Winds of Change:
Gender Quota on Boards in the face of Patriarchy*

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Abstract :

We study the long-term effect of gender quotas in India, the first country with strong patriarchal norms to mandate female directors. Five years after the reform, female director appointments increase from less than 10% to over 20%. Almost half of the firms appoint and retain female directors beyond the ambit of the quota, with board diversity and board networks as primary drivers. We also find that the gender gap in director remuneration decreases from 30% to 3%. Overall, our results suggest that introducing gender quotas in environments with strong patriarchal norms can deepen and diversify the director labor pool.

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The underrepresentation of women on corporate boards remains one of the most debated topics in corporate governance in the 21st Century. The debate has intensified with the introduction of gender quotas in advanced economies, starting with a 40% gender quota in Norway in 2003 followed by recent legislations in Germany, France, Italy, and the United States (i.e., California).[1] At the same time, gender quotas have gained traction in emerging markets, which are often characterized by strong patriarchal norms and lower corporate governance standards, with India and Pakistan mandating at least one female director on corporate boards.[2] Despite a rich literature on gender disparity on corporate boards, evidence on the long-term effect of gender quotas in environments with strong patriarchal norms remains scant.

From a corporate governance perspective, the effect of gender quotas in emerging markets with strong patriarchal norms remains an open empirical question. First, firms operating in such environments may comply with the gender quotas by appointing females related to company insiders, thus limiting the size and quality of the director labor pool. Second, in theory, quotas can be an effective tool to deepen and diversify the talent pool of corporate directors by creating opportunities for women. This might be particularly true in emerging markets, where lower corporate governance standards often impede board composition and director quality. However, the supply of high-quality female directors might be limited in emerging markets due to more significant gender disparities in the labor market, questioning whether gender quotas will have long-term effects for females in the labor market for corporate directors.

This study examines the long-term effect of the gender quota in India, the first country with strong patriarchal norms to mandate female directors on corporate boards. The gender quota required firms to have at least one female director by April 1, 2015. Our primary focus is to understand whether the opportunities for females on corporate boards improve after the introduction of the gender quota. The starting point of our analyses is to examine changes in female director appointments to corporate boards. To ensure that we are not capturing the mechanical effect of the reform, we exclude the year of the reform from our analyses. We find that introducing the gender quota is associated with a 13 percentage points increase in the fraction of female director appointments with independent directors driving this increase.

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[1] As the first wave of gender quotas were introduced in developed economies, prior work focused on analyzing the effect of gender quotas in Norway (Ahern and Dittmar, 2011; Matsa and Miller, 2011; Bertrand et al., 2019; Eckbo, Nygaard, and Thorburn, 2020), Belgium, France, Italy, and Spain (Comi et al., 2016), Italy (Ferrari et al., 2016), Sweden (Hinnerich and Jansson, 2017), France (Ferriera et al., 2020), and California in the United States (von Meyerinck et al., 2021; Gertsberg, Mollerstrom, and Pagel, 2021; Greene, Intintoli, and Kahle, 2020; Hwang, Shivdasani, and Simintzi, 2020).

[2] Table 1 provides the chronology of gender quotas that mandate female directors across countries, while Appendix Figure A1 ranks countries on their patriarchal norms based on the World Value Survey and uses the response to the question "*When jobs are scarce, men should have more right to a job than women*".

To ascertain that the replacement of outgoing female directors does not drive the increase in female director appointments, we focus on voluntary appointments of female directors. Specifically, we only include female director appointments in the post-reform period if the firm already complies with the quota mandating one female director. We find that voluntary appointments drive the baseline effect, leading to a greater female representation on the boards beyond the ambit of the gender quota. In particular, the fraction of firms with two or more female directors increased from less than 10% before the reform to almost 45% five years after the reform. We further find that the appointment of new female directors drives the increase in voluntary appointments and that few female directors become busy. As a result, the female director pool expands three-folds from around 350 unique female directors to more than 1,000 unique female directors.

The increase in the appointment rates are reflected in important committees, albeit by a smaller magnitude. We find that the fraction of females on the audit and nomination & remuneration committees increase from less than 4% to more than 12%, five years after the reform. Before the reform, 1% to 2% of the chairpersons on these key committees were females increasing to 5.8% for the audit committee and 9.5% for the nomination & remuneration committee. These effects, however, do not extend to the highest corporate echelon, either as the chairperson of the board or as top executives of the firm.

To understand which firms choose to voluntarily appoint female directors, we rely on prior work and examine whether more diverse boards and firms with connected directors (directors that are exposed to female directors on other boards) are more likely to appoint additional female directors (Adams and Ferreira, 2009; Giannetti and Wang, 2020; Cai, Ngyugen, and Walking, 2021). We hypothesize that the introduction of the gender quota tables discussion on board composition and diversity on corporate boards, in which case we expect more diverse boards and firms with connected directors to appoint female directors. At the board level, we find that firms with female controlling owners, firms with foreign directors, and firms operating in industries with greater female representation on boards are more likely to appoint female directors voluntarily. At the committee level, we find that firms with female directors and foreign directors on the audit committee are less likely to appoint female directors voluntarily. This result suggests that female directors in key committees do not drive the post-reform increase in voluntary female director appointments on the boards. Further, we find that board networks play a key role in facilitating voluntary female director appointments.

A natural question is whether the expansion of the female director labor pool is associated with changes in the quality of appointed directors. In terms of quality, we find that the marginal female director appointment is similar to the marginal male director appointment, as measured by stock price reactions, education, and specialization. The stock price reactions are negative for mandatory female director appointments, which is attributable to: (i) that a majority of firms opt to comply with the quota by expanding their board size, and (ii) that there is a temporary drop in female director quality as measured by experience at the time of the compliance with the quota, which subsequently reverses as the pool of female directors expand and gain experience. We also examine whether the appointment of directors related to the controlling owner family, indicative of tokenism, drives the expansion of the female director labor pool. We find that the fraction of related directors on the boards increased from 4% to 6%, which is economically small. The stock market reacts negatively to appointments of related directors, suggesting that these appointments are perceived by shareholders as value decreasing. Overall, these findings indicate that firms continue to appoint high-quality female directors after the reform by tapping into the increased pool of experienced female directors.

Lastly, we examine whether the gender gap in director remuneration narrows after the introduction of the gender quota. Two years before the reform, female independent directors earned 30% less than male independent directors serving the same role on the same company's board. Five years after the reform, the gap *within* the board reduces to 3.3%. The 26.7 percentage point reduction in the gender gap in remuneration is statistically and economically significant.[3] In further analysis, we find that the gender gap in director remuneration reduces both for female directors appointed before and after the reform, ruling out that the reduction is driven by differences in director quality. More importantly, these changes are driven by increasing pay to female directors, rather than reductions in pay disparity.

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[3] To ensure that the estimated gender gap is not an artifact of gender differences in committee assignments or individual characteristics like tenure, experience, and expertise, we include these time-varying director characteristics as controls in our empirical specification. The estimated gender gap is virtually similar with and without director characteristics as controls.

Although our results are consistent with the view that gender quotas expand the female director pool, these findings might alternatively be driven by changing social norms. If general trends in attitudes towards female directors drive the increase in voluntary appointments, we expect the increase to be larger for firms that are more exposed to stronger social norms and for firms that operate in labor markets with greater female opportunities. To test this, we use proxies for attitudes towards women and female labor market opportunities and interact the variation in their intensities across geographies and industries, with voluntary appointments of female directors. Across different proxies, we find consistent evidence of a substantial increase in voluntary female director appointments after introducing the gender quota, even for firms located in environments that are more hostile towards women and in industries that provide the least opportunities to women. These findings bolster our interpretation that the gender quota tables discussion on diversity inducing firms to voluntarily appoint female directors beyond the ambit of the quota.

Further, we rule out the possibility that boards appoint female independent directors to replace male independent directors who leave boards due to firm-specific events following the introduction of personal liability that coincided with the gender quota. We find similar estimates for female appointment rates in firms that did not experience a resignation and in firms that experience the death of a male director, thus ruling out the concern that female directors are appointed in response to firm-specific events that trigger director vacancies.

We also consider that gender quota is introduced at an active time for corporate governance reforms, suggesting that other market developments might have contributed to increased female director appointments. For example, around the introduction of the gender quota, there is an increased focus on corporate governance due to increased ownership by institutional investors and the emergence of proxy advisors in India (Subramanian, 2016). We, therefore, examine whether institutional investors' pressure, shareholder support in director elections or firms' anticipation of future regulation instead drive our findings. We find that female director appointments increase similarly for firms with high and low institutional ownership. Further, using data from a leading proxy advisory firm, we show that recommendations on director elections have a muted effect on female director appointment rates. In summary, we conclude that a general movement towards gender equality and other market developments such as increased pressure from institutional investors or proxy advisor recommendations do not drive the long-term increase in voluntary female director appointments.

Our study contributes to the literature on the effect of gender quotas on corporate boards. Much of the evidence focuses on Norway, the first country to introduce binding gender quotas, and how the stock market reacted to the announcement of the quota (Nygaard, 2011; Ahern and Ditmar, 2012; Matsa and Miller, 2013; and Eckbo, Nygaard, and Thornburn, 2019). Other studies have analysed the effect of gender quotas on firm value in other European countries (Comi et al., 2016; Ferrari et al., 2016; Hinnerich and Jansson, 2017; Ferriera et al., 2020) and California (Hwang, Shivdasani and Simintzi, 2020; Greene, Intintoli, and Kahle, 2020; von Meyerinck et al., 2020).[4] These studies find that introducing gender quotas either has no effect or a negative effect on firm value and interpret the latter as evidence of supply-side constraints in the market for corporate directors. Unlike these studies, we study the long-term effect of introducing gender quota in an emerging market with strong patriarchal norms and lower corporate governance standards, with these institutional differences impeding board composition and director quality. Our findings suggest that gender quotas can deepen and diversify director pools in these environments. We find that the marginal female director appointment is similar to the marginal male director appointment in terms of director quality. This evidence on director quality contrasts evidence from developed economies with many studies arguing that supply-side constraints imposed by the mandate result in negative stock price reactions among firms that appoint female directors.

Our second contribution is to evaluate the long-term effect of the gender quota on the labor market for corporate directors. Our evidence suggests that long-term improvements for females in the director labor market through (i) an increase in female director appointments, (ii) a greater female representation on important subcommittees but not in top positions such as CEOs or chairs of the board, and (iii) a significant reduction in the gender gap in director remuneration. These findings are consistent with Bertrand et al., (2019), who find a positive effect of the reform in Norway.[5] Relative to Bertrand et al., (2019), our contribution is to provide evidence on the long-term effect of introducing gender quota in an emerging market with strong patriarchal norms and lower corporate governance standards. Despite these institutional differences, our findings suggest a positive long-term impact for women who make it to the boardrooms in such economies.

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[4] Comi et al., (2016) analyze gender quotas in Belgium, France, Italy, and Spain. Ferrari et al., (2016) analyzes gender quota in Italy. Hinnerich and Jansson (2017) analyze gender quotas in Sweden.

[5] Bertrand et al., 2019 also examine the effect of gender quotas beyond corporate boards but find limited evidence to suggest that the reform had an impact on the career prospects of young women in Norway.

Our study also relates to the emerging literature highlighting the importance of corporate culture and gender equality (Guiso, Sapienza, and Zingales, 2014; Grennan, 2017; Graham et al., 2017; 2019). Corporate culture is shaped by female leadership, resulting in improved workplace conditions and compensation for women (Tate and Yang, 2015; Duchin, Simutin, and Sosyura, 2020; Lins et al., 2020; and Wang and Giannetti, 2020). In comparison, our findings provide evidence suggesting that policies aimed at gender equality in emerging markets can have a positive long-run impact in shaping corporate boards and reducing the gender gap in director remuneration.

Our study also contributes to the broader literature examining the impact of policies aimed at gender equality in emerging markets. Several studies provide evidence that gender quotas have been effective in encouraging female participation in politics (Chattopadhyay and Duflo, 2004) and entrepreneurship (Naaraayanan, 2021). Relatedly, exposure to female leaders in politics improves voter attitudes towards females and that such policies have a role model effect influencing adolescent girls' career aspirations and educational attainment (Beaman et al., 2009; Beaman et al., 2012). In comparison to these studies, we evaluate the long-term effect of gender quotas on corporate boards and show that they can deepen and diversify director pools in environments with strong patriarchal views.

A central thesis in this study is that gender quotas allow firms to tap into a deeper talent pool of directors. Our results on gender quotas catalyzing the increase in gender diversity on corporate boards are echoed in media reports (IiAS, 2020). They report that regulatory changes have led to greater female representation on corporate boards, females garnering important committee positions, and a reduction in the gender gap in director remuneration.

Collectively, our study is the first to evaluate the effect of gender quotas on corporate boards in an institutional setting with strong patriarchal norms. The first wave of gender quotas was introduced in developed economies, and many of the empirical studies argue that they impose substantial costs on firms due to supply constraints in the labor market for directors. As emerging markets generally have stronger patriarchal norms and lower corporate governance standards, it is crucial to understand the effect of gender quotas in this context. To this end, our study provides the first evidence that is informative for policymakers and market participants.

The remainder of the paper is organized as follows: Section 1 provides an overview of the gender quota and corporate governance reforms in India. Section 2 describes the data and provides summary statistics, while Section 3 examines the long-term changes in female director appointments and their subsequent assignment to important committees. In Section 4, relates firm characteristics to voluntary appointments and Section 5 focuses on quality of the appointed director. Section 6 examines long-term changes in the gender gap in compensation. Section 7 addresses concerns about general trends in social norms, institutional investors' pressure to reform boards, contemporaneous corporate governance reforms, and market developments as alternative explanations for our findings. Lastly, Section 8 offers concluding remarks. An Internet Appendix provides many supporting details.

1. Gender quotas and corporate governance reforms in India

The introduction of the gender quota on corporate boards is part of a regulatory push to improve board diversity and corporate governance standards in India. Starting in 1999, The Ministry of Corporate Affairs (MCA) and the securities market regulator the Securities and Exchange Board of India (SEBI) appointed the Birla Committee to promote and improve corporate governance standards. The Birla Committee recommended strengthening the structure of boards and internal controls (e.g., audit committee, remuneration committee, and disclosure to shareholders) but did not focus on gender diversity.[6] The SEBI introduced recommendations of the Birla Committee through Clause 49 of the listing agreement, which became effective for all firms on January 1, 2006.[7]

Alongside these regulatory initiatives, the government proposed three bills to amend the corporate governance sections of the Companies Act of 1956. The Companies (Amendment) Bill, 2003 included a provision for female directors on corporate boards of large firms. However, the government withdrew the Bill for its review or rectification by the MCA following criticism by chambers of commerce and industry groups. In the revised Companies Bill, 2009, there was no reference to gender diversity on boards. The Bill was ultimately withdrawn because the Ministry of Finance and the MCA failed to agree regarding the delegation of regulatory oversight to the SEBI.

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[6] In fact, there is no mention of “diversity”, “gender”, “female” or “woman” in the Report of the Kumar Mangalam Birla Committee on Corporate Governance (1999).

[7] Appendix Figure A2 shows the timeline of corporate governance reforms in India. See Black and Khanna (2007) and Dharmapala and Khanna (2012) for studies of the valuation consequences of the introduction of Clause 49 in 2006.

The Companies Bill, 2011, followed the withdrawal and introduced a gender quota, requiring firms to have at least one female director to encourage more female participation in corporate decision making.[8] The proposal was enacted as the Companies Act, 2013 in August 2013.[9] Following the enactment of the Companies Act in 2013, the SEBI aligned the corporate governance provisions in Clause 49 with the new law. The revised Clause 49 mandated at least one female director, introduced restrictions on director eligibility and remuneration, and mandatory annual performance reviews for independent directors. Moreover, the law introduced stringent personal liability, which deterred individuals from serving as independent directors (Naaraayanan and Nielsen, 2021). All changes were effective from October 1, 2014, except for the gender quota, which was effective from April 1, 2015.

Moreover, to further improve the corporate governance standards of listed firms in India, the SEBI instituted the Kotak Committee on Corporate Governance in June 2017. Based on the recommendations by the committee and comments from stakeholders, the SEBI set out to implement the recommendations. These changes include reducing the maximum number of directorships to 7, expanding the eligibility criteria for independent directors, and requiring the largest 500 (1,000) listed firms by market capitalization to have at least one female independent director by April 1, 2019 (April 1, 2020).

In keeping with the extant literature on gender quotas, we analyze how the stock market reacts to the administrative announcements related to the quota and the enactment of the final law (Ahern and Dittmar, 2011; Matsa and Miller, 2011; Comi et al., 2016; Ferrari et al., 2016; Hinnerich and Jansson, 2017; Ferriera et al., 2020; Eckbo, Nygaard, and Thorburn, 2020; Greene, Intintoli, and Kahle, 2020; Hwang, Shivdasani, and Simintzi, 2020, among others). In Appendix Table A1, we find that the stock price reactions to these announcements are negative, but the difference in stock price reactions between firms that comply and firms that do not comply with the gender quota is economically small and statistically insignificant.[10] Prior work interprets stock price reactions as a test of supply-side constraints in the market for corporate directors, and through this lens, our evidence suggests that the market does not seem to be concerned about limited supply of high-quality female directors.

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[8] The parliamentary committee report on the Companies Bill, 2011 offers one justification for the proposal by stating that the
provision is "*likely to be in line with the policy of the Government for encouraging more and more women participation in decision making at various levels*" ((Kamalnaath and Peddada, 2012). The Parliamentary Committee Report on the Companies Bill, 2011 is available here.

[9] Section 149 of Companies Act, 2013 states that "Provided further that such class or classes of companies as may be prescribed, shall have at least one woman director."

[10] To account for the return co-movement in time regardless of the differential firm-level impact of news announcements, we follow the methodology outlined in Eckbo, Nygaard, and Thorburn (2020).

Further, alongside the regulatory initiatives focusing on improving board efficiency, the regulation introduced by the SEBI in 2010 required mutual funds to be transparent about their policies regarding voting on the resolutions of shareholder meetings (see Subramanian, 2016). This new regulation fueled the growth of the proxy advising industry in India, catering to the mutual funds' need for external advice on corporate governance issues. In summary, the gender quota is introduced at an active time for corporate governance reforms brought about by regulation and market developments. In Section 7, we, therefore, address whether our findings capture everything happening in the arena of corporate governance during this time.

2. Data and summary statistics

To analyze the long-term effect on corporate boards, we obtain data on the board composition and firm financials for firms listed on the National Stock Exchange (NSE) in India for the period from 2010 to 2020.[11]

Data on board composition are from Indian Boards, a database maintained by the Prime database group. This dataset is equivalent to BoardEx for the United States and most recently used in Naaraayanan and Nielsen (2021). The data contain information on director characteristics such as age, gender, nationality, education, experience, director type, date of appointment, cessation date, the reason for cessations, and director remuneration.[12]

Accounting data and stock prices are from Prowess, which is the Indian equivalent of CRSP/Compustat. Prowess is maintained by the Center for Monitoring Indian Economy (CMIE) and has been used in several prior studies on Indian firms, including Bertrand, Mehta, and Mullainathan (2002); Gopalan, Nanda, and Seru (2007; 2014); Siegel and Choudhary (2012); Chakrabarti and Subramanian (2016). We use the latest version of Prowess, free from survivorship bias, as highlighted by Siegel and Choudhary (2012).

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[11] The NSE is the leading stock exchange of India. It is the world's 11th largest stock exchange with a market capitalization of more than US$2.27 trillion (as of April, 2018).

[12] Director remuneration and committee assignments are available for the period 2013-14 to 2019-20. Therefore, for analysis involving director remuneration and committee assignments, we restrict the sample period to 2013-14 to 2019-20.

Our final sample consists of a panel of firms listed on the NSE from 2010 to 2020. This sample corresponds to 10,084 firm-year observations and 86,713 director-year observations. In our analysis, "year" refers to the financial year instead of the calendar year because the financial year in India runs from April 1 to March 31. Thus, we refer to the financial year starting on April 1, 2014, and ending on March 31, 2015, as 2014-15.

Table 2 presents the descriptive statistics related to female directors and the size of the director pool. Panel A reports characteristics of the balanced panel of 919 NSE-listed firms in our sample.[13] Further, it reports the number of firms with and without a female director and the average number of female directors on the board. From the table, it is evident that in 2013-14, the year before the gender quota, most firms did not have a female director. In 2014-15, almost all firms complied with the gender quota.[14] More interestingly, the average number of female directors increased to 1.6 by the end of our sample, rising from 0.5 before the reform. The increase implies that many firms appoint more female directors than required by the gender quota: The fraction of firms with two or more female directors increase from less than 10% before the reform to almost 45% five years after the reform.

The introduction of the gender quota in 2014-15 increased the size of the female director pool significantly, as shown in Panel B of Table 2. In 2013-14, boards of firms listed on the NSE had 394 unique female directors, increasing to more than 1,000 after the reform. This increase came at the expense of unique male directors, decreasing from over 6,000 to 5,388 in 2019-20. Further, most of the increase in female directorships can be attributed to appointments of independent directors, increasing from 210 in 2013-14 to 924 in 2019-20. The threefold expansion of the female director pool supplements the evidence from Norway, which saw a smaller increase in the female director pool making the average female director busy (Bertrand et al., 2019).[15] In contrast, our evidence from India, which required firms to have one female director on the board, suggests that the pool of female candidates appears large enough, and as a result, female directors do not become busy after the reform (see Appendix Figure A4).

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[13] Our sample only includes 894 firms in 2019-20 because a few firms reported late as they made use of extensions granted by the government to reporting timelines amidst COVID-19.

[14] In Appendix Figure A3, we show noncompliance rates at monthly frequencies around the introduction of the gender quota. We find that 60% of the firms did not have a female director 12 months before the initial compliance date while only 3.6% of the firms did not have a female director 12 months after the initial compliance date. These time patterns suggests that most of the firms complied with the gender quota in a timely fashion. As a result of the low noncompliance rates, we do not focus on these firms in the analyses.

[15] France and Italy saw a twofold increase of while Belgium and Spain saw an almost onefold increase in the proportion of female directors on the board (Comi, Grasseni, Origo, and Pagani, 2016).

Figure 1 shows the fraction of female directors on Indian boards across time to shed light on the time trend. The top panel shows that around 5% of directors were female before the reform, increasing to 11% due to the reform. Interestingly, Figure 1 also shows a positive time-trend after the reform, with the fraction of female directors increasing from 11% to 16%. The increase of 5 percentage points is driven by independent directors, as shown in the bottom panel of Figure 1.

These effects are starker when we examine the fraction of females among director appointments in Figure 2. In the year of the reform, more than 40% of all appointments are females. After the reform, around 20% of all appointments are female directors which is more than twice the fraction before the reform. Again, the bottom panel of Figure 2 shows that independent directors drive these changes. Five years after the reform, more than 30% of all appointments of independent directors are female directors, compared to less than 10% before the reform.

These changes to board composition and female director appointments motivate our research question of understanding the long-term effect of gender quotas on corporate boards in environments with strong patriarchal views and lower corporate governance standards. This question remains unexplored because prior literature on gender quotas primarily focuses on countries with more egalitarian views toward female participation in corporate decision-making at various levels.

3. The long-term effect on female director appointments

In this section, we aim to present a comprehensive view of changes in boards' propensity to hire women beyond the ambit of the gender quota. We focus on female director appointments to corporate boards after excluding the reform year and examine further whether such appointments extend to important committee positions or the highest executive positions in the firm.

3.1 Female director appointments around the reform

We begin by examining the long-term effects of gender quota on the boards' propensity to appoint female directors. To formally test whether the appointment rates are higher after the reform, we use an Ordinary Least Squares (OLS) regression specification, where the dependent variable is an indicator for a female director.[16] Our main specification focuses on testing whether female directors are more likely to be appointed in post-reform years of 2015-16 and after. To ensure that we indeed capture the long-term effect beyond the ambit of the quota, we exclude the year of the reform (i.e., the financial year 2014-15).

In keeping with prior literature, we control for firm characteristics (firm size, fraction of independent directors on the board, market to book value, ownership of the controlling shareholder, return on assets, stock return, and stock price volatility) and include firm fixed effects in the specification. The inclusion of firm fixed effects ensures that time-invariant firm characteristics correlated with director appointments are not driving our results. Table 3 reports the results.

Column 1 of Table 3 shows that the female director appointment rate is 13.4 percentage points higher after the introduction of gender quota. This effect is both economically and statistically significant, given the baseline appointment rate of 7.3% for female directors before the reform. Column 2 of Table 3 shows that this effect is stronger for the subsample of independent director appointments. Appointments of female independent directors are 19.1 percentage points more likely after the reform. Column 3 of Table 3 shows that the female director appointment rates for inside directors is 7.5 percentage points higher after the reform, and the effect is statistically significant at the 1% level.

To ascertain that the replacement of outgoing female directors does not drive the increase in female director appointments, in Figure 3, we focus on the boards' propensity to voluntarily appoint female directors after the reform. The top panel of Figure 3 plots the fraction of director appointments and director turnovers that are female. In the post-reform years, the difference between the two bars shows a net increase in female director appointments beyond the ambit of the quota. We refer to these as voluntary appointments of female directors, defined as appointments beyond the ambit of the quota.[17]

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[16] Given that the dependent variable is an indicator, we should ideally be using a probit or a logistic regression model. However, we use an OLS model to avoid the incidental parameters problem associated with nonlinear fixed-effects estimation in a panel setting (Neyman and Scott, 1948).

[17] Voluntary appointment of female directors occurs both before and after the reform. Before the gender quota, any appointment of a female director is voluntary. After the gender quota, appointments of female directors are voluntary if there is already one female on the board. We classify appointments of female directors after the reform as voluntary whenever the board already has a female director who stays on the board after the appointment.

In the bottom panel of Figure 3, we show the fraction of firms with two (three) or more female directors resulting from voluntary appointments beyond the ambit of the quota. We find a persistent increase in the fraction of firms with two or more female directors after the reform. Before the gender quota, less than 10% (3%) of all firms have two (three) or more female directors. After the reform, the fraction of firms with two (three) or more female directors increased from 10% to 44% (3% to 10%).

Column 4 of Table 3 focuses on voluntary appointments by excluding appointments of female directors to comply with the gender quota. Specifically, we only include female director appointments in the post-reform period if the firm already complies with the quota requiring one female director. The indicator for post-reform years shows that the probability of a voluntary appointment of a female director increased by 11.6% after the introduction of the gender quota.

In sum, after the gender quota, firms voluntarily appoint female directors, leading to a substantial increase in female representation on the boards beyond the ambit of the gender quota.

3.2 Female representation on committees and in top positions

Next, we examine whether female appointments extend to important committee positions and the highest executive positions in the firm. Figure 4 shows the fraction of chairs or members of the audit and nomination & remuneration committees that are females, respectively.[18] The top (bottom) panel shows that around 3.4% (3.9%) of the members of the audit (nomination & remuneration) committee are females, before the reform, which increases to 12.8% (13.5%) after the reform.[19] Interestingly, it also shows the fraction of firms where female directors serve as chairs of audit (nomination & remuneration) committee increases from 1.1% (1.3%) to 5.8% (9.5%).

To formally test whether the appointment rates on committees are higher after the reform, we use an Ordinary Least Squares (OLS) regression specification. Table 4 reports the results. Columns 1 and 2 report the results for the audit committee, while columns 3 and 4 report the results for the nomination & remuneration committee. The dependent variable in columns 1 and

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[18] Due to data availability, we observe committee assignments for directors from 2012-13 to 2018-19, both years inclusive.

[19] Both the Companies Act, 2013 and the listing regulations of SEBI, include a mandatory nomination & remuneration committee (NRC) for the appointment of all directors, including independent directors. As a result, most firms have a joint committee covering both nomination and remuneration functions.

3 is the fraction of audit committee or nomination & remuneration committee members that are female, while the dependent variable in columns 2 and 4 is an indicator taking the value of one if the chairperson of the audit (nomination & remuneration) committee is a female.[20] As before, we exclude the year of the reform (i.e., the financial year 2014-15) and include firm fixed effects to control time-invariant firm characteristics in the empirical specification. In keeping with the prior literature, we also control for firm-level time-varying covariates, as in the baseline specification in Table 3.

Column 1 (column 3) of Table 4 shows that the fraction of members of the audit (nomination & remuneration) committee who are females is 7.5 (7.5) percentage points higher after the introduction of the gender quota. This effect is economically and statistically significant given the baseline fraction of 3.3% (3.8%) before the reform. Column 2 (column 4) shows that the fraction of firms with female directors serving as chairs of the audit (nomination & remuneration) committee is increasing by 3.4 (5.8) percentage points higher post-reform. Lastly, in column 5 (column 6), we find that these changes do not extend to the representation of women in the highest corporate echelons.[21] These findings are consistent with evidence from the US that women are more likely to join monitoring committees (Adams and Ferreira, 2009; Field, Souther, and Yore, 2020) and evidence from Norway that gender quotas for directors have little impact on the gender composition of top executives (Bertrand et al., 2019).

4. Board diversity and voluntary appointments of female directors

The increase in the number of female directors on corporate boards beyond the ambit of the gender quota begs the question of which types of firms voluntarily appoint them. If the introduction of the gender quota tables discussion about board composition and diversity on corporate boards, we expect to see that more diverse boards appoint additional female directors. Additionally, we explore the role of board networks in raising gender diversity on corporate boards as suggested in recent work by Cai, Nguyen, and Walking (2021) in the context of the United States. Therefore, in the following subsections, we relate the probability of a voluntary female director appointment in the post-reform period to various firm-level proxies for board diversity and measures of board networks.

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[20] Given that the dependent variable is a fraction, we should ideally be using a fractional outcome regression model. However, we use an OLS model to avoid the incidental parameters problem associated with nonlinear fixed-effects estimation in a panel setting (Neyman and Scott, 1948).

[21] In unreported results, we do not find a change in the firm-level fraction of highest paid female executives around the gender quotas.

We begin in Table 5 by relating voluntary female director appointments to measures of board diversity in a difference-in-differences empirical specification. In particular, our specification includes measures of diversity as well as interactions between these measures and the post-reform indicator. To be consistent with our baseline analyses (Table 3), we exclude the year of the reform (i.e., the financial year 2014-15). The dependent variable is an indicator variable for whether the firm appointed a female director voluntarily in the post-reform period. Column 1 relates the diversity on the board of directors to the voluntary appointments of female directors. We find that board diversity has no impact on voluntary appointments before the reform. However, after the reform, board diversity positively affects voluntary female director appointments. Firms with female controlling shareholders on their boards are 3.8 percentage points more likely to appoint female directors after the reform. We also find that firms with foreign directors on their boards and firms with expert directors on their boards are 2.7 percentage points and 5.6 percentage points more likely to appoint female directors voluntarily, respectively. We find a smaller but positive effect for firms with greater age diversity and no effect for firms operating in industries with higher female representation on boards.[22]

Columns 2 and 3 relate the age diversity of the audit committee and the nomination & remuneration committee to the likelihood of appointing female directors voluntarily. Results across these columns suggests that diversity on key committees had no effect on female director appointment before the reform. After the reform, we find that having a female director on the audit committee lowers the probability of voluntarily appointing female directors. One interpretation of this result is that the gender quota tables discussions on board composition and diversity on corporate boards leading to the majority of male-dominated boards appointing female directors voluntarily. With the expansion of the director labor pool, females do not become busy by being part of many committees. Interestingly, these results suggest a limited role for newly appointed female directors on important committees to raise diversity on boards. We find this consistent pattern for the nomination & remuneration committee, but note that the estimate is statistically insignificant. We obtain similar results when we include all the firm characteristics in the same specification (column 4).

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[22] When computing the age of the board, we omit the appointed director in the computation. We do this to avoid the mechanical relationship between age diversity and appointment probability for female directors, who are on average younger than the male directors in our sample (see Appendix Table A3).

Next, we examine the role of board networks in increasing voluntary appointments of female directors. Recent work in the context of the United States finds that connected directors raise gender diversity on boards by potentially allowing firms to tap into professional networks of directors thus reducing search costs (Cai, Nguyen, and Walking, 2021). Table 6 relates measures of board networks to the likelihood of appointing female directors voluntarily. We define three measures of board networks that capture the exposure to female directors based on directorships on other boards: (i) atleast one of the male directors serves as a director of another firm that has two or more female directors, (ii) across all male directors of a firm, we calculate the average number of boards they serve on that have two or more female directors, and (iii) across all male directors of a firm, we use the maximum number of boards they serve on that have two or more female directors. Before the reform, there is a positive association between connected directors and voluntary appointments of female directors. This association becomes even stronger after the reform. This increase in voluntary appointment of female directors does not come at the expense of female directors getting more busy as documented in Appendix Figure A4. To understand the time patterns, we plot the marginal effects by year split by whether firms have atleast one male director that also serves on another firm having two or more female directors in Figure 5. Consistent with results in Table 6, the difference across the groups increases after the introduction of the gender quota, suggesting that board networks facilitate voluntary appointments of female directors.

Overall, we find a significant increase in voluntary appointments of female directors on diverse boards with board networks playing a key role in facilitating female director appointments. These findings are consistent with the idea that introducing the gender quota tables discussion about board composition and diversity on corporate boards.

5. Quality of the marginal director

A natural question is whether and how the expansion of the female director labor pool affects the quality of the marginal director, and hence firm value. We measure the quality of the marginal director by stock price reactions to firm-specific announcements of director appointments and supplement these with descriptive statistics on the characteristics of the appointed directors (i.e., age, experience, and expertise), measured at the time of appointment.

Table 7 reports the stock price reactions to director appointments to assess the quality of the marginal director. In keeping with prior literature (Rosenstein and Wyatt, 1990; 1997), we focus on firm-specific director appointments to compare the quality of the marginal male director to the quality of the marginal female director.[23] To measure the stock price reactions, we access daily returns from Prowess for a 3-trading-day period around firm-specific director appointment announcement dates. We remove firms without trading volume in the estimation window. To calculate the abnormal return, we assume a single-factor model, where beta is estimated using the data from the pre-event window.

Table 7 presents the average stock price reaction to director appointments by gender, appointment type, and whether firms adjusted their board size. Panel A shows that the average stock price reaction to director announcements is negative but statistically insignificant. These results contrast evidence from the United States where stock price reactions to director appointments are positive on average but statistically insignificant (Rosenstein and Wyatt, 1990; 1997). Interestingly, we find almost identical stock price reactions to the appointment of male and female directors. The differences in the average stock price reaction across male and female director appointments are statistically insignificant across all director types.

Next, we examine differences in stock price reactions to female directors by their appointment type. We hypothesize that mandated female directors are more likely to lack experience and skills than female directors appointed voluntarily by firms outside the ambit of the gender quota (Boyallian, Dasgupta, and Homroy, 2019). If this is the case, we expect the stock price reactions to the appointment of mandatory directors to be negative and stock price reactions to the appointment of voluntary directors to be positive. Panel B of Table 7 finds evidence consistent with this conjecture: Stock market reactions to voluntary appointments of female directors are positive, while stock price reactions to mandatory appointments to comply with the quota are associated with negative stock returns. However, we find that the difference is statistically insignificant across all director types.

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[23] This approach is similar to (Rosenstein and Wyatt, 1990; 1997) and has been adopted by Adams, Gray, and Nowland (2012) and Naaraayanan and Nielsen (2021) to study changes in stock prices around mandatory new director announcements in the context of Australia and India, respectively.

Panel C of Table 7 examines whether the negative stock price reactions to the mandatory appointments of female directors are due to firms simultaneously adjusting their board size to comply with the gender quota. Increasing board size is associated with lower firm value and financial performance (Yermack, 1996). If firms choose to comply with the gender quota by expanding the boards, the stock price reactions might reflect the investor's response to this expansion rather than the appointed director. The average firm expands its board size to comply with the gender quota, and investors react negatively to such director appointments. The estimates are statistically significant at the 10 percent level.

In contrast, mandatory appointments in firms that do not adjust the board size are positive and statistically significant and drive the difference in stock price reaction across these two types of firms. This difference is statistically significant across appointment types for the average female director and the average female independent director. Lastly, for firms that reduce their board size, investors respond positively, with statistically insignificant estimates.

To supplement the evidence in Table 7, Figure 6 reports the stock price reactions to director appointments by gender and appointment type around the reform. The top panel of the figure shows that the marginal female director appointed in response to India's gender quota is of a similar quality as the marginal male director. Further, in the bottom panel, we find substantial heterogeneity in stock price reactions to female director appointments at the time of compliance with the quota based on the experience of the incoming director. In particular, we find that stock prices increase by 1.29% if the firm appointed an experienced female director to comply with the gender quota and fall by -0.57% if the firm appointed a female director without experience. This difference of 1.86% is economically large and statistically significant at the 5% level.

Appendix Table A2 compares characteristics, measured at the time of appointment, of the newly appointed directors by financial year. Panels A and B show that the average firm in our sample appointed slightly younger female directors with less prior board experience in response to the reform, and this effect is temporary. By the end of our sample period, newly appointed female directors have similar or longer experience than newly appointed male directors. For example, in the immediate year before the reform, only 14% (17%) of the female (male) directors had board experience (at least one directorship before their current appointment), while in the year of the reform, this drops to 6% (16%). In contrast, at the end of our sample period in 2019-20, about

22% (13%) of the female (male) directors have board experience. We find similar patterns for other measures of board experience (i.e., boards per director and board tenure).

Additionally, Appendix Table A2 compares director expertise, as measured by education and specialization, for newly appointed female and male directors. In 2012-13, 47% of female directors had an accounting, finance, or law degree in an average firm, with more than 69% of the directors having a post-graduate degree. At the end of the sample period in 2019-20, these fractions are 56% and 62%, respectively. A similar level and trend are observed for men, suggesting that gender differences in director expertise are small. In Appendix Table A3, we compare female director characteristics by appointment type and find that mandated female directors have significantly less leadership experience, lower education, and less work experience than voluntary female director appointments.

We also examine whether the appointment of directors related to the controlling owner family, indicative of tokenism, drives the expansion of the female director labor pool.[24] The top panel of Figure 7 plots the average fraction of related male and female directors on the board in percentage by financial year.[25] The figure shows that the fraction of related directors does not vary significantly across gender around the introduction of the gender quota. We do not see significant changes in the number of related directors for both females and males, inconsistent with the notion that firms choose to comply with the gender quota by appointing directors from within the family. In the bottom panel of Figure 7, we find that the stock market reacts negatively to the appointment of related directors, suggesting that shareholders view these appointments as value-decreasing. Thus, we conclude that the increase in female directors on corporate boards is unlikely to be driven by firms appointing related directors but rather firms tapping into the expanded director pool and hiring more professional and qualified female directors.

In summary, our results are consistent with the view that gender quotas expand the director talent pool. The marginal female director is of similar quality, as measured by education, specialization, and stock price reactions, to the marginal male director. Further, there is a temporary drop in female director quality at the time of the gender quota, which subsequently reverses as the pool of female directors expands and gains board experience. Overall, these results suggest that firms continue to appoint high-quality female directors by tapping into the increased pool of experienced directors after the reform.

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[24] The concerns about tokenism are stressed in media reports at the time of compliance in April 2015 (e.g., Business Today, 2015). These reports hypothesized (albeit strongly) that most firms would choose to comply by hiring from within the controlling family or someone related. An alternative interpretation is that women related to the controlling shareholders are the most powerful women.

[25] "Related" director classification is provided by the vendor. They collect information on whether the director is related to the controlling owner family from a variety of sources including annual reports, media articles, and mandatory disclosures such as related party transactions.

6. Long-term effect on gender gap in compensation

If the introduction of the gender quota tables discussion about diversity on corporate boards, we expect to see a reduction in the gender gap in director remuneration after the reform. To estimate the gender gap in director remuneration, we focus the analysis on independent directors to ensure that we capture compensation for serving on the board. We restrict the sample to firms with at least one female director on their board each year to ensure that we compare compensation policies *within* the same firm rather than across firms. This is important because relatively few firms have a female director before the introduction of the gender quota in the financial year 2014-15 (see Table 2).[26] In addition, we drop the appointment year to avoid confounding the gender gap in director remuneration with mechanical effects due to appointment of directors in the middle of the financial year.

In the top panel of Appendix Figure A5, we plot the evolution of compensation in 2015 INR millions by gender for all directors in our sample. Before the reform, there is a sizeable gap in remuneration between male and female independent directors. After the reform, the gender gap in director compensation narrows, and by the end of the sample compensation of male and female directors converges. To rule out differences in director quality as a potential explanation for these results, the top panel of Figure 8 plots the level of compensation split by gender for directors appointed before the reform and finds that by the end of the sample period, the gap is non-existent. The bottom panel of Figure 8 shows a similar pattern wherein the gender gap in compensation narrows for directors appointed after the quota.

More formally, to explore the evolution in the gender gap in director remuneration, we obtain residuals from the following regressions:

$$y_{ijt} = \alpha_{jt} + \varepsilon_{it} \qquad (1)$$

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[26] Due to data availability, we observe director remuneration from 2012-13 to 2018-19.

where y_{ijt} is the logarithm of compensation of director i in firm j in year t, and α_{jt} are firm-year fixed effects. Thus, residuals from Equation (1) capture the fraction of compensation that is unexplained by differences in firm policies within a particular financial year. Directors with a positive residual are paid more than an average independent director of the same firm in a given year, while directors with a negative residual are paid less than the average independent director in the same firm in a given year.

The bottom panel of Appendix Figure A5 uses the residuals from Equation (1) as our dependent variable in a specification where we include an interaction term between an indicator for whether the director is female and indicators for each year from 2012-13 to 2018-19. To estimate the gender gap in compensation, we further include controls for board committee appointments (indicators for chair of the board, and chairpersons or members of the audit and the nomination & remuneration committees), director characteristics (tenure and expertise) as well as firm characteristics (firm size, fraction of independent directors on the board, market-to-book value, ownership of the controlling shareholder, return on assets, stock return, and stock return volatility). Two years before the reform, female independent directors earned 30% less than male independent directors serving the same role on the same firm's board, which declines to 3.3%, five years after the reform. The 26.7 percentage points reduction in the gender gap in remuneration is significant, both statistically and economically.

To rule out differences in director quality as an explanation for these results, the top panel of Figure 9 plots the estimated gender gap in director remuneration each year for directors that were appointed before the reform, whereas the bottom panel of Figure 9 plots the estimated gender gap in director remuneration by year for directors appointed after the reform. Consistent with Figure 8, we find in the top panel that the gender gap is quite stark before the introduction of the gender quota. In 2012-13, the gender gap in director remuneration is estimated to be -24%. After the reform, we see that the gender gap in director remuneration narrows significantly. By the end of the sample, the gender gap in remuneration is estimated to be +6%.

Table 8 summarizes the results from Figure 9 in a specification where the dependent variable is the residuals from Equation (1). Our variable of interest includes an indicator for female director and an interaction term between the indicator for a female director and an indicator for post-reform years. As in Figure 9, the specifications include firm-level (i.e. firm size, fraction of independent directors on the board, market-to-book value, ownership of the controlling shareholder, return on assets, stock return, and stock return volatility) and director-level controls (i.e., tenure, expertise, board, and committee assignments) as well as year-fixed effects. To ensure that we observe compensation for a full year of service, we exclude directors in the year of their appointment.

Estimates from Table 8 suggest that, on average, females are paid 17 percent less than male directors before the reform, an effect that is statistically significant at the 10 percent level. The interaction between the female director indicator and the post-reform indicator is positive and statistically significant. The magnitude of the positive interaction term indicates that the gender gap is eliminated after the reform.

One immediate concern with the specification in column 1 is that we can only test whether the reform narrowed the gender gap for directors appointed before the reform. In column 2, we restrict the sample to directors appointed before the introduction of the gender quota to mitigate such concerns. Again, in this sample, we find that the female directors, after the reform, are paid a small premium relative to male directors of the same firm. Further, in column 3, focusing on directors appointed after the reform, we find that the average gender gap in compensation is 2.4% and statistically insignificant.

We also formally test whether the gender gap in director remuneration at the start of the sample, i.e., 2012-13, is significantly different from the gender gap in director remuneration at the end of the sample, i.e., 2018-19. We report the *p*-value of the *F-test* at the bottom of columns 1 and 2 in Table 8. Across columns 1 and 2, we find that the gender gap in director remuneration is significantly different at the 5% level.

The reduction in gender gap in compensation might alternatively be driven by general changes in remuneration policies at firms. For instance, firms might have decided to standardize remuneration for directors thus mechanically reducing the gap in compensation across female and male directors. To examine this possibility, Appendix Figure A6 plots pay dispersion across time. To measure pay dispersion, we calculate the average remuneration for directors based on their pay rank on the board each year. We plot these averages for the lowest, the median, and the highest paid directors on the board. We note that there is a substantial pay dispersion which tends to increase over time. Thus, reduction in the gender gap in compensation is unlikely to be driven by changes to pay dispersion at firms.[27]

Another possibility is that the gender gap in compensation could result from changes to pay policies at firms due to the introduction of personal liability (Naaraayanan and Nielsen, 2021). Specifically, they find that firms experiencing director turnover in the financial year 2014-15 increase their pay to attract and retain independent directors. To rule out this possibility, Appendix Table A4 splits the sample by whether the firm experienced a turnover in the financial year 2014-15. Columns 1 and 2 focus on all directors while columns 3 and 4 focus on directors appointed before the reform. Across the columns, we find that the reduction in the gender gap in compensation is similar across firms that do and that do not experience a turnover in the financial year 2014-15. These results mitigate concerns regarding introduction of personal liability affecting the gender gap in compensation.

Overall, the evidence suggests that the attitude towards female independent directors changed following the introduction of the gender quota, thus narrowing the gender gap in director remuneration in the long run.

7. Alternative Explanations

Although our results are consistent with the view that gender quotas expand the female director pool without compromising director quality, a general societal trend towards gender equality might alternatively explain our findings. Moreover, as noted in the introduction, the gender quota is introduced at an active time for corporate governance reforms and other market developments. Therefore, we address the concern of whether our findings capture pressure from institutional investors, recommendations from proxy advisors, or firms' anticipation of future regulation. Lastly, we also consider whether boards appoint female independent directors to merely replace male independent directors who left the boards following the introduction of personal liability, introduced alongside the gender quota.

7.1 Social norms and voluntary appointments of female directors

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[27] In unreported tests, we confirm that the compensation rank of female directors improves over time.

This subsection considers whether general trends in social norms and attitudes towards women explain female directors' voluntary appointments. In particular, we are interested in understanding whether the reform is part of a general movement towards gender equality that can explain the spike in voluntary appointments on corporate boards. To test this, we use proxies for attitude towards women and female labor market opportunities and interact the variation in their intensities across geographies and industries, with voluntary appointments of female directors. If general trends drive the increase in voluntary appointments, we expect that heterogeneity in firms' exposure to social norms and female opportunities in the labor market to affect the voluntary appointment of female directors.

To shed light on the appointments, Appendix Figure A7 plots the fraction of female director appointments before and after the reform, across different proxies for social norms and attitudes towards women. The top row shows the long-term effect on appointments for quartiles of a) attitudes towards women from the World Value Survey, b) the sex ratio at birth (female relative to male births) from the Population Census, and c) crime against women per capita from the National Crime Records Bureau. Quartile 1 (4) contains firms in environments that are the most (least) hostile towards women. The bottom row shows the long-term effect on female director appointments for quartiles of female opportunities in the labor market, measured at the industry level. We measure female opportunities in the labor market using a) the fraction of female employees, b) the fraction of female entrepreneurs, and c) the fraction of female directors. Quartile 1 (4) contains firms in industries that give women the least (most) opportunities.

If the general attitude towards women drives the increase in board diversity, we expect larger changes among firms in quartile 4 relative to quartile 1. Contrary to this explanation, we find a substantial increase in female director appointments in all quartiles in the post-reform period, even for firms located in environments that are more hostile towards women and in industries that provide the least opportunities to women. This suggests that general trends in social norms and attitudes towards women do not drive the baseline increase in female director appointments.

Focusing on firms that appoint two or more females in Figure 10, we again find a substantial increase in the fraction of such firms irrespective of their exposure to general attitudes towards women. Table 9 confirms that these results hold in regression framework after controlling for time-invariant firm characteristics and time-varying covariates that potentially affect the propensity to appoint female directors. The estimated coefficients show that the long-term effect on voluntary appointments of female directors is similar across all measures of firms' exposure to social norms and female opportunities in the labor market. Overall, these findings bolster our interpretation that the gender quota tables discussion on diversity inducing firms to voluntarily appoint female directors beyond the ambit of the quota.

7.2 Introduction of personal liability

This subsection considers the alternative explanation that personal liability for independent directors, introduced alongside the gender quota, created vacancies on the board. Prior research finds that around the introduction of personal liability in India in 2014-15, there was a significant but temporary spike in turnover rates among male independent directors in the year of the reform (Naaraayanan and Nielsen, 2021).[28] In response to the temporary outflow of independent directors in 2014-15, firms might have replaced male directors with female directors.

To address this alternative explanation, we exclude the subsample of firms experiencing independent director resignations in the period before the introduction of the gender quota. Naaraayanan and Nielsen (2021) show that around half of the NSE-listed firms had at least one male independent director resigning from the board before the reform in 2014-15. Column 1 in Table 12 presents the baseline results from column 1 of Table 3 to facilitate comparison. Panel A reports the results for all appointments, while panel B reports the results for voluntary appointments where we only include female director appointments in the post-reform period if the firm already complies with the quota requiring one female director. Across both panels, column 2 excludes firms with vacancies created by male independent director resignations and finds that the post-reform female director appointment rates are similar to the baseline estimates. Column 3 imposes a less restrictive assumption and excludes firms that experienced vacancies in the year of the gender quota and introduction of personal liability (i.e., the financial year 2014-15). Again we find quantitatively similar results.

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[28] In Appendix Figure A8, we confirm that the introduction of personal liability led to a temporary spike in turnover rates among independent directors, with most directors leaving before the expiration of their term. This spike is restricted to only the year of the introduction of the reform, i.e., the financial year 2014-15. Moreover, in Appendix Figure A9, we show that directors vacate their board seats in the middle of their term instead of waiting for the end of their term to leave without fanfare. Lastly, in Appendix Figure A10, we plot the survival estimates for male and female directors. We find that female directors are more likely to stay on the boards when compared to male directors, a pattern that holds even for directors appointed after the introduction of gender quotas.

One concern with analyzing appointments is that director vacancies are hardly exogenous and might correlate with board and director characteristics. For example, director resignations might affect the desirability to serve on the board for aspiring directors. If such potential signals differentially impact male and female directors, then these firm-specific events that trigger vacancies might instead explain our results. To address this concern, we analyze appointments among firms where the death of a male director creates vacancies. Column 4 imposes this sample restriction and finds that the results are qualitatively similar when we exclusively analyze vacancies created by death. To further alleviate concerns that deaths may not be "sudden," in column 5, we exclude the sample of firms where vacancies emerge due to the death of a director above 75 years.[29] Again, these results rule out the possibility of director replacements driving the observed increase in female director appointments.

In summary, we find consistent and robust evidence that director replacements do not explain the long-run increase in female director appointments on corporate boards.

7.3 Pressure from institutional investors

This subsection considers whether institutional investors pushing for corporate governance changes and increased board diversity explain the baseline increase in female director appointments. Prior literature highlights the role of institutional investors in improving corporate governance (Aggarwal, Erel, Ferreira, and Matos, 2011; Bena, Ferreira, Matos, and Pires, 2017; Schmidt and Fahlenbrach, 2017) and in promoting female directors in the United States (Gormley, Gupta, Matsa, Mortal, and Yang, 2021). Figure 11 plots the average fraction of females directors appointed, split by median institutional ownership, in percentage points by financial year. The top panel shows the split for firms based on whether the domestic institutional ownership is above or below the sample median, respectively.

We note that firms with higher ownership by domestic institutional investors tend to appoint more female directors. However, this increase is similar in magnitude for firms with lower ownership by domestic institutional investors. Further, foreign institutions might be more likely to push for board diversity given their experience with board diversity from developed economies. Hence, in the bottom panel, we split firms into high and low ownership based on foreign institutional ownership. Again, we find that the increase in director appointments occurs for all firms, irrespective of the level of ownership by foreign institutions.

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[29] We find similar results if we use a sample of director deaths before the age of 70.

In Table 10, we formally test whether the female director appointment rate varies with the level of institutional ownership before and after the introduction of the gender quota. To facilitate comparison, column 1 of Table 10 presents estimates from our baseline specification in column 1 of Table 3: Female directors are 13.4 percentage points more likely to be appointed after the reform. In column 2, we include the level of ownership by all institutional investors, i.e., domestic and foreign institutional investors, and an interaction term between the level of institutional ownership and the post-reform indicator. We note that firms with higher ownership by institutional investors tend to appoint more female directors. The interaction term between institutional ownership and the post-reform indicators is negative and statistically significant. However, the magnitude of the estimate is economically insignificant (almost a precisely estimated zero), indicating that institutional investors do not drive the increase in female director appointments after the reform.

After controlling for institutional ownership, we find that firms are 17.7 percent more likely to appoint a female director after the reform. In columns 3 and 4, we consider the ownership of domestic institutional investors and foreign institutional investors, respectively. Firms with greater ownership by foreign institutional investors are more likely to appoint female directors, while this relationship is absent for domestic institutional investors. Further, Appendix Table A5 presents the regression estimates by splitting the level of institutional ownership at the median (equivalent to Figure 11) and finds no differential effect on female director appointment rates across firms with high and low levels of institutional, domestic, and foreign ownership, respectively.

Overall, we conclude that institutional investors do not drive the long run increase in female director appointments.

7.4 Market developments: proxy advisor recommendations and shareholder support

This subsection considers the role of proxy advisor recommendations and shareholder support as an alternative explanation for our findings. Precisely, the reform coincides with an expansion in coverage of Indian firms by proxy advisors catering to mutual funds' need for external advice on corporate governance issues. Thus, one alternative interpretation of the increasing female representation on boards outside the ambit of the quota is that firms respond to proxy advisor recommendations and the increased shareholder support for female candidates in director elections.

To examine whether the increase in female director appointments coincides with a surge in positive recommendations by proxy advisors and shareholder support in director elections, we use data from Institutional Investor Advisory Services India Limited (IiAS) on director voting recommendations and voting outcomes during our sample period.[30] In total, IiAS issued recommendations on 1,329 resolutions relating to director elections in 2014-15, and by 2018-19 it issued recommendations on 1,350 director elections.[31] About 10% of the resolutions in 2014-15 relates to female directors, increasing to 14% by 2018-19.[32] IiAS is more supportive of female directors than male directors, with an average of 90% (82%) of their recommendations in support of the female (male) candidate. This evidence is consistent with Gertsberg, Mollerstrom, and Pagel (2021) in the context of the California gender quota. Given the more positive support towards female candidates and growing coverage of director elections by IiAS, it is plausible that firms appoint female directors following the support from proxy advisors and shareholders.

More formally, Table 11 shows the impact of IiAS recommendations and director election outcomes on the female director appointment rates. Panel A focuses on IiAS recommendations, while panel B focuses on shareholder voting outcomes. As in Table 3, the unit of observation is director-firm-year, and the dependent variable is an indicator for female directors. Here again, to be consistent with our previous analyses, we drop the year of the reform (i.e., the financial year 2014-15).[33] The post-reform indicator shows that female appointment rates are 12.8% higher after the introduction of the gender quota. In column 2, we include an indicator for IiAS coverage, taking the value of one if IiAS covers the firm in that financial year and find that firms with IiAS coverage are less likely to appoint female directors. In column 3, we include an indicator equal to one if IiAS recommends voting for the director. We find that if IiAS recommends voting for, then the candidate is less likely to be a female, with the estimate being statistically insignificant. Lastly, in column 4, adding these variables as covariates simultaneously does not affect the estimates on the post-reform indicator. Collectively, the results in panel A of Table 11 are inconsistent with proxy advisors driving the increase in female director appointments. One likely explanation for this finding is that proxy advisors tend to cover firms with greater corporate governance issues, and these firms may be less likely to appoint female directors.

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[30] Founded in 2010, IiAS is India's leading corporate governance and proxy advisory firm. ISS entered the Indian market in 2014 and issues recommendations according to its broad voting guidelines.

[31] We begin in the financial year 2014-15 because that is the first year in which voting was recorded electronically. Before that, voting in meetings was by way of show of hands and therefore the voting outcomes are unavailable.

[32] Further, the sample coverage is determined by institutional investors' interest in firms in which they sought voting recommendations on and they were increasingly focused on investing in small and mid-cap stocks.

[33] We also drop the financial year 2019-20, as few firms delayed voting on director elections due to the onset of COVID-19.

Panel B of Table 11 shows the impact of shareholder support on director elections. In column 1, we include the fraction of votes cast in favor of the directors and find an almost identical point estimate on appointment rates. To capture unobservables such as firm-level heterogeneity determining support, we modify and follow Aggarwal, Dahiya, and Prabhala (2018) by including the aggregate firm-level votes for (column 2) and excess votes for (column 3) in the director elections. In column 2, adding the average fraction of firm-level vote for a director as an additional explanatory variable does not affect appointment rates. In column 3, we include excess votes for, calculated by subtracting the average fraction of votes for all directors in a firm from each directors' votes for, and again we find no effect on female director appointment rates. Finally, in column 4, we test the joint effect of IiAS recommendations and shareholder voting, and again we find no effect on appointment rates. The limited impact of shareholder support might reflect that the Indian market has a higher proportion of retail investors who lack strong incentives to vote in director elections. Alternatively, this might be because proxy advisory services in India began in 2014-15 and are a relatively new phenomenon.

In summary, Table 11 shows that the coefficient on post-reform across specifications remains stable in magnitude and statistical significance, thus ruling out contemporaneous market developments in the arena of corporate governance as a potential explanation for our findings.

7.5 Anticipation of revision in gender quota in 2019-20

Lastly, we consider another alternative explanation for the increase in female director appointments is that firms anticipate future regulations mandating at least one female independent director among the 500 largest firms by 2019-20. To address this concern, we examine whether boards affected by this regulation differentially change the number of female independent directors around the gender quota. If firms anticipate future regulation, we expect a higher level of female directors among firms that needed to be in compliance with the new regulation by April 1, 2019 (i.e., the financial year 2018-19). If the gender quota, on the other hand, tables discussions on board diversity, we expect to find a general increase in the level of female directors across all firms, irrespective of the future mandate.

To examine this possibility, we plot the average number of female independent directors conditional on the firm's market capitalization in the top panel of Appendix Figure A11. The figure shows that the number of female independent directors does not vary significantly across these firms around the introduction of the gender quota. We see increases in the number of female independent directors for both large and small firms, consistent with the notion that there is a changing attitude towards female directors after the gender quota in 2014-15. In Appendix Table A6, we formally show a general increase in female directors on corporate boards around the reform. Interestingly, the increase in female directors is larger for small firms unaffected by the reform mandating female independent directors by April 1, 2019. We conclude that the increase in female independent directors on corporate boards around the gender quota is unlikely to be driven by the firm's anticipation of future regulation mandating at least one independent director among the largest 500 firms in 2018-19.

8. Conclusion

This study examines the long-term effect of gender quota in India, the first country with strong patriarchal norms to mandate female directors. Five years after the reform, female director appointments increase from less than 10% to over 20%. Almost half of the firms appoint and retain female directors beyond the ambit of the quota. We also find an increase in the appointment rates for women to important committees but these changes do not extend to the highest corporate echelons, such as top executives of the firm.

Consistent with a change in the attitude towards female directors, we find that the gender gap in director compensation narrows from 30% before the reform to 3.3% five years after the reform. Further analysis shows that the gender gap reduces for female directors who served on boards before the reform and continue to do so after the reform, thus ruling out changing director quality as an explanation of the narrowing of the gender gap in remuneration.

These findings collectively advance our understanding of the effect of gender quotas on corporate boards in environments with strong patriarchal norms and lower corporate governance standards. Our results contrast the evidence from the first wave of gender quotas introduced in developed economies, which point towards substantial costs due to supply constraints in the directors' labor market. In India, the female director pool expands three-folds from around 350 unique female directors to more than 1,000 unique female directors and the expansion allow firms to hire qualified female directors. The marginal female director appointment is of similar quality as the marginal male director appointment. Further, gender-diverse boards and firms with monitoring needs appoint female directors voluntarily, and such appointments are value increasing. Overall, our findings suggest that gender quotas can deepen and diversify director pools in environments with strong patriarchal norms and lower corporate governance standards. To this end, our study provides the first evidence of the long-term effects of the gender quotas that is informative for policymakers and market participants.

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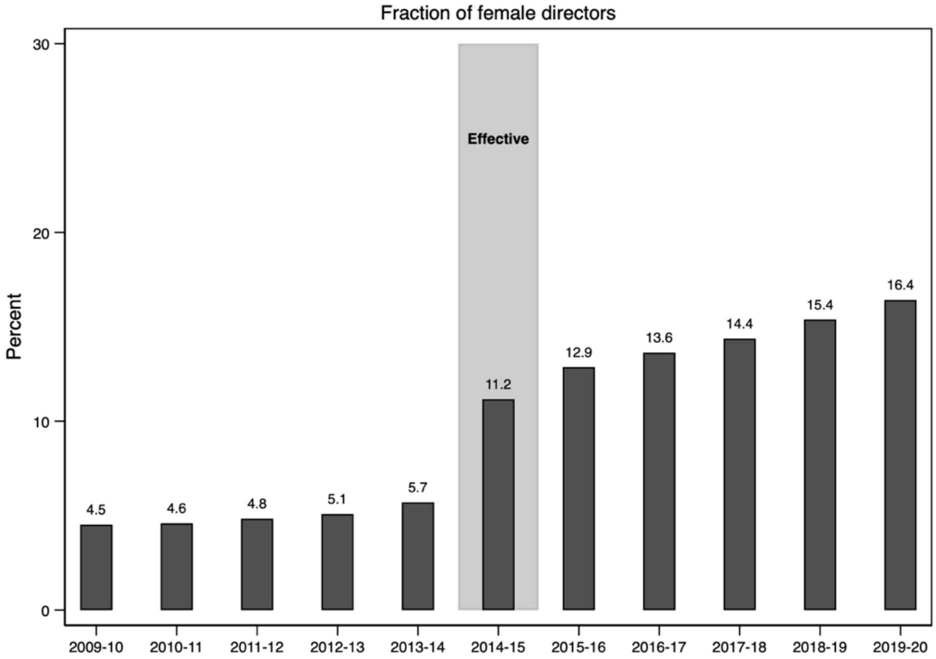
Figure 1: Female directors by year

The top figure plots the average fraction of female directors in percentage points by financial year. The bottom figure plots the average fraction of female directors in percentage points by financial year for inside and independent directors. The white hollow bars in the plot represent inside directors, while the solid black bars represent independent directors. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female director.



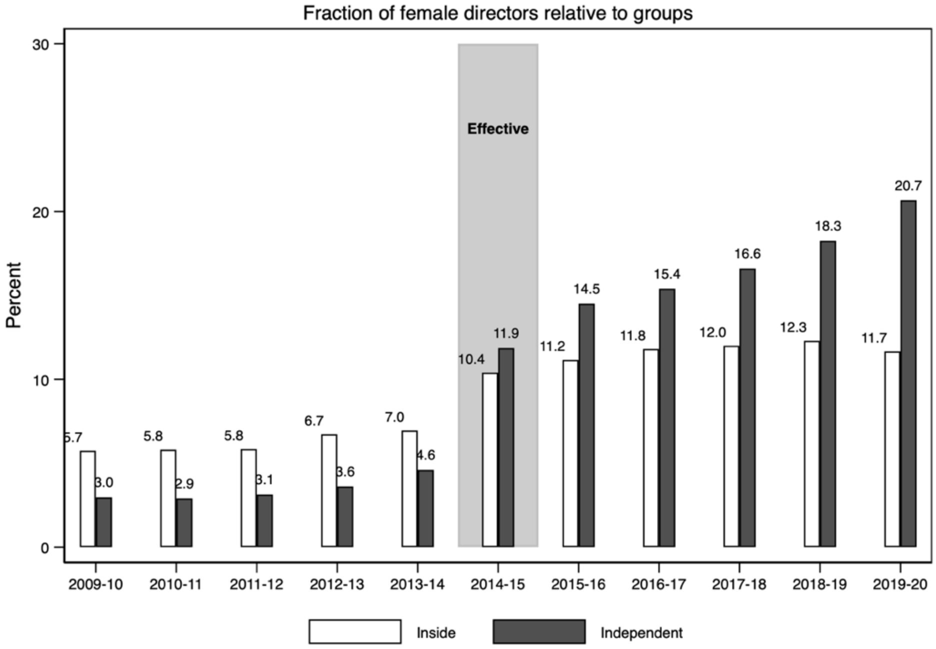
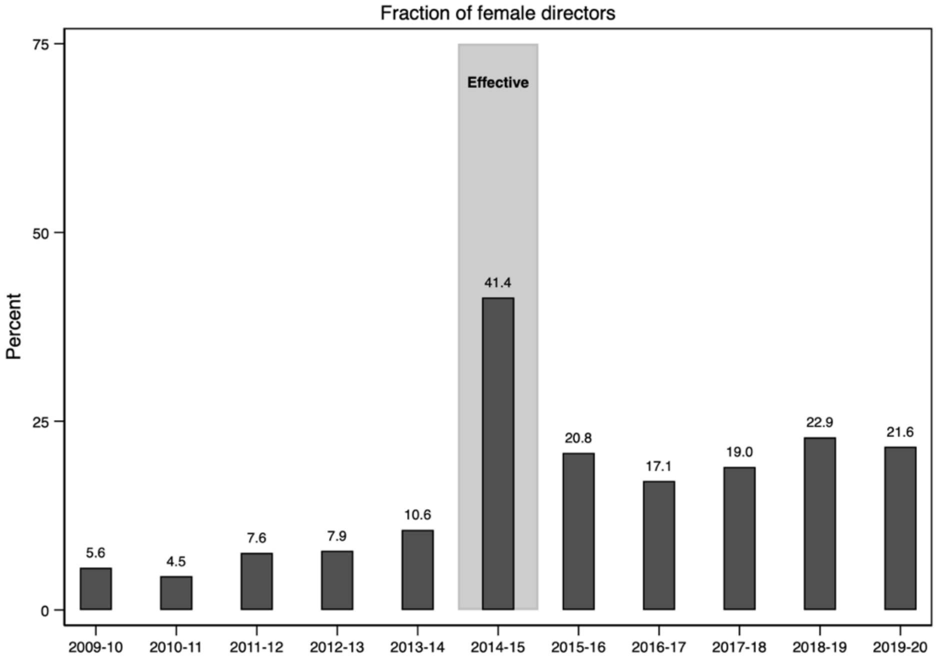


Figure 2: Female director appointments by year

The top figure plots the average fraction of female director appointments in percentage points by financial year. The bottom figure plots the average fraction of female director appointments in percentage points by financial year for inside and independent directors. The white hollow bars in the plot represent inside directors, while the solid black bars represent independent directors. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female director.



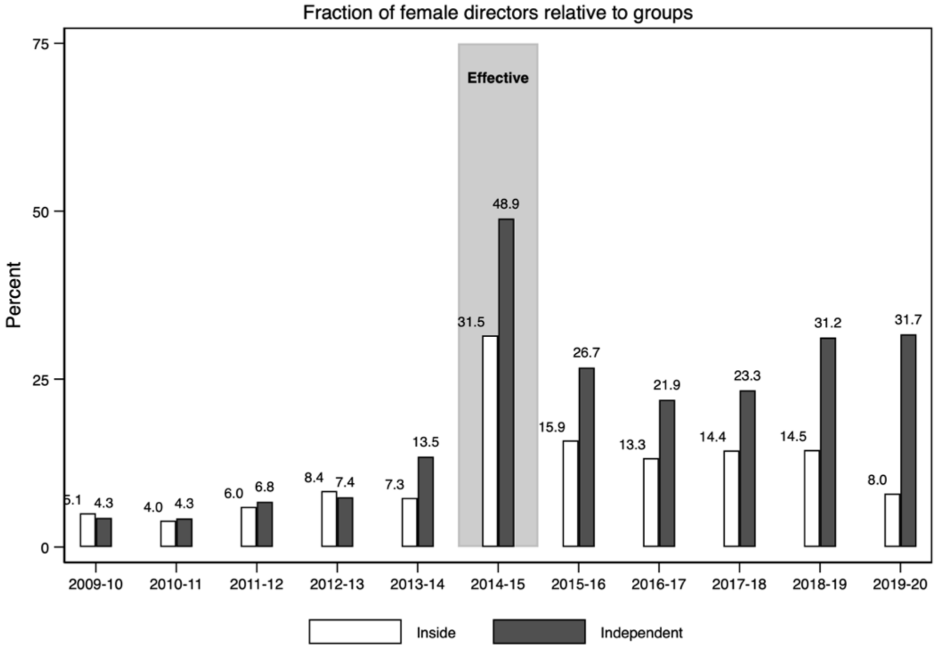
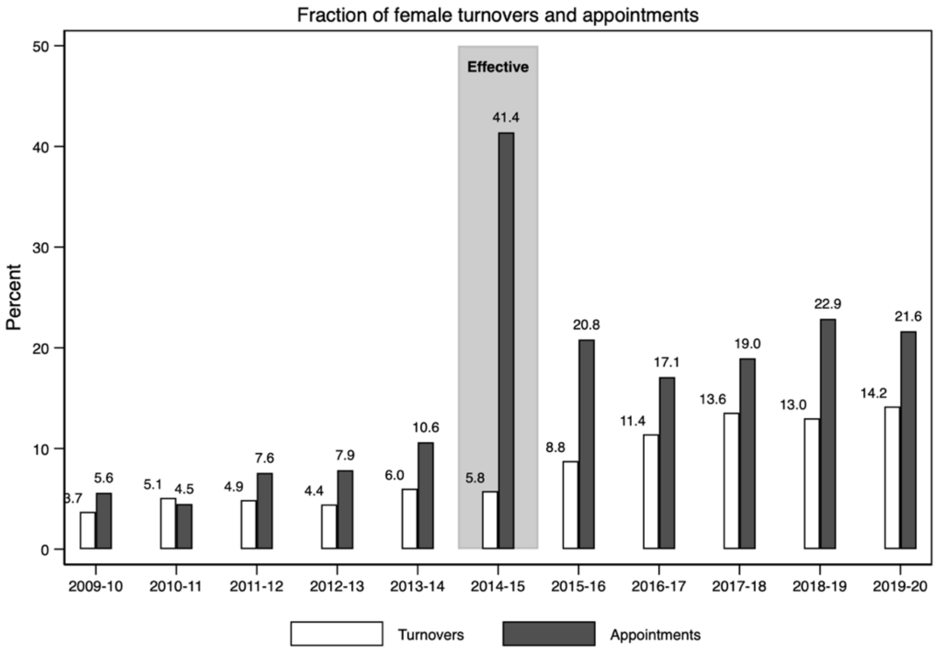


Figure 3: Voluntary female director appointments by year

The top figure plots the average fraction of female turnovers and the average fraction of female appointments by financial year. The difference between the two bars illustrates the gain in female directors net of turnover and replacements. The bottom figure plots the fraction of firms with two (three) or more female directors by financial year. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female director.



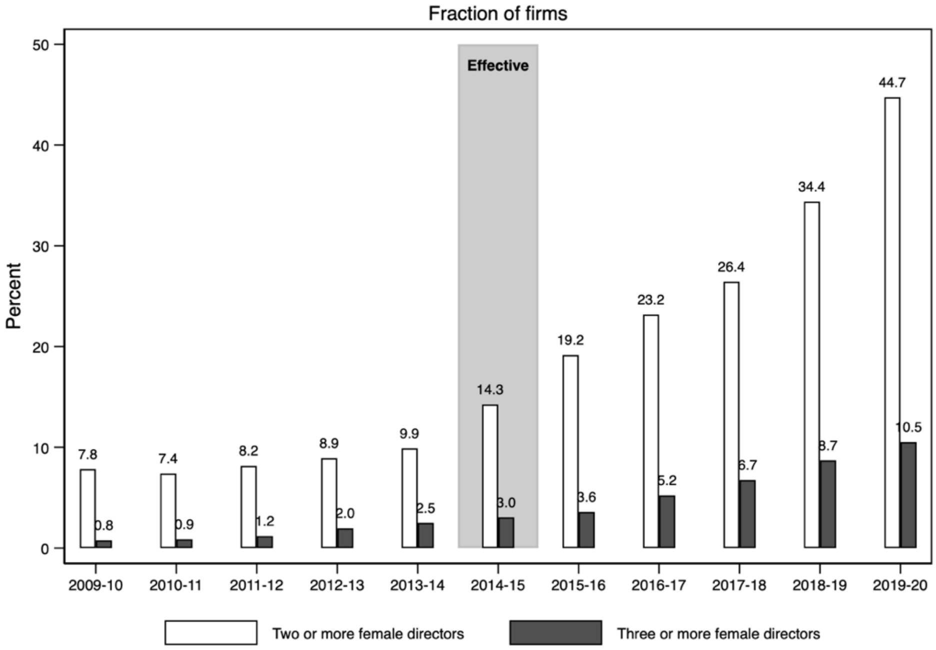
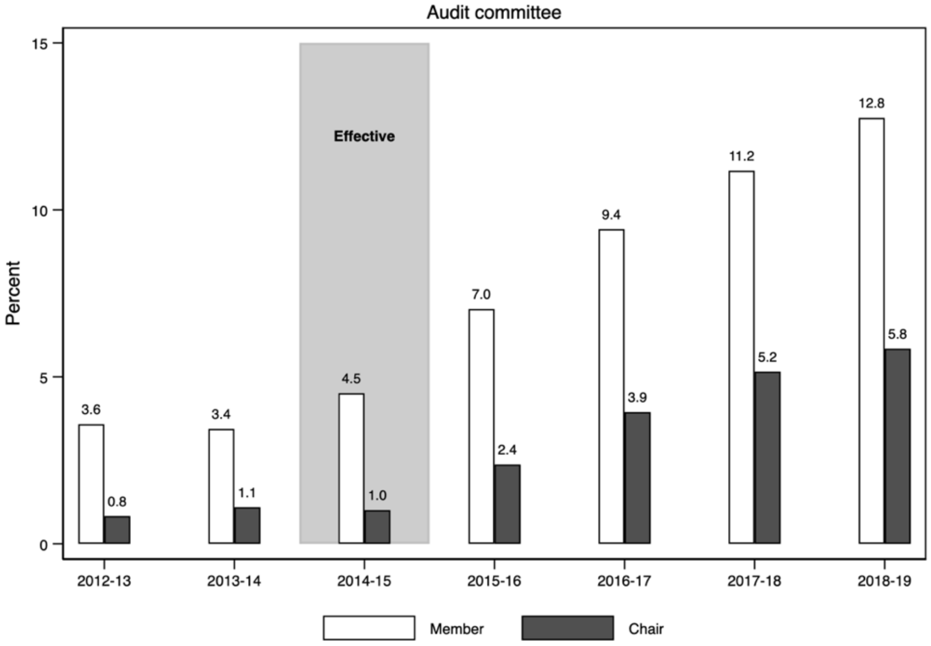


Figure 4: Female representation on committees by position

The top figure plots the average fraction of audit committee members and chairs that are female in percentage points by financial year. The bottom figure plots the average fraction of nomination & remuneration committee members and chairs that are female in percentage points by financial year. Across both panels, the white hollow bars represent committee members while the solid black bars represent committee chair. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female director. Due to data availability, we observe committee assignments from 2012-13 to 2018-19, both years inclusive.



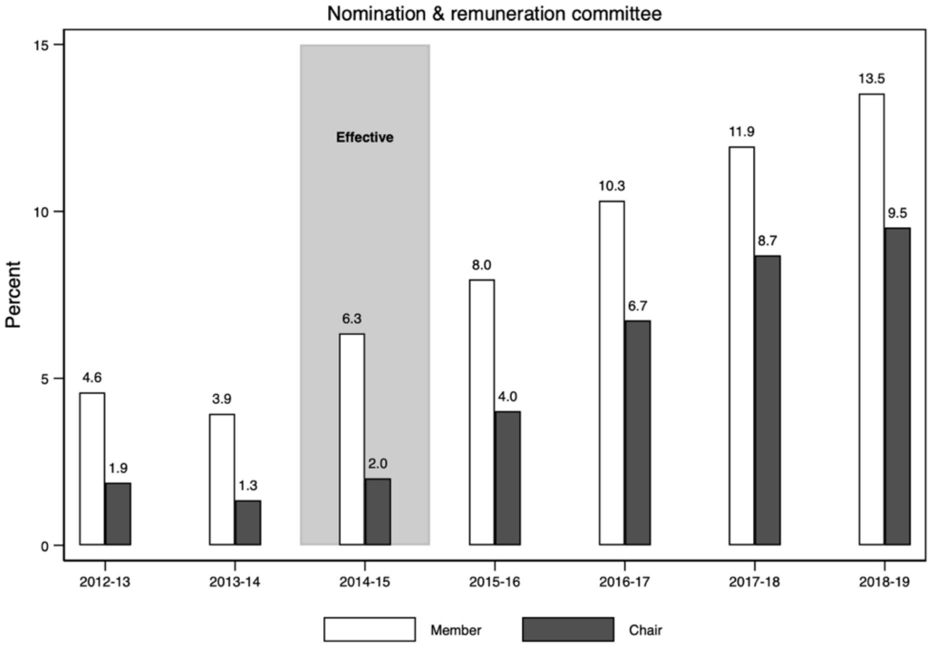


Figure 5: Connected directors and voluntary female director appointments

This figure plots the marginal changes in the probability to voluntarily appoint a second female director by financial years split across firms that have a director sitting on another board with two or more female directors. Marginal effects are coefficients from an ordinary least squares regression of whether a firm has two or more female directors on yearly indicators interacted with a dummy variable indicating whether atleast one director on the current board also sits on the board of another firm that has two or more female directors. The specification also controls for firm-fixed effects. The grey hollow circles in the plot represent firms with directors sitting on another board with more than one female director, while the solid black diamonds represent firms with directors on another board with zero or one female director. The 95% confidence intervals displayed on top.

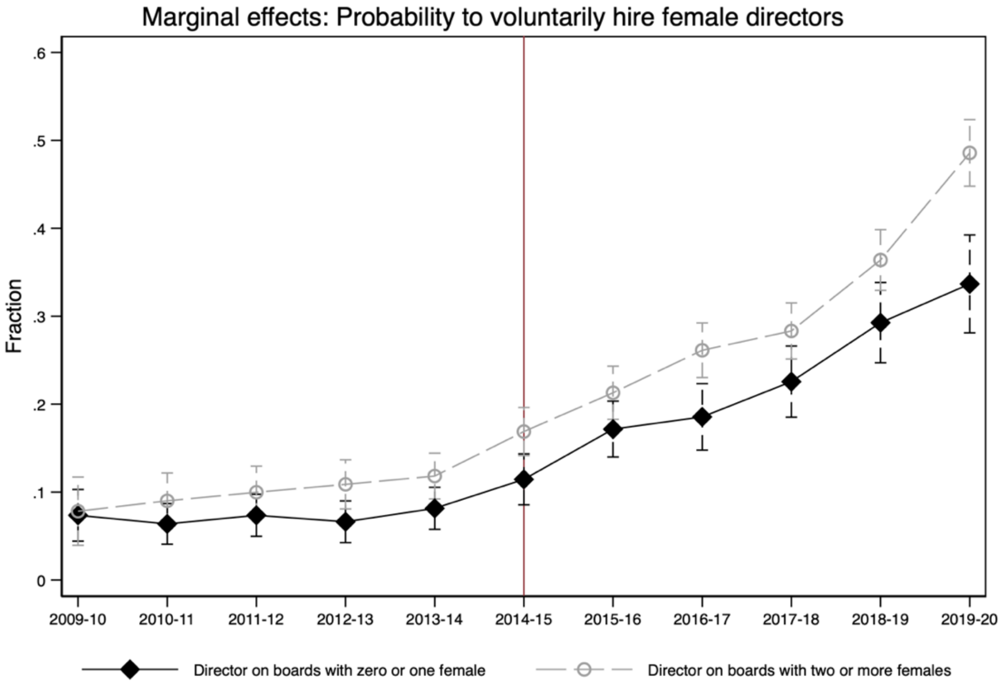
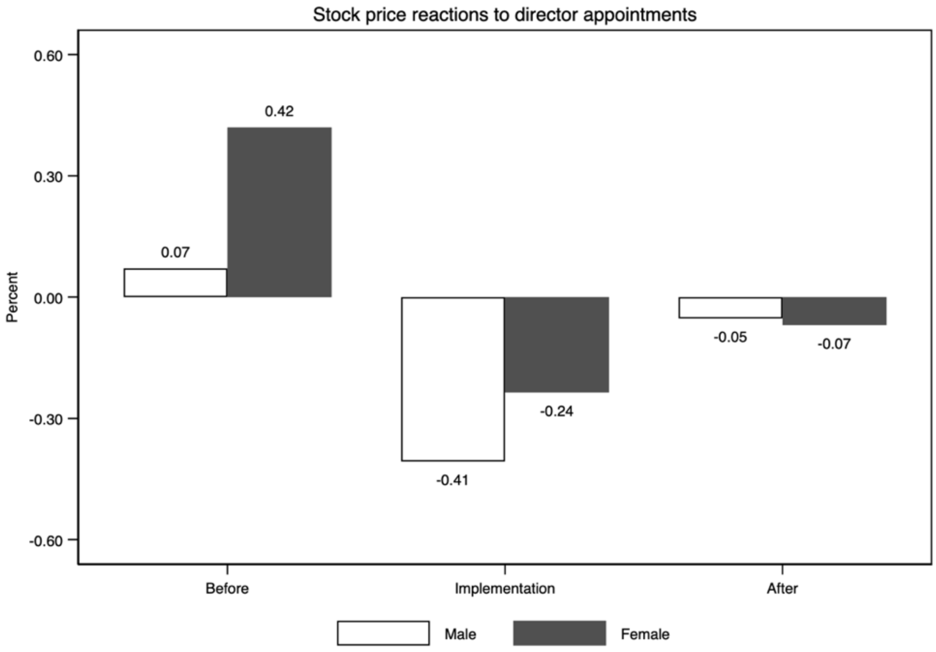


Figure 6: Stock price reactions to director appointments by gender and experience

The top figure plots the average stock price reaction to director appointments by gender around the reform. The white hollow bars in the plot represent male directors, while the solid black bars represent female directors. The bottom figure plots the average stock price reaction to female director appointments by experience. The light grey bars in the plot represent new female directors, while the darker grey bars represent experienced female directors.



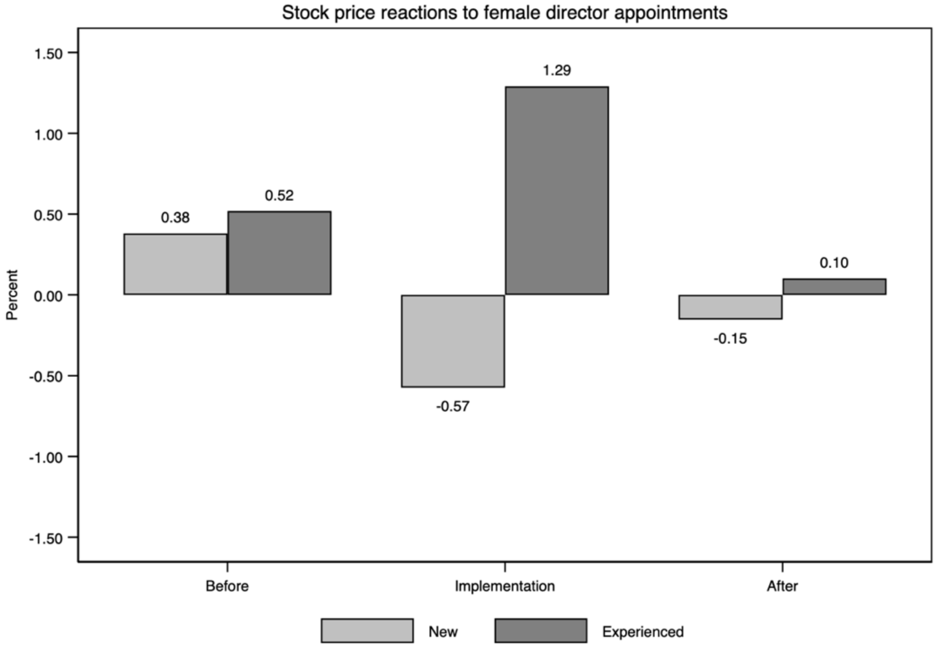


Figure 7: Related director appointments

The top figure plots the average fraction of related male and female directors on the board in percentage points by financial year. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female on their boards. The bottom figure plots the stock price reactions to related director appointments in percentage around the reform for male and female directors. The white hollow bars in the plot represent male directors, while the solid black bars represent female directors.

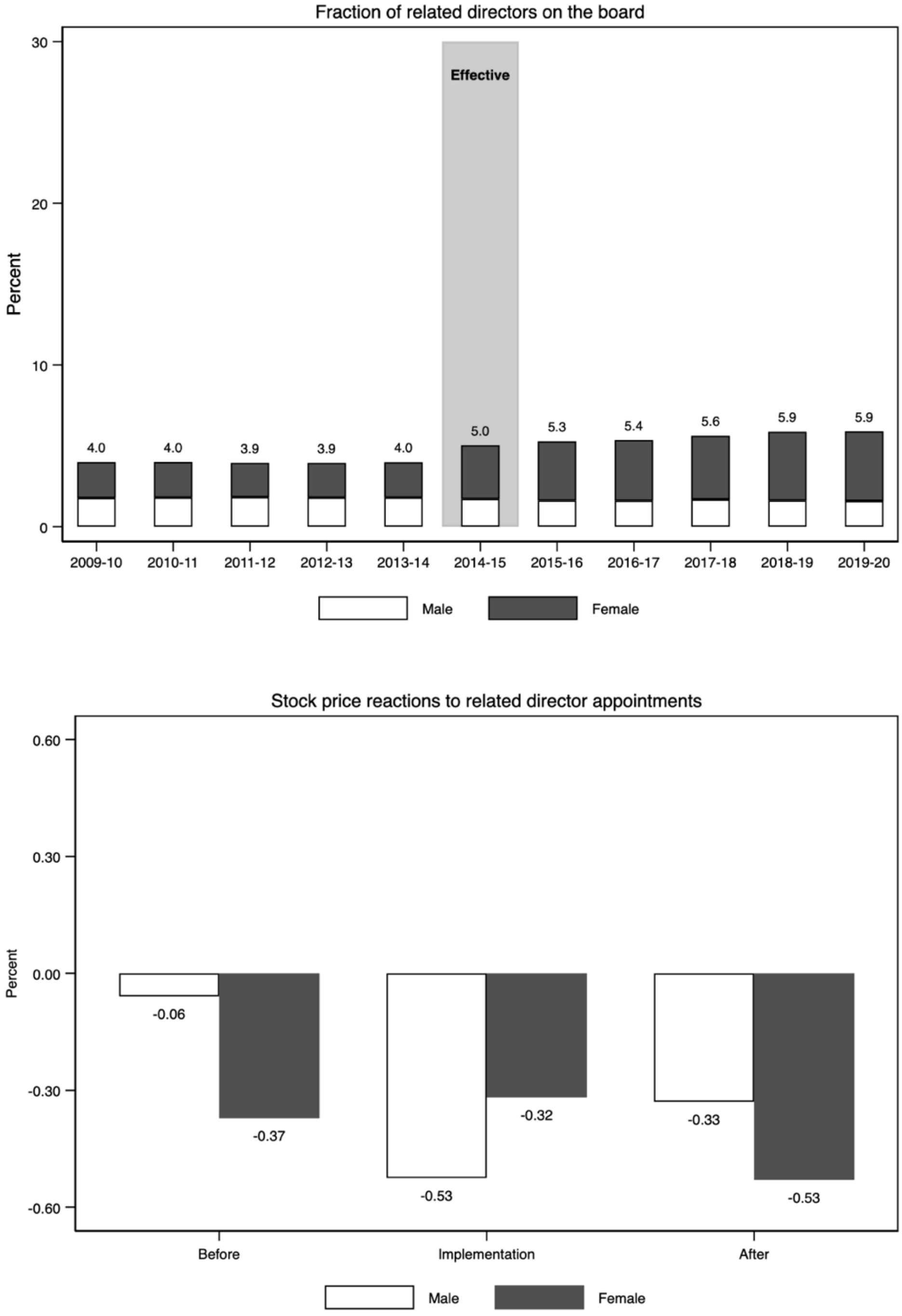


Figure 8: Gender gap in compensation for independent directors by year

These figures plot the average compensation in 2015 INR millions by financial year. The top (bottom) panel plots the average compensation by financial years for directors appointed before (after) the gender quotas were enacted. We exclude the appointment year to avoid confounding the gender gap in compensation with mechanical effects due to appointment of directors in the middle of the financial year. The sample is restricted to firms with at least one female on their board for the period from 2012-13 to 2018-19. Across the panels, the solid line represents male directors, while the dashed line represents female directors. The vertical red line represents the effective date for firms to comply with the gender quota of having at least one female on their boards. Due to data availability, we observe director remuneration from 2012-13 to 2018-19, both years inclusive. One US$ is equivalent to 62 INR (as of January 2015).

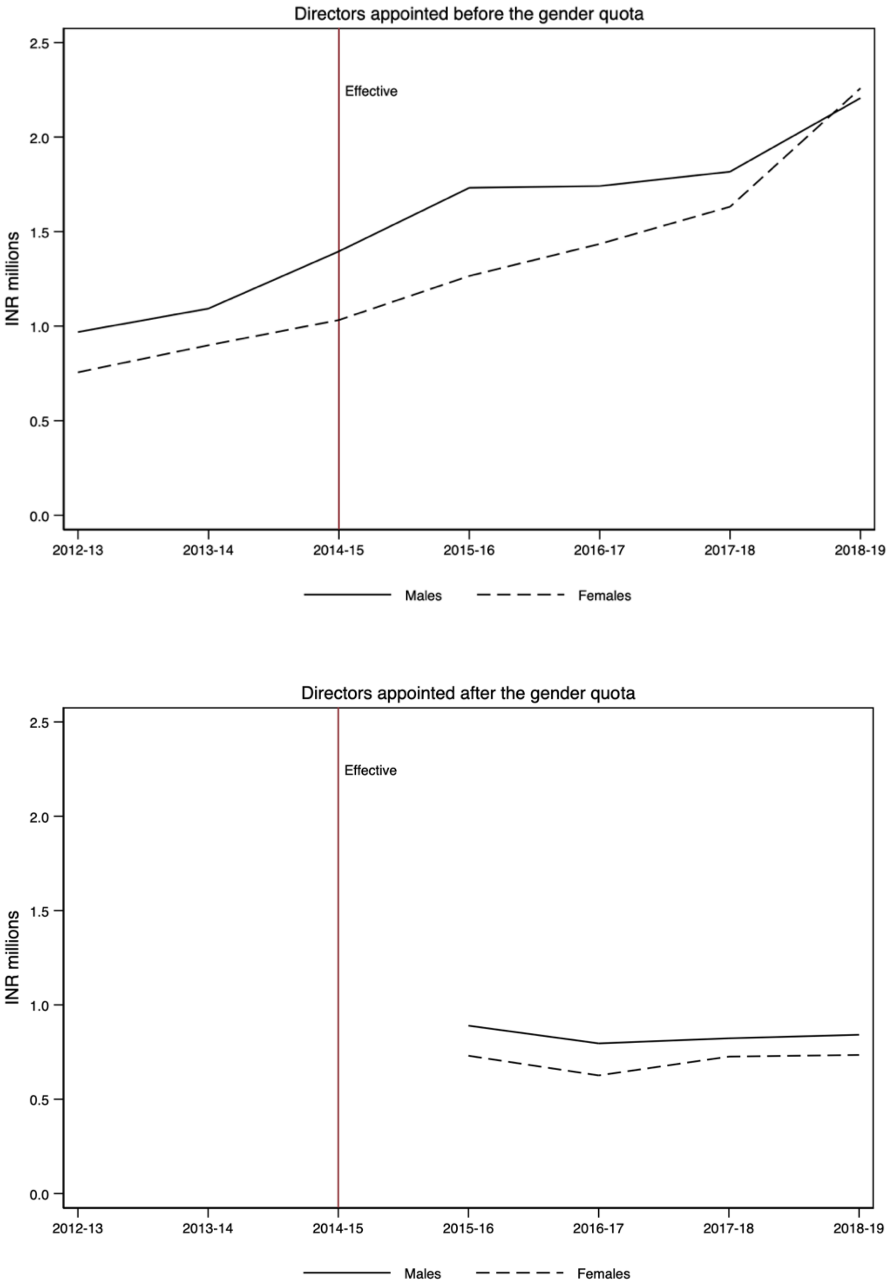
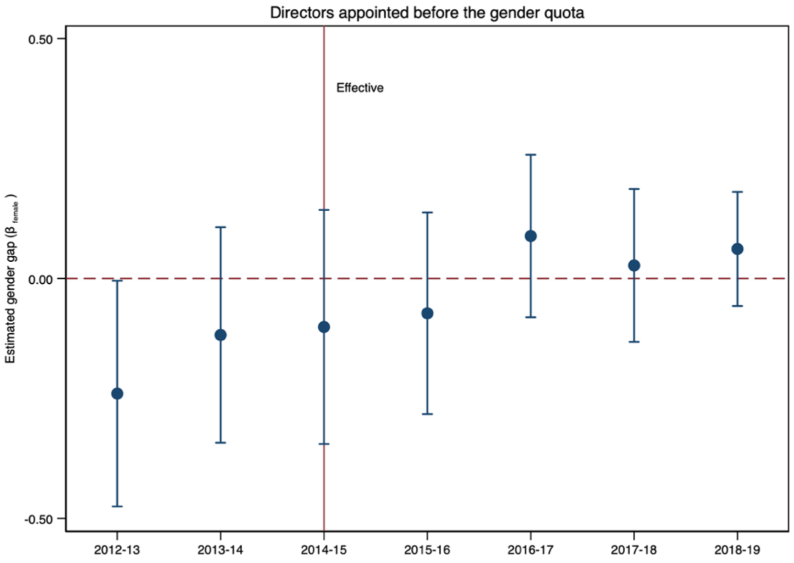


Figure 9: Gender gap in compensation for independent directors by year

These figures plot the estimated coefficients and their corresponding 95% confidence intervals of the gender gap in compensation residuals by financial year. Residuals are obtained from a regression of the natural logarithm of compensation on firm-year fixed effects (see Equation 1). The top panel plots the estimated coefficients on the gender gap for independent directors appointed before the reform, while the bottom panel plots the estimated coefficients for independent directors appointed after the reform. Across both panels, we restrict the sample to firms with at least one female director on the board. We drop the appointment year to avoid confounding the gender gap with mechanical effects due to appointment of directors in the middle of the financial year. The specification includes controls for committee-level and firm-level characteristics (see Table 8 for details). Standard errors are clustered at the firm-level. The vertical red line represents the effective date for firms to comply with the gender quota of having at least one female director. Due to data availability, we observe director remuneration from 2012-13 to 2018-19, both years inclusive.



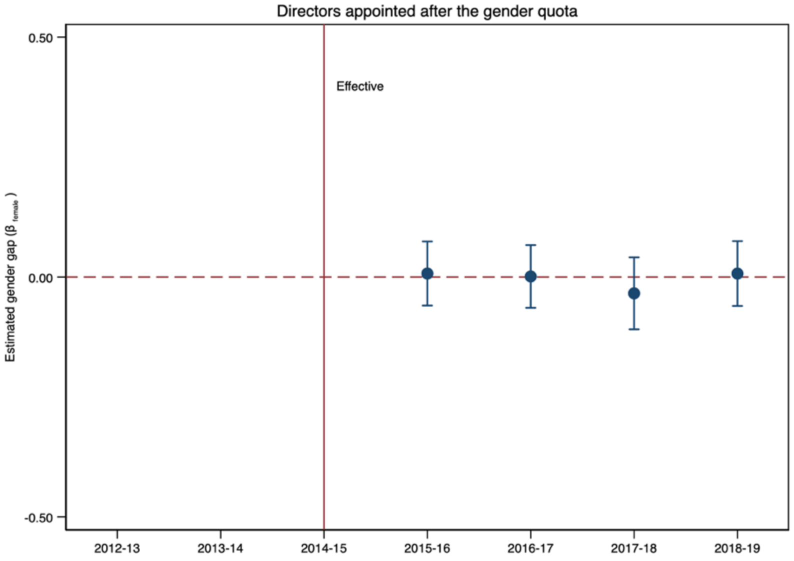
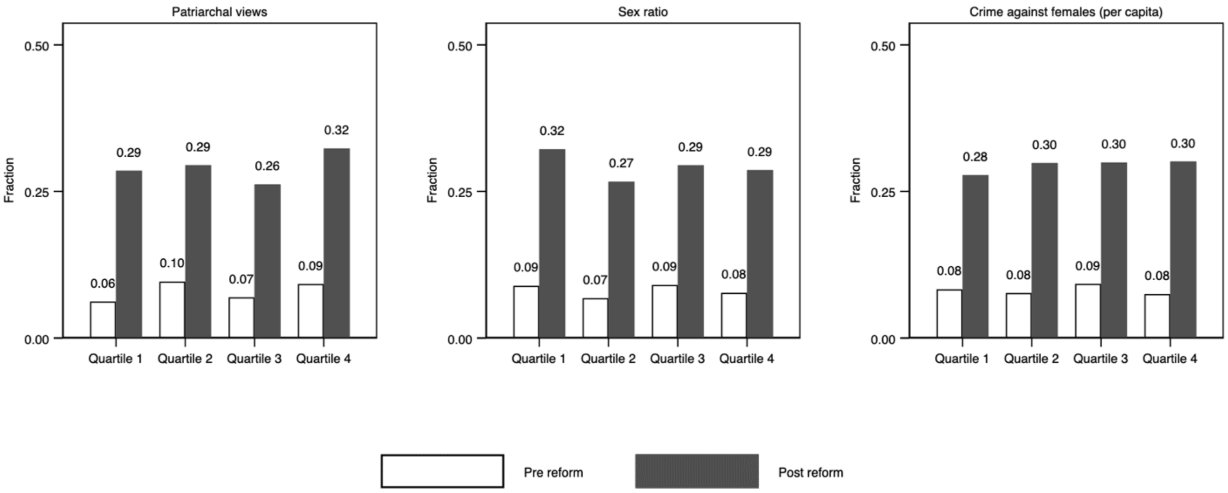


Figure 10: Fraction of firms with two or more female directors by social norms

All figures plot the average fraction of firms with two or more female directors before and after the introduction of the gender quota. Panel A shows averages across quartiles of attitudes towards women, whereas Panel B shows averages across quartiles of female opportunities in the labor market. To measure general attitudes towards women, we gauge patriarchal norms from the question "*When jobs are scarce, men should have more right to a job than women*," of the World Value Survey, the sex ratio at birth (female relative to male births) from the population Census, and crime against females (per capita) from the National Crime Records Bureau. All three measures are based on the headquarter state of the firm, and quartile 1 (4) contains firms in environments that are the most (least) hostile toward women. To measure female opportunities in the labor market, we use the fraction of female employees in the industry, the fraction of female entrepreneurs in the industry, and the fraction of female directors in the industry (excluding the firm). All three measures are based on the primary industry of the firm, and quartile 1 (4) contains firms in environments that give the least (most) opportunities to women.

(a) Attitude towards women



(b) Opportunities in the labor market

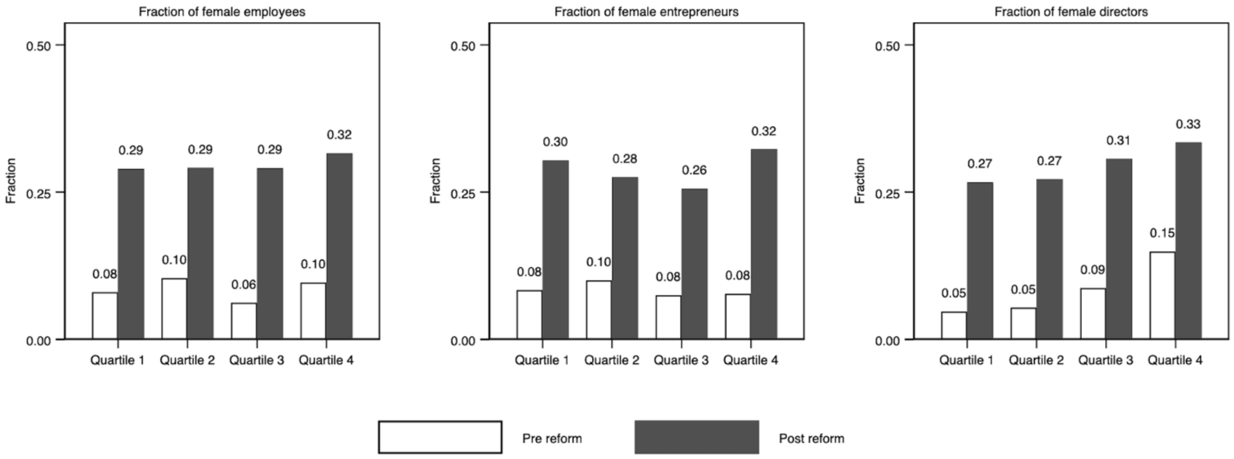


Figure 11: Female director appointments by firm ownership structure

The top figure plots the average fraction of female directors appointed, split by median domestic institutional ownership in percentage points by financial year. The bottom figure plots the average fraction of female directors appointed, split by median foreign institutional ownership in percentage points by financial year. Across both panels, the white hollow bars represent firms with above-median ownership share, while the solid black bars firms with below-median ownership share. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female director.

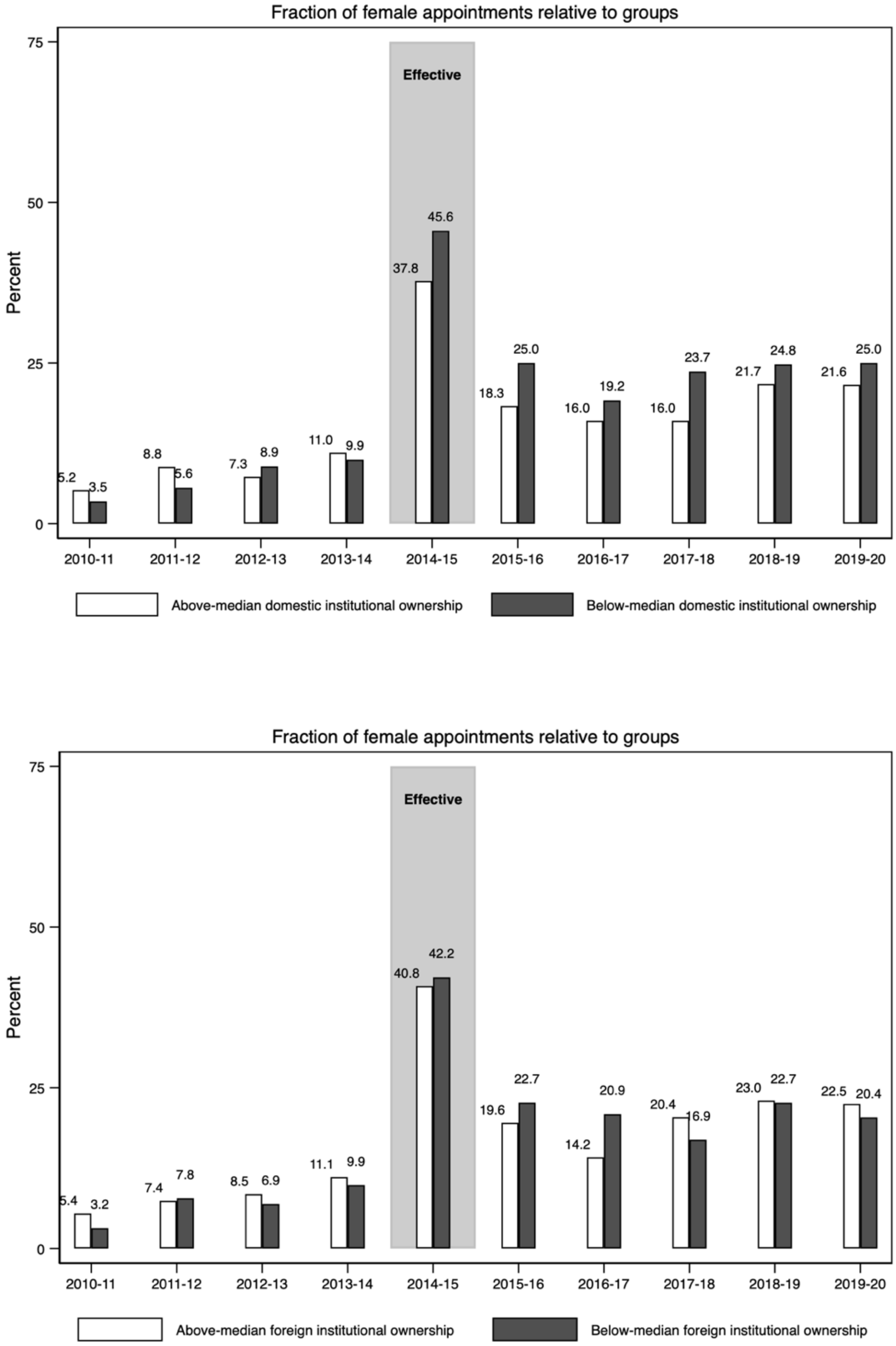


Table 1: Gender quotas on corporate boards around the world

This table reports the chronology of legislation introducing gender quotas on corporate boards of publicly traded companies around the world. The table includes countries that have introduced regulation through legislation, rather than through recommendations in corporate governance codes. We report the year of compliance, whether the quota is binding, the quota and notes with specific details for the quota. Quotas either require a minimum number of directors of each gender or a minimum fraction of each gender is represented among the board of directors.

Country	Compliance year	Binding	Quota	Notes
Israel	1999	Yes	At least 1 woman	
Norway	2008	Yes	40%	
Kenya	2010	No	33%	
Iceland	2013	Yes	40%	
India	2014-15	Yes	At least 1 woman	
Italy	2015	Yes	33%	
Netherlands	2015	No	30%	Expired in 2016. Continued as soft law
Spain	2015	No	40%	
Germany	2016	Yes	30%	
Belgium	2017	Yes	33%	
France	2017	Yes	40%	
Austria	2018	Yes	30%	
Pakistan	2018	Yes	At least 1 woman	
India	2019-20	Yes	At least 1 female independent director	Applicable to Top 500 firms by market capitalization in 2019-20, and to Top 1,000 firms by market capitalization in 2020-21.
Portugal	2020	Yes	33%	
United States				
- California	2020	Yes	At least 1 woman	After 1 year: 2 women on boards with 5 directors. 3 women on boards with 6 or more directors.
- Washington	2022	No	25%	Firms can opt out, but need to send a board diversity discussion and analysis to all shareholders with voting rights.

Table 2: Female directors and size of the director pool by year

We report the number of firms with and without female directors and the size of the director pool by gender of the NSE-listed firms in our sample for the period from 2009-10 to 2019-20. Panel A reports the following: *Number of firms*, *Number of firms with a female director*, *Number of firms without a female director, Average number of female directors,* and *Fraction of firms with two or more female directors*. Panel B reports the following: *Number of unique directors, Number of unique female directors, Number of unique male directors, Number of female directors, Number of female independent directors,* and *Number of female inside directors*.

		Financial year										
	All	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Panel A: Number of firms with and without female directors												
Number of firms	10,084	919	919	919	919	919	919	919	919	919	919	894
Number of firms with a female director	7,035	302	319	333	340	378	857	903	905	908	908	882
Number of firms without a female director	3,049	617	600	586	579	541	62	16	14	11	11	12
Average number of female directors	0.9	0.4	0.4	0.5	0.5	0.5	1.1	1.2	1.3	1.3	1.4	1.6
Fraction of firms with two or more female directors	18.5	7.8	7.4	8.2	8.9	9.9	14.3	19.2	23.2	26.4	34.4	44.7
Panel B: Size of the director pool by gender												
Number of unique directors	72,862	6,409	6,504	6,588	6,535	6,589	6,988	6,741	6,704	6,674	6,721	6,409
Number of unique female directors	7,373	316	327	347	351	394	805	876	932	973	1,031	1,021
Number of unique male directors	65,489	6,093	6,177	6,241	6,184	6,195	6,183	5,865	5,772	5,701	5,690	5,388
Number of female directors	9,389	382	396	423	442	495	1,019	1,117	1,172	1,227	1,324	1,392
Number of female independent directors	4,957	77	76	84	164	210	561	640	673	732	816	924
Number of female inside directors	4,116	212	222	222	277	284	456	476	499	495	507	466

Table 3: Female director appointments after the gender quota

This table presents the long-term effect of the gender quota on the appointment rates of women on boards on NSE-listed firms for the period from 2009-10 to 2019-20. We drop the financial year 2014-15 to prevent attributing the mechanical increase in female director appointments in the year of the reform to the long-term effect of the gender quota. The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for a female director. Column 1 includes all directors while column 2 (column 3) focuses on independent (inside) directors. Column 4 focuses on voluntary appointments by excluding appointments of female directors to comply with the gender quota. Specifically, we only include female director appointments in the post-reform period if the firm already complies with the quota requiring one female director. *Post reform* is an indicator equal to one for financial years after 2014-15 in which the gender quota is effective. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	All	Independent	Inside	Voluntary
	(1)	(2)	(3)	(4)
Post reform	0.134***	0.191***	0.075***	0.116***
	(0.011)	(0.022)	(0.015)	(0.008)
Firm size $_{t-1}$	-0.009	-0.008	-0.005	0.010*
	(0.006)	(0.012)	(0.009)	(0.006)
Fraction of independent directors $_{t-1}$	0.001	0.020	0.024	-0.029*
	(0.025)	(0.051)	(0.040)	(0.017)
Market-to-book value $_{t-1}$	0.001	-0.002	0.007	0.005
	(0.004)	(0.004)	(0.009)	(0.004)
Ownership of the controlling shareholder $_{t-1}$	0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)
Return on assets$_{t-1}$	-0.047	-0.119	-0.037	0.025
	(0.041)	(0.081)	(0.044)	(0.024)
Stock return $_{t-1}$	-0.001	-0.007	-0.005	0.002
	(0.006)	(0.012)	(0.009)	(0.004)
Stock return volatility $_{t-1}$	-0.001	-0.012	0.014	0.002
	(0.003)	(0.011)	(0.012)	(0.002)
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.128	0.246	0.269	0.169
Observations	8,508	3,816	3,960	7,809

Table 4: Female representation on committees and in top positions

This table presents results examining the long-term effect of the gender quota on important positions held by females on committees and in top executive positions for the sample of NSE-listed firms for the period from 2012-13 to 2018-19. We drop the financial year 2014-15 to be consistent with our baseline analyses (Table 3). The unit of analysis is a firm-year. In column 1 (column 3), the dependent variable is the fraction of audit committee (nomination & remuneration committee) members that are female. In columns 2 (column 4), the dependent variable is an indicator taking the value of one if the chairperson of the audit committee (nomination & remuneration committee) is a female. In column 5 (column 6), the dependent variable is an indicator taking the value of one if the chairperson of the board (if either the Chief Executive Officer or the Managing Director (CEO/MD)) is a female. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	Audit committee		Nomination & remuneration committee		Top executive positions	
	Member	Chair	Member	Chair	Chairperson	CEO/MD
	(1)	(2)	(3)	(4)	(5)	(6)
Post reform	0.075***	0.034***	0.075***	0.058***	0.007	0.005
	(0.009)	(0.011)	(0.010)	(0.017)	(0.005)	(0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.629	0.601	0.656	0.651	0.727	0.797
Observations	4,438	4,438	4,159	4,159	6,433	6,433

Table 5: Board diversity and voluntary female director appointments

This table relates proxies for board diversity to a firms' decision to appoint female directors voluntarily for the sample of NSE-listed firms for the period from 2015-16 to 2019-20. We drop the financial year 2014-15 to be consistent with our baseline analyses (Table 3). The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for voluntary appointments of female directors. Specifically, we only include female director appointments in the post-reform period if the firm already complies with quota requiring one female director. Column 1 focuses on the board of directors. *Female controlling shareholder (Foreign director)* is an indicator for whether the firm prior to the gender quota ever had a female promoter (foreign director) on the board. *Fraction of female directors in industry (excl. firm)* is the female share of directors in the two-digit NIC industry (excluding the firm). *Average (Standard deviation) director age* compute the average director age (standard deviation of the director age). Column 2 (column 3) focuses on the measures of age diversity on the audit committee (nomination & remuneration committee). Column 4 includes all measures of diversity at once. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include year fixed effects using standard errors clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	Board		**Audit committee (AC)**		**Nomination and Remuneration committee (NRC)**		**All**	
	Baseline	Interaction	Baseline	Interaction	Baseline	Interaction	Baseline	Interaction
	(1)		(2)		(3)		(4)	
Female promoter	0.005	0.038**					0.000	0.061***
	(0.005)	(0.017)					(0.001)	(0.020)
Foreign director	-0.001	0.027*					0.003	0.043**
	(0.003)	(0.015)					(0.004)	(0.021)
Fraction of expert directors	0.004	0.056**					-0.008	0.078**
	(0.006)	(0.025)					(0.010)	(0.035)
Fraction of female directors in industry	-0.028	0.290					-0.069	0.603*
	(0.063)	(0.273)					(0.088)	(0.310)
Average director age	-0.000	0.000					-0.001	-0.001
	(0.001)	(0.000)					(0.001)	(0.002)
Standard deviation of director age	-0.001**	0.002*					0.000	0.001
	(0.000)	(0.001)					(0.000)	(0.002)
Average director age (AC)			-0.002**	0.002***			0.000	0.002
			(0.001)	(0.000)			(0.000)	(0.002)

Standard deviation of director age (AC)		-0.001*	0.002*			-0.000	0.001
		(0.000)	(0.001)			(0.000)	(0.002)
Female director (AC)		-0.007	-0.024**			-0.001	-0.024
		(0.005)	(0.012)			(0.001)	(0.015)
Foreign director (AC)		0.002	-0.012			0.001	-0.088***
		(0.002)	(0.021)			(0.002)	(0.033)
Average director age (NRC)				-0.002	0.038	-0.002	0.046
				(0.003)	(0.023)	(0.003)	(0.034)
Standard deviation of director age (NRC)				-0.002**	0.002***	-0.000	-0.001
				(0.001)	(0.000)	(0.000)	(0.002)
Female director (NRC)				-0.001	0.002	-0.000	-0.000
				(0.000)	(0.001)	(0.000)	(0.002)
Foreign director (NRC)				-0.002	-0.015	-0.000	-0.003
				(0.003)	(0.013)	(0.001)	(0.016)
Observations	7,526	3,555		3,360		3,206	
Adjusted R-squared	0.047	0.009		0.007		0.015	

Table 6: Connected directors and voluntary female director appointments

This table examines the role of connected directors in a firms' decision to appoint female directors voluntarily for the sample of NSE-listed firms for the period from 2015-16 to 2019-20. We drop the financial year 2014-15 to be consistent with our baseline analyses (Table 3). The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for voluntary appointments of female directors. Specifically, we only include female director appointments in the post-reform period if the firm already complies with quota requiring one female director. We consider three measures of director connectedness: a dummy variable indicating whether atleast one director on the current board also sits on the board of another firm that has two or more female directors (column 1); the average number of directors on the current board who also sit on the board of another firm that has two or more female directors (column 2); the maximum number of directors on the current board sitting on the board of another firm that has two or more female directors (column 3). *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include year fixed effects using standard errors clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Connectedness measure	Atleast one (1)	Average (2)	Maximum (3)
Connected director	0.028	0.193***	0.022*
	(0.019)	(0.073)	(0.013)
Post reform x Connected director	0.047**	-0.032	0.026**
	(0.023)	(0.065)	(0.013)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adjusted R-squared	0.435	0.437	0.437
Observations	9,164	9,164	9,164

Table 7: Stock price reactions to director appointments by gender and appointment type

This table reports the average three-day cumulative abnormal returns (CAR) over a three-day event window from one day before to one day after the announcement of a director appointment. The sample includes appointments in NSE-listed firms for the period from 2009-10 to 2019-20. Panel A reports the three-day CARs by gender while Panel B reports the three-day CARs by appointment type for female directors. Voluntary appointments include female director appointments in the post-reform period if the firm already complies with quota requiring one female director. Panel C reports the three-day CARs for mandatory director appointments by whether firms choose to expand their board size or not. Across the three panels, columns 1, 3, and 5 (columns 2, 4, and 6) report the average CARs (N, number of observations) for all directors, independent directors, and inside directors, respectively. The row titled, *Difference,* reports the difference in the average CARs across gender, appointment type, and whether firms expand their board size, respectively. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: By gender

	All		Independent		Inside	
	Average (1)	N (2)	Average (3)	N (4)	Average (5)	N (6)
Female director	-0.036 (0.143)	1,362	-0.018 (0.179)	869	-0.067 (0.218)	493
Male director	-0.032 (0.076)	6,222	-0.250** (0.118)	2,650	0.129 (0.090)	3,572
Difference (Female-Male)	-0.004 (0.150)	7,584	0.232 (0.200)	3,519	-0.197 (0.224)	4,065

Panel B: By appointment type for female directors

	All		Independent		Inside	
	Average (1)	N (2)	Average (3)	N (4)	Average (5)	N (6)
Voluntary	0.113 (0.220)	434	0.054 (0.291)	268	0.209 (0.327)	166
Mandatory	-0.106 (0.177)	928	-0.050 (0.220)	601	-0.208 (0.284)	327
Difference (Voluntary - Mandatory)	0.219 (0.274)	1,362	0.103 (0.357)	869	0.417 (0.437)	493

Panel C: Mandatory appointments by board size for female directors

	All		Independent		Inside	
	Average (1)	N (2)	Average (3)	N (4)	Average (5)	N (6)
Expands board size	-0.387* (0.218)	618	-0.333 (0.257)	416	-0.497 (0.395)	202
Same board size	0.702* (0.418)	156	0.955* (0.540)	101	0.237 (0.651)	55
Reduces board size	0.205 (0.429)	154	0.146 (0.677)	84	0.277 (0.527)	70
Difference (Expands - Same)	-1.089** (0.473)	774	-1.289** (0.598)	517	-0.734 (0.760)	257

Table 8: Gender gap in compensation for independent directors after the gender quota

This table reports the changes in the gender gap in compensation residuals around the gender quota for the sample of NSE-listed firms for the period from 2012-13 to 2018-19. The sample is restricted to this period due to data availability on committee positions and director remuneration. The unit of analysis is director-firm-year. The dependent variable is the residuals obtained from a regression of firm-year fixed effects on the natural logarithm of compensation. These residuals capture variation in director compensation *within* the board of a firm in a given financial year. Column 1 reports the results for all directors while column 2 (column 3) reports the results for directors that are appointed before (after) the gender quota. *Female director* is an indicator equal to one for female directors. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. All regressions include committee-level controls for each director. These include: *Chairman* an indicator taking the value of one if the director is the chairperson of the board, *Nomination & remuneration committee member (chair)* an indicator taking the value of one if the director is a member (chair) of the nomination & remuneration committee, *Audit committee member (chair)* an indicator taking the value of one if the director is a member (chair) of the audit committee, and *Committee* an indicator taking the value of one if the director occupies any committee position. All the regressions include the following firm-level control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All firm-level control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include year fixed effects and standard errors are clustered at the firm-level. We also report the *p*-value from an *F-test* that tests if the residuals at the end of the sample are statistically different to the residuals at the start of the sample. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	All directors	Appointed before	Appointed after
	(1)	(2)	(3)
Female director	-0.173*	-0.141	-0.024
	(0.092)	(0.091)	(0.039)
Post reform x Female	0.208**	0.198**	-
	(0.088)	(0.092)	
Committee-level controls	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
F-test: Female*2013 = Female*2019 (*p*-value)	0.05	0.05	-
Adjusted R-squared	0.10	0.096	0.11
Observations	10,363	7,526	2,837

Table 9: Social norms and voluntary appointments of female directors

This table examines changes in voluntary female director appointments around the gender quota reform by varying levels of attitude towards women and opportunities in the labor market, for the period from 2009-10 to 2019-20. The unit of analysis is a director appointment-firm-year. We drop the financial year 2014-15 to avoid the mechanical relationship between the reform and female director appointments. The dependent variable is an indicator for voluntary female director appointment, which excludes any appointment of female directors to comply with the gender quota. Specifically, we only include female director appointments in the post-reform period if the firm already complies with the quota requiring one female director. Columns (1) through (3) measures social norms across quartiles of attitudes towards women, whereas columns (4) through (6) measures social norms across quartiles of female opportunities in the labor market. To measure general attitudes towards women we use the question "*When jobs are scarce, men should have more right to a job than women*," from the World Value Survey, the sex ratio at birth from the population Census, and crime against females (per capital). All three measures are based on the headquarter state of the firm, and quartile 1 (4) contains firms in environments that are the most (least) hostile toward women. To measure female opportunities in the labor market, we use the female share of employment in the industry, the female share of entrepreneurs in the industry and the female share of directors in the industry (excluding the firm). All three measures are based on the primary industry of the firm, and quartile 1 (4) contains firms in environments that give the least (most) opportunities to women. All the regressions include the following control variables: *Post reform* is an indicator equal to one for financial years 2014-15 and after as the gender quota became effective in the financial year 2014-2015. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Return on assets* is the ratio of profit after tax to book value of assets. *Stock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. In addition, we also include the *Ownership of the controlling shareholder* as a control variable. All controls are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	Attitude towards women			Opportunities in the labor market		
	Patriarchal views (1)	Sex ratio (2)	Crime against females (per capita) (3)	Fraction of female employees (4)	Fraction of female entrepreneurs (5)	Fraction of female directors (6)
Post reform x Quartile 1	0.107*** (0.018)	0.099*** (0.014)	0.107*** (0.014)	0.108*** (0.017)	0.110*** (0.018)	0.113*** (0.014)
Post reform x Quartile 2	0.138*** (0.013)	0.113*** (0.019)	0.119*** (0.020)	0.077*** (0.016)	0.050*** (0.018)	0.122*** (0.015)
Post reform x Quartile 3	0.100*** (0.014)	0.132*** (0.012)	0.130*** (0.012)	0.121*** (0.019)	0.074*** (0.012)	0.133*** (0.014)
Post reform x Quartile 4	0.108*** (0.012)	0.106*** (0.013)	0.101*** (0.012)	0.080*** (0.015)	0.135*** (0.018)	0.095*** (0.013)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.170	0.169	0.169	0.159	0.160	0.169
Observations	7,809	7,809	7,809	7,809	7,809	7,809

Table 10: Institutional ownership and female director appointments

This table examine changes in female director appointment rates by the level of institutional ownership around the gender quota for the sample of NSE-listed firms for the period from 2009-10 to 2019-20. We drop the financial year 2014-15 to prevent attributing the mechanical increase in female director appointments in the year of the reform to the long-term effect of the gender quota. The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for a female director. Column 1 reports the baseline result from column 1 of Table 3 for all directors while column 2 presents results for the proportion of the firm's share held by all institutions. Column 3 (column 4) focuses on domestic (foreign) institutional ownership share. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	Baseline	All Institutions	Domestic Institutions	Foreign Institutions
	(1)	(2)	(3)	(4)
Post reform	0.134***	0.177***	0.159***	0.162***
	(0.011)	(0.015)	(0.014)	(0.013)
Ownership share $_{t-1}$	-	0.002**	0.001	0.002**
		(0.001)	(0.001)	(0.001)
Post reform x Ownership share $_{t-1}$	-	-0.003***	-0.003***	-0.003***
		(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.023	0.025	0.024	0.025
Observations	8,508	8,508	8,508	8,508

Table 11: Market developments and female director appointments

This table reports results examining the impact of market developments on female director appointments for the sample of NSE-listed firms for the period from 2009-10 to 2018-19. We drop the financial year 2014-15 to prevent attributing the mechanical increase in female director appointments in the year of the reform to the long-term effect of the gender quota. The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for a female director. Panel A reports the results examining the effect of IiAS recommendations on female director appointments, while panel B reports the results examining the impact of shareholder voting on female director appointments. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. *IiAS coverage* is an indicator for whether the firm was covered by IiAS, while *IiAS recommends for* is an indicator variable for whether IiAS recommends shareholders to vote against the re-election of a director. *Votes for* is the fraction of votes cast that are against the re-election of a director. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	Panel A: Proxy advisor (IiAS) voting recommendations			
	(1)	(2)	(3)	(4)
Post reform	0.128***	0.146***	0.128***	0.146***
	(0.012)	(0.014)	(0.012)	(0.014)
IiAS coverage	-	-0.046***	-	-0.050***
		(0.017)		(0.019)
IiAS recommends “for”	-	-	-0.004	0.014
			(0.021)	(0.023)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.028	0.030	0.028	0.029
Observations	7,459	7,459	7,459	7,459

	Panel B: Shareholder support for director appointments			
	(1)	(2)	(3)	(4)
Post reform	0.129***	0.137***	0.128***	0.137***
	(0.012)	(0.014)	(0.012)	(0.014)
Votes for (%)	-0.000	0.000	-	-
	(0.000)	(0.000)		
Firm-level average votes for (%)	-	-0.001	-	-0.001
		(0.001)		(0.001)
Excess votes for (%)	-	-	0.000	0.000
			(0.000)	(0.001)
IiAS recommends for	-	-	-	-0.002
				(0.050)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.028	0.028	0.028	0.028
Observations	7,459	7,459	7,459	7,459

Table 12: Alternative specifications

This table presents alternative specifications for the sample of NSE-listed firms for the period from 2009-10 to 2018-19. We drop the financial year 2014-15 to avoid the mechanical relationship between the reform and female director appointments. The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for a female director. Panel A presents the results for all appointments while panel B presents the results for voluntary appointments of female directors. Specifically, we only include female director appointments in the post-reform period if the firm already complies with quota requiring one female director. Across both panels, column 1 presents results from column 2 (column 4) of Table 3 for all directors while column 2 presents results after excluding firms with male director resignations. Column 3 presents results after excluding firms with male director resignations in the financial year 2014-15, while column 4 presents results in the sample of firms which experience the death of a director. In column 5, we focus on the sample of firms which experience the death of a director below the age of 75 years. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: All appointments

	Baseline	Exclude firms with male independent director resignations	Exclude firms with male independent director resignations in 2014-15	Firms with director deaths	Firms with director deaths below 75 years
	(1)	(2)	(3)	(4)	(5)
Post reform	0.134***	0.115***	0.122***	0.151***	0.144***
	(0.011)	(0.028)	(0.013)	(0.021)	(0.026)
Controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.023	0.018	0.020	0.028	0.033
Observations	8,508	1,157	5,819	2,848	1,608

Panel B: Voluntary appointments

	Baseline	Exclude firms with male independent director resignations	Exclude firms with male independent director resignations in 2014-15	Firms with director deaths	Firms with director deaths below 75 years
	(1)	(2)	(3)	(4)	(5)
Post reform	0.116***	0.121***	0.117***	0.123***	0.107***
	(0.008)	(0.022)	(0.009)	(0.016)	(0.019)
Controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.059	0.047	0.058	0.041	0.025
Observations	7,809	1,063	5,363	2,597	1,473

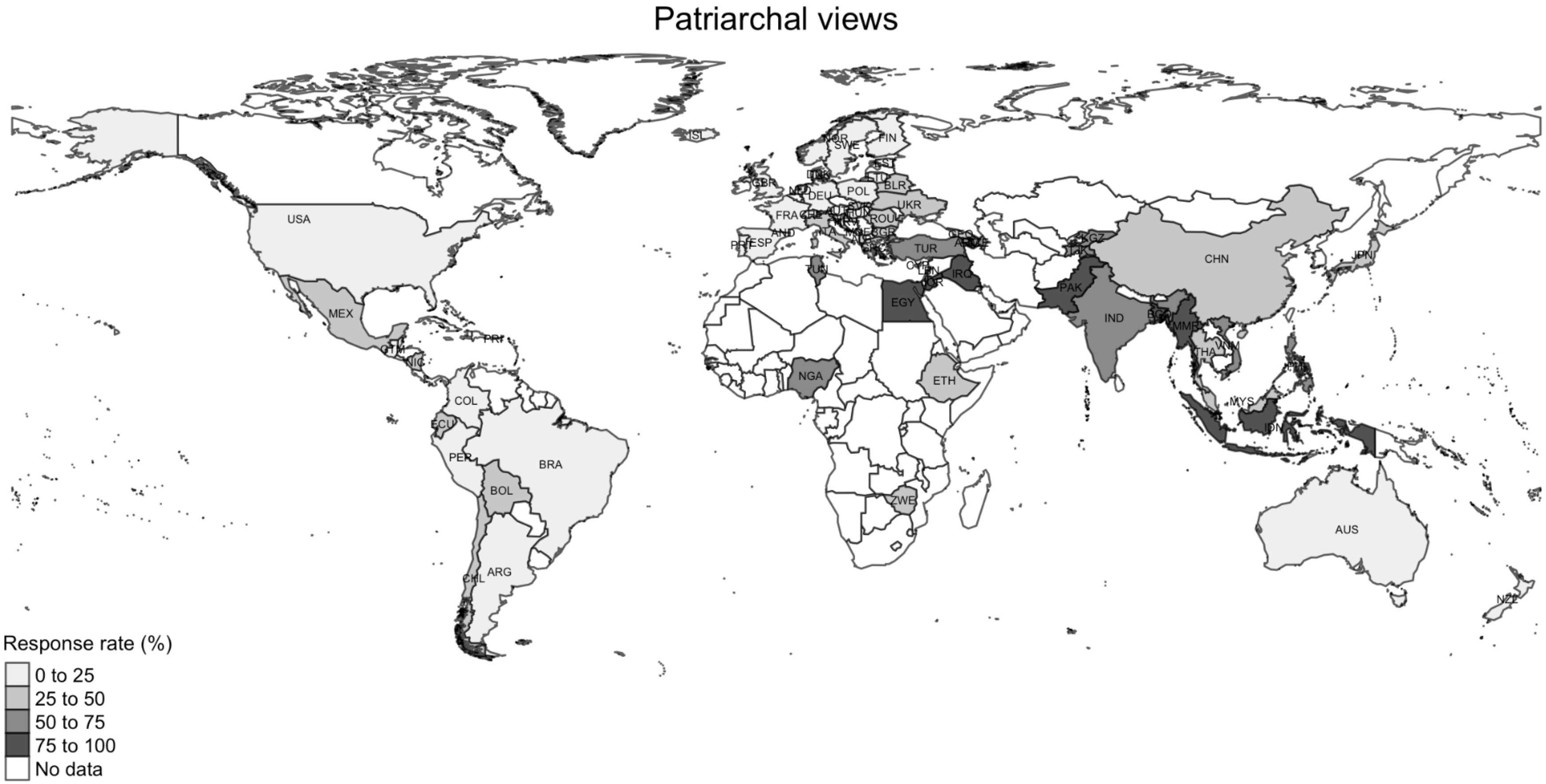
Internet Appendix

"Winds of Change:
Gender Quota on Boards in the face of Patriarchy"

S. Lakshmi Naaraayanan and Kasper Meisner Nielsen

Appendix Figure A1: Patriarchal views across countries

The map displays variation in patriarchal views across different countries around the World. We rely on World Value Survey to measure patriarchal views and use the response to the question "*When jobs are scarce, men should have more right to a job than women*". A higher response rate of "Yes" indicates stronger patriarchal views while a lower response rate of "Yes" indicates weaker patriarchal views. Prior research has focused on understanding the effects of gender quotas in developed countries which are characterized by weaker patriarchal norms as seen from the heatmap below. These countries include Norway, France, Spain, Italy, and the United States and all of which have more egalitarian and less patriarchal views (0 to 25% range). Different from these studies, we focus on an emerging market, India, and study the long-term effect of introducing gender quota in an environment characterized by stronger patriarchal views (50 to 75% range).


Patriarchal views
ISL
NOR
SWE
FIN
EST
LTU
BLR
DNK
GBR
NLD
DEU
POL
UKR
FRA
CHE
ROU
AND
ITA
SRB
BGR
PRT
ESP
TUR
GEO
KGZ
TJK
CHN
JPN
CYP
LBN
JOR
IRQ
TUN
EGY
PAK
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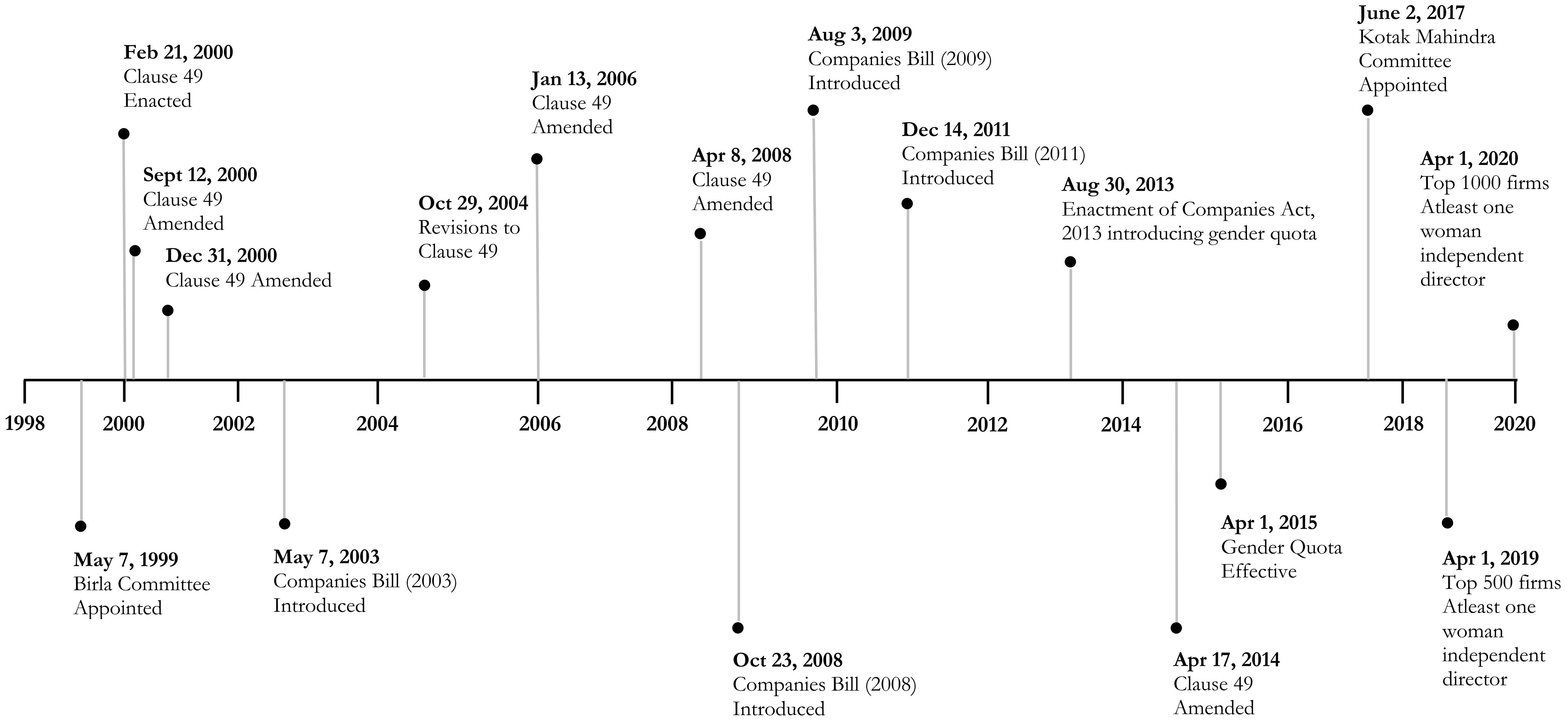
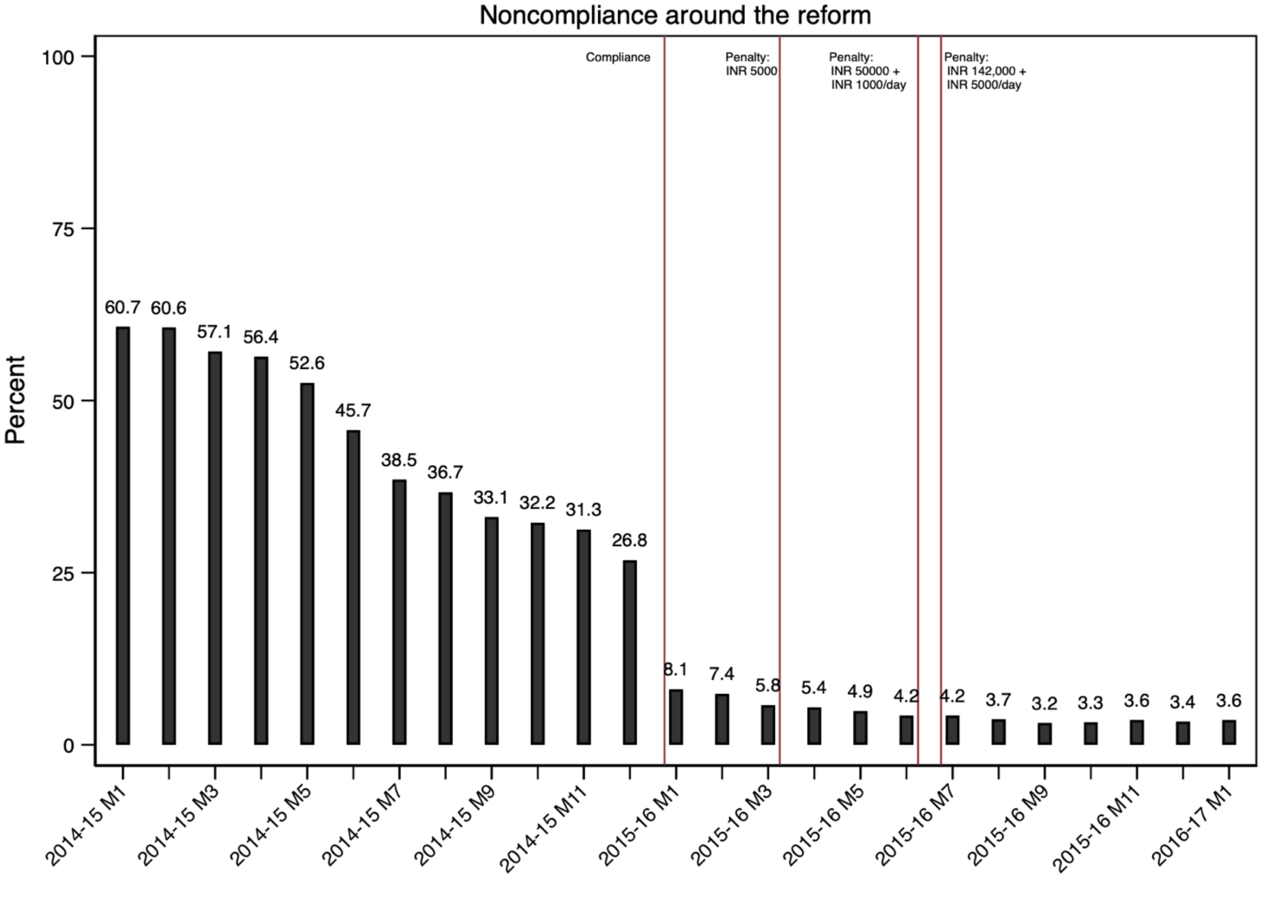
BGD
MMR
THA
VNM
MYS
IDN
NGA
ETH
ZWE
AUS
NZL
USA
MEX
GTM
NIC
PRI
COL
ECU
PER
BRA
BOL
CHL
ARG
Response rate (%)
0 to 25
25 to 50
50 to 75
75 to 100
No data

Appendix Figure A2: Timeline of corporate governance reforms in India


May 7, 1999 Birla Committee Appointed
Feb 21, 2000 Clause 49 Enacted
Sept 12, 2000 Clause 49 Amended
Dec 31, 2000 Clause 49 Amended
May 7, 2003 Companies Bill (2003) Introduced
Oct 29, 2004 Revisions to Clause 49
Jan 13, 2006 Clause 49 Amended
Apr 8, 2008 Clause 49 Amended
Oct 23, 2008 Companies Bill (2008) Introduced
Aug 3, 2009 Companies Bill (2009) Introduced
Dec 14, 2011 Companies Bill (2011) Introduced
Aug 30, 2013 Enactment of Companies Act, 2013 introducing gender quota
Apr 17, 2014 Clause 49 Amended
Apr 1, 2015 Gender Quota Effective
June 2, 2017 Kotak Mahindra Committee Appointed
Apr 1, 2019 Top 500 firms Atleast one woman independent director
Apr 1, 2020 Top 1000 firms Atleast one woman independent director
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

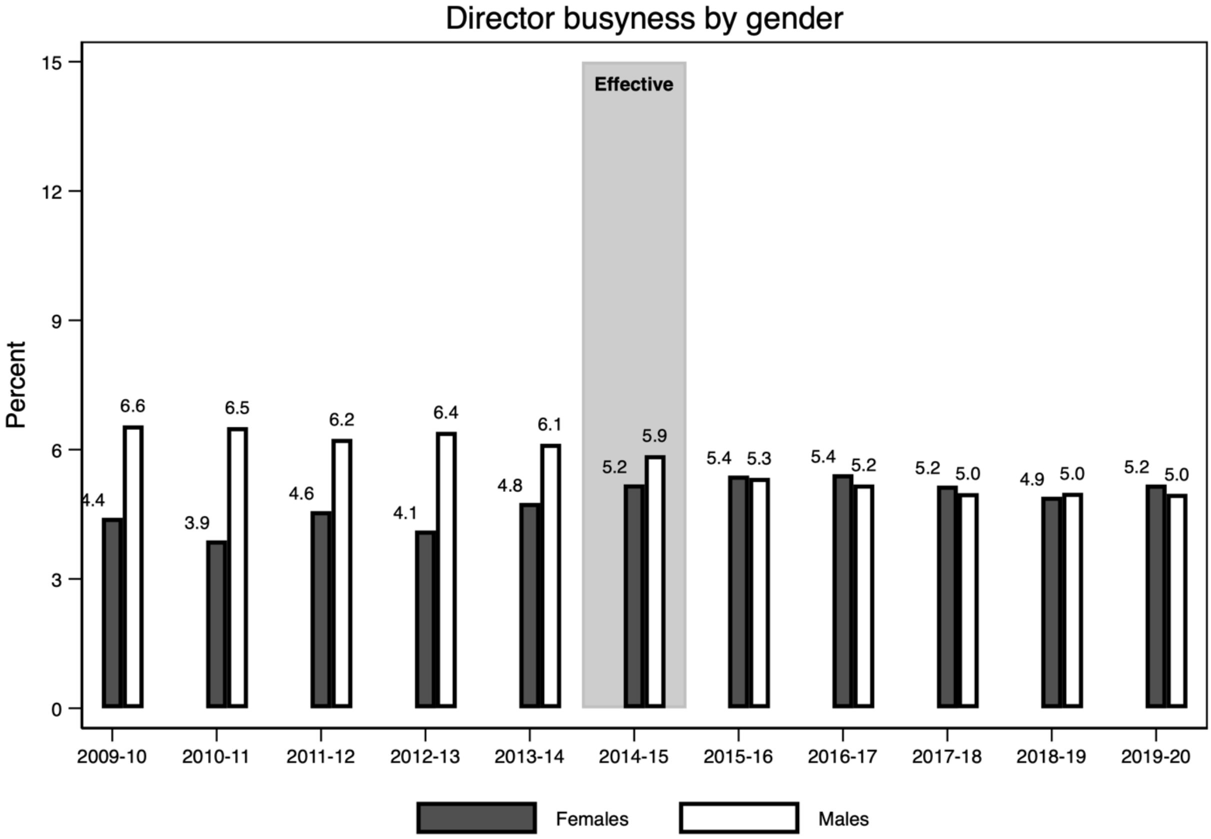
Appendix Figure A3: Noncompliance around the reform

The top figure plots the fraction of firms in percentage with no female director on their boards for each month in the financial year around the year of compliance with the gender quotas. The sample is restricted to 12 months around the actual compliance data (01 April, 2015). The vertical red lines represent the effective date for firms to comply with the gender quota of having at least one female director and subsequent penalties imposed by the SEBI for noncompliance: Compliance date (April 1, 2015), Penalty of INR 5,000 (June 30, 2015), Penalty of INR 50,000 and additional penalty of INR 1,000 per day (September 30, 2015), and Penalty of INR 142,000 and additional penalty of INR 5,000 per day (starting from October 1, 2015).



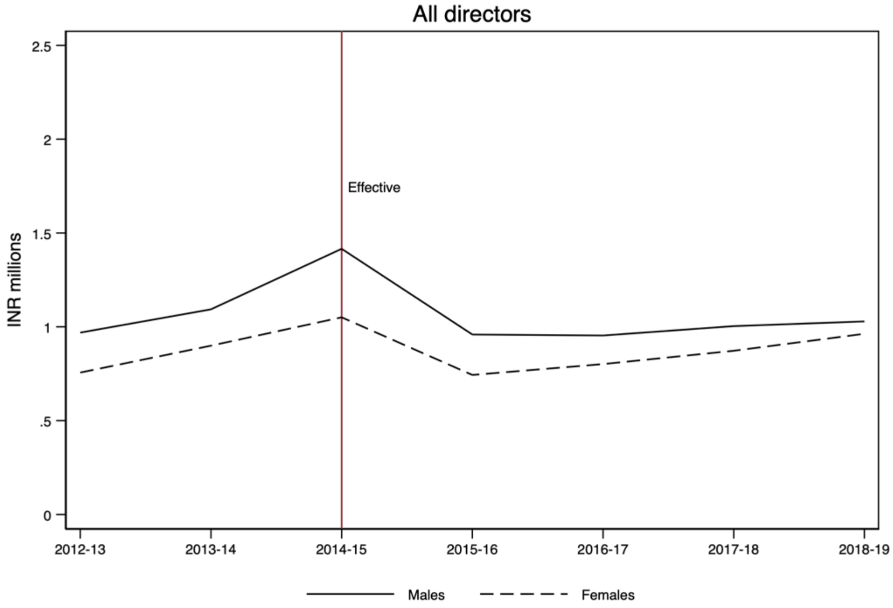
Appendix Figure A4: Director busyness by gender

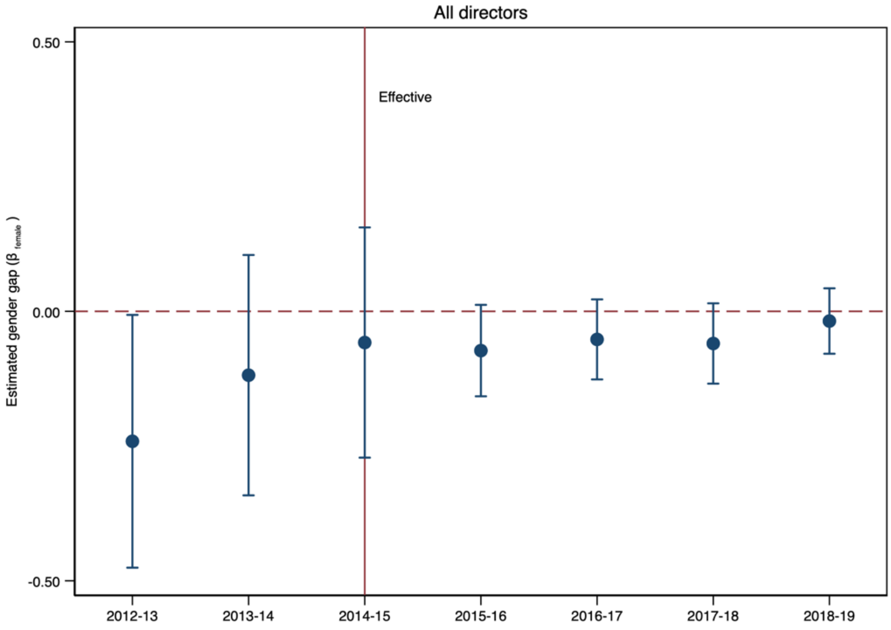
The figure plots the fraction of busy directors in percentage by gender each financial year. We define a director to be busy if they hold three or more directorships in a particular financial year. The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female director.



Appendix Figure A5: Gender gap in compensation for independent directors by year

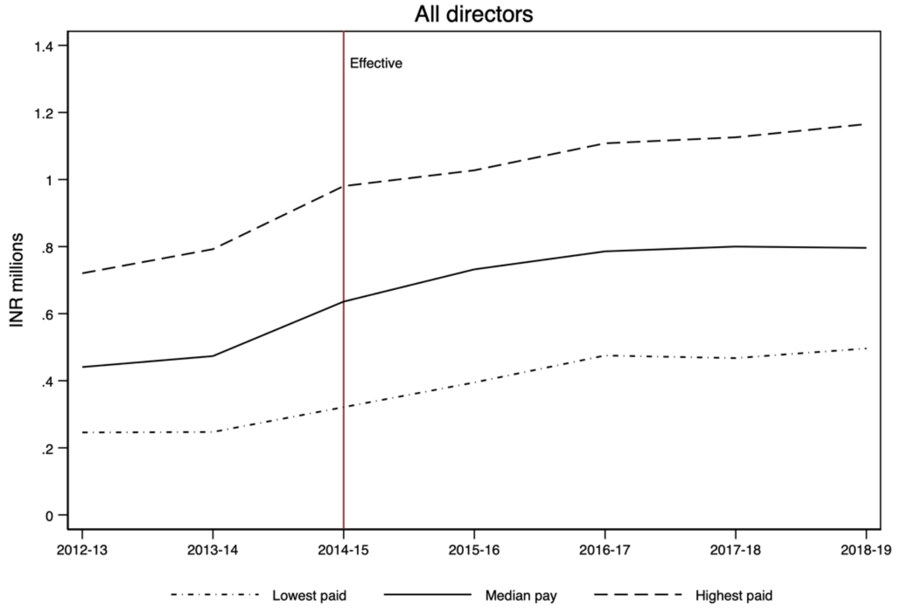
These figures plots the level of compensation gap and the estimated coefficients and their corresponding 95% confidence intervals of the gender gap in compensation residuals by financial year. Residuals are obtained from a firm-year fixed effects where the dependent variable is the natural logarithm of compensation. The top panel plots the level of compensation by gender for all independent directors, while the bottom panel plots the yearly estimated coefficients for all independent directors. Across both panels, we restrict the sample to firms with at least one female director on the board. We drop the appointment year to avoid confounding the gender gap in compensation with mechanical effects due to appointment of directors in the middle of the financial year. The specification in the bottom panel includes controls for committee-level and firm-level characteristics (see Table 8 for details). Standard errors are clustered at the firm-level. The vertical red line represents the effective date for firms to comply with the gender quota of having at least one female director. Due to data availability, we observe director remuneration from 2012-13 to 2018-19, both years inclusive. One US$ is equivalent to 62 INR (as of January 2015).





Appendix Figure A6: Pay dispersion within board over time

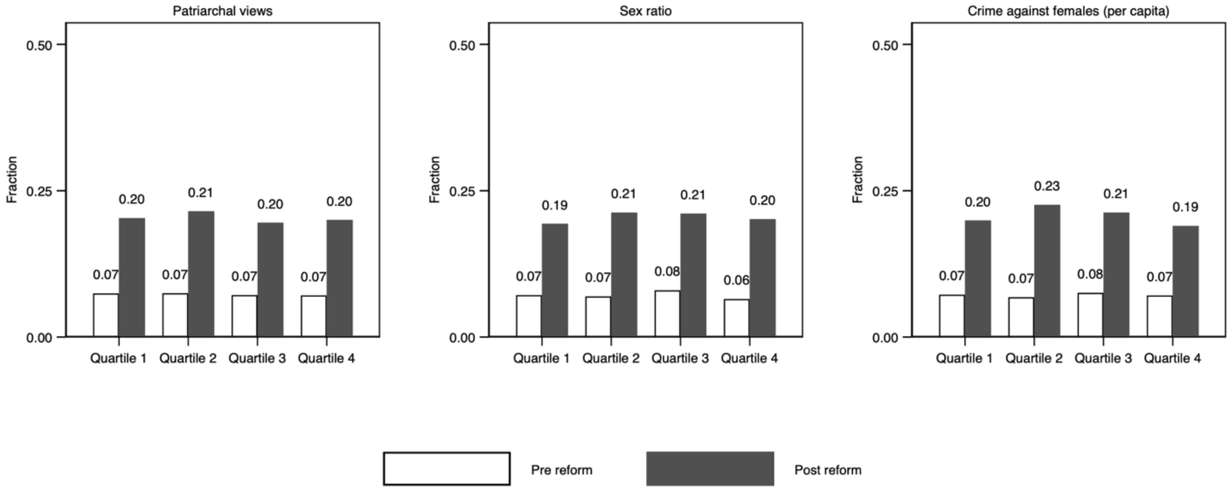
These figures plots the evolution of pay dispersion for directors by financial year. Each financial year, we compute the average compensation (residuals) for the lowest paid director (shortdash dotted line), for the median director (solid line), and for the highest paid director (dashed line) within the firm. Residuals are obtained from a firm-year fixed effects where the dependent variable is the natural logarithm of compensation. We restrict the sample to firms with at least one female director on the board. We drop the appointment year to avoid confounding the gender gap in compensation with mechanical effects due to appointment of directors in the middle of the financial year. The vertical red line represents the effective date for firms to comply with the gender quota of having at least one female director. Due to data availability, we observe director remuneration from 2012-13 to 2018-19, both years inclusive. One US$ is equivalent to 62 INR (as of January 2015).



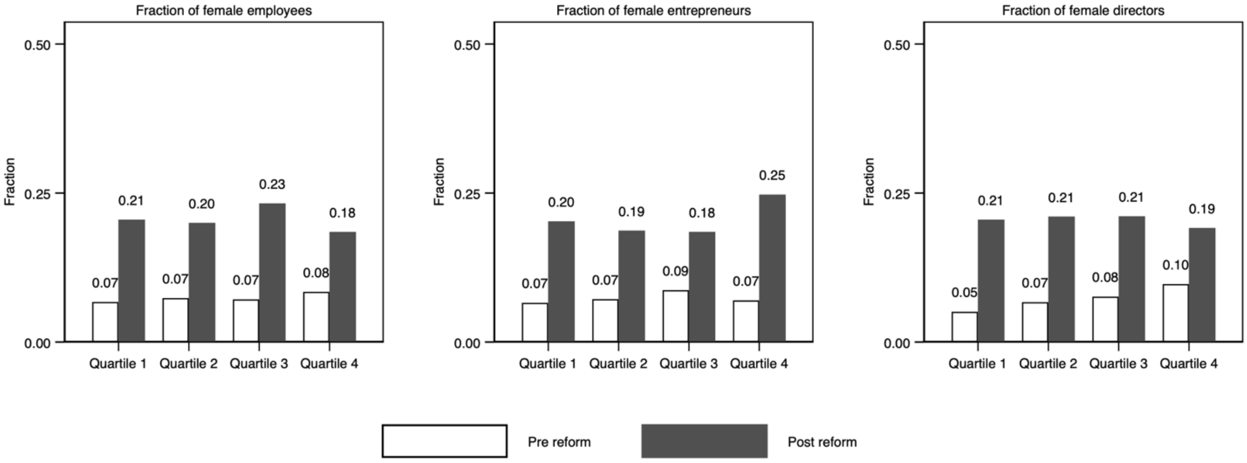
Appendix Figure A7: Social norms and female director appointments

All figures plots fraction of female director appointments before and after the introduction of the gender quota. Panel (a) shows averages across quartiles of attitudes towards women, whereas Panel (b) shows averages across quartiles of female opportunities in the labor market. To measure general attitudes towards women we use the question "*When jobs are scarce, men should have more right to a job than women*," from the World Value Survey, the sex ratio at birth form the population Census, and crime against females (per capital). All three measures are based on the headquarter state of the firm, and quartile 1 (4) contains firms in environments that are the most (least) hostile toward women. To measure female opportunities in the labor market, we use the female share of employment in the industry, the female share of entrepreneurs in the industry and the female share of directors in the industry (excluding the firm). All three measures are based on the primary industry of the firm, and quartile 1 (4) contains firms in environments that give the least (most) opportunities to women.

(a) Attitude towards women

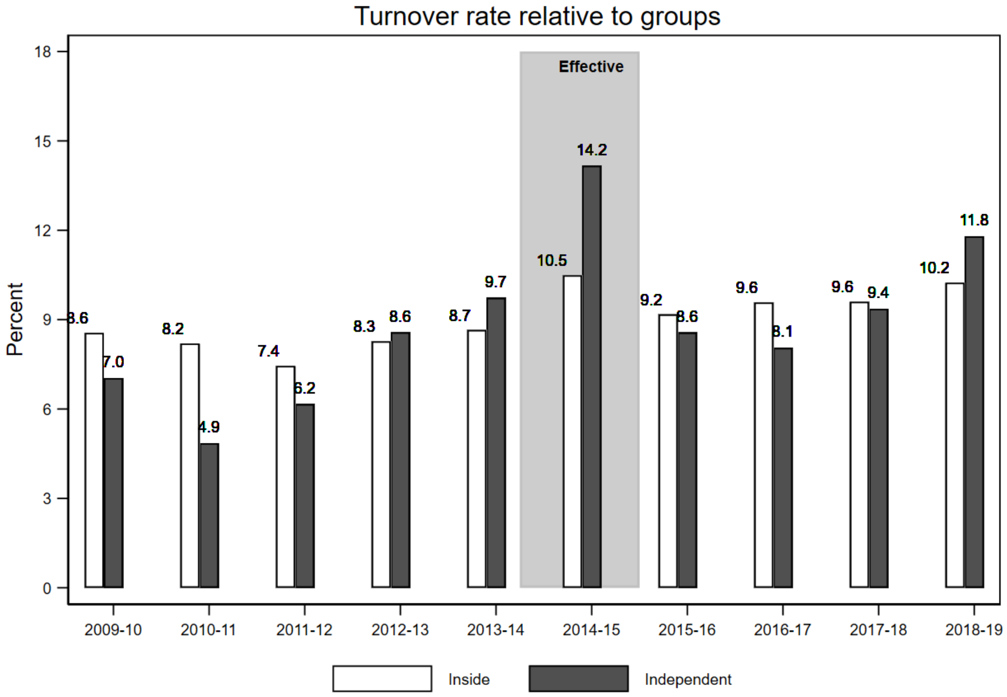


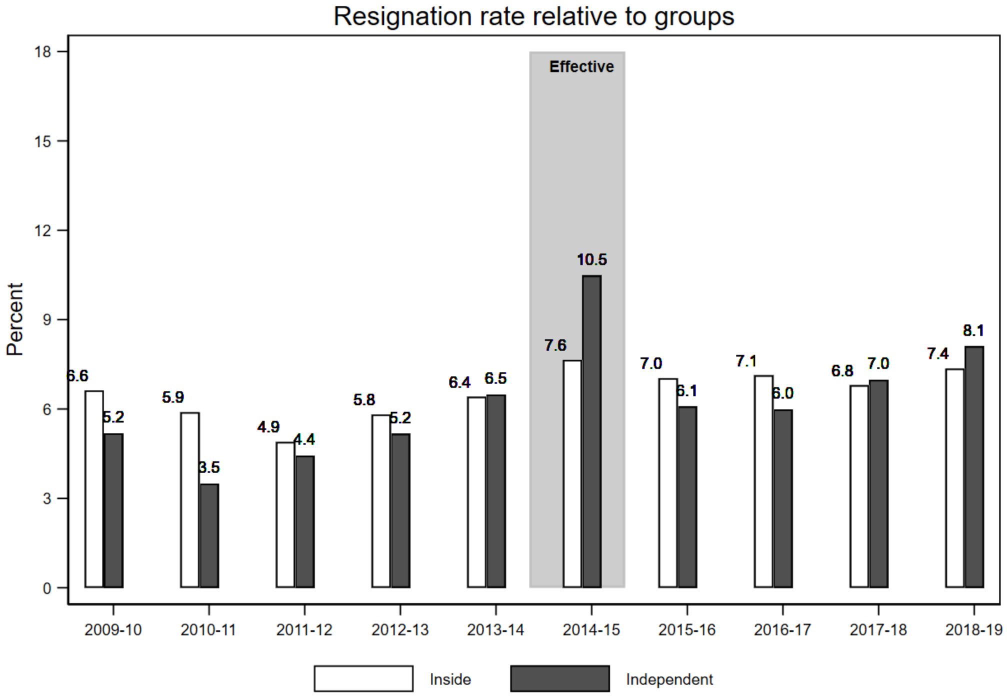
(b) Opportunities in the labor market



Appendix Figure A8: Turnover and resignations around the reform

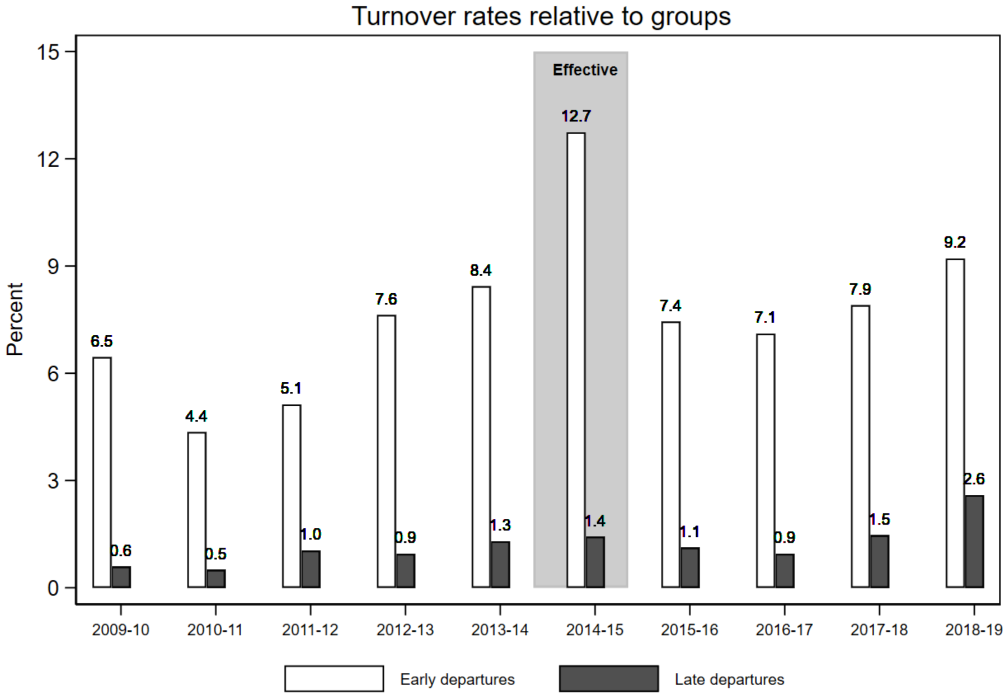
The top figure plots the average turnover rates in percentage by financial year for inside and independent directors. The bottom figure plots the average resignation rates in percentage by financial year for inside and independent directors. The white hollow bars in the plot represent inside directors while black solid bars represent independent directors.

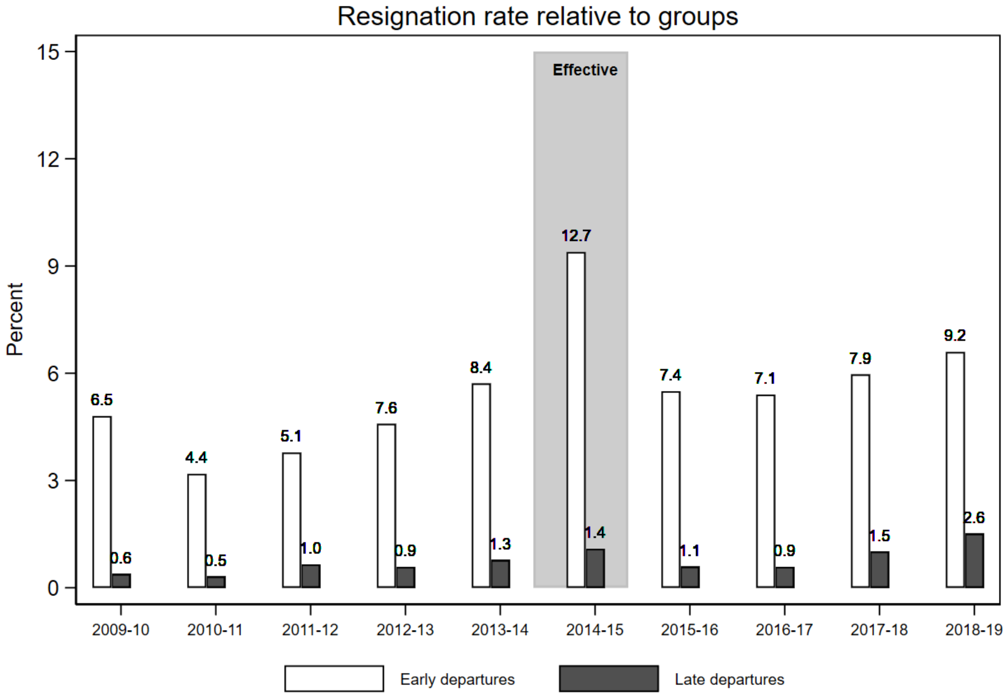




Appendix Figure A9: Turnover and resignation by term expiration around the reform

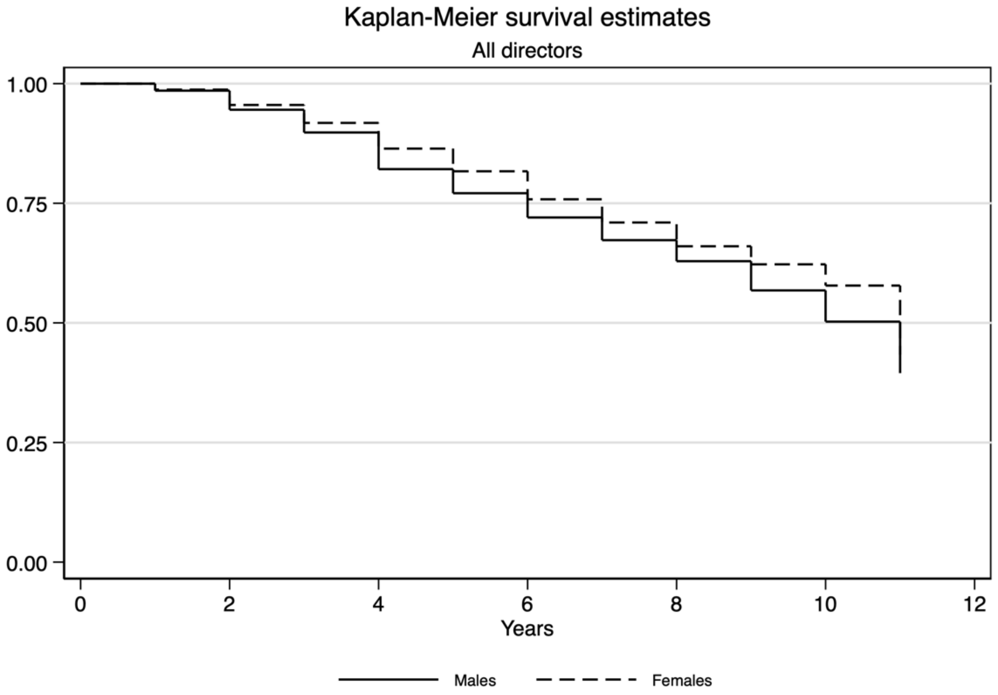
The top figure plots the average turnover rates in percentage by financial year for independent directors split by when they vacated their board seat relative to the expiration date. The bottom figure plots the average resignation rates in percentage by financial year for independent directors split by when they vacated their board seat relative to the expiration date. We classify independent director leaving in the middle of their term (i.e., within 0 to 3 years) as early departures while independent directors leaving in the last year of their term are defined as late departures.

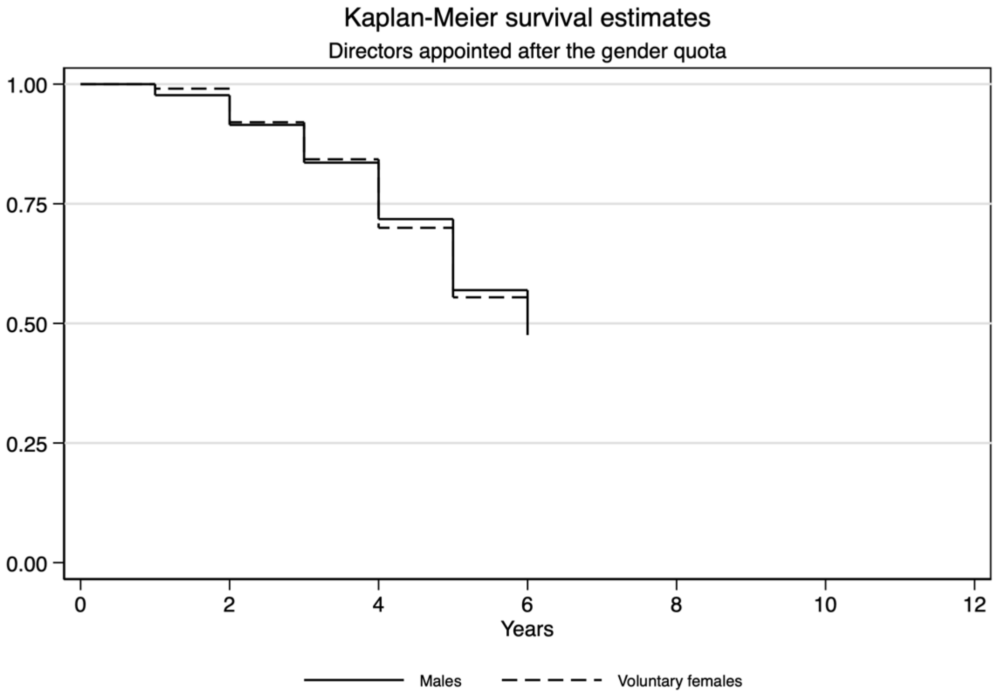




Appendix Figure A10: Survival analysis by gender

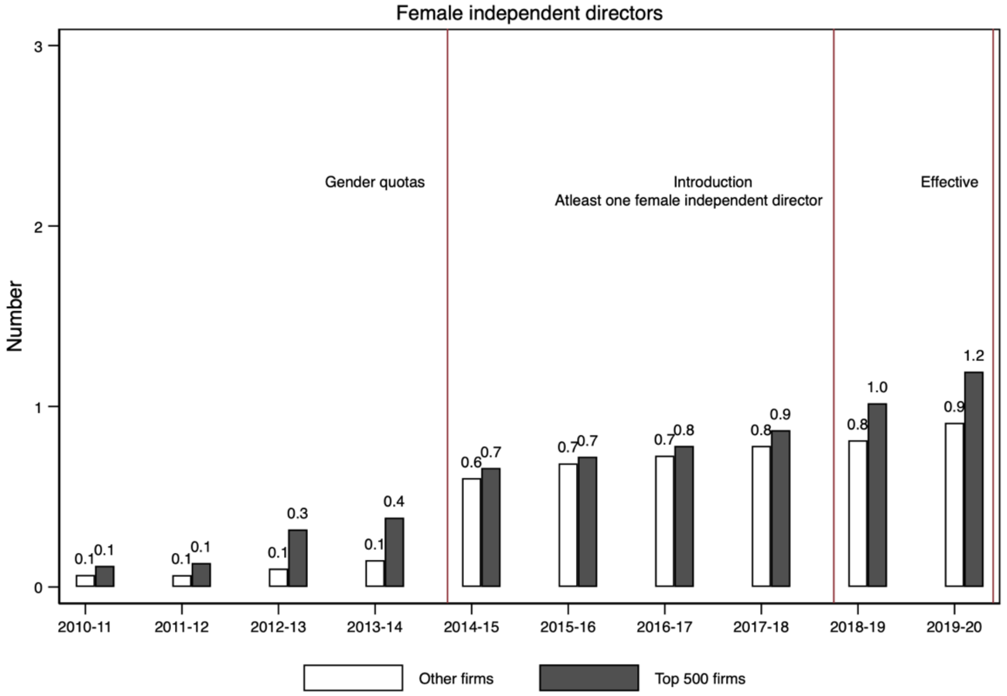
The figures plot the Kaplan-Meier survival estimates to the time taken to vacate the board split by the gender of the director. The top figure plots the survival estimates for all directors while the bottom panel plots the survival estimates for the set of directors appointed on the boards after the introduction of the gender quotas. Specifically, we compare male directors to voluntary female directors. The sample is restricted to directors who are appointed at or after the start of the sample period in the financial year 2009-10. Across the panels, the solid line represents male directors, while the dashed line represents female directors.

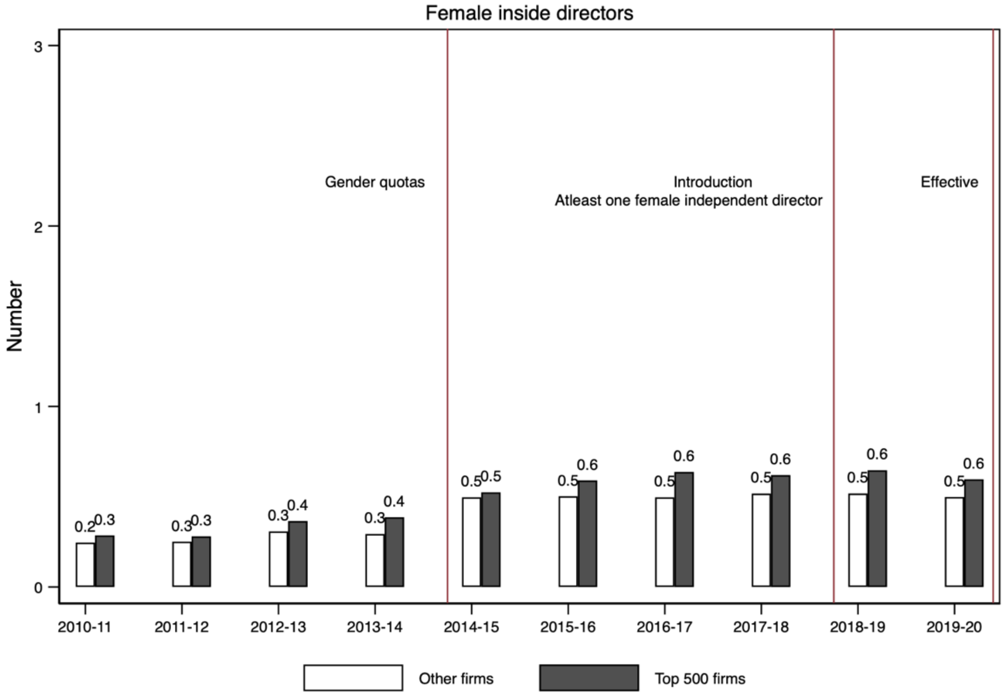




Appendix Figure A11: Anticipation of future regulations

The top figure plots the average number of female independent directors by financial year. The bottom figure plots the average number of female inside directors by financial year. In both panels, the white hollow bars represent firms that were outside the top 500 firms by market capitalization, while the solid black bars represent firms in top 500. The solid red lines represent the effective date for firms to comply with the gender quota, SEBI's introduction of new regulation requiring firms to have atleast one female independent director on their boards, and effective date for the top 500 firms to comply with this new regulation, respectively.





Appendix Table A1: Stock price reactions to the events around the introduction of gender quota

This table shows stock price reactions to the events around the introduction of gender quota through the enactment of the Companies Act, 2013. Specifically, it reports the mean cumulative abnormal returns (CAR) using an event window from one day before to one day after the announcement. Panel A reports the three-day CARs around the announcement of the requirement of one woman director in Companies Bill, 2011. Panel B reports the three-day CARs around the introduction of Companies Act, 2013 while panel C reports the three-day CARs around the SEBI circular on extension. We adopt the portfolio time-series approach outlined in Eckbo, Nygaard, and Thorburn(2020) to account for the return co-movement in time regardless of the differential firm-level impact of news announcements. Across the panels, column 1 reports the average three-day CAR for all firms and column 2 (column 3) report the average three-day CAR for firms who had at least one (or no) female director on their board at the time of the respective announcements. The column titled, *Difference,* reports the difference in the average CARs for these two types of firms. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Announcement *Event date: 14 December, 2011*	All (1)	Female (2)	No female (3)	Difference (3) - (2)
	-2.226**	-1.925**	-2.357**	-0.432
	(0.916)	(0.708)	(1.031)	(1.251)
N	1,029	364	665	1,029

Panel B: Introduction *Event date: 30 August, 2013*	All (1)	Female (2)	No female (3)	Difference (3) - (2)
	-1.784*	-1.449	-2.012**	-0.563
	(1.074)	(1.292)	(0.933)	(1.594)
N	943	380	563	943

Panel C: SEBI circular on extension *Event date: 15 September, 2014*	All (1)	Female (2)	No female (3)	Difference (3) - (2)
	-1.239	-1.323	-1.148	-0.175
	(3.210)	(3.239)	(3.182)	(4.541)
N	1,024	580	444	1,024

Appendix Table A2: Characteristics of the appointed directors by gender and year

We report characteristics, measured at the time of appointment, for the directors appointed to the sample of NSE-listed firms from 2009-10 to 2019-20. Panel A reports director characteristics, measured at the time of appointment, for female appointees while panel B reports director characteristics, measured at the time of appointment, for male appointees by financial year. Across both panels, we report the following director characteristics (measured at the time of the appointment): *Age* (in years), *Boards per director* (average number of directorships on other boards prior to appointment), *At least one directorship* (fraction with at least one directorship prior to appointment) and *Board tenure* (measured as total tenure across all other boards prior to appointment). Further, we classify directors as: *New director* (an appointee who appears for the first time as a director), *Independent director* (average number of independent directorships prior to the appointment), R*elated director* (indicator for an appointee who is related to the controlling shareholder). We also measure expertise for each director in two ways. Under *Specialization*, we classify each director based on his educational qualification as well as his occupation. We create an indicator for directors who possess an *accounting, finance & law degree* or is a chartered accountant, CPA, CFA, JD, LLB or LLM. *Business management & MBA* is an indicator for general business degrees and MBAs. *Academics* is an indicator for professors. Under *Highest degree attained,* for each director we extract their highest educational qualification and classify them into *"Graduate or below",* "*Post-graduate*", and "*Doctorate*". The shaded region represents the year of compliance (excluded from analyses) for the gender quota of having at least one female on their boards.

	Financial year											
	All	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Overall (#)	9,897	822	758	832	802	857	1,389	831	772	823	962	1,049
Female (#)	1,780	46	34	63	63	91	575	173	132	156	220	227
Male (#)	8,117	776	724	769	739	766	814	658	640	667	742	822
Panel A: Female directors – Characteristics measured at the time of appointment												
Age (years)	52.5	51.9	51.1	53.6	50.9	54.8	51.4	51.8	53.0	51.9	53.0	55.8
Boards per director (#)	0.19	0.43	0.32	0.35	0.16	0.33	0.08	0.14	0.11	0.14	0.26	0.37
At least one directorship (%)	0.12	0.26	0.12	0.17	0.14	0.14	0.06	0.09	0.10	0.10	0.19	0.22
Board tenure (years)	0.74	1.65	0.43	1.41	0.83	1.24	0.35	0.34	0.53	0.38	1.04	1.55
New director (%)	0.74	0.72	0.79	0.70	0.78	0.68	0.84	0.75	0.74	0.74	0.66	0.59
Independent director (%)	0.61	0.50	0.53	0.35	0.45	0.58	0.64	0.57	0.47	0.63	0.64	0.78
Related director (%)	0.23	0.39	0.26	0.18	0.27	0.19	0.23	0.24	0.28	0.22	0.21	0.16
Specialization												
Accounting, finance, & law	0.49	0.43	0.71	0.44	0.44	0.47	0.49	0.55	0.48	0.37	0.50	0.56
Academics	0.28	0.13	0.41	0.29	0.32	0.33	0.26	0.25	0.24	0.27	0.30	0.34
Business & MBA	0.61	0.48	0.68	0.62	0.70	0.57	0.59	0.58	0.55	0.58	0.60	0.71
Highest degree attained												
Graduate or below	-	-	-	-	-	-	-	0.01	0.01	0.01	-	-
Post-graduate	0.62	0.55	0.63	0.65	0.67	0.69	0.57	0.58	0.73	0.61	0.65	0.63
Doctorate	0.10	0.14	0.09	0.09	0.13	0.14	0.11	0.12	0.04	0.08	0.08	0.10
Panel B: Male directors – Characteristics measured at the time of appointment												
Age (years)	56.4	55.9	55.4	54.8	55.8	56.4	56.6	57.1	56.4	57.2	57.6	58.7
Boards per director (#)	0.35	0.74	0.45	0.43	0.43	0.33	0.29	0.24	0.21	0.22	0.24	0.23
At least one directorship (%)	0.18	0.34	0.23	0.22	0.19	0.17	0.16	0.14	0.13	0.13	0.15	0.13
Board tenure (years)	1.29	1.68	1.29	1.29	1.42	1.10	1.38	1.22	1.14	1.16	1.24	1.18
New director (%)	0.68	0.62	0.69	0.67	0.67	0.68	0.69	0.70	0.70	0.71	0.65	0.68
Independent director (%)	0.41	0.48	0.45	0.38	0.39	0.48	0.41	0.35	0.36	0.43	0.38	0.43
Specialization												
Accounting, finance, & law	0.49	0.47	0.47	0.48	0.47	0.46	0.45	0.51	0.51	0.50	0.55	0.52
Academics	0.24	0.25	0.23	0.23	0.22	0.20	0.21	0.25	0.22	0.27	0.30	0.27
Business & MBA	0.59	0.53	0.54	0.60	0.56	0.50	0.55	0.64	0.60	0.64	0.68	0.64
Highest degree attained												
Graduate or below	-	0.01	-	-	-	-	0.01	-	-	-	-	-
Post-graduate	0.62	0.54	0.60	0.59	0.67	0.62	0.63	0.66	0.63	0.62	0.65	0.59
Doctorate	0.08	0.10	0.09	0.10	0.09	0.10	0.10	0.07	0.07	0.09	0.06	0.06

Appendix Table A3: Female director characteristics by appointment type

We report characteristics, measured at the time of appointment, for the sample of directors appointed to NSE-listed firms from 2009-10 to 2019-20. We report the following director characteristics (measured at the time of the appointment): *Age* (in years), *Boards per director* (average number of directorships on other boards prior to appointment), *At least one directorship* (fraction with at least one directorship prior to appointment) and *Board tenure* (measured as total tenure across all other boards prior to appointment). Further, we classify directors as: *New director* (an appointee who appears for the first time as a director), *Independent director* (average number of independent directorships prior to the appointment), *Related director* (indicator for an appointee who is related to the controlling shareholder). We also measure expertise for each director in two ways. Under *Specialization*, we classify each director based on his educational qualification as well as his occupation. We create an indicator for directors who possess an *accounting, finance & law degree* or is a chartered accountant, CPA, CFA, JD, LLB or LLM. *Business management & MBA* is an indicator for general business degrees and MBAs. *Academics* is an indicator for professors. Under *Highest degree,* for each director we extract their highest educational qualification and classify them into *"Graduate or below",* "*Post-graduate*", and "*Doctorate*". ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	All	Appointment type		Difference	t-Stat.
		Voluntary	Mandatory		
		(1)	(2)	(2) - (1)	
Number of director-years	1,780	526	1,254		
Age (years)	52.5	53.8	52.0	-1.80	-2.52**
Boards per director (#)	0.19	0.27	0.16	-0.11	-3.50***
At least one directorship (%)	0.12	0.17	0.11	-0.06	-3.64***
Board tenure (years)	0.74	1.06	0.60	-0.46	-3.01***
New director (%)	0.74	0.67	0.77	0.10	4.50***
Independent director (%)	0.66	0.63	0.68	0.05	1.84*
Related director (%)	0.20	0.22	0.20	-0.02	-1.20
Specialization					
Accounting, finance & law	0.49	0.53	0.48	-0.05	-1.86*
Business & MBA	0.28	0.29	0.27	-0.02	-4.32***
Academics	0.61	0.68	0.57	-0.11	-0.71
Highest degree attained					
Graduate or below	0.00	0.00	0.00	0.00	-0.07
Post-graduate	0.62	0.68	0.60	-0.08	-3.10***
Doctorate	0.10	0.07	0.11	0.04	2.33**

Appendix Table A4: Gender gap in compensation by firms experiencing director turnover in FY 2014-15

This table reports the changes in the gender gap in compensation residuals around the gender quota split by whether the firm experienced a turnover in the financial year 2014-15. The sample consists of NSE-listed firms for the period from 2012-13 to 2018-19. The sample is restricted to this period due to data availability on committee positions and director remuneration. The unit of analysis is director-firm-year. The dependent variable is the residuals obtained from a regression of firm-year fixed effects on the natural logarithm of compensation. These residuals capture variation in director compensation *within* the board of a firm in a given financial year. Columns 1 and 2 reports the results for all directors while columns 3 and 4 reports the results for directors that are appointed before the gender quota. Column 1 (column 3) focuses on firms that experienced a director turnover in the financial year 2014-15 while column 2 (column 4) focuses on firms that did not experience a director turnover in the financial year 2014-15. *Female director* is an indicator equal to one for female directors. *Post reform* is an indicator equal to one for financial years after 2014-2015 in which the gender quota is effective. All regressions include committee-level controls for each director. These include: *Chairman* an indicator taking the value of one if the director is the chairperson of the board, *Nomination & remuneration committee member (chair)* an indicator taking the value of one if the director is a member (chair) of the nomination & remuneration committee, *Audit committee member (chair)* an indicator taking the value of one if the director is a member (chair) of the audit committee, and *Committee* an indicator taking the value of one if the director occupies any committee position. All the regressions include the following firm-level control variables: *Firm size* is the log of book value of assets. *Fraction of independent directors on the board* is the fraction of the independent directors on the board of the firm. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Ownership of the controlling shareholder* is equity ownership of the controlling shareholder. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. All firm-level control variables are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include year fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	All directors		**Appointed before**	
	Turnover in 2014-15	No turnover in 2014-15	Turnover in 2014-15	No turnover in 2014-15
	(1)	(2)	(3)	(4)
Female director	-0.189	-0.167	-0.159	-0.137
	(0.134)	(0.119)	(0.133)	(0.118)
Post reform x Female	0.173	0.224*	0.192*	0.192
	(0.117)	(0.119)	(0.105)	(0.126)
Committee-level controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted-R^2	0.14	0.089	0.14	0.083
Observations	3,635	6,728	2,485	5,041

Appendix Table A5: Institutional ownership and female director appointments

This table examine changes in female director appointment rates by the level of institutional ownership around the gender quota for the sample of NSE-listed firms for the period from 2009-10 to 2019-20. We drop the financial year 2014-15 to prevent attributing the mechanical increase in female director appointments in the year of the reform to the long-term effect of the gender quota. The unit of analysis is a director appointment-firm-year. The dependent variable is an indicator for a female director. Column 1 presents results from column 2 of Table 3 for all directors while column 2 presents the results for all institutions. Column 3 (column 4) focuses on domestic (foreign) ownership share. *Post reform* is an indicator equal to one for financial years 2014-15 and after as the gender quota became effective in the financial year 2014-2015. *High ownership share* is an indicator equal to one if the firm's domestic (foreign) ownership share are above the median in the previous financial year. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Return on assets* is the ratio of profit after tax to book value of assets. S*tock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. In addition, we also include the *Ownership* of the controlling shareholder as a control variable. All controls are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

	Baseline	All Institutions	Domestic Institutions	Foreign Institutions
	(1)	(2)	(3)	(4)
Post reform	0.134***	0.186***	0.178***	0.155***
	(0.011)	(0.018)	(0.018)	(0.015)
High ownership share	-	0.059***	0.047***	0.015
		(0.016)	(0.016)	(0.014)
Post reform x High ownership share	-	-0.083***	-0.069***	-0.037**
		(0.020)	(0.020)	(0.019)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.023	0.025	0.025	0.023
Observations	8,508	8,508	8,508	8,508

Appendix Table A6: Anticipation of future regulation and female appointments by firm size

This table reports the results examining changes in appointment rates of women on boards by firm size around the regulation requiring firms to have atleast one female independent director, for the sample of NSE-listed firms for the period from 2009-10 to 2019-20. We drop the financial year 2014-15 to prevent attributing the mechanical increase in female director appointments in the year of the reform to the long-term effect of the gender quota. The unit of analysis is a director appointment-firm-year. Panel A reports the estimates for the top 500 firms (by market capitalization) while panel B reports the estimates for remaining firms in our sample. Across both the panels, the dependent variable is an indicator for a female director. Column 1 includes all directors, column 2 focuses on independent directors, and column 3 focuses on inside directors. Column 4 focuses on voluntary appointments by excluding appointments of female directors to comply with the gender quota. Specifically, we only include female director appointments in the post-reform period if the firm already complies with quota requiring one female director. *Post reform* is an indicator equal to one for financial years 2014-15 and after as the gender quota became effective in the financial year 2014-2015. All the regressions include the following control variables: *Firm size* is the log of book value of assets. *Market-to-book value* is the market-to-book ratio of assets, defined as market value of equity plus book value of debt over book value of assets. *Return on assets* is the ratio of profit after tax to book value of assets. *Stock return* is the annualized return and *Stock return volatility* is the annualized standard deviation of the firm's daily stock returns during the year. In addition, we also include the *Ownership of the controlling shareholder* as a control variable. All controls are lagged by one year. We use ordinary least squares (OLS) regression specification to estimate the coefficients. All regressions include firm fixed effects and standard errors are clustered at the firm-level. Standard errors are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Large firms

	All (1)	Independent (2)	Inside (3)	Voluntary (4)
Post reform	0.090*** (0.013)	0.141*** (0.027)	0.059*** (0.018)	0.113*** (0.010)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.123	0.233	0.203	0.183
Observations	5,818	2,399	2,976	5,409

Panel B: Small firms

	All (1)	Independent (2)	Inside (3)	Voluntary (4)
Post reform	0.197*** (0.023)	0.270*** (0.043)	0.093** (0.040)	0.114*** (0.018)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.254	0.398	0.544	0.289
Observations	2,690	1,417	984	2,400