Indicator for newly hired director is connected to the focal firm's CEO, where connections are defined using education and past employment following Fracassi and Tate (2012). Source: Boardex
Indicator for connection to existing director	Indicator for newly hired director is connected to an existing director at the focal firm, where connections are defined using education and past employment following Fracassi and Tate (2012). Source: Boardex
Indicator for member of audit committee	Indicator for director sits on the audit committee. Source: Boardex
Indicator for member of compensation committee	Indicator for director sits on the compensation committee. Source: Boardex
Indicator for member of executive committee	Indicator for director sits on the executive committee. Source: Boardex
Indicator for member of nominating committee	Indicator for director sits on the nominating committee. Source: Boardex
LessTwo^{2016}	Indicator for firm has less than two female board members at 2016 fiscal year end. Source: Boardex
Ln(Compensation)	Log of director's total compensation. Source: Execucomp.
MarketCap^{2016}	Market value of equity measured end of December 2016, from CRSP.
NoFemaleLeader^{2016}	Indicator that equals zero if the firm has a female CEO or at least one female director on the nominating, audit, or compensation committee in 2016. The indicator equals one otherwise. Source: Boardex
Number of connections to existing directors	Number of existing directors connected to the newly hired director, where connections are defined using education and past employment following Fracassi and Tate (2012). Source: Boardex
One^{2016}	Indicator for firm has one female board member in 2016 fiscal year end. Source: Boardex
Post2016	Indicator for year greater than 2016.
Post2017	Indicator for year greater than 2017.
Sales^{2016}	Sales measured 2016 fiscal year end, from Compustat.
Share of directors that are newly hired females	Number of female directors on the board this year, not on the board in the previous year, scaled by the total number of directors on the board in the prior year. Source: Boardex
Share of directors with director experience	Number of directors on the board with director experience at another company scaled by board size. Source: Boardex
Share of existing directors that depart	Share of female directors who were on the board in the previous year that are no longer on the board. Source: Boardex
StateStreet^{2016}	State Street's ownership in a firm (from Thomson Reuters 13F) divided by its market value of equity (from CRSP) measured at the end of 2016.

Vanguard^{2016}	Vanguard's ownership in a firm (from Thomson Reuters 13F) divided by its market value of equity (from CRSP) measured at the end of 2016.
Zero^{2016}	Indicator for firm has zero female board members in 2016 fiscal year end. Source: Boardex

Table A2

Robustness to Controlling for Differential Trends Based on Being Headquartered in California

This table reports coefficients from firm-panel regressions of female board representation on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*) and an indicator for years after 2016 (*Post2016*), firm fixed effects (FE), year FE, and interactions between *Post2016* and indicators for having zero (*Zero*) and one (*One*) female director in 2016. The dependent variables are the change in a board's number of females (columns 1-2) and share of directors that are female (columns 3-4). Columns (2) and (4) include interactions between an indicator for being headquartered in California (*CaliforniaHQ*) and indicators for each year between 2015 and 2019 (*Year=2015*, *Year=2016*, *Year=2017*, *Year=2018*, and *Year=2019*). The sample includes firm-year observations from 2014 to 2019. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level.

	Dependent variable			
	Change in number of females		*Female director share*	
	(1)	(2)	(3)	(4)
$Big3^{2016} \times Post2016$	1.136***	1.143***	0.181***	0.181***
	(0.093)	(0.093)	(0.018)	(0.018)
CaliforniaHQ × Year=2015		-0.013		0.001
		(0.034)		(0.003)
CaliforniaHQ × Year=2016		-0.036		0.000
		(0.036)		(0.004)
CaliforniaHQ × Year=2017		0.010		0.007
		(0.036)		(0.004)
CaliforniaHQ × Year=2018		-0.096***		0.006
		(0.032)		(0.005)
CaliforniaHQ × Year=2019		0.168***		0.031***
		(0.044)		(0.005)
Year FE	X	X	X	X
Firm FE	X	X	X	X
$Zero^{2016} \times Post2016$	X	X	X	X
$One^{2016} \times Post2016$	X	X	X	X
N	17,315	17,281	17,973	17,935
R^2	0.169	0.172	0.833	0.834

Table A3

Tests for Evidence of Limited Supply Explanation

This table reports coefficients from director-panel regressions of directors' compensation and number of other board seats on an interaction between a firm's ownership by The Big Three in 2016 (*Big3*), an indicator for years after 2016 (*Post2016*), and an indicator for the director being female (*Female*). The estimations also include firm-year fixed effects (FE) and controls for *Female*, *Female* × *Big3,* and *Female* × *Post2016*. The dependent variables are Ln(compensation) (column 1) and number of other board seats held at time of appointment to the current board (column 2). The sample in column 1 includes all director-firm-year observations from 2014 to 2019. Following Field, Yore, and Souther (2020), we restrict the sample to directors that were appointed more than a year ago to avoid any pro-rated compensation packages. The sample in column 2 is restricted to director-firm-year observations for all newly appointed directors. Standard errors, which are adjusted for clustering at the firm level, are reported in parentheses. All variables are defined in Table A1. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

	Dependent variable	
	Ln(Compensation) (1)	*Number of other board seats at time of joining* (2)
Female × *Big3* ^{2016} × *Post2016*	0.089	0.252
	(0.093)	(1.409)
Female × *Post2016*	-0.009	-0.128
	(0.008)	(0.117)
Female × *Big3* ^{2016}	-0.221*	1.381
	(0.101)	(1.125)
Female	-0.019**	-0.110
	(0.009)	(0.091)
Firm-Year FE	X	X
N	61,724	8,783
R^2	0.769	0.454

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