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Abstract

Globally, women's share in corporate leadership has been steadily rising, including in India. The female director mandate under The Companies Act (2013) in India marked a significant step toward gender-inclusive corporate leadership, requiring listed firms to have at least one woman on their board. Within a year, the percentage of listed firms without women on board plummeted from 53 percent to less than 10 percent. Despite this progress, India still lags in the share of women in middle and senior management roles at only 17 percent, compared to nearly 33 percent for the world.

This paper documents the status of gender-inclusive corporate leadership and uses the woman director mandate in the Act to study its relationship with firm outcomes, including financial performance and corporate culture in India. Interestingly we find that firms, on average, were appointing more women than mandated by the Act, suggesting the favorable impact of the current government's signal to foster women-led development and the positive experience gained by firms. At the same time, newly appointed women were younger and more educated than their male counterparts and their average directorship "stretch factor" increased significantly compared to men.

Combining personnel-level data from NSE-listed firms with firm performance data and employing a reverse difference-in-difference econometric strategy, we find that having at least one woman on board is associated with higher economic performance, financial stability, and lower financial risk. Additionally, using almost 400,000 employee reviews scraped from a company review platform, we find that higher shares of women in board positions correlate positively with employee ratings and sentiment scores only when firms also hire women in top management positions. This analysis highlights the business case of appointing more women at the top.

Keywords: Women's Leadership, Firm Performance, Firm Culture

JEL Classification: J16, L25, M59

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1. Introduction

Recognizing the wide gender disparities globally, the 2023 G20 leaders' declaration in New Delhi, highlighted the importance of women-led development and women's economic empowerment. Promoting female leaders across sectors is a priority in Indian national economic policy. Several initiatives have been taken to bridge these gaps, including mandating Indian companies to appoint at least one female director. This paper focuses on assessing whether this mandate has been successful and, more generally, whether women in top positions in corporate India have increased as well. In addition, we also explore whether such increases have gone hand-in-hand with better firm performance and firm culture.

The share of women directors in corporate India at 17 percent is lower than the global average of nearly 20 percent, and substantially lower than the best-performing country, France, at over 43 percent. The number of women in chair positions decreased between 2018 and 2021 (Deloitte, 2022).

Furthermore, India lags in terms of representation of women in middle and senior management positions, with a share of only 17 percent (ILOSTAT, 2024). For context, the average share of women in senior and middle management positions is 32.4 percent for advanced economies, and 32.8 percent for the world.

In this paper, we answer three questions on women's leadership in response to this Act. First, we study the evolution of board gender composition for NSE-listed firms in India. Specifically, we explore whether the enforcement of the woman director mandate under The Companies Act (2013) reflects genuine change or if it merely represents tokenism within boards. Relatedly, we also explore whether there have been positive spillovers to appointing more women in management positions. Second, we attempt to find a causal relationship, using a reverse "difference in difference" econometric strategy between the share of women on boards and firms' financial performance, in terms of profits, returns, and financial stability. For this, we use three different measures of returns and debt-to-equity ratio as an indicator for financial stability. Third, we use rich text data on company reviews by employees to study the association between the share of women on boards and firm culture. We quantify firm culture by analyzing about 400,000 employee ratings and sentiment scores based on reviews posted on AmbitionBox¹.

There are three main findings of this paper. First, after the implementation of the Companies Act in 2014, women's share on boards in NSE-listed firms increased by 9.4 percentage points over the next seven years, reaching 17.1 percent in 2021. At the same time, we also find that women hired as directors after this mandate were younger and more educated than their male counterparts. These women held a greater number of directorships across firms and the gender gaps in board meetings attendance fell. There were little spillovers in terms of increasing managerial roles for women.

Second, we find that the presence of women on boards led to better financial performance for the large and medium cap firms but not for the small cap firms. For the larger firms, we show that in the years following the mandate enforcement, firms saw a positive change in financial indicators which was sustained over time. Specifically, we

¹ Data scraped from AmbitionBox was also used in Chakraborty and Mahajan (2023), to analyze the number of benefits provided to employees by different firms.

find that having at least one woman on boards yielded better returns by three different measures and greater financial stability measured by debt-equity ratio for the larger firms.

Third, we find that higher shares of women in board positions are positively associated with employee ratings and sentiment scores, but only for firms with at least one woman in top management.

The organization of this paper is as follows: In Section 2, we specify how our paper contributes to the existing literature. In Section 3, we present stylized facts on female leadership in corporate India, covering both directorship and management positions over time, and relative to other countries. In Section 4, we explore the relationship between gender gaps in director positions and firm-level financial performance. In Section 5, we ask whether having more women in director and top management positions is associated with better organizational culture. In Section 6, we present the conclusions of the paper. The final section proposes policy recommendations based on the analysis in this paper. From a policy perspective, these results help make a business case for hiring more women at the top.

2. Contribution to the Existing Literature

This paper contributes to the existing literature in several ways. As a starting point, we combine several novel data sources to construct a comprehensive database on the gender composition in boards and key managerial positions, firm performance, and organizational culture. We focus on firms listed in the National Stock Exchange (NSE) for the period 2006-2023. To study firm performance, we combine firm-level panel data on leadership personnel with financial performance data collected from annual financial statements. To quantify and study organization culture, we built a novel database by scraping text information presented in company reviews by their employees, and using the corresponding sentiment scores and employee ratings to proxy for firm culture. Second, we systematically establish a positive causal relationship between female leadership and firm level financial outcomes, which has been elusive in most of the existing national literature and scarce in the global literature. We do this by identifying an exogenous shock to Indian companies that made it mandatory to hire at least one woman on the company's board and by exploiting the quasi-random variation in the share of women on boards following this mandate. Third, we explore and find that inclusive firm culture, as measured directly by employee reviews collected from an independent source, is associated with the presence of women directors on boards, but only when accompanied by the presence of women in top management positions.

There is a growing literature on the role of women leaders on firm performance, but the evidence has been mixed. Global evidence suggests that more female directors on board improves financial performance (Credit Suisse, 2012; Catalyst, 2014; Christiansen and others, 2016; Sahay and Cihak, 2018), but others find that the impact on firm performance is either negative (Adams and Ferreira, 2009; Ahern and Dittmar, 2012; Matsa and Miller, 2013), or zero (Bertrand et al, 2019).

With regard to India, the evidence until very recently has been mixed as well. While some studies (albeit with a smaller sample size of firms) find that a greater gender diversity on board is positively associated firm performance (Chatterjee and

Nag, 2022; Duppati et. al., 2019; Roy, 2023), other studies find a negative association between female leadership and firm performance, which they argue is due to an increase in the agency cost following the appointment of a female CEO (Jadiyappa, 2019). These mixed results can be explained by the endogenous selection of women into different types of firm, leading to a biased inference (Rob and Wattson, 2012). Jain (2022) and Roy (2023) argue that the performance depends on the gender norms in states of India where these firms are located. A shortcoming of these studies is that the relationship between female leadership and firm performance remains endogenous.

In this paper, we put together a large panel of most Indian firms listed on the National Stock Exchange (NSE) as of 2023 which includes both financial and non-financial firms. Controlling for several demographic factors at the firm level, we use the quasi-random variation in the appointment of women directors, to explain the differences in firm performance which depend on the gender gap in board directors.

The literature on female leadership and firm culture is scarce. At the global level, Callahan et. al. (2024) found a positive (albeit nuanced) relationship between higher shares of women on boards and the enactment of human capital development policies that benefit firm employees for a sample of S&P 1500 firms based in the US. With regard to India, we are not aware of any papers that directly look at the relationship between higher shares of women in leadership positions and firm culture, as measured by employee sentiments.

Two recent papers by Biswas (2023) and Dhar (2023) respectively, have also exploited the Company's Act 2013 to establish a relationship between female leadership and firm performance. Their results confirm our findings. Dhar (2023) exploits the variation in women's representation in boards pre-mandate as an instrumental variable to find a positive impact of including women on boards on firm's financial performance. She also identifies firm culture indirectly by looking at firm's expenditure on staff welfare and training. Biswas et. al. (2023) finds that higher network centrality of women (i.e. their connectedness) on boards is associated with higher firm value, through their information advantage and women director networks. Our work extends the understanding of this relationship in several ways using a methodology that allows us to understand the average effect of women's representation in firms that had to respond to this policy, allowing for changes in other characteristics within the firm due to women's representation and this policy. We also consider other measures of financial performance and firm culture. First, in our paper, we also find evidence for the hypothesis that women contribute to greater financial stability of firms by analyzing the debt-equity ratio of firms. Second, we explore firm culture directly by quantifying employee ratings and sentiment scores, which is collected from employee reviews from an independent online platform. We also look at whether having more women directly has spillover effects in the appointment of more women managers in leadership positions. Finally, our findings are consistent with Biswas et. al (2023) in that we also find an increase in the number of other directorships held by women following the enforcement of the woman director mandate, which may be an important channel underlying our results on the positive impact of increased representation of women relative to men on firm performance, through increased network that women bring in relative to men.²

² This is discussed in more detail in Section 0 of this paper.

Box 1: The Companies Act (2013)

The Companies Act (2013) was passed by the parliament and approved by the President of India on the 29th of August, 2013. Some of its provisions were implemented by a notification published on the 12th of September, 2013. The initial deadline imposed by the Securities and Exchange Board of India (SEBI) for meeting the mandate around women directors was October 2014. This deadline was later pushed to the 1st of April 2015.

As per the Companies Act, 2013, it is mandatory to appoint at least one woman on board in certain types of companies. The penalty for non-compliance of provision extends to a fine of Rs. 10,000 with a further fine of Rs. 1,000 per day if the contravention continues. A woman director has to play the role like any other director. Women directors can hold a maximum of twenty directorships that includes the sub-limit of ten public companies. Any contravention on this part shall be subjected to a fine ranging between Rs. 5,000-Rs. 25,000.

A woman director may leave the company for any reason such as resignation, removal, automatic vacation or retirement by rotation before the expiry of her term as a Director. The Board of Directors must fulfil this vacancy known as intermittent vacancy within a period of three months. In case of an absence of a woman director for a period of not less than three months, the board must appoint an alternative director to ensure the smooth functioning of the company. The alternative director shall leave the firm after the return of the woman director. In case there are more than one woman on the board, it is optional for the company to appoint an alternative director. A woman director can hold the position of director until the next Annual General Meeting from the date of appointment. She is also entitled to seek for reappointment at the general meeting. The tenure of women director is liable to retirement by rotation similar to other directors. Like any other director, a woman director can also tender her resignation any time before the expiry of her term by giving a notice to the company.

A company, whether a public company or a private company, will be required to appoint at least one woman on board if it fulfils any of the following criteria: (1) it is a company whose securities are listed on any stock exchange; (2) it is a company with a paid-up capital of rupees one hundred crore or more and a turnover of rupees three hundred crores or more.

3. Gender Gaps in Corporate Leadership—Stylized Facts

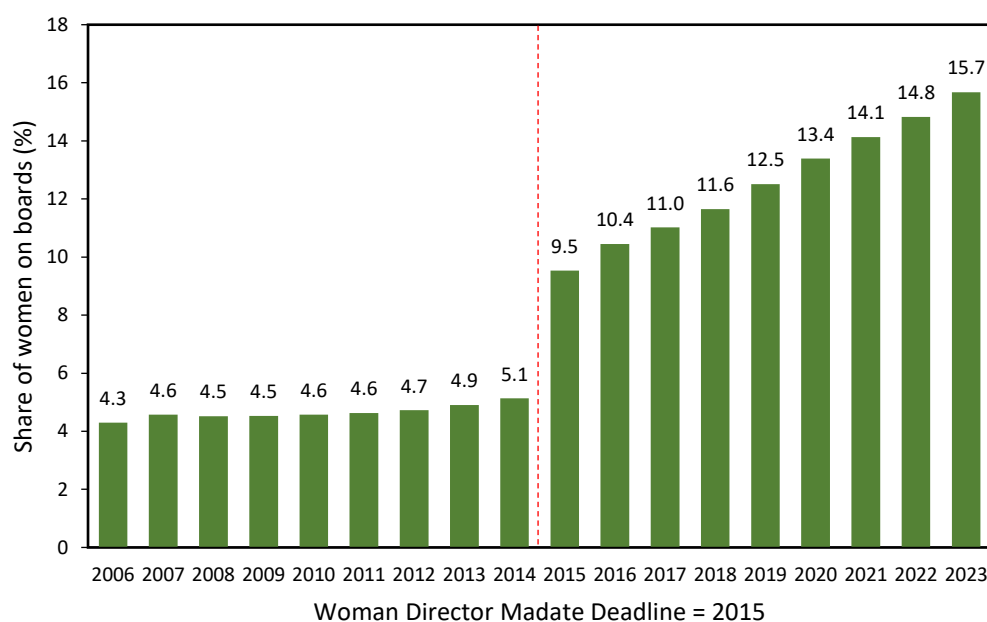
As compared to other parts of the world, the share of women directors in corporate India at 17 percent is lower than the global average of nearly 20 percent, and substantially lower than the best-performing country (France) at over 43 percent. The number of women in chair positions decreased between 2018 and 2021 (Deloitte, 2022).

We first look at the trends in female directorship in India before and after the implementation of the Company's Act (2013), and then explore whether there has been a positive spillover of hiring women in boards under the Company's Act (2013) on top management positions in firms.

3.1. How did the Board and Management Gender Composition Evolve?

Although the Companies Act was officially implemented in 2013, the deadline for meeting the woman director mandate was set for April 1 2015. Figure 1 shows a jump in the share of women in boards in 2015. This step-increase was observed for both financial and non-financial firms. This is shown in Appendix II, Figure A1.

Figure 1: SHARE OF WOMEN ON BOARDS



Source: PRIME Database

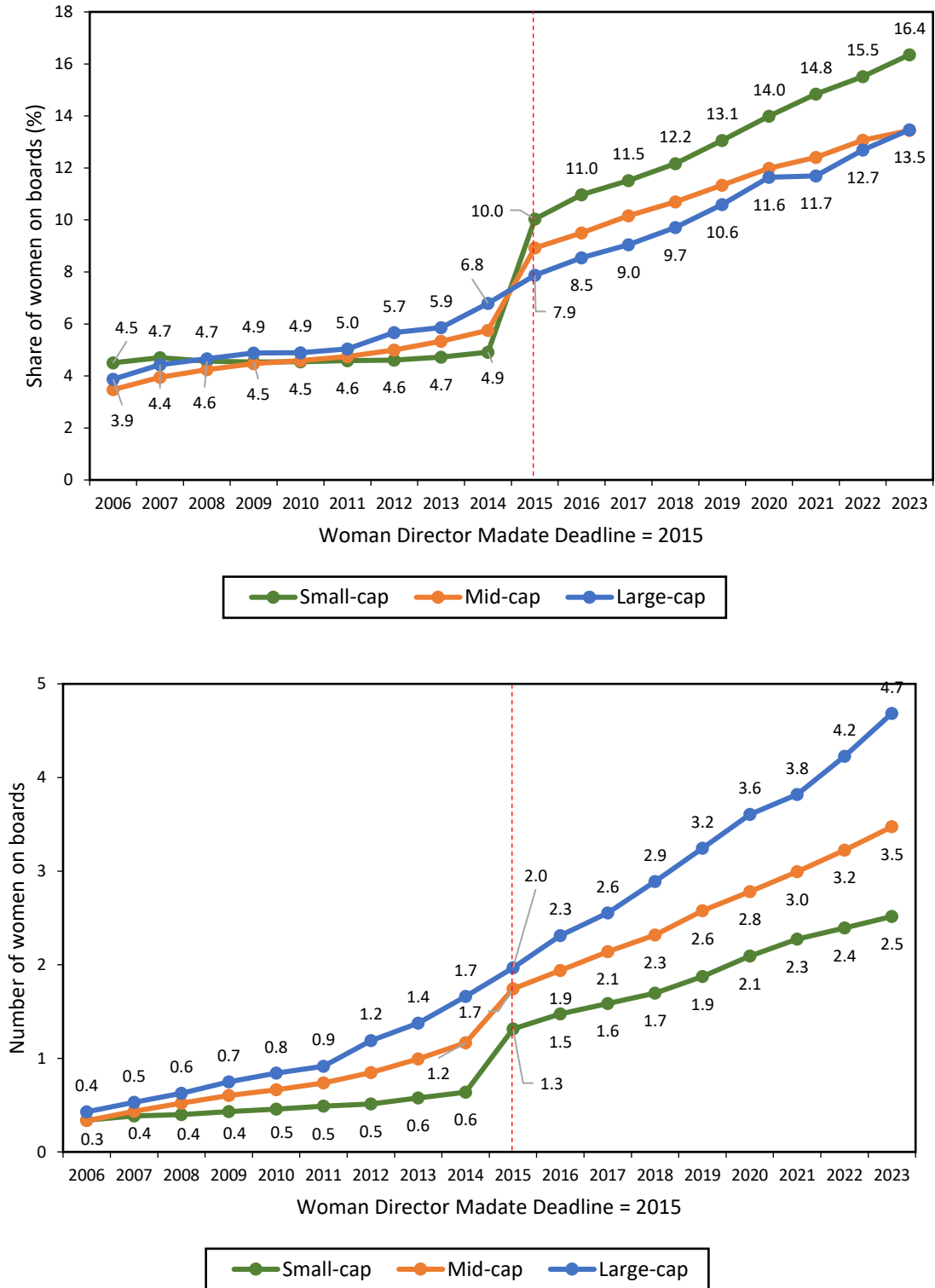
Younger firms established after liberalization in India (in 1991) have a higher share of women in leadership positions, for both boards and top management. In fact, for top management positions, this difference was almost 10 percentage points in 2023. This indicates that younger firms are embracing diversity more often than older firms, which appear to exhibit more rigid cultural norms (Appendix II, Figure A2).

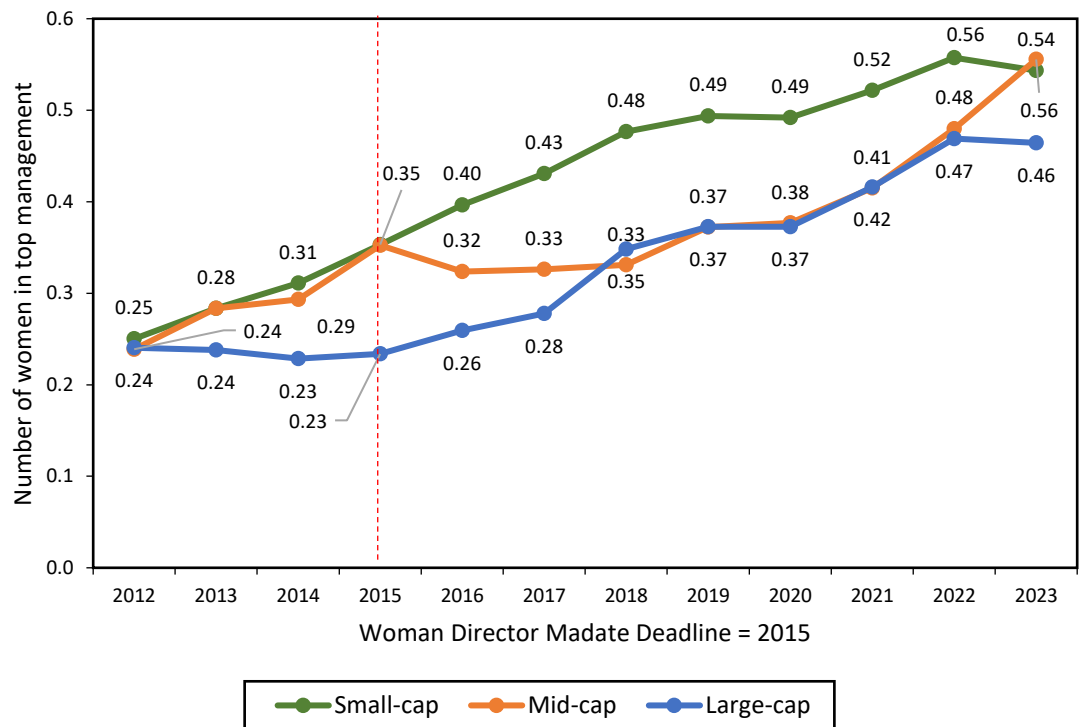
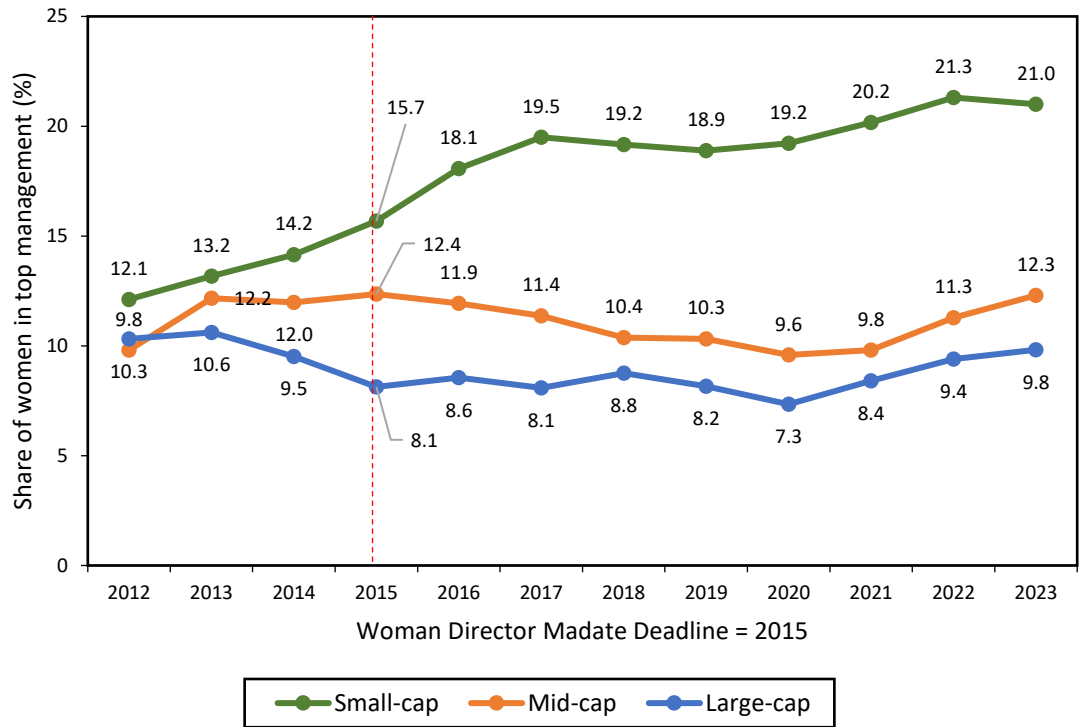
Figure 2 indicates that small-cap firms have higher shares of women on their boards than mid-cap and large-cap firms. The number of women on boards experienced a jump for small firms in 2015, while board size remained relatively stable. Smaller firms also have more women in managerial positions on average, despite having fewer managerial personnel in total.

We delve deeper into the data on large cap firms by examining the trends in the top ten firms (based on market capitalization in 2023). This is because we expect industry leaders to set higher standards for gender equality in the corporate sector via a demonstration effect. As Box 2 indicates, the most striking feature is that most firms (eight out of ten—the exceptions are Infosys and ICICI Bank Ltd.) had lower shares of women directors on their boards relative to all other firms. Moreover, the number of women in top management positions was zero for 5 of these firms. There is no systematic difference between financial and non-financial firms. Overall, we find that ICICI Bank Ltd set the best industry standard by hiring multiple independent women on

boards, involving them in committees, and appointing women in top management teams.

Figure 2: AVERAGE SHARE AND NUMBER OF WOMEN IN LEADERSHIP BY FIRM SIZE

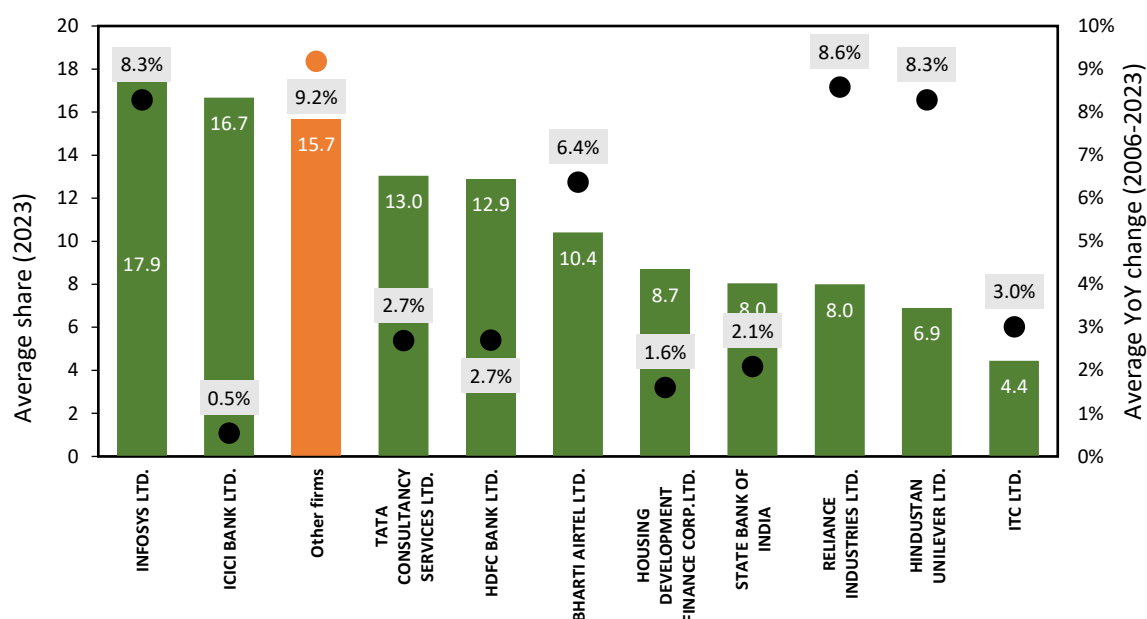




Source: PRIME and CMIE Database

Box 2: Status of Women in the Top Ten Firms in India

Figure 3: SHARE OF WOMEN ON BOARDS (MARCH 2023) AND AVERAGE YEAR-ON-YEAR CHANGE (FY 2005-06 – FY 2022-23)



Source: PRIME and CMIE databases. List of top ten firms were based on market capitalization as of March 2023, and was cross-checked using NSE India.

Note: The share of women on the boards as of March 2023 (represented by green bars for top ten firms and orange bar for all other firms on average) are shown on the left-hand side y-axis. The average year-on-year percentage change in the share of women in boards over the entire period of observation (2006-2023) for these firms are represented by dots and shown on the right-hand side y-axis.

We look at the top 10 firms in India based on market capitalization as of March 2023, and compare the status of women in leadership positions amongst these firms.

Best Performers

Of the top ten firms, Infosys Ltd. and ICICI Bank Ltd. performed better than the industry average with regard to director positions. Infosys Ltd appointed four additional women board directors between 2014-16, taking the total to six. All women appointed were independent, and the average level of education for women increased significantly, surpassing that of men in the two years following the mandate's announcement, thus alleviating "tokenism" concerns or concerns that the average quality of women fell after the director mandate. While women were better educated and held more committee membership and chair positions than their male counterparts, their remuneration was, on average, lower than men's. In contrast to a rising number of women directors, the top management team (including C-Suite positions) in Infosys Ltd. had no women throughout the sample period.

ICICI Bank Ltd. had the highest number of women (nine) on their boards out of the top ten firms, as of March 2023. Given the large board size of 54 members, the share remained relatively low, with a low average year-on-year percentage increase. Similar to the industry

average, the women hired were younger and more educated compared to their male counterparts. They held about the same number of chair positions on committees and had higher remuneration on average. We also find that there were positive spillovers to hiring women in C-Suite positions—throughout the period there were one to two women among the four to seven-member top management team.

Worst Performers

Hindustan Unilever Ltd. and Reliance Industries Ltd. were the only firms that did not have any women prior to the woman director mandate. They appointed one woman each in the year the mandate was enforced. As a result, both firms showed two of the highest rates of increase in the share of women on boards, at 8.3 percent and 8.6 percent respectively. This is somewhat misleading as the starting point was low, and despite the high rate of increase, their share of women directors in 2023 was the lowest in this group. Both firms only hired one additional woman director in the years following the mandate. Additionally, Reliance Industries Ltd. had no independent women on board until as late as March 2019. Moreover, in both these companies no woman director chaired any committee until April 2021. Interestingly, the women directors had lower education and remuneration on average relative to their male counterparts. Reliance Industries Ltd. had no women in top management until FY 2018-19, and Hindustan Unilever Ltd. had none throughout our sample period.

ITC Ltd. was the worst performing firm in terms of share of women directors as of 2023. The first female director was appointed in late 2012 and one other in later years. Women on average were younger and more educated and held no chair positions on committees (despite holding more membership positions than their male counterparts). ITC Ltd. also had no women in their top management team throughout our sample period.

It is worth pointing out that although the State Bank of India had a relatively low share of women, it had the second-highest number of women on board (tying with Infosys Ltd. with 7 female board members). On the other hand, participation of women in board committees as chairs was almost zero, and as members remained lower than that of men for most years. During 2019-2021, there were no women in top management despite an expansion in their size from 6 to 9 members.

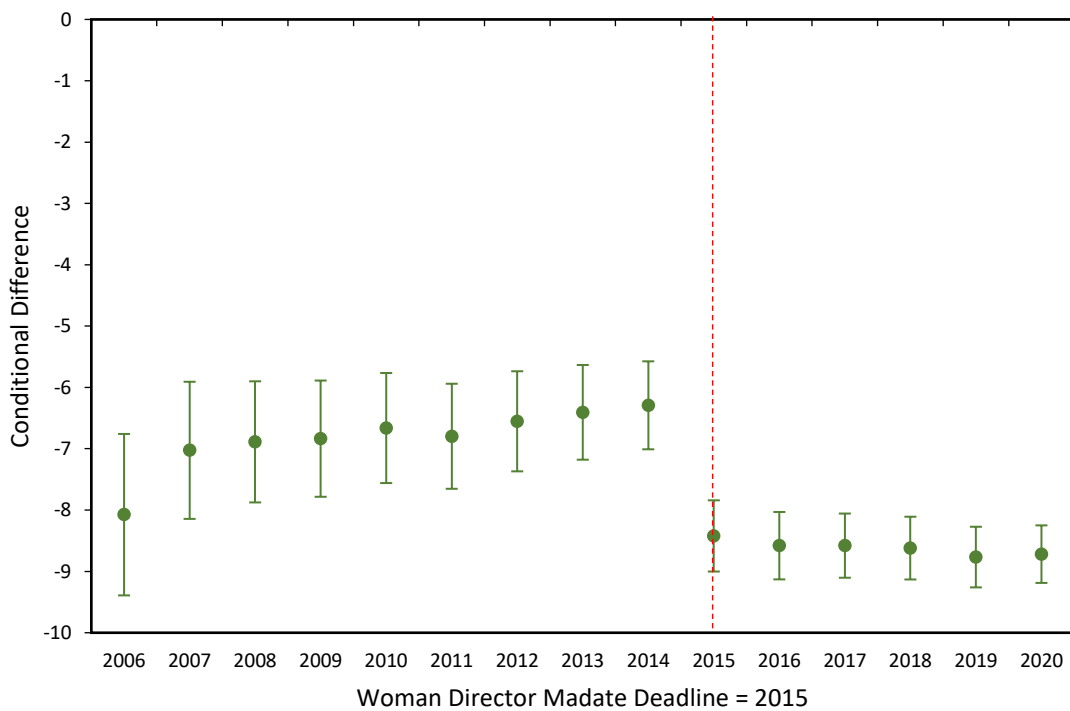
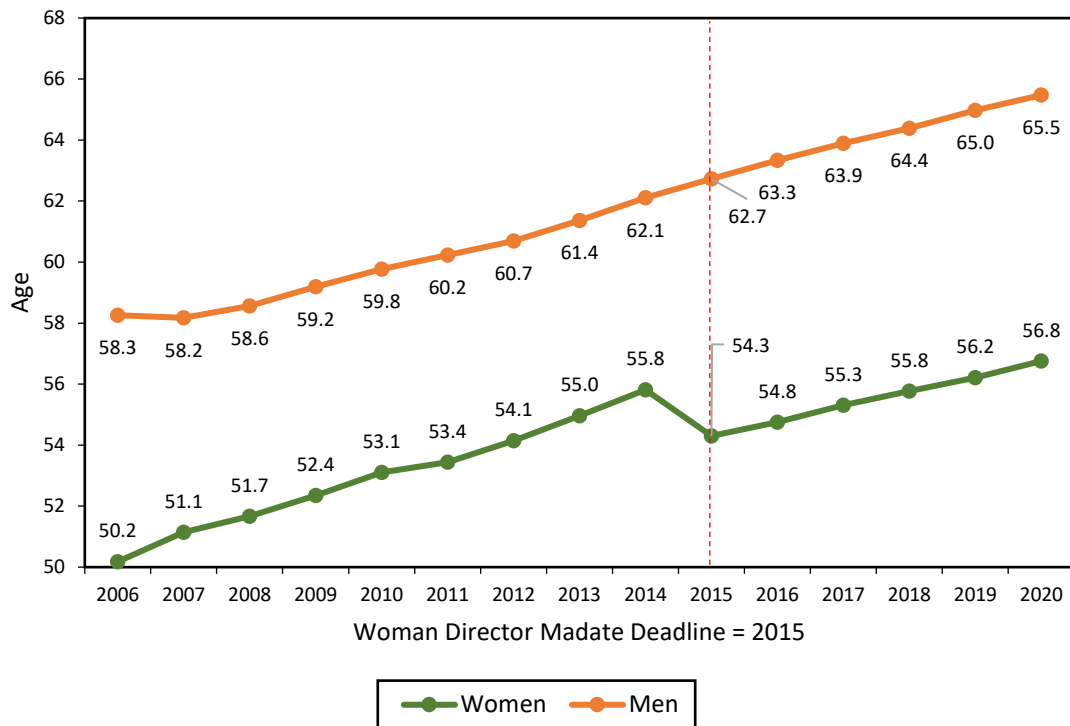
3.2. What were the Women Board Member Characteristics?

In addition to gender composition, we also looked at four director-level characteristics: education, age, number of other directorships held, and share of meetings attended. This is important to assess the hiring patterns of women directors and proxy for whether they played an active role in board decisions.

Age of Directors

Following the enforcement of the mandate, there was a sharp decrease in the average age of women (Figure 4). This shows that any new women added to the directors' pool following the mandate were significantly younger than both their male counterparts and the women already on boards before the mandate was enforced.

Figure 4: AVERAGE AGE OF DIRECTORS, BY GENDER



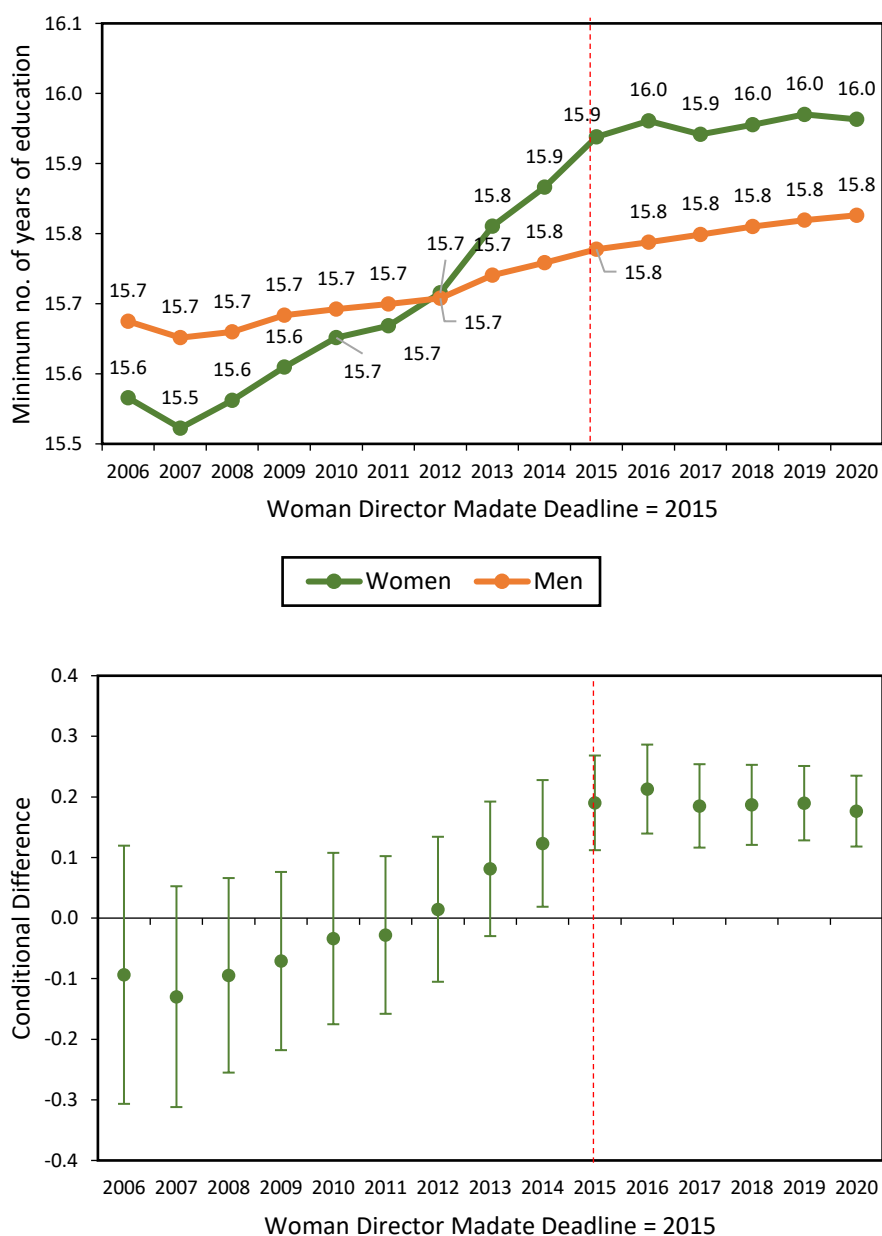
Source: PRIME Database

Note: Age difference between women and men, conditional on year. The bars show the 95% confidence interval.

Education level

Figure 5 shows the educational profile of both women and men being hired after the implementation of the mandate. The average (minimum) number of years of education for women caught up with the average for men around 2012, and became significantly higher (conditional on age) starting from 2015. The average education for women has also been consistently increasing at a faster rate compared to that of men, which remains comparatively flat throughout. In sum, following the enforcement of the woman director mandate, women on boards were significantly younger and more educated than their male counterparts.

Figure 5: AVERAGE MINIMUM YEARS OF EDUCATION, BY GENDER



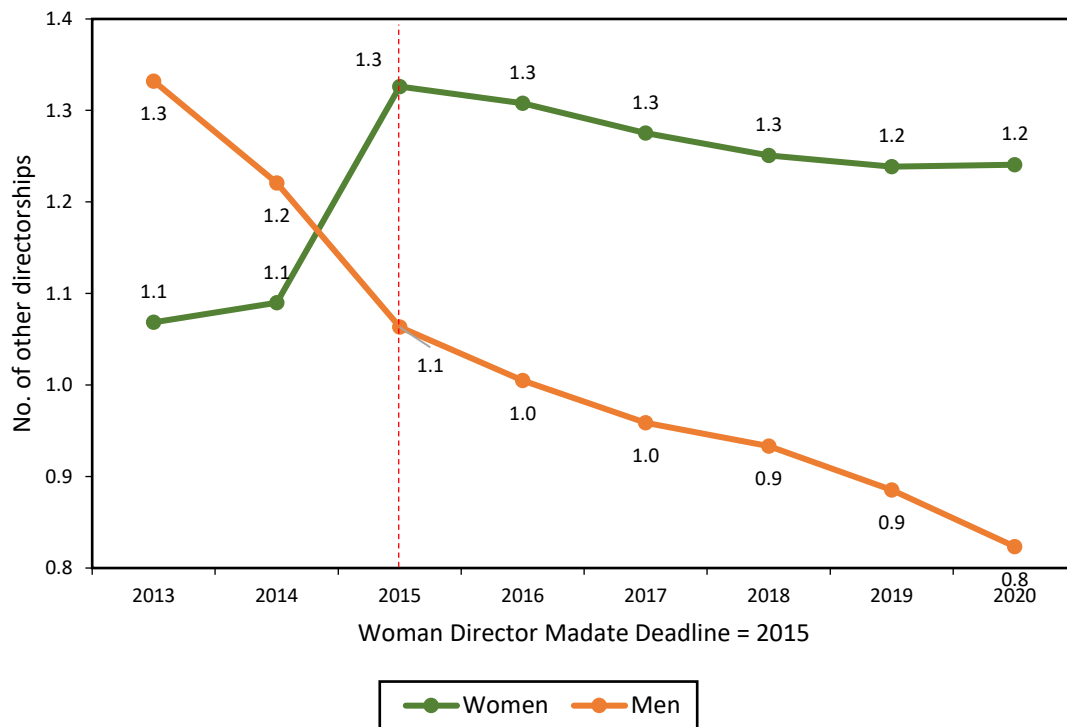
Source: PRIME Database

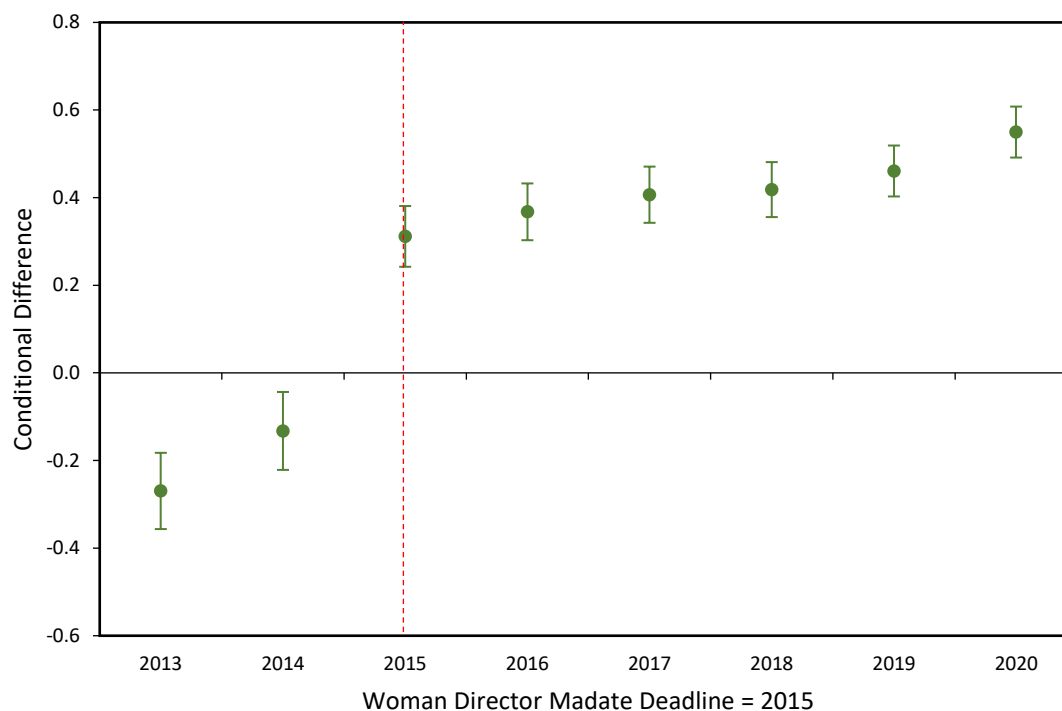
Note: Education level difference between women and men, conditional on age and year. The bars show the 95% confidence interval.

Number of other directorships held

Figure 6 shows that on average, women held fewer other directorships compared to men before the implementation of the mandate in 2014. There were also fewer unique women in the pool of directors compared to men before 2015 (around 928 unique women compared to around 15,541 unique men). Although the approximate number of unique women increased after the implementation of the mandate (to around 4,677 unique women after 2015), this increase was not enough to keep up with the mandate requirements of having at least one woman on board. Consequently, the same women were hired across multiple boards. Furthermore, the approximate number of unique men increased at a faster rate compared to women post-mandate (to around 28,000 after 2015), which likely contributed to a decrease in the average number of other directorships held by men. In general, although the mandate allowed multiple directorship of women on corporate boards, the pool of women did not expand fast enough to comply with the mandate. This could reflect supply (shortage of qualified women) or demand-side factors (conscious or unconscious bias in hiring) or both. The demand side factors seem more binding, given that women being hired were more educated than men.

Figure 6: AVERAGE NUMBER OF OTHER DIRECTORSHIPS HELD, BY GENDER





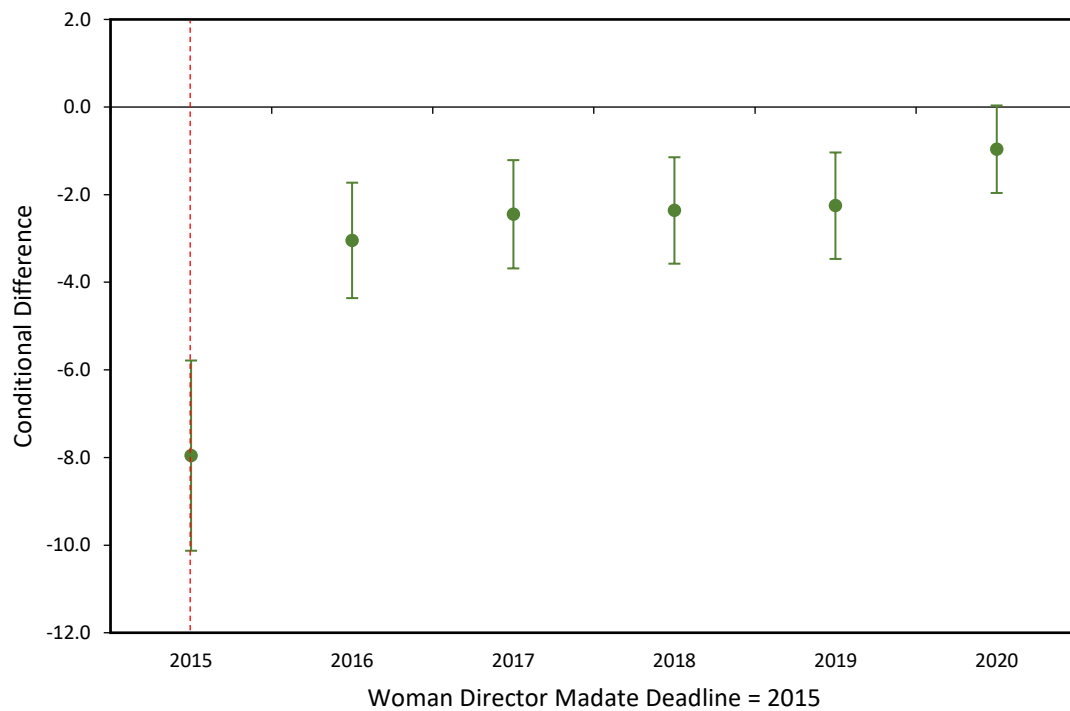
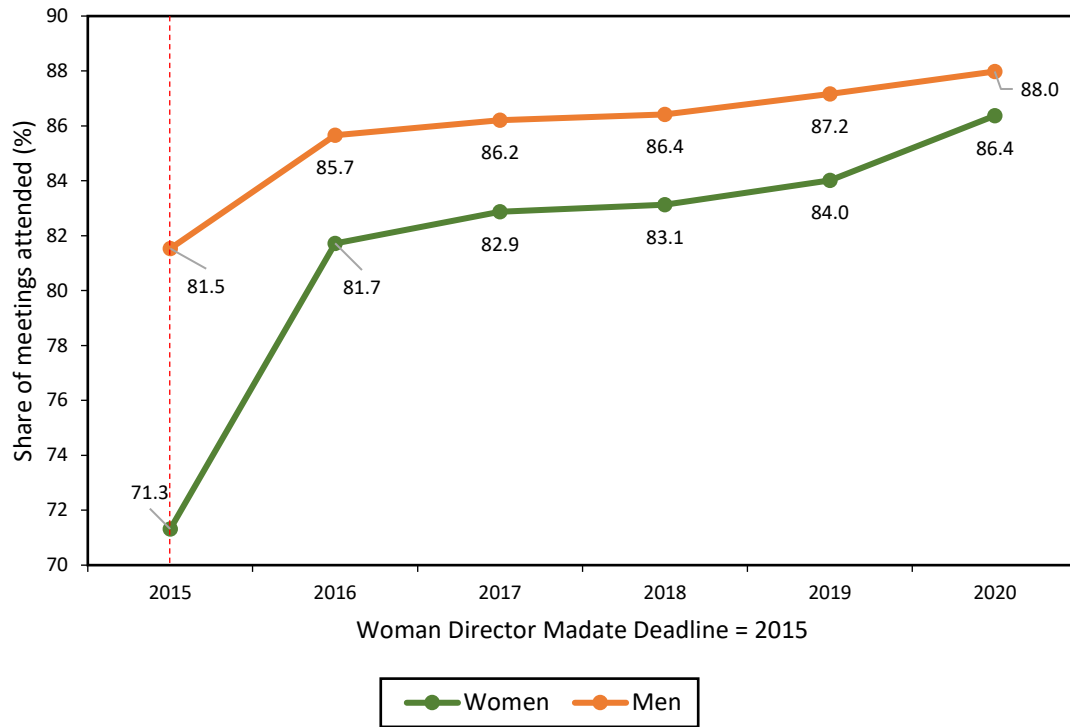
Source: PRIME Database

Note: Difference in multiple directorship between women and men, conditioned on year, education, and age. The bars show the 95% confidence interval.

Board meeting attendance

It is also interesting to note that the average share of board meetings attended by women (an indication of participation in decision-making) was significantly lower than that of men in the years following the implementation of the mandate (Figure 7). However, this gap has been slowly closing, as more firms hire more than one woman on their boards, leading to greater gender diversity. Despite this, there is still a gender gap in the meeting attendance, implying that women are still not able or willing to attend more meetings. This could reflect female discomfort with male-dominated boards or the disproportionate burden of unpaid care work on women. This reduces the ability of women directors to participate fully in firms' decision-making processes.

Figure 7: AVERAGE SHARE OF BOARD MEETINGS ATTENDED, BY GENDER



Source: PRIME Database

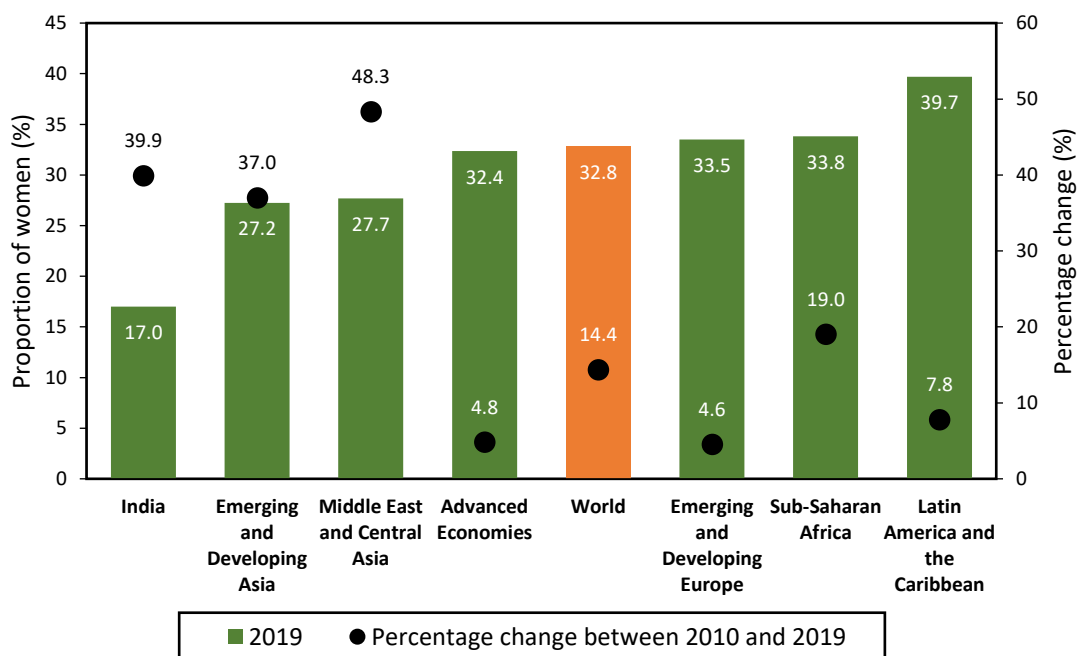
Note: Board attendance difference between women and men, conditioned on year, education, and age. The bars show the 95% confidence interval.

3.3. Did the effect of the Companies Act (2013) trickle down to C-Suite and Middle Management Positions?

We document gender gaps in management positions in India relative to other countries, as reported by the International Labor Organization. This is defined as the number of women employed in middle and senior management as a percentage of total employment in management. The data for this indicator is available for 69 countries in 2010 and for 96 countries in 2019. We calculate group averages using IMF's definitions for country groups and track the progress for these groups relative to India over a 10-year period (2010-2019) for which comparative data are available.

Figure 8 shows that India's record is the lowest among all regions and compared to the global average, even though the rate of increase is among the highest during 2010-19.

Figure 8: SHARE OF WOMEN IN MANAGEMENT POSITIONS IN A GLOBAL CONTEXT

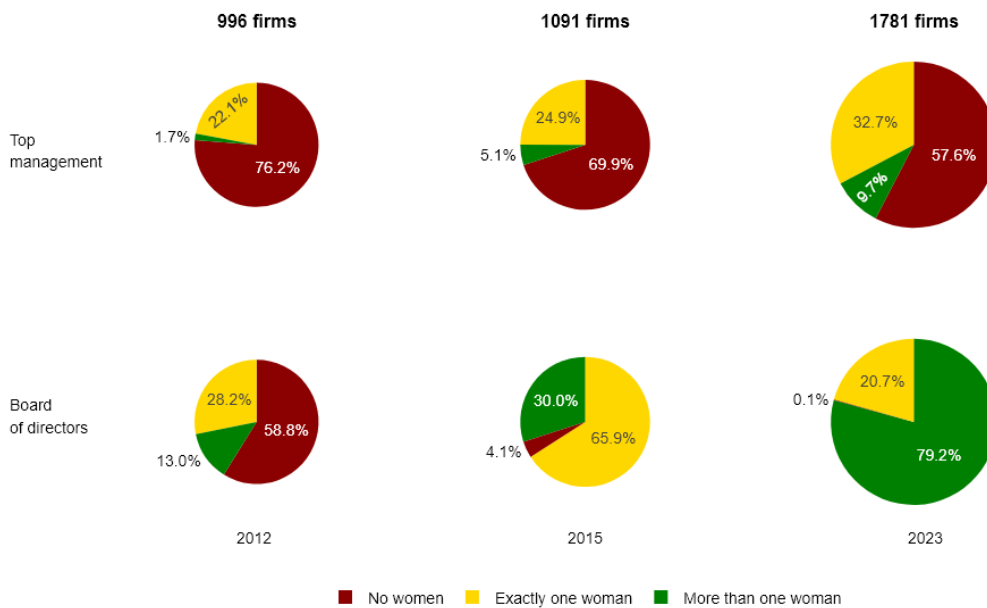


Source: ILOSTAT

We next explore if there were positive spillovers from the female director mandate to management positions in India. The mandate has been successful in that the share of firms with no women on board dropped from 58.8 percent in 2012 to 4.1 percent in 2015, as observed in Figure 9. Furthermore, many firms went beyond the mandate and appointed additional women post 2015. The proportion of firms in the sample with two women or more increased from 13 percent in 2012 to 30 percent in 2015, and reached nearly 80 percent in 2023.

With regard to management positions, there is little evidence of positive spillovers. More than 50 percent of NSE-listed firms had no women in the top management team in 2023, 33 percent had only one woman, and less than 10 percent had more than one woman. This is concerning as Post et al. (2021) find that women's integration in top management team is effective only when there is more than one woman in such teams.

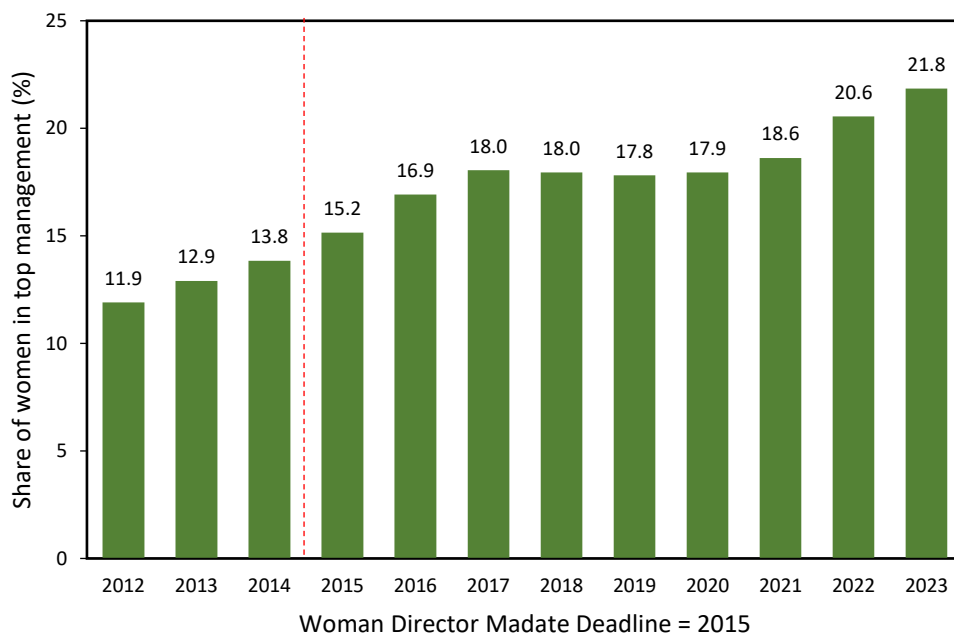
Figure 9: SHARE OF FIRMS IN SAMPLE BY NUMBER OF WOMEN IN LEADERSHIP



Source: PRIME Database

The absence of spillovers from the director mandate to management positions is confirmed in Figure 10 below, where no jump in the share of women in top management (C-suite) positions is observed following the implementation of the mandate.

Figure 10: SHARE OF WOMEN IN TOP MANAGEMENT



Source: PRIME Database

4. Gender Composition of Boards and Firm Performance

To establish a causal effect of female representation on boards on firms' financial performance, we use the external shock stemming from the implementation of the Companies Act 2013, and divide firms into policy "unaffected" and policy "responders" groups.

4.1. Sample Design

A firm is in the "responders" group if it is an NSE-listed firm and has had no women board directors prior to the enforcement of the mandate in 2015, but subsequently appointed at least one woman to their board by the deadline. The "responders" group, therefore, contain only compliers for the purpose of our study. This led to the dropping of 11 non-complying firms from our original sample. The "unaffected" group has firms that already had women on their board before the mandate was implemented.

The year firms were affected by the mandate is defined as the later of the two years: the first year the firms were listed or 2015 (the year the Companies Act was enforced). 2015 is taken as the enforcement year because the Companies Act came into force in October 2013, and the deadline to meet the mandate was April 2015.

Firms that were listed on the NSE after 2015 had to be dropped for two main reasons. The first reason relates to a lack of relevant information on these firms. Our database starts recording board information for firms either from 2006 or from the year they were listed on the National Stock Exchange (NSE). Therefore, if firms were listed after the mandate deadline (2015) and they had at least one woman on their board in the first year of observation, we do not have any information on whether the woman was appointed before the firm's mandate deadline (classifying the firm as "unaffected"), or after the deadline (classifying the firm as a "responder"). Second, even if we knew the year when the first woman was appointed to the board, if they were not listed by 2015, they could have still been affected by the changes in hiring environment and the general move towards equitable gender representation in boards. Including these firms in the "unaffected" group rather than the "responders" group could therefore bias our empirical estimates downwards, and vice versa if they were not affected by the changing environment. By dropping the firms that were listed after 2015, the treatment year for all firms included in the sample is 2015.

We begin our sample with 2580 firms for which data on both financial performance and board-related composition and characteristics are available. We exclude 684 firms that were listed after 2015 for reasons noted in the previous paragraph. We then drop an additional 424 firms for which either pre- or post-treatment observations were not available. Finally, we remove 59 firms that were unlisted after the mandate was implemented. The final sample size for estimation purposes, therefore, includes 1413 firms, of which 707 firms are in the "unaffected" group, and 706 are in the "responders" group. Of the 706 "responders", 11 firms are non-compliers, and 695 firms are compliers. After dropping these 11 firms, we finally have 707 "unaffected" firms and 695 "responder" firms.

4.2. Empirical Model

Our goal is to find the impact of hiring at least one female board member on financial performance of firms. To investigate this, we exploit the variation in the effect of the Companies Act (2013) policy intervention across firms, depending on whether firms already had at least one woman on their board (“unaffected”), or hired a woman on their board after the policy was implemented (“responders”). We implement a difference-in-differences (DiD) in reverse strategy a la Kim & Lee (2018) using these groups.

The DiD in reverse model uses the exogenous policy shock on firms to examine the effect of appointing female board members on firm performance. Since all firms in our sample either have to or already comply with the mandate, we do not have treatment and control groups. Instead, we have an “always treated” group and a “switched” group. The always treated group had women on their board even before the Act was implemented, and therefore did not need to change their hiring behavior. The switched group did not have any women on their board after the act was implemented, and therefore had to change their behavior.³

The following DiD in reverse model is estimated:

$$Y_{it} = \alpha + \delta D_{it} + \beta_1 size_{it} + \beta_2 traded_{it} + \gamma_i + \theta_t + \epsilon_{it} \quad (1)$$

Where Y_{it} is the outcome (financial indicators) for firm i at time t , $size_{it}$ is a dummy fixed effects variable for the three categories of firms—large, medium, and small cap, $traded_{it}$ is a dummy variable indicating whether firm i was traded on the stock market (either NSE or BSE) at time t , D_{it} is a treatment dummy as explained below, and γ_i and θ_t are firm and time-fixed effects, respectively.

The dummy D_{it} gives the treatment status of firm i at time t . Since we have responders (switched firms) and unaffected firms (always treated firms), D_{it} is calculated in the following way:

$$D_{it} = 1 - Q_i + Q_i I_{[t \geq 2015]} \quad (2)$$

where Q_i is equal to 0 if firm i is a “policy unaffected” firm and equals 1 if the firm is a “policy-responder.” The term $I_{[t \geq 2015]}$ is equal to 1 if the year is equal to or greater than 2015, and 0 if not. This means that D_{it} for a “policy unaffected” firm is equal to 1 throughout the sample period. On the other hand, D_{it} for a “policy-responder” is 0 before 2015 and 1 thereafter. Intuitively, this means that the dummy D_{it} takes the value 1 for any firm (policy unaffected or policy responders), that has at least one woman on the board at time, t .

³ Only 5 listed firms had no women on their board during the sample period. We assume that all women who were appointed in FY 2014-15 was in response to the mandate.

For the DiD in reverse model to yield unbiased results, a key assumption that needs to be made is that in the absence of the mandate, the financial outcomes of the two groups would have followed the same trend over time, even if there are systematic differences in the value of the financial outcomes. Given that this assumption is plausible, we can take the behavior of the unaffected firms in the post-period as the counterfactual.⁴ We then estimate the “catch up” by responder firms over the years following the implementation of the mandate, which gives us an estimate of the post-period effects of the mandate on responder firms.

We use event study plots to visualize the similarity or difference in trends between unaffected and responder firms, taking 2014 as the base year. This also helps us to visualize the effect of the implementation of the mandate at each point in time starting in 2015.

For this, we run the following regression:

$$Y_{it} = \alpha + \lambda_t(Q_i * year_t) + \beta_1 size_{it} + \beta_2 traded_{it} + \gamma_i + \theta_t + \epsilon_{it} \quad (3)$$

where λ_t represents the systematic difference in value of the average financial outcomes between unaffected and responder firms in time t . We take 2014 as the base year, when the difference in the value of the financial indicators between the two groups is normalized to zero. Our hypothesis is that λ_t should not be significantly different from zero before the year of treatment (2015) for the parallel trends assumption to hold.

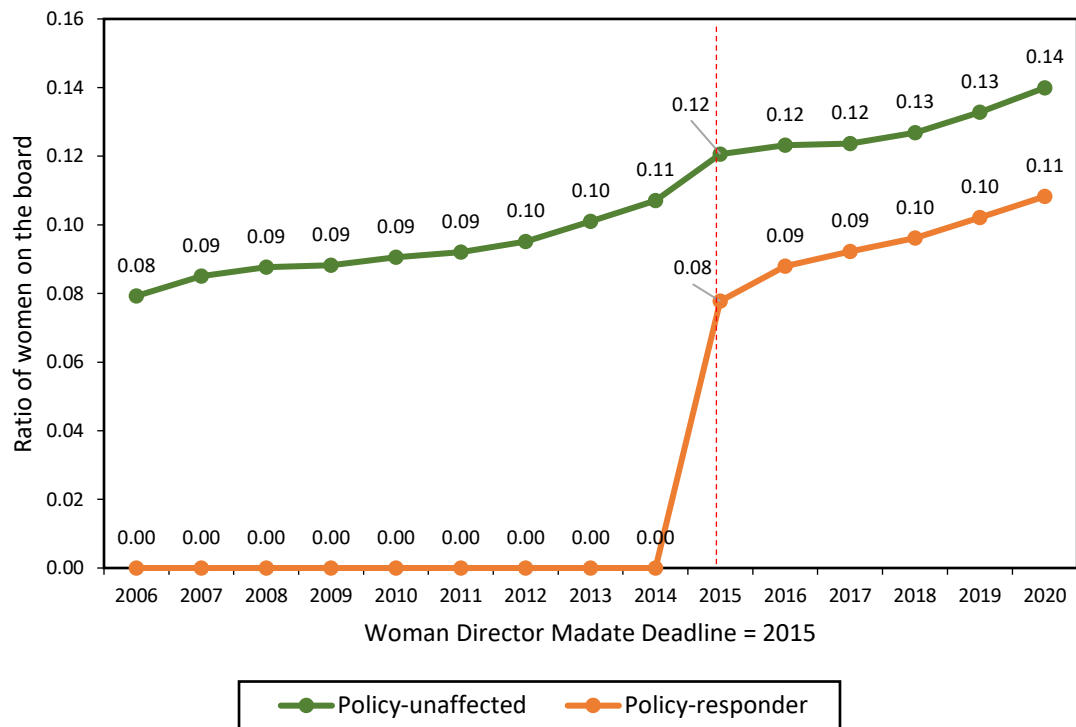
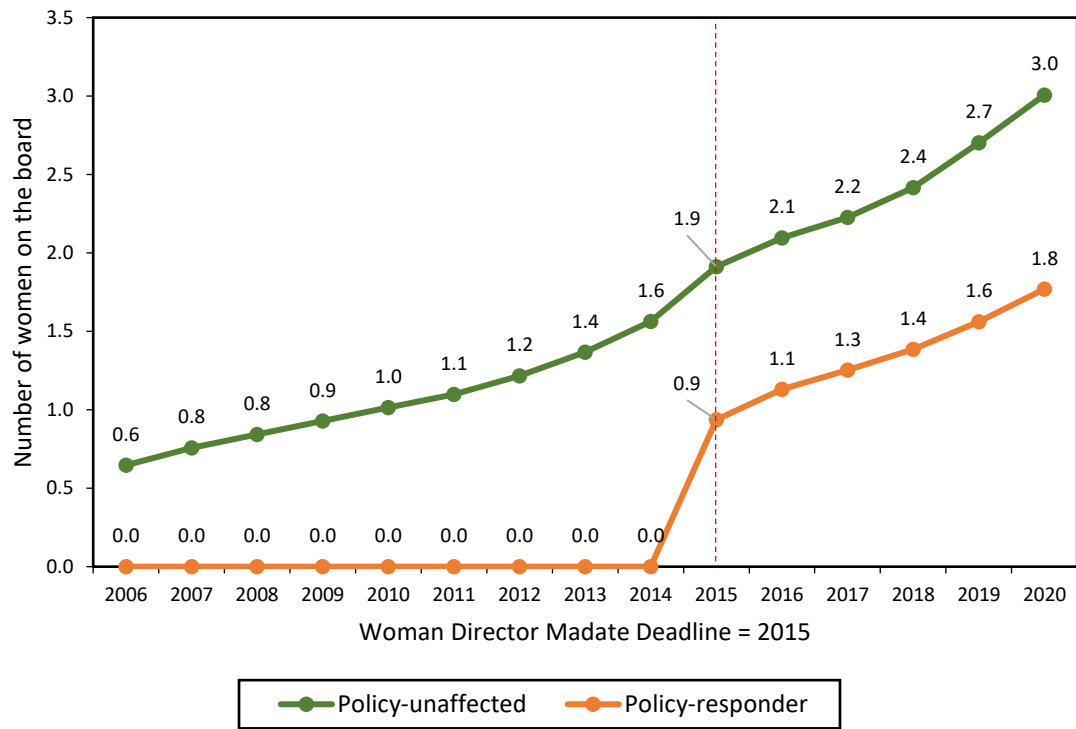
Event study plots for profits after tax, returns on net worth, and debt-to-equity ratio are presented in and discussed further in the next section.

4.3. Trends by Treatment Group and Common Time Trends

Since the policy was implemented on 12th September 2013, and the deadline for compliance was eventually set for 1st April 2015 (end of FY 2014-15, represented as 2015 in our dataset), we assume that most of the women being hired as a response to this policy were appointed during 2015. We can observe the jump in the average share of women on boards for responder firms in Figure 11, while the trend for unaffected firms remains relatively flat. The dotted red line shows the deadline for the mandate (end of FY 2014-15, represented by 2015 in our dataset).

⁴ Following Kim & Lee (2019), this is a plausible counterfactual if the condition of common trends in the pre-treatment periods between the two groups is met.

Figure 11: NUMBER AND RATIO OF WOMEN ON BOARD BY TREATMENT GROUP



Source: PRIME Database

Appendix I Table A1 provides a detailed description of firm characteristics by treatment group—the unaffected and responder groups.

Figure 12 shows event study plots for three firm outcomes: profit after tax, return on net worth, and debt-to-equity ratio.⁵ These graphs plot the coefficients λ_t (as described in equation 3) for all years except for 2014, which is taken as the base year and normalized to zero. Therefore, the coefficients for each year show the conditional differences between responder and unaffected firms.

For all three event studies, the λ_t coefficients are not significantly different from zero in the pre-mandate period, confirming the plausibility of the parallel trends.

For profit after tax, the average difference between outcomes for responder and unaffected firms with respect to 2014 is insignificant and very close to zero in the pre-mandate period. The year after mandate enforcement (2016) sees a jump, and the conditional differences in the post-mandate years shows that on average, there is a positive catch-up (indicated by the positive mean), leading to a lower conditional difference between the two groups. Similar trends can be seen for returns on net worth and the opposite can be seen for debt-to-equity ratio. However, the jump (and the corresponding “catch up” for policy responders) following mandate enforcement is not as significant for returns on net worth, and the effect of the mandate seemingly diminishes in the following years, reaching pre-mandate difference in 2020.⁶

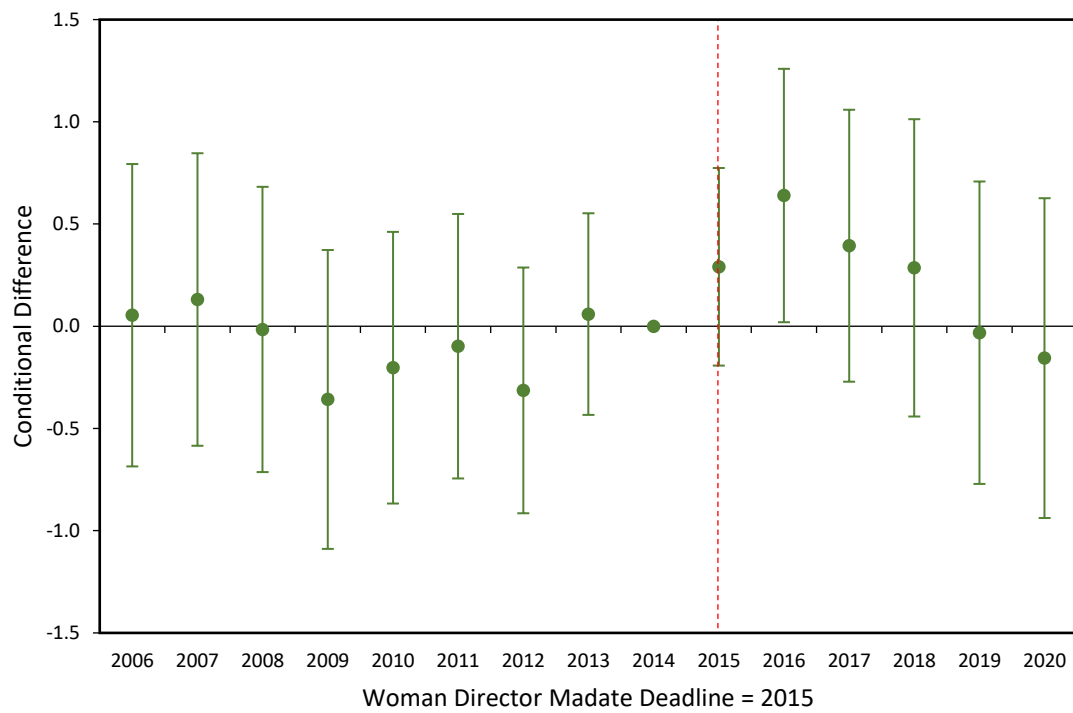
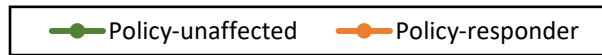
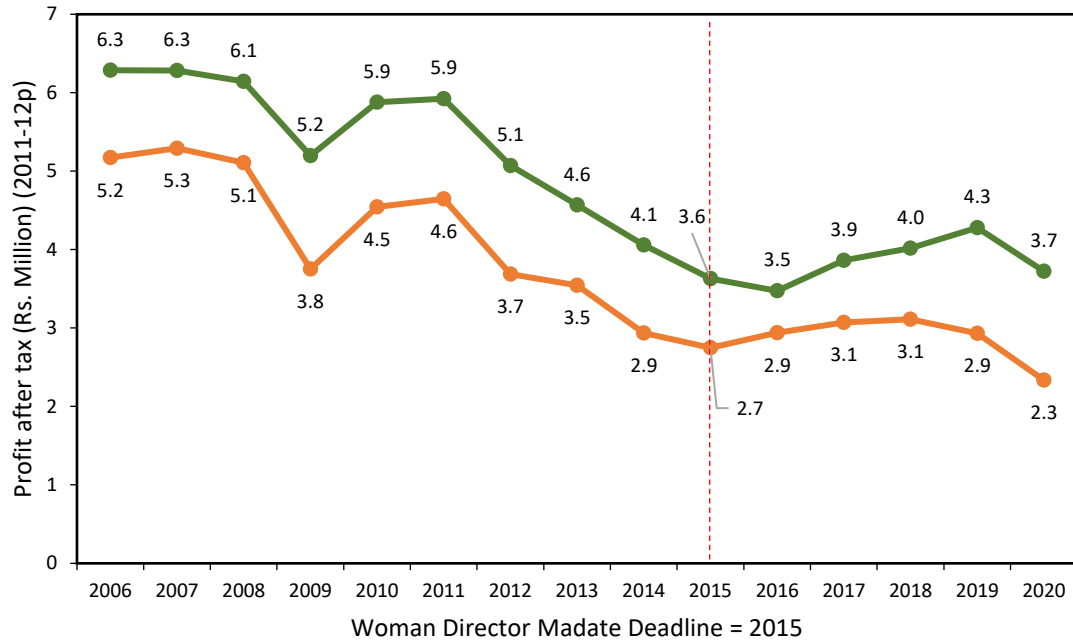
For debt-to-equity ratio, unaffected firms on average have consistently had higher debt-to-equity ratios, both before and after the mandate’s enforcement. However, this difference seems to be widening in the years following mandate enforcement, as the average debt-to-equity ratio for policy responders is pushed downwards. However, conditional on firm fixed effects, size, and trading status, the event study plot shows that this change in the debt-to-equity ratio for responders with respect to unaffected firms is small and insignificant.

⁵ Profit after tax (given in Rs. million) has been adjusted for inflation using FY 2011-12 as the base year. Additionally, all measures of financial performance have been transformed using the inverse hyperbolic sine function in order to reduce bias introduced by outliers in the data.

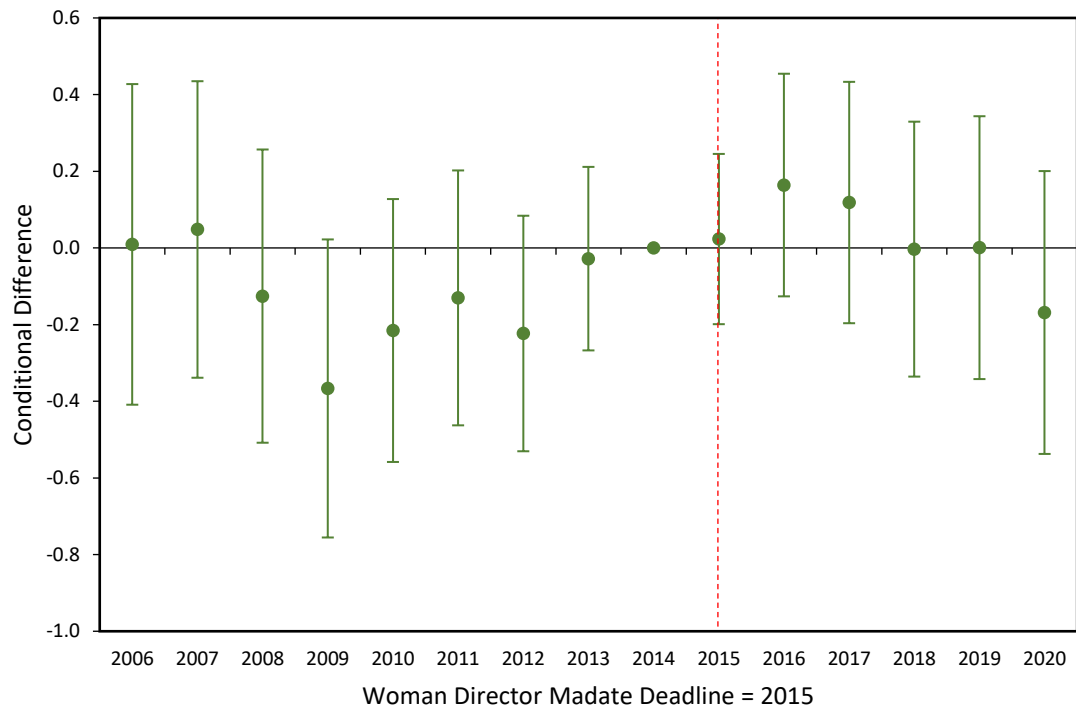
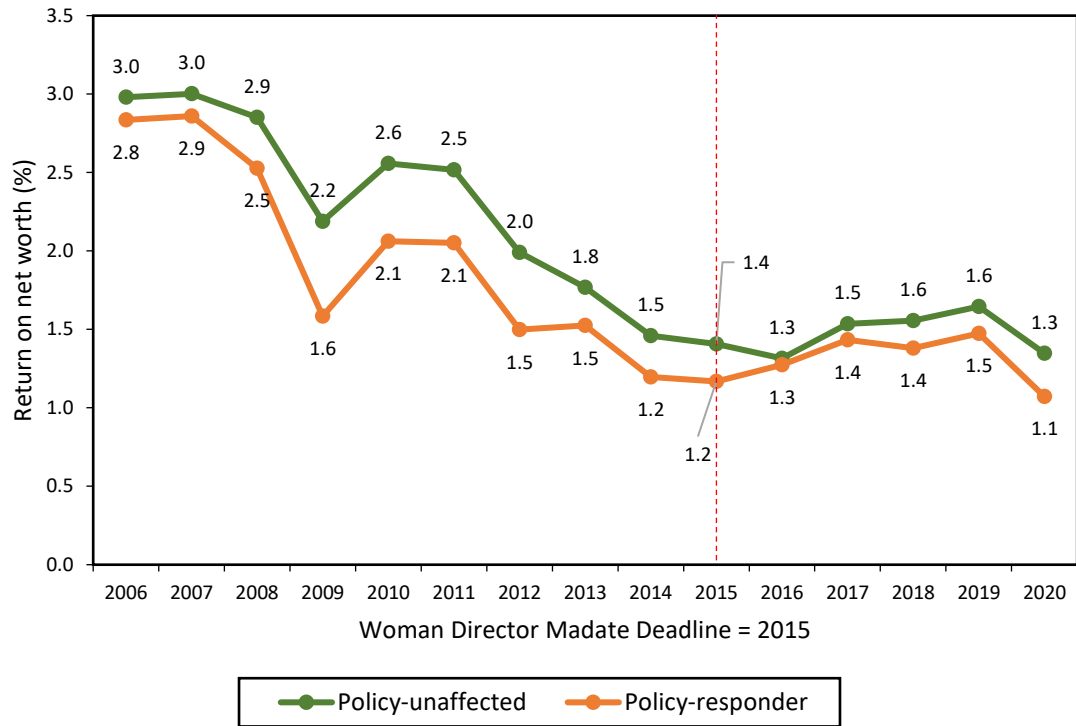
⁶ Furthermore, most of the difference between average post- and pre-mandate conditional difference between policy-unaffected and policy-responders seems to be driven by the fact that the financial crisis in FY 2008-09 seemingly hit responders harder, widening the difference between the two groups. This is plausible, since policy-responders are, on average, smaller, and by association, less likely to be able to absorb external shocks.

Figure 12: UNCONDITIONAL MEANS AND CONDITIONAL DIFFERENCES

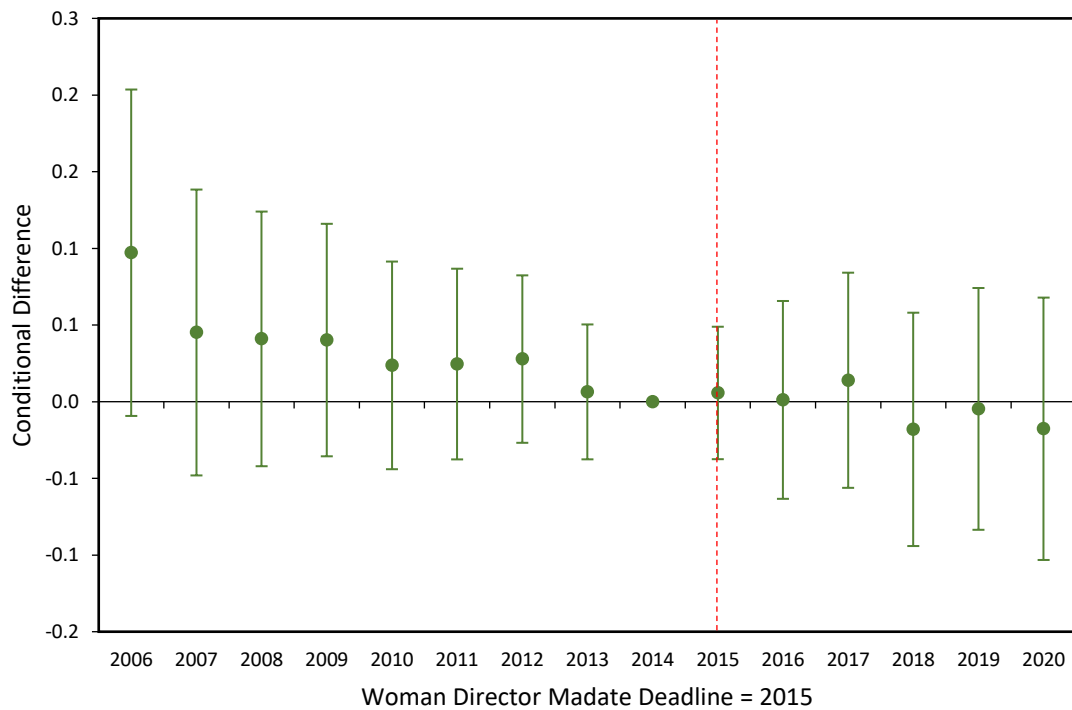
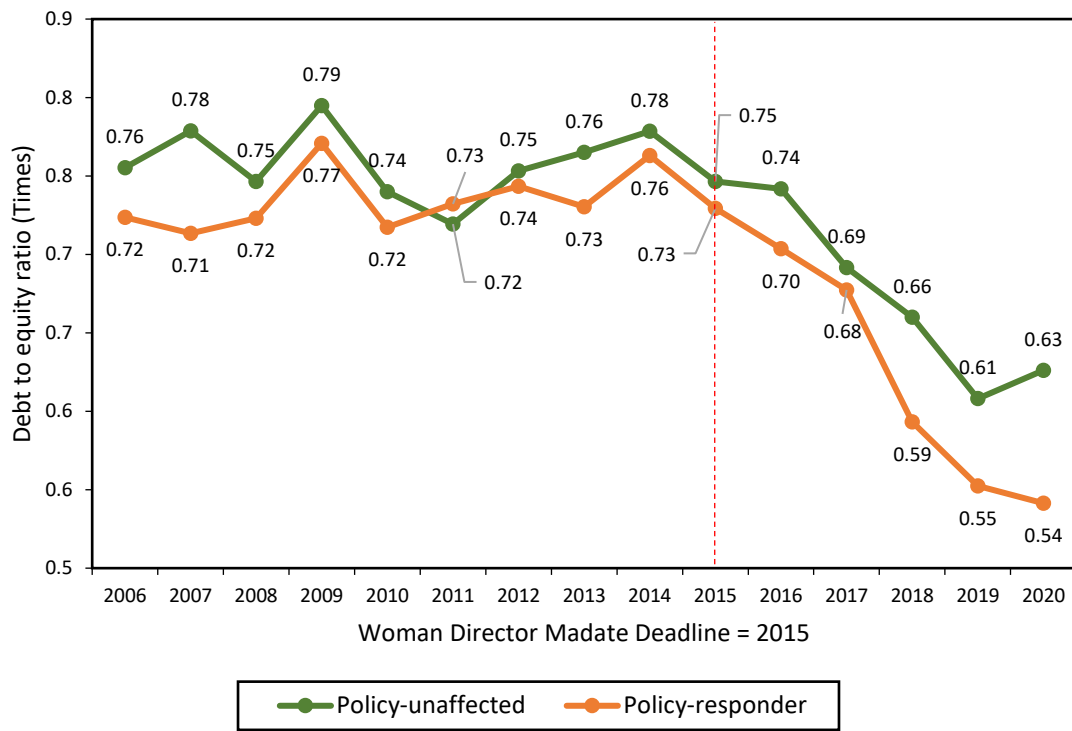
PROFIT AFTER TAX (2011-12P)



RETURN ON NET WORTH



DEBT-TO-EQUITY RATIO



Source: PRIME and CMIE Database

Note: All indicators have been transformed using the inverse hyperbolic sine (I.H.S.) function, to reduce the effect of outliers. The bars show the 95% confidence interval.

4.4. Regression Results

Table 1 shows the result of the difference-in-difference (DiD) in reverse regression, controlling for firm size, trading status, and firm and year fixed effects. Following the mandate's enforcement, firms that did not have any women on board and therefore had to appoint at least one woman experienced 34 percent higher profits, 14.6 percent higher returns on net worth, and 3.1 percent lower debt-to-equity ratio. However, these are not statistically significant.

Following our observations from the event study plots (Figure 12), it is possible that the insignificant results are driven by the fact that the jump following the mandate did not result in consistently lower differences between responder and unaffected firms. For profit after tax, the difference between the two groups reverted to pre-mandate difference around 2018, while for returns on net worth, the mandate effects seemingly diminished in 2017⁷.

Table 1: DID IN REVERSE REGRESSION RESULTS

	Profit after tax (Rs. Million) (2011-12p)	Return on net worth (%)	Debt to equity ratio (Times)
[1 – Responder + (Responder * Post)]	0.340 (0.243)	0.146 (0.116)	-0.0313 (0.0289)
Traded dummy	Yes	Yes	Yes
Size FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	17587	16647	16591
Mean of Dep. Variable	4.160	1.803	0.712

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Dependent variables are transformed by the inverse hyperbolic sine function

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are “not treated”). Therefore, the coefficient shows average “catch up” in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

⁷ It is also important to note the impact of the financial crisis of 2008-09 (represented as 2009 in our data) on our final estimate. Policy-unaffected firms were seemingly less affected by the financial crisis, and there might be an upward bias in our final treatment effect because of this.

We expect the effect of hiring at least one woman on boards where there were previously none on firm performance to differ across different types of firms. Our hypothesis is that larger firms with more resources and better benefits (in all positions) to attract more women on boards. This is tested in the next section.

4.5. Heterogeneity by size

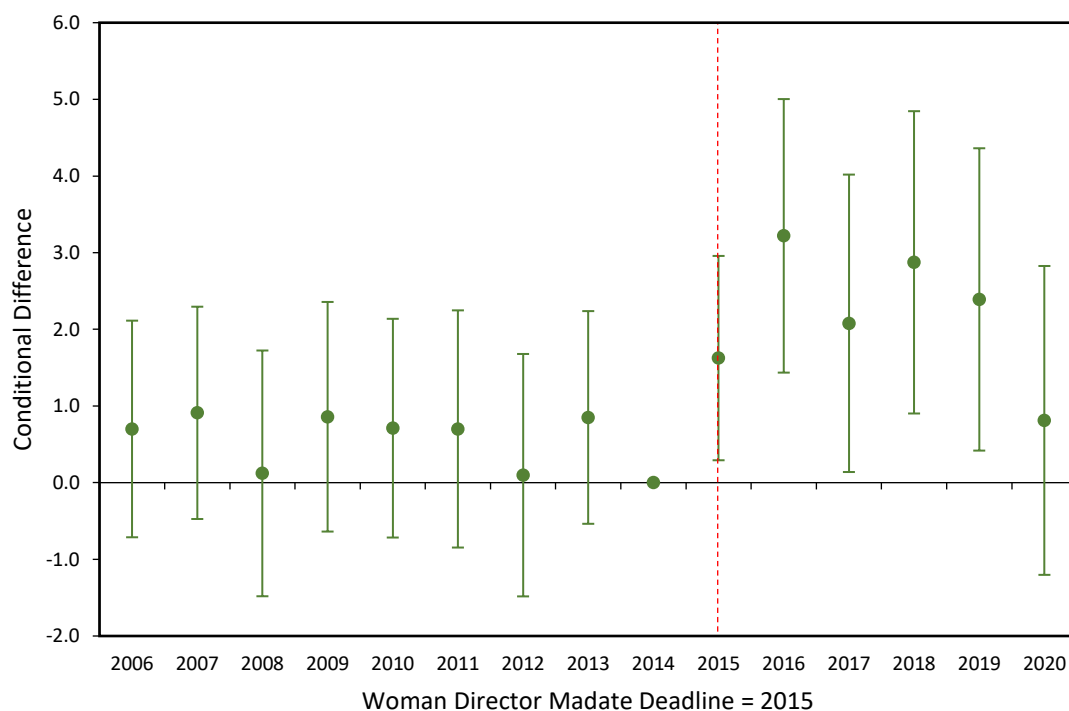
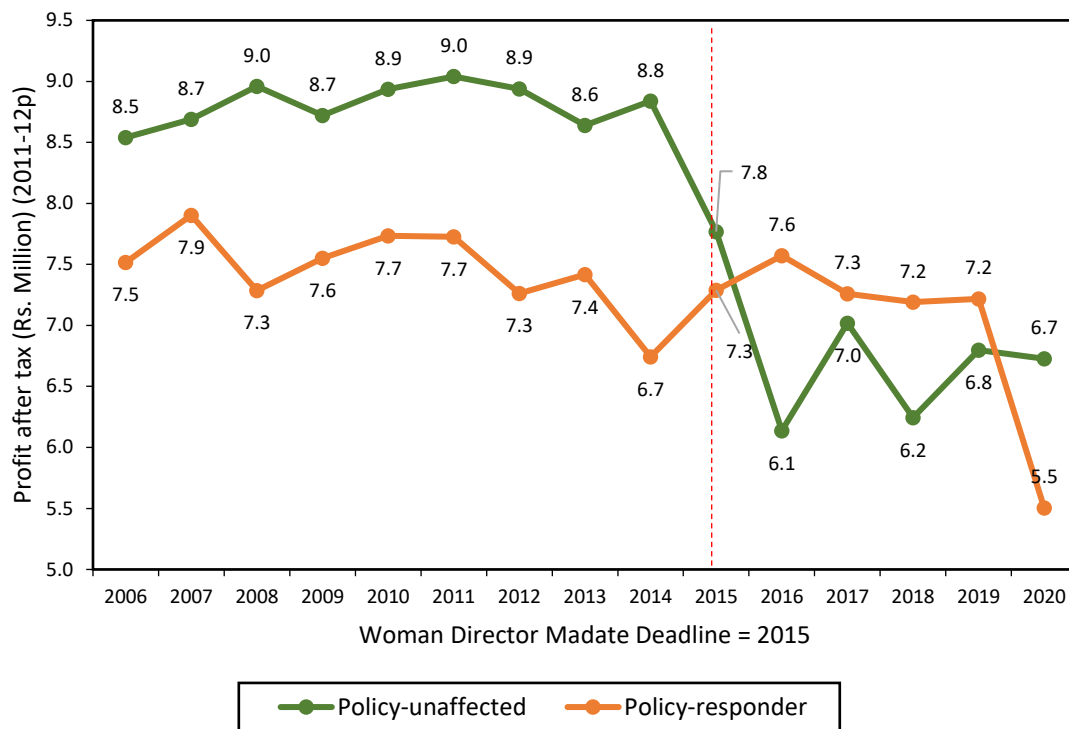
We run separate regressions on sub-samples of small-cap firms, and mid- and large-cap firms. The sample is divided based on the average size group of firms throughout the period of observation, rather than the size group of the firms in a particular year. We do this to reduce the effect of large spikes in firm performance (resulting in changes in a firm's market capitalization, and by association, current size group) on the sample selected.

We divide the sample into three different sized firms to allow for changes in the coefficients because there may be structural difference in the relationship between firm performance and the presence of female directors.

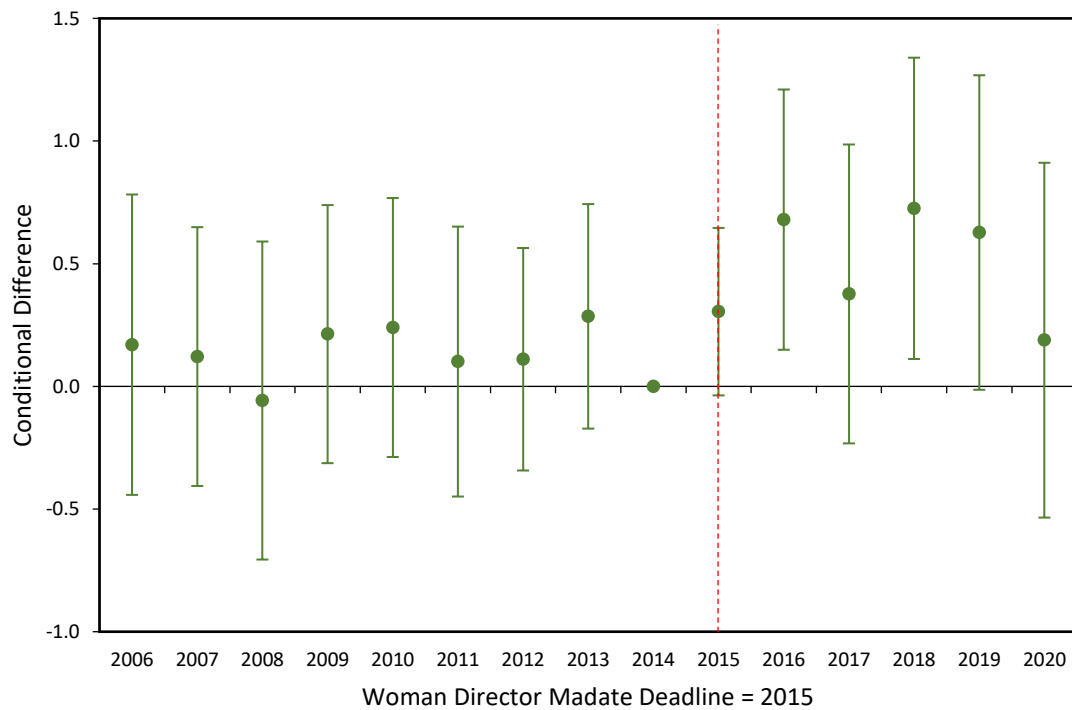
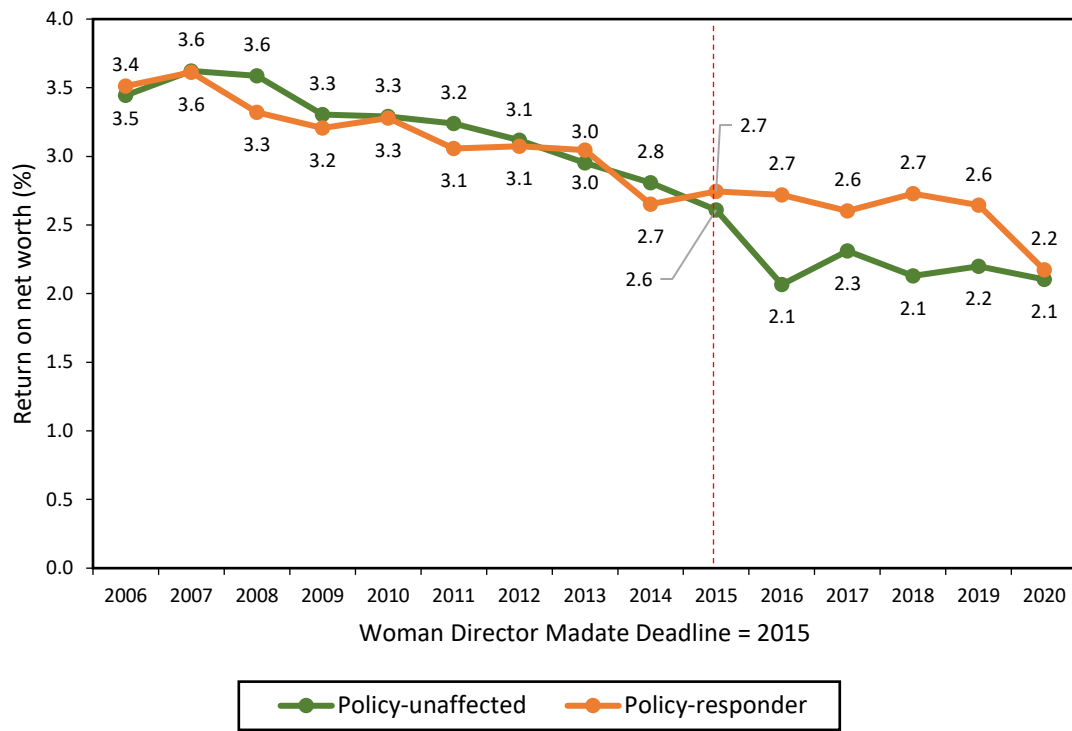
The event studies for only the sample of mid- and large-cap firms are given in Figure 13. For larger responder firms, the change in conditional differences following mandate enforcement did not revert to pre-mandate differences as quickly as it did for small-cap firms. This ability to maintain the jump in performance in the years following the mandate led to a more consistent shift in firm performance for these firms. In other words, there was a significant positive effect of the mandate on these firms.

Figure 13: UNCONDITIONAL MEANS AND CONDITIONAL DIFFERENCES – SUBSET OF MID- AND LARGE-CAP FIRMS

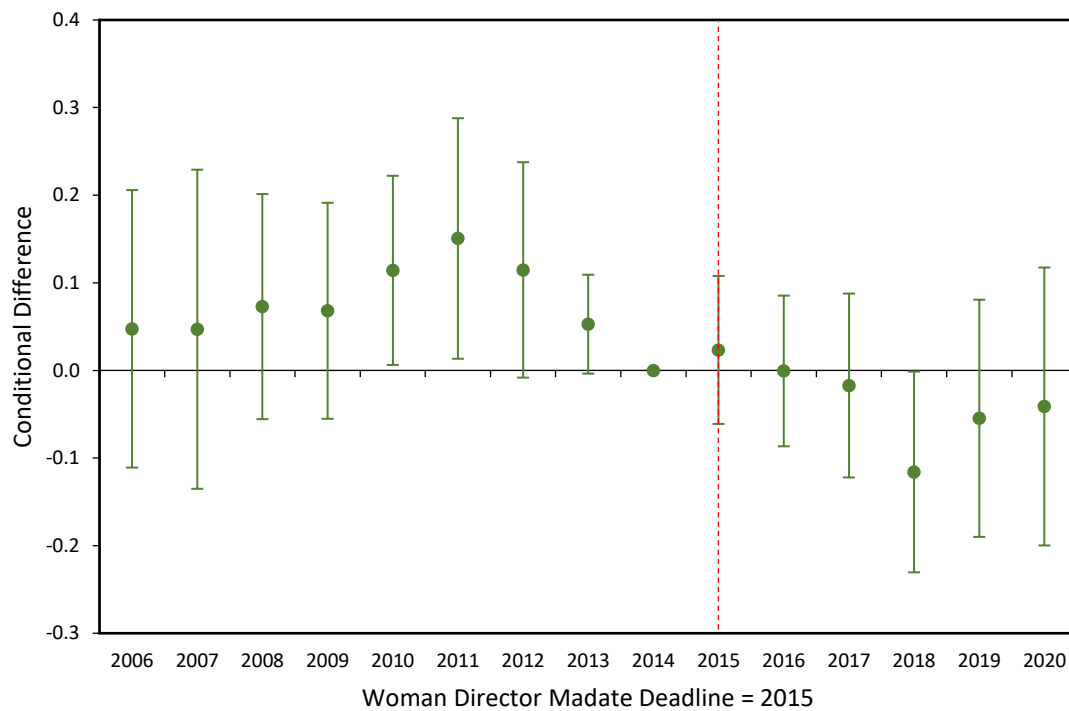
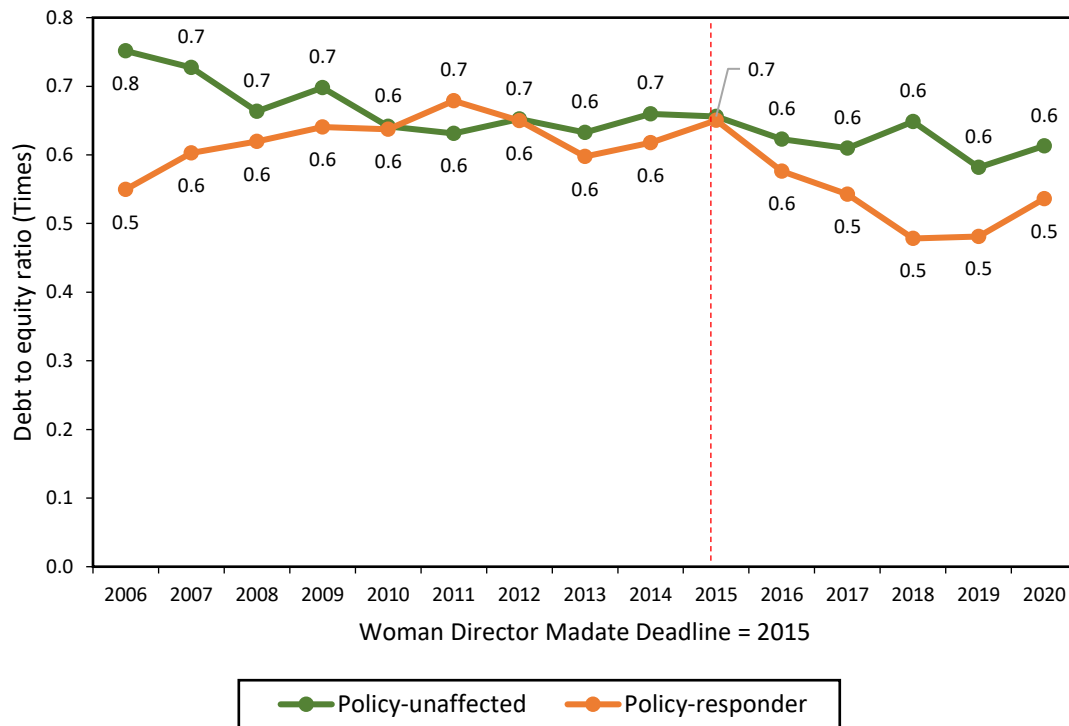
PROFIT AFTER TAX (2011-12P)



RETURN ON NET WORTH



DEBT-TO-EQUITY RATIO



Source: PRIME and CMIE Database

Note: All indicators have been transformed using the inverse hyperbolic sine (I.H.S.) function, to reduce the effect of outliers. The bars show the 95% confidence interval.

As can be seen in Table 2, mid- and large-cap responder firms experienced 173.9 percent higher profits, 48.5 percent higher returns on net worth, and 9.28 percent

lower debt-to-equity ratio. While there are still positive effects (negative for debt-to-equity ratio) for the sample of small-cap firms, these are not statistically significant.

Table 2: DDR REGRESSION RESULTS – SUB-SAMPLE BY FIRM SIZE

	Profit after tax (Rs. Million) (2011-12p)		Return on net worth (%)		Debt to equity ratio (Times)	
	Small-cap	Mid- or Large-cap	Small-cap	Mid- or Large-cap	Small-cap	Mid- or Large-cap
[1 – Responder + (Responder * Post)]	0.128 (0.270)	1.739*** (0.512)	0.0879 (0.140)	0.485*** (0.161)	-0.0237 (0.0348)	-0.0928** (0.0414)
Traded dummy	Yes	Yes	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14002	3302	13122	3281	13054	3283
Mean of Dep. Variable	3.213	8.239	1.508	3.005	0.743	0.598

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Dependent variables are transformed by the inverse hyperbolic sine function

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are “not treated”). Therefore, the coefficient shows average “catch up” in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

4.6. Robustness Check – Consistent Sample of Firms

To check the sensitivity of the effect of appointing women on boards to changes in the sample of firms across time, we take a fixed sample of firms for which data is consistently available for all 15 years taken for our analysis (2006 to 2020). This gives us a sample of 567 firms, out of which 306 are unaffected and 261 are responders. The results for this are shown in Table 3.

Table 3: DDR REGRESSION RESULTS – CONSISTENT SAMPLE

	Profit after tax (Rs. Million) (2011-12p)	Return on net worth (%)	Debt to equity ratio (Times)
[1 – Responder + (Responder * Post)]	0.590*	0.180	-0.0525
	(0.336)	(0.163)	(0.0374)
Traded dummy	Yes	Yes	Yes
Size FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	8490	8189	8182
Mean of Dep. Variable	5.114	2.081	0.692

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Dependent variables are transformed by the inverse hyperbolic sine function

* p < 0.10, ** p < 0.05, *** p < 0.01

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are “not treated”). Therefore, the coefficient shows average “catch up” in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

Within the consistent sample of 567 firms, 142 firms are, on average, not in the small-cap category. Out of these, 108 firms are unaffected and 34 firms are responders. 424 firms are, on average, in the small-cap category, out of which, 198 firms are unaffected and 226 firms are responders. We rerun DDR using a consistent sample of firms, divided by their average size group (either small-cap, or mid- to large-cap). The results for this are shown in Table 4.

Table 4: DDR REGRESSION RESULTS – CONSISTENT SAMPLE, SUB-SAMPLE BY FIRM SIZE

	Profit after tax (Rs. Million) (2011-12p)		Return on net worth (%)		Debt to equity ratio (Times)	
	Small-cap	Mid- or Large-cap	Small-cap	Mid- or Large-cap	Small-cap	Mid- or Large-cap
[1 – Responder + (Responder * Post)]	0.0205 (0.369)	2.004*** (0.651)	0.0190 (0.197)	0.463* (0.238)	-0.0332 (0.0467)	-0.116** (0.0569)
Traded dummy	Yes	Yes	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6360	2130	6091	2098	6088	2094
Mean of Dep. Variable	4.147	8.002	1.800	2.897	0.702	0.663

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Dependent variables are transformed by the inverse hyperbolic sine function

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are “not treated”). Therefore, the coefficient shows average “catch up” in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

5. Women in Leadership Positions and Firm Culture

In this section, we focus on the association between the share of women on boards and firm culture, and the circumstances under which this association holds. Previous studies on this topic suggest that firms with greater gender equity in leadership positions are more likely to be more productive, inclusive, and collaborative, and inspire more organizational loyalty. In this context, it is important to consider the prevalent culture of firms before the mandate—if firms are required by law to appoint women on their boards, they may not necessarily possess the culture of inclusivity that allows women to meaningfully participate in decision-making.

We test two main hypotheses. First, we study the association between ratio of women on boards and firm culture and hypothesize that this relationship is positive (i.e. we expect higher ratios of women to be associated with better firm culture). Second, we hypothesize that the association between ratio of women on board and firm culture is stronger if there is evidence that the firm also has women in senior management positions.

5.1. Data Description and Methodology

We quantify firm culture using employee ratings scraped from AmbitionBox, which is an online platform used by employees to find and rate companies. All the reviews posted are from employees working in offices based in India. Since AmbitionBox was established in 2017, data is only available from 2017 onwards.

We scraped more than 1 million employee reviews posted between 2017 and 2023 (the year 2023 also includes reviews posted in the early months of 2024, until March), covering 2526 firms. Figure 14 shows an example review from AmbitionBox. For each review, we collected the overall rating, and ratings given under individual categories (namely career growth, skill development, company culture, work satisfaction, salary & benefits, job security, and work-life balance). These ratings range between 1 and 5. We also collected the review text under “Likes”, “Dislikes”, and “Work details”. Finally, we collect information on the employee’s job title and the year the review was posted.

Figure 14: EXAMPLE OF EMPLOYEE REVIEW FROM AMBITIONBOX

Process Associate in Kolkata
Full Time · Finance Department
★ 4.0 posted on 24 Apr 2024

Likes
There is a good work culture and supportive team as well as great brand value world wide.

Dislikes
Appraisal and benefits are so minimal and there is very few growing opportunity.

Work Details
Work policy: 3 days/week from office
Work days: Monday to Friday (Flexible Timings)
Work related travel: This is a desk job.

Process Associate in Kolkata
Full Time · Finance Department
★ 4.0 posted on 24 Apr 2024

Overall Rating
★ 4.0

Category Ratings

★ 1.0 Career Growth	★ 2.0 Salary & Benefits
★ 4.0 Skill Development	★ 4.0 Job Security
★ 3.0 Company Culture	★ 3.0 Work-Life Balance
★ 3.0 Work Satisfaction	

Source: AmbitionBox

We combine some groups to calculate work culture ratings (simple average of company culture, work satisfaction, and work-life balance), growth ratings (simple average of career growth and skill development ratings), and security ratings (simple average of salary & benefits and job security ratings).

Using the processed⁸ rich text data collected under likes, dislikes, and overall review, we calculate sentiment polarity scores, which range from -1 to 1.⁹ The score is negative if the overall sentiment of the text is negative, positive if the sentiment is positive, and 0 if the sentiment is neutral. Throughout the analysis, these scores have been weighted by the word length of their respective cleaned texts. This is done to prevent bias caused by long texts but with very few substantive words, which tends to increase the occurrence of zeros and results in unreliable average scores.

The correlation between overall weighted sentiment polarity scores for the review texts and the ratings left by employees is positive and significant. This correlation is stronger for sentiment polarity scores calculated for likes more than dislikes. This is because employees who leave low ratings are more likely to describe the negative aspects of their workplaces' cultures using comparatively neutral language. On the other hand, employees who leave positive ratings are more likely to use language with higher positive sentiment in their reviews.

We study four different measures of employee ratings (average ratings, work culture ratings, growth ratings, and work security ratings), and three different measures for employee sentiment (compound sentiment scores for likes, dislikes, and total review text), giving us seven different measures of firm culture.

Firm culture is more likely to be affected by the ratio of women on board if this ratio has been consistently high. To account for this, and to avoid introducing bias to our estimates by using outliers, we take the average of the share of women on board in the current and last year as the main independent variable. Introducing lag terms in our analysis allows us to account for the possible lasting effects of having more women on board on firm culture.

The average number of reviews per firm rose substantially from 14 in 2017 to 169 in 2023. Since the number of reviews posted per firm was the highest in 2023, and more than 90 percent of firms were covered in 2023, we use 2023 as our year of analysis. This is also done to make sure that we can use lagged averages for gender composition in board while minimizing the effect of COVID-19 on our data. Since the main dependent variable for 2023 will be the average share of women on board in FY 2022-23 and FY 2021-22, we minimize the influence of COVID-19 (FY 2020-21). Therefore, our final sample includes around 400,000 employee reviews.

⁸ We process the review texts by excluding words that can be considered "redundant" in terms of influencing overall sentiment of the text. We call these "stop words". Natural Language Processing toolkit (NLTK), which is a Python library for Natural Language Processing, considers a list of 179 words "stop words", which we exclude from our text data. Both the sentiment polarity scores and word length of reviews have been calculated using text that excludes these "stop words".

⁹ For this, use the VADER SentimentAnalyzer function, which is included in the Natural Language Toolkit library on Python. This function works with a sentiment lexicon, which is a dictionary containing words or phrases and their respective sentiment ratings, depending on whether they are positive or negative. For our analysis, the cleaned text for each review is first "tokenized", or broken into individual words. These individual words are then checked against their respective sentiment scores, based on which the overall compound sentiment score of the text is calculated.

Each employee review is taken as one observation for the purposes of our study to be able to identify input from managers and other employees separately. As has been observed in surveys worldwide, the seniority of the employees likely changes their perspective on firm culture.

Finally, we control for firm-level characteristics including firm size, industry, and age groups. Instead of size based on market capitalization, we find that size based on the number of employees in the firm explain heterogeneity within ratings and sentiment polarity better. The size is web-scraped from the company profile page on AmbitionBox. The size categories used are: 1-10, 11-50, 51-200, 201-500, 501-1k, 1k-5k, 5k-10k, 10k-50k, 50k-100k, and 100k+ employees. The industry groups are: banking, non-banking finance, construction & real estate, diversified, electricity, manufacturing, mining, and services (other than financial). The firms are divided into age groups based on the year of establishment. The categories used for this are before 1950, between 1951 and 1971, between 1972 and 1985, between 1986 and 1990, and after 1991. These categories are based on the business environment in India when the firms were established.

We run simple OLS regressions (including weights for sentiment polarity scores) to quantify the association between firm culture and share of women on board. Since the share of women in top management positions is heavily concentrated at 0, we are unable to separately study the effect of gender inclusive leadership in top management teams. However, we study the simultaneous impact of having women in boards and at least one woman in the top management team, as our second hypothesis.

5.2. Association between Ratio of Women in Boards and Firm Culture

To check if the association between ratio of women on board and firm culture is positive, we run the following regression (for review r given for firm i , for year 2023):

$$Y_{ir} = \alpha + \delta \text{ratio}_i + \gamma \text{manager}_{ir} + \beta X_i + \epsilon_{ir} \quad (4)$$

Here, ratio_i refers to the average ratio of women on board in 2022 and 2023 for firm i , manager_{ir} is a dummy variable equal to 1 if review r posted for firm i is from an employee in a managerial position, and X_i refers to firm-level controls (industry, age, and size).

Table 5: OLS WITH FIRM AND REVIEW-LEVEL CHARACTERISTICS, FOR 2023

	Average rating (out of 5)	Average Work culture ratings	Average Growth ratings	Average Work security ratings	Compounded sentiment score for likes
Average ratio of women on board over current and last year	0.311 (0.205)	0.230 (0.247)	0.301 (0.223)	0.282 (0.220)	0.0903* (0.0485)
Manager flag	-0.0995*** (0.0165)	-0.164*** (0.0210)	-0.0687*** (0.0217)	0.00659 (0.0181)	-0.0133*** (0.00454)
Size FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Observations	344681	298016	298016	298016	295789
Mean of Dep. Variable	3.905	3.636	3.452	3.677	0.416

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Sentiment scores are weighted by the corresponding word length

Since scores for dislikes are largely concentrated on zero (implying neutral sentiment polarity), we have not included results for compounded dislikes and total sentiment scores (which are also affected by the scores for dislikes) in this table. Results for these outcomes are in Appendix II, Table A2.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 shows that the ratio of women on board is positively associated with firm culture, however, this association is only significant at the 10% level for only one of the variables—the sentiment polarity scores for likes. The low significance of this association is not surprising, given that board members do not directly manage a company.

We run the regression described in equation (4) on sub-samples of firms based on whether they have at least one woman in top management. Table 6 shows that across all measures of firm culture, the association between ratio of women on boards and firm culture is higher and significant for firms that currently have at least one woman in their top management team.

Table 6: OLS WITH FIRM AND REVIEW-LEVEL CHARACTERISTICS, FOR 2023 – SUB-SAMPLE BASED ON PRESENCE OF WOMEN IN TOP MANAGEMENT

	Average rating (out of 5)		Average Work culture ratings		Average Growth ratings		Average Work security ratings		Compounded sentiment score for likes	
	No women	At least one woman	No women	At least one woman	No women	At least one woman	No women	At least one woman	No women	At least one woman
Average ratio of women on board over current and last year	0.223 (0.298)	0.769** (0.308)	0.190 (0.376)	0.570* (0.328)	0.257 (0.293)	0.934** (0.379)	0.388 (0.311)	0.596* (0.335)	0.139** (0.0697)	0.169** (0.0713)
Manager flag	-0.099*** (0.0196)	-0.082*** (0.0188)	-0.160*** (0.0250)	-0.143*** (0.0215)	-0.071*** (0.0231)	-0.039* (0.0215)	0.014 (0.0176)	0.026 (0.0202)	-0.012*** (0.0042)	-0.006 (0.0059)
Size FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	182514	123679	155608	110066	155608	110066	155608	110066	154506	109155
Mean of Dep. Variable	3.912	3.857	3.628	3.606	3.450	3.405	3.680	3.635	0.413	0.413

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Sentiment scores are weighted by the corresponding word length

Since scores for dislikes are largely concentrated on zero (implying neutral sentiment polarity), we have not included results for compounded dislikes and total sentiment scores (which are also affected by the scores for dislikes) in this table. Results for these outcomes are in Appendix II, Table A3.

* p < 0.10, ** p < 0.05, *** p < 0.01

6. Conclusion

In this paper we document the status of gender-inclusive corporate leadership and use the woman director mandate in the Companies Act (2013) to study its relationship with firm outcomes, including financial performance and corporate culture in India.

We find that firms, on average, were appointing more women than mandated by the Companies Act (2013). At the same time, newly appointed women were younger and more educated than their male counterparts and their average number of directorships, the “stretch factor,” increased significantly compared to men. Furthermore, board meeting participation increased for both men and women in the years following the enforcement of the mandate, and consequently the gender gap in meeting attendance decreased. Despite these large changes in both the share of women on boards and average director characteristics, we do not see the positive trends replicated for top management teams (C-Suite). In FY 2022-23, more than half of the NSE-listed firms in our sample did not have even one woman in their top management teams, and less than 10 percent of firms had exactly one woman.

Regarding the impact of the presence of women on boards on financial performance, we find that having at least one woman on board is associated with higher economic performance, financial stability, and lower financial risk for the larger firms. We observe that although all firms see some impact on financial performance after hiring at least one woman following the mandate, mid-cap and large-cap firms see a more consistent impact for a longer period post-mandate.

We use quantitative measures for firm culture across four different dimensions to study the impact of higher representation of women in leadership on firm culture and employee satisfaction. We find that higher shares of women in board positions are positively associated with employee ratings and sentiment scores, but the relationship is significant only when there is at least one woman in top management (C-suite) positions. These results help us understand possible channels through which gender-equitable boards and top management teams could positively impact firm culture.

7. Policy Recommendations

The analysis presented in this paper has several policy implications.

First, the positive impact on firm’s financial performance due to the presence of women in corporate boards, as well as the positive finding on firm culture of hiring more women in top management positions, confirm that there is a clear business case for appointing more women in top positions in the corporate sector.

Second, we find that the Companies Act (2013) was instrumental in increasing the representation of women in boards. By 2023, almost 80 percent of all firms in our sample had more than one woman. Moreover, companies tended to go beyond the mandate, suggesting the favorable impact of the current government’s priority to foster women-led development and the positive experience gained by firms. This means that sustained efforts from top policymakers to promote women in leadership positions and in implementing the quota mandate were highly successful and should continue.

Third, the positive spillovers from or the “demonstration effect” of the directorship mandate to hire more women in top management positions did not

materialize. In other words, the expectation that adding women to boards would improve gender diversity in other levels of leadership cannot be taken for granted. Given our finding that there is a positive association between the presence of senior women managers and firm culture, there is a lesson for the corporate sector to hire more women in top management positions. Mandating quotas for women in management teams could be considered by policymakers. Alternatively, the government and the business community could promote several human resources practices in the private sector that have been successful in other countries. These include annual gender-bias training for companies, ensuring that there is a gender balance in the interviewing panel, systematically including and seeking out the views of women in management meetings, allowing for flexible working arrangements, and mentorship or sponsorship programs for women.

Fourth, if the problem is on the supply side, we believe it is unlikely due to the absence of highly qualified women, given the rising and substantial number of women graduating in India in higher education, at levels similar to their male counterparts in most fields. If that is the case, it is worth exploring why highly educated women do not join the work force or drop out of the work force after a few years. A major factor could be the disproportionate burden that women carry for unpaid care work and household chores. A recent nationwide time-use study from India found that women aged 15-29 allocate 7.4 hours per day to household chores and care work, while similarly aged men only allocate 2.8 hours to these activities (Vikram et al., 2024). This calls for more child and elder care facilities, which could be provided at work or by the government. The government could also consider providing subsidies for care facilities to companies that hire and retain more women, and incentivize paternal involvement in child care duties.

Fifth, data on director-level characteristics indicate that women hired on boards have consistently been significantly younger and more educated than their male counterparts. This is good news to the extent that it shatters the myth that the firms have had to compromise on quality because of the enforcement of the Companies Act (2013). At the same time, it points to exploring deeper if there are conscious or unconscious biases against women. Some studies (for example, Ng and Wiesner, 2007) indicate that women must be more qualified than their male counterparts to be considered for the same positions.

Sixth, the finding in our paper that the number of other directorships held by women skyrocketed in the years following the mandate points to whether a serious attempt has been made by companies to expand the pool of potential women directors. If women serve on many boards, it could constrain their capacity to attend multiple board meetings and contribute more productively to board discussions and decisions. Business organizations that represent and advocate the interests of industry could create a roster of qualified women directors and C-Suite managers, which is periodically shared with their member firms.

Finally, empowering women begins at home. The cultural environment at home that fosters an equal treatment of boys and girls has a significant bearing on the attitudes of women themselves when they enter the work force. The influence and views of spouses and in-laws after marriage is also critical. Policies to address cultural and social factors are complex, but there is increasing evidence that signal and support of top policymakers, business leaders, and religious/spiritual leaders can make a significant difference.

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APPENDIX I

Data Sources and Sample – Gender Composition of Boards and Firm Performance

Our firm-level analysis includes firms listed on the National Stock Exchange (NSE), and covers indicators under four broad topics: firm identification, financial performance, leadership, and culture. Indicators for firm-level corporate leadership has been collected from PRIME for 2707 firms. This has been combined with financial performance indicators and market capitalization collected from CMIE to get a firm-year unbalanced panel dataset covering 2580 firms over 18 years (from FY 2005-06 to FY 2022-23). To avoid biasing our results due to COVID-19, we only include the 15-year period in our analysis, until FY 2019-20. Indicators on firm culture have been calculated using employee reviews scraped from AmbitionBox.

Firm leadership indicators include data on directors and top managerial personnel. Details about company directors, including gender, age, education, board meeting attendance, and number of other directorships held (indicating director stretch factor) has been collected for around 33,547 unique directors, for 2707 NSE-listed firms between 2006 and 2023. Data on gender, age, and education is available starting from 2006, while data on number of other directorships held is available from 2013 and share of meetings attended is available from 2015. These indicators have been averaged to create a firm-year unbalanced panel dataset. We have also calculated averages disaggregated by gender to explore if director characteristics differed by gender, and how they differed both before and after the implementation of the Companies Act (2013). Gender composition of top management teams have also been collected for a total of 2332 firms (including both firms listed on the NSE, and some unlisted financial sector firms). This data is available between FY 2011-12 and FY 2023-24. Top management positions include positions C-suite positions like CEO, CFO, COO, etc., and a few other positions including Company Secretary, Compliance Officer etc. Gender composition data within leadership (board and top management) positions are used as the main dependent variable in our analysis.

Firm identification indicators include industry, age of the firm, firm size, and listing information. We use broad the CMIE industry classification, which gives us eight industry groups: Banking, Non-banking finance, Construction & real estate, Diversified, Electricity, Manufacturing, Mining, and Non-financial services. The firms are also divided into five age groups, depending on the business and economic environment of the country at the time of incorporation. The five groups are firms incorporated before 1950, incorporated between 1951 and 1971, incorporated between 1972 and 1985, incorporated between 1986 and 1990, and incorporated after 1991. Firm size is based on its market capitalization value given on the stock exchange where it is listed (or averaged across multiple stock exchange values, if the firm is listed on multiple stock exchanges). These firms are then divided into small-cap, mid-cap, and large-cap based on the rules defined by SEBI (Securities and Exchange Board of India). Two firm-level dummies have also been calculated, indicating whether the firm is listed on at least one stock exchange, and whether the firm's shares are being actively traded on at least one stock exchange. If a firm is listed on at least one stock exchange, and has not been suspended from this stock exchange, then we classify the firm as "traded".

Financial performance indicators have been collected from CMIE for 2580 NSE-listed firms between FY 2005-06 and FY 2022-23, and include measures for profits after tax, returns on net worth, and debt-to-equity ratio. We focus on these indicators to analyze a firm's profitability (using the profits and returns indicators), and financial stability (using debt-to-equity ratio, which is an indicator for liquidity). Since profits after tax is a currency value, we have adjusted it for inflation using the GDP deflator, indexing on the year FY 2011-12.

The financial performance dataset, merged with board and identification data, forms our final unbalanced panel dataset, including information for 2580 NSE-listed firms between FY 2005-06 and FY 2022-23. This final sample of firms covers a wide range of economic activities. The sample includes 2215 listed firms, and 365 unlisted firms (as of FY 2022-23). There are 2190 non-financial firms, 325 financial non-banking firms, and 65 banking firms. Most (~53.1%) of these firms have been established after liberalization (1991). Within this sample, 191 firms (around 7.4% of the final sample) only have one year available for financial performance. Therefore, these firms are dropped during the econometric analysis. It is also important to note that throughout the rest of this paper, financial years have been used for analyzing the effect of board gender composition on firm outcomes, and the ending year are used to refer to them. Therefore, FY 2014-15 is referred to as 2015 in both the text and figures.

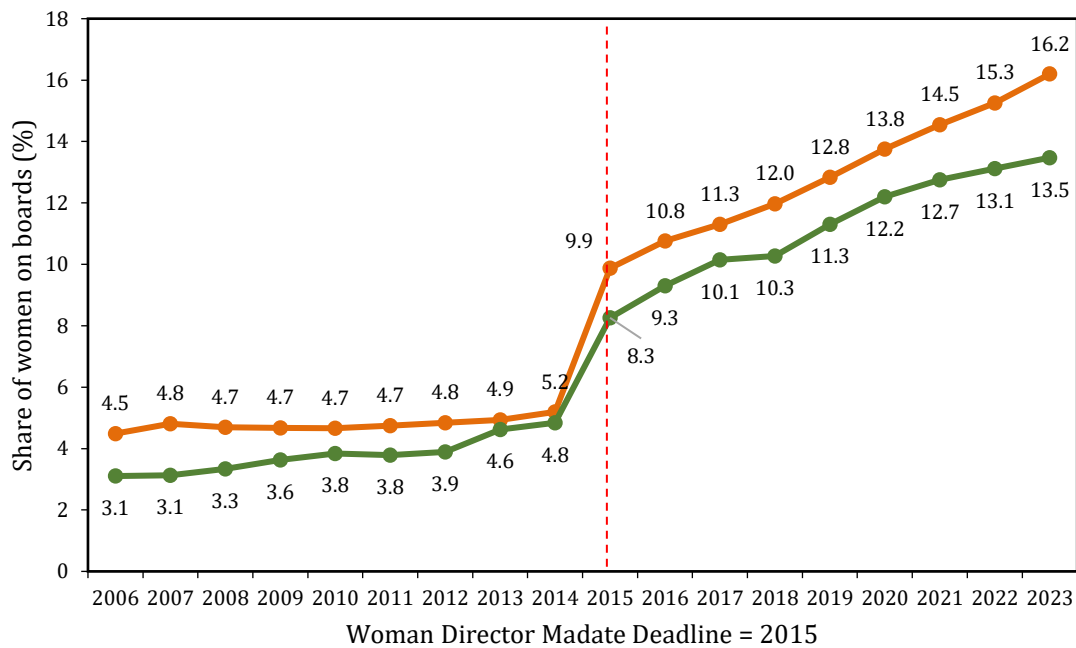
Table A1: FIRM CHARACTERISTICS BY TREATMENT GROUP

	Policy Unaffected	Policy Responders	Total
All firms	707	695	1402
Industry			
Banking	32	6	38
Non-banking finance	79	78	157
Construction & real estate	55	55	110
Diversified	10	22	32
Electricity	10	8	18
Manufacturing	352	385	737
Mining	11	4	15
Services (other than financial)	158	137	295
Age group			
Before 1950	104	68	172
Between 1951 and 1971	88	80	168
Between 1972 and 1985	155	157	312
Between 1986 and 1990	100	127	227
After 1991	260	263	523
Size Groups in 2020			
Small-cap	439	547	986
Mid-cap	69	47	116
Large-cap	70	16	86
Missing size group	24	6	30
Total firms in 2020	602	616	1218

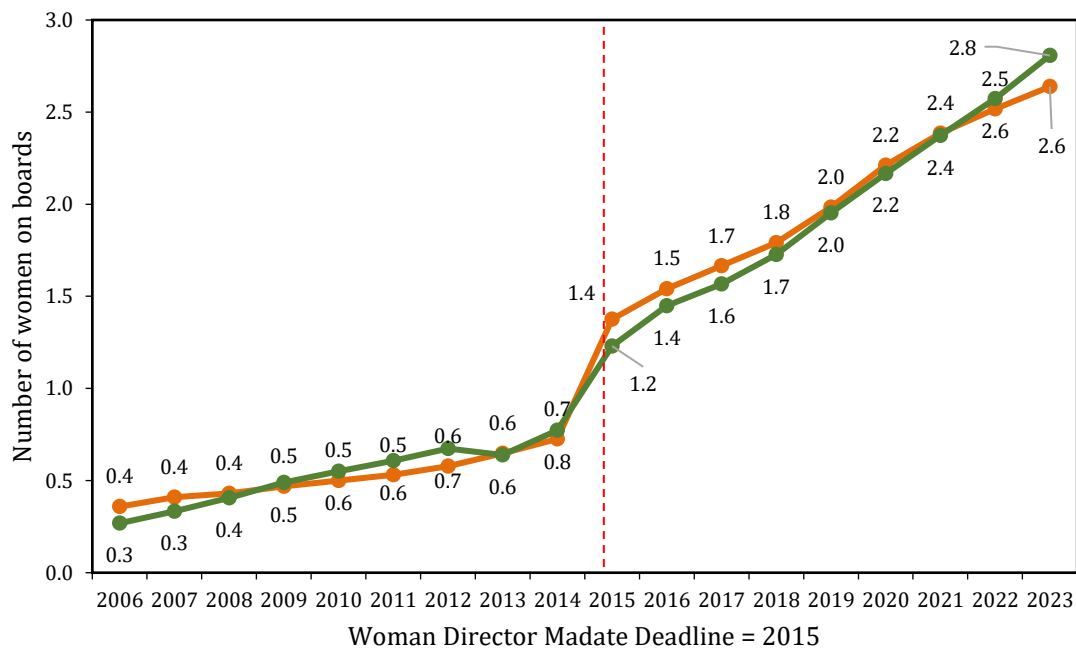
Source: PRIME and CMIE Databases

APPENDIX II

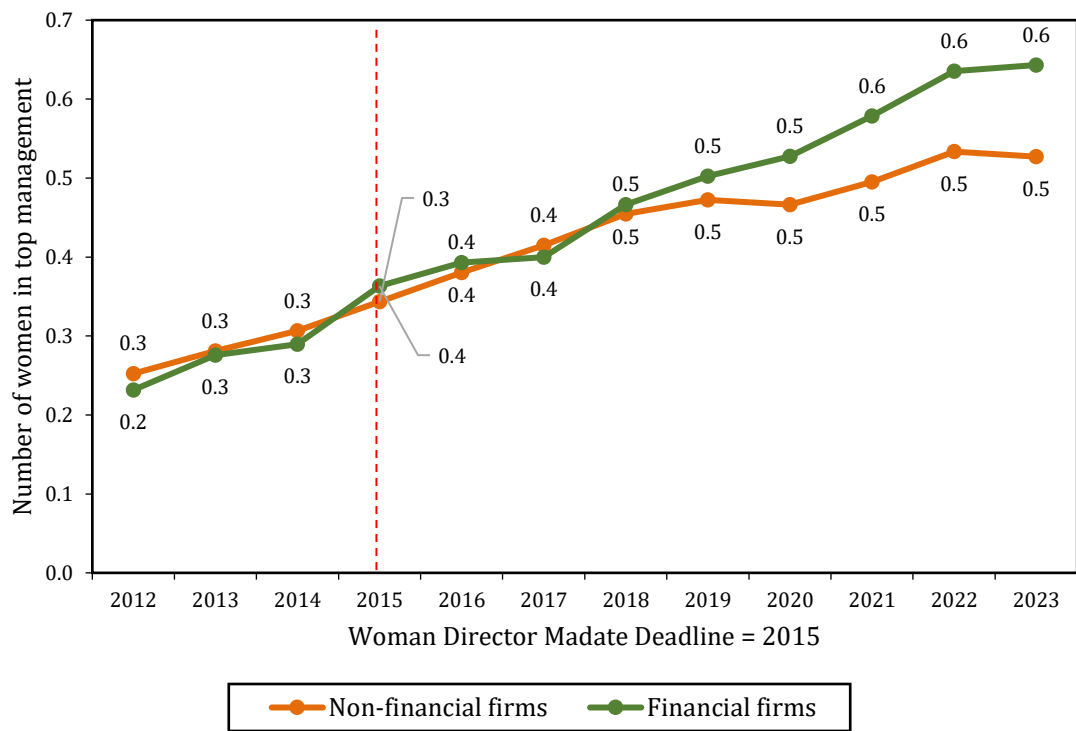
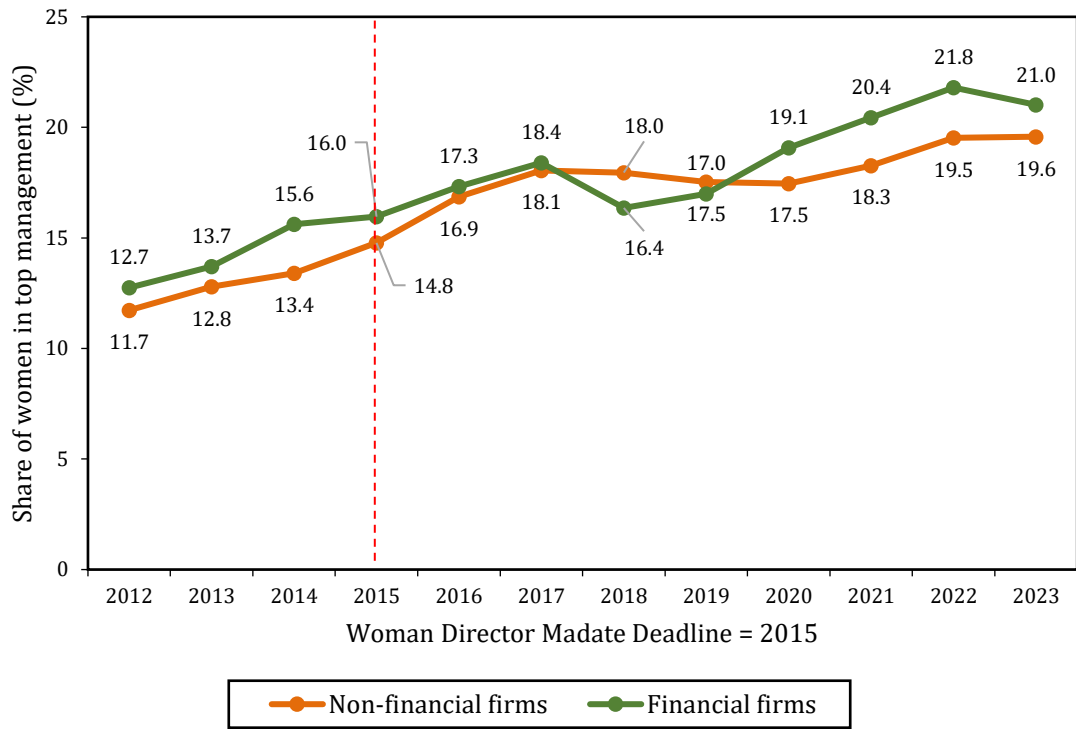
Figure A1: AVERAGE SHARE AND NUMBER OF WOMEN IN LEADERSHIP BY INDUSTRY



—●— Non-financial firms —●— Financial firms

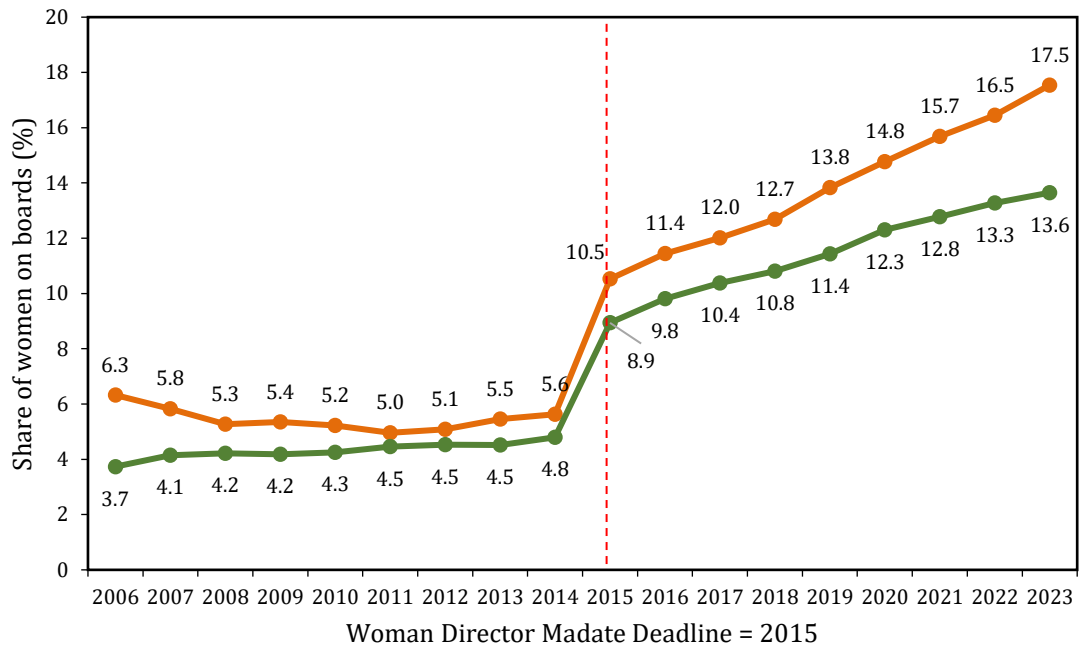


—●— Non-financial firms —●— Financial firms

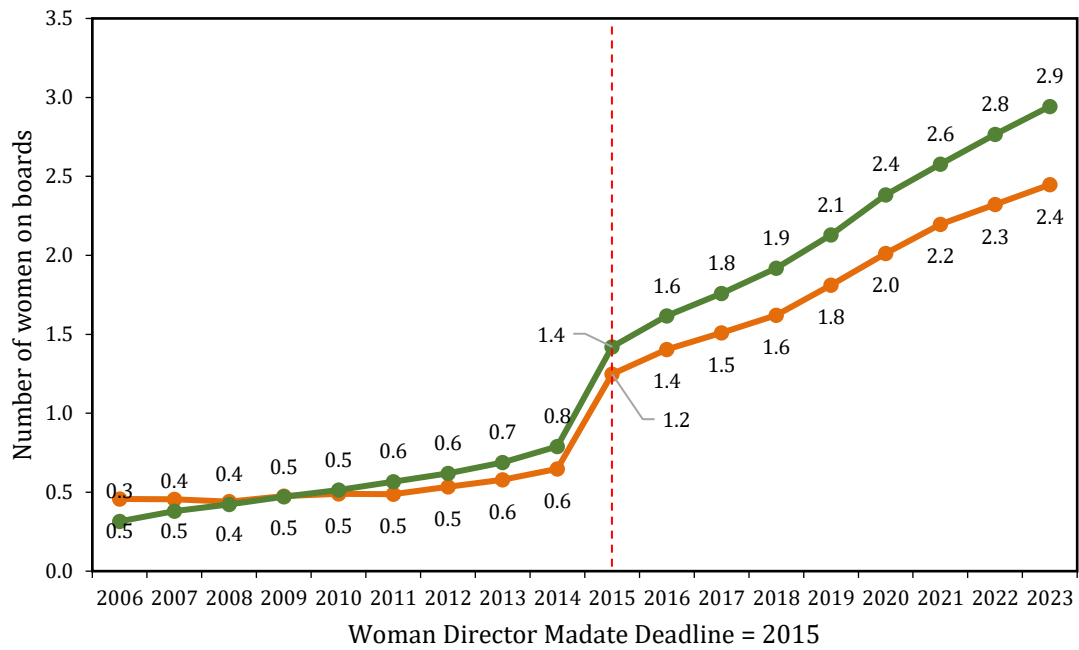


Source: PRIME and CMIE Databases

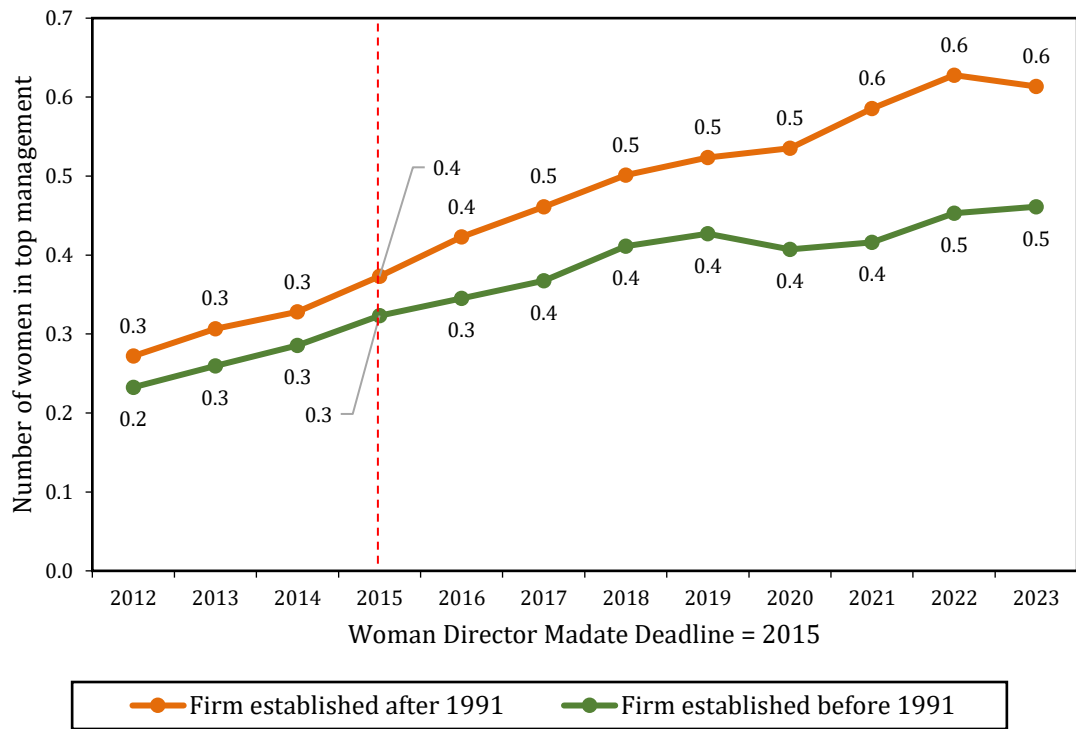
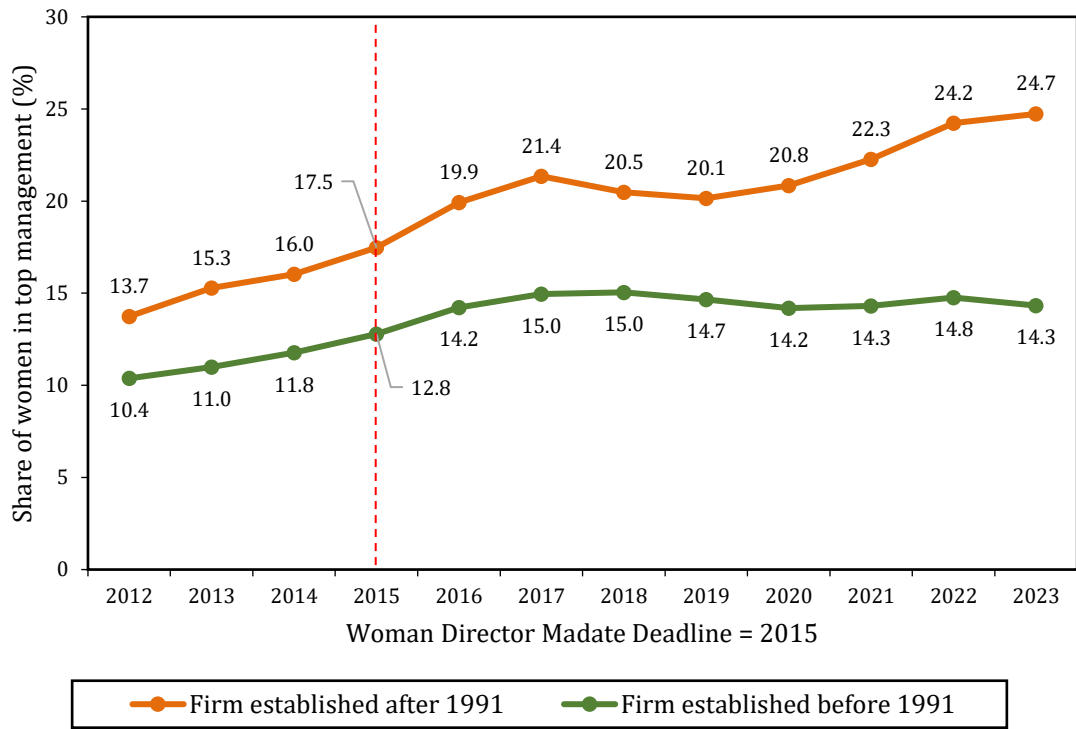
Figure A2: AVERAGE SHARE AND NUMBER OF WOMEN IN LEADERSHIP BY FIRM AGE



—●— Firm established after 1991 —●— Firm established before 1991



—●— Firm established after 1991 —●— Firm established before 1991



Source: PRIME and CMIE Databases

Table A2: OLS WITH FIRM AND REVIEW-LEVEL CHARACTERISTICS, FOR 2023

	Compounded sentiment score	Compounded sentiment score for dislikes
Average ratio of women on board over current and last year	0.0734 (0.0636)	0.00260 (0.0406)
Manager flag	-0.0184*** (0.00501)	-0.00550 (0.00337)
Size FE	Yes	Yes
Industry FE	Yes	Yes
Age FE	Yes	Yes
Observations	344681	298016
Mean of Dep. Variable	3.905	3.636

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Sentiment scores are weighted by the corresponding word length

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: OLS WITH FIRM AND REVIEW-LEVEL CHARACTERISTICS, FOR 2023 – SUB-SAMPLE BASED ON PRESENCE OF WOMEN IN TOP MANAGEMENT

	Compounded sentiment score		Compounded sentiment score for dislikes	
	No women	At least one woman	No women	At least one woman
Average ratio of women on board over current and last year	0.0854 (0.0973)	0.150* (0.0809)	-0.0246 (0.0629)	-0.0113 (0.0571)
Manager flag	-0.0140*** (0.00484)	-0.0163** (0.00734)	-0.000541 (0.00405)	-0.00840 (0.00607)
Size FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Observations	155570	110038	148566	105416
Mean of Dep. Variable	0.355	0.351	0.0305	0.0284

Source: Authors' Calculations

Note: Standard errors (in parentheses) are clustered at the firm level

Sentiment scores are weighted by the corresponding word length

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



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