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Abstract

This paper provides evidence on the effect of women directors on the performance of family firms with a case study of India. Existing literature on the subject has primarily focused on widely held firms, notably in the US. Given that ownership structure and governance environment of family firms are distinctly different from those of non-family firms, the evidence on the relationship between women on board and firm performance in the context of widely held firms may not apply in the context of family firms. India provides an ideal setting for analyzing this question as the presence of family firms is pervasive and since 2013 India has instituted gender quotas on corporate boards. Using a data-set of 10218 firm year observations over a ten year period from 2005 to 2014 which spans the pre-quota and post-quota years, we find robust evidence that women directors on corporate boards positively impact firm value and that this effect increases with the number of women directors on board. However, we find that the positive effect of gender diversity on firm performance weakens with the extent to which the family exerts control through occupying key management positions on the board. In addition, women directors affiliated to the family have no significant effect on firm value, whereas independent women directors do. Our results with respect to profitability are somewhat different; while as in the case of market value, women directors positively impact profitability with the positive effect driven by independent women directors, the effect does not vary with the extent of family control. Taken together, our results suggest that though gender diversity on corporate boards may positively impact firm performance in family firms in general, the extent of family control can have a significant bearing on this relationship. The findings from this study could be instructive for emerging economies like India in promoting gender-based quotas on corporate boards.

Keywords: board of directors, gender diversity, family ownership and control, gender-quota

JEL Classification: G32, G34, G38

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1. Introduction

The presence of women directors on corporate boards has been increasingly recognized as a necessary component of good corporate governance. The need to constitute gender diverse boards has been primarily motivated by the business case, that it 'pays' to have women directors on boards as women have strengths and experiences distinct from that of men that adds value to board deliberations and monitoring of management (Adams and Ferreira, 2009, Davies Report, 2011; Rhode and Packel, 2014). The crux of the arguments in favour of a gender diverse board is that women are inherently distinct relative to their male counterparts, are more "democratic, transformational and demonstrate trust-building leadership style," are more risk averse in financial decision making, have higher ethical standards, are more conscientious, well-prepared and are ready to ask "awkward questions", and the presence of women directors is likely to increase board independence and lead to better decision making (for background literature, see Gul et al., 2007; Davies Report, 2011). The business case has been further bolstered by the normative argument that achieving greater gender parity on boards is by itself a desirable objective as the presence of women high up in the corporate hierarchy can help draw attention to important social issues such as family life and flexible work arrangements, thereby furthering the cause of women empowerment and gender equality in the work place in general (Francoeur et al., 2008).

Arguments for greater gender diversity in company boards have been accompanied by a slew of laws, regulations and voluntary initiatives to increase the presence of women directors on company boards. Yet, empirical evidence on the performance effects of women on boards, measured in terms of market value and/or profitability, is surprisingly mixed. Studies that find a positive effect of women directors on firm performance (Carter et al., 2003; Nguyen and Faff, 2007; Campbell and Minguez-Vera, 2008; Adams and Ferreira, 2009; Lukerath-Rovers, 2013; Liu et al., 2014; Nguyen et al., 2015) co-exist with studies that find no effect (Hussein and Kiwiwa, 2009; Miller and Triana, 2009; Farrell and Hersch, 2005), along with those that find a negative effect (Adams and Ferreira, 2009; Ahern and Dittmar, 2012). The absence of unambiguous positive effects of gender diversity brings into question quota based policy initiatives that a growing number of countries, both developing and developed, have been subscribing to, requiring boards to have a minimum number/proportion of women in order to correct existing gender imbalance at the board level so as to improve corporate governance and firm performance.

An examination of existing empirical studies on women on board and firm performance reveals that much of the relevant body of research is confined to the analysis of the role of women directors in widely held corporations with separation of ownership and control. Specifically, the existing literature leaves out of its

purview public corporations that are characterised by concentrated insider ownership and control and typically have a strong presence of families either in terms of voting rights, or management control or both. Such firms are considered to be far more prevalent in developed and developing countries around the world as compared to widely held firms exemplified primarily in US based studies (La Porta et al., 1999; Maury, 2006).[2] In fact, recent research highlights the importance of family firms with concentrated ownership and control even in the US, where such firms are estimated to account for approximately one-third of Fortune 500 companies (DeMott, 2008; Holderness, 2009). Among the countries that have introduced gender quotas in the boardroom or are in the process of considering quotas, or are witnessing institutional pressures on firms to constitute more gender balanced boards, a substantial proportion of such countries are dominated, not by widely held firms, but by firms with concentrated ownership and control, many among which are owned and managed by families. Among these are both developed and developing countries as diverse as Spain, Denmark, Belgium, India, Kenya, Israel, Hong Kong, Germany and Brazil.[3] Notwithstanding this, the evidence on the impact of women directors on corporate performance for firms with concentrated ownership and control, specifically family firms, is sparse at best.

The objective of this paper is to provide empirical evidence on the performance effects of gender diversity in corporate boards with a case study of Indian family firms. The rationale for examining the impact of women directors with particular focus on family owned and controlled firms with concentrated ownership structures (henceforth, family firms) is dictated by the consideration that such firms, as a growing scholarship on ownership and governance highlight, have ownership and governance structures that are distinctly different from those of widely held firms, giving rise to corporate governance challenges that are specific to such firms (Anderson and Reeb, 2004; DeMott, 2008). Specifically, family firms are considered to be unique in comparison to non-family firms in terms of agency problems as manifested in ownership patterns, governance structure, management, motivation, objectives and social value systems (Zahra et al., 2004; Pieper, 2010). Given this, a question of interest is whether women directors matter in these firms in ways that are different from that in widely held firms. Encompassing this question is the larger question of general interest as to whether the governance environment of a firm matters in determining the relationship between gender diversity and firm performance. Limited empirical evidence shows that the institutional environment in which firms operate can matter in the effect of gender

[2] For instance, La Porta et al. (1999) find for their sample of 49 countries that the mean ownership of the three largest shareholders in 46 per cent and at the 10 per cent cut-off of equity ownership, the 27 richest countries in the world in the sample have on an average 52 per cent of medium firms owned by individuals or families.

[3] For a discussion on policies on gender diversity on boards, and a list of countries under different policy regimes, see the weblink Increasing Gender Diversity on Boards: Current Index of Formal Approaches http://www.catalyst.org/knowledge/increasing-gender-diversity-boards-current-index-formal-approaches

diversity on firm performance (Liu et al., 2014; Nguyen et al., 2015), and that the effect can be sensitive to the quality of firm level corporate governance as manifested in the quality of monitoring (Adams and Ferreira, 2009) and in the quality of firm-level disclosures (Gul et al., 2011). In our paper, we focus specifically on whether family firm dominance, as manifested in ownership and control structures, affects the relationship between gender diversity and firm performance. As the literature on governance of family firms suggest especially with respect to the role and functioning of corporate boards, directors on boards of family firms as compared to widely held firms may require different strategies and skill sets as well as incentives to impart their fiduciary duties of monitoring and advising management (Anderson and Reeb,2004; DeMott, 2008). A case in point is the role of independent directors in family firms who are required to be one of the "primary lines of defense" for minority shareholders to guard against expropriation by controlling shareholders (Anderson and Reeb, 2004).

Our primary hypothesis is that family firm dominance may impact the relationship between gender diversity in board and firm performance in ways that can be distinct from widely held firms. This is built from juxtaposing the literature on characteristics and governance of family firms with the literature on gender attributes that highlights how women and men directors differ in terms of monitoring attributes and skill sets (Adams and Funk, 2011; Bertrand, 2011; Nielson and Huse, 2011; Matsa and Miller, 2010). As stated earlier, family firms are fundamentally distinct from their widely held counterparts, in terms of the nature of agency problems and operating environment. If we consider alongside this the gender attributes of directors found in the social psychology and experimental literature, of how men and women in the general population, and in the population of directors, differ in terms of their value systems and capabilities, one can argue that the effectiveness of women directors in family firms is likely to be different with regard to corporate governance and firm performance. As actions can be predicted by value systems, systematic differences in value systems of directors by gender can help predict the effect of gender diversity on corporate outcomes (Adams and Funk, 2011). By mapping gender attributes of directors to characteristics of family firms, one can identify ways in which dominant attributes of women directors, such as universalism and benevolence, conformism and tradition (Schwartz, 1992), may matter for family firm governance relative to the governance of widely held firms, and can therefore yield differences in outcomes. As we will discuss in greater detail in Section 2 of this paper, the reduced form effect of the attributes of women directors on performance is *a priori* unclear and therefore the relationship between board gender diversity and performance in family firms becomes an empirical issue.

The choice of Indian corporates to provide evidence on the impact of women directors on corporate performance of family firms is dictated by several important considerations. First is the obvious fact that a

large majority of publicly held corporations in India are characterised by concentrated ownership and control structures and widely held firms with diffused ownership are an exception rather than a rule. Second, firms with concentrated ownership and control account for almost 80 percent of market capitalization. Further, if we employ the common definitions of family firms in the literature (Anderson and Reeb, 2003) of members of founding family (referred to promoters in India) owning at least 20 per cent of voting equity, family firms account for almost 95 per cent of firm year observations in our sample. Such firms include both firms affiliated to business groups and standalone firms. This provides us an opportunity to utilize the variation in concentrated ownership structures through board itself which has not been studied in the literature in the context of gender diversity.

The second reason for India being an appropriate setting for analyzing the issue at hand is that we can naturally exploit the variation in the ownership and control structure of firms in India to analyse first the effect of women directors in family firms, and then whether the effectiveness of women directors depend on the governance structure as manifested in the extent of family control on the board of directors. Evidence from US firms suggest that the effect of gender diversity on performance depends on how a firm is governed in terms of its ability to resist takeovers (Adams and Ferriera, 2009), while evidence from Chinese listed firms (Liu et al., 2014) show that the impact of female directors on performance depends on whether the firm is a legal person-controlled firm or a state-controlled firm. In our paper, we contribute evidence on whether the impact of gender diversity varies with the extent to which members of the founding family have control in management. In India, the management control structure of family firms can be distinguished in terms of the extent to which founding family members or promoters hold key managerial positions on the board, of that of a Chief Executive Officer (CEO) and a Chairperson. This could range from them having no control, when a promoter is neither a CEO or a Chairperson, to those with full control of the board in terms of a promoter holding the post of both chairperson and CEO. By evaluating the performance effect of women on board by type of founding family control, we seek to capture whether the governance by women directors is subject to founding family influence on the board. This question in our opinion assumes particular importance in light of the institution of gender quotas in family controlled firms around the world. The question is also linked to the larger social psychology literature on the extent to which outside directors, particularly women directors, can be effective in governance in the presence of an authoritative, and by and large, male figure such as the promoter who may hinder independent judgement. Experiments in social psychology highlight how simple elements of human behavior (like loyalty) impede the independent decision making calculus of an individual. Morck (2004) for instance argues that in the absence of complementary mechanisms, genuine independence of directors from management may prove elusive; directors out of a sense of loyalty seldom oppose the

CEO's decisions even at the expense of a director's fiduciary duty and enjoys a positive sense of well-being from their reflexive obedience to the CEO. This is a distinct possibility especially in firms with controlling shareholders who often occupy important positions on corporate boards, and significantly influence the selection and appointment of outside directors and also tend to be hierarchical and deference-oriented (De Mott, 2008). The academic literature on the *pros* and *cons* of having women directors on board and women-director attributes does suggest that men and women can be different in terms of how they respond to control and loyalty issues.

The third reason why a study of gender diversity of boards in India is relevant and is of general interest is that India has been the latest to join this breed of countries whereby a mandatory gender quota in corporate boards of public limited companies has been introduced in the new Companies Act, 2013. The evolution of the law on gender quota, beginning from the time it was drafted in 2011, to its compliance deadline of April 1, 2015, forms a natural setting to evaluate the effect of gender quota using an exogenous policy shock. Such exogenous policy shocks help bypass the problems of estimation arising from the possible presence of endogeneity in the relationship between women directors and firm performance (Ahern and Dittmar, 2012). In the Indian context, we can identify four policy regimes in this respect, one when appointing women on board was voluntary (prior to 2011), second is the prospective quota regime, between 2011 and 2013, third is the transition regime between the announcement of the Companies Act, 2013 in the year 2013 when companies started complying to meet the compliance deadline of April 1, 2015, and finally the post compliance period, post April 1, 2015. The panel data set for the current study with 10218 firm-year observations span a period of eleven years from 2005-14 including the first three regimes. Using the Indian policy experience, we thus have the advantage of examining within the same institutional context the effect of women directors on boards both when appointments were voluntary and when quotas were in the process of being introduced. In doing so, we incorporate elements of both strands of studies on gender diversity at the board level, the US based studies (notably, Adams and Ferreira, 2009) examining the effect of women directors in a no-quota regime and studies in a post-quota regime, being based in countries that have introduced quotas, such as Norway and Denmark (Ahern and Dittmar, 2012) in a unified framework. Consistent results across the two approaches will ensure that our findings are robust independent of the estimation methodology.

Finally, an examination of the role of women directors in Indian firms contributes to the limited evidence on the subject not only with respect to family firms, but also with regard to such firms within the institutional context of developing/emerging economies. As Rhode and Packell (2014) point out, the relationship between board characteristics and firm performance could vary by regulatory regimes and

governance structures, economic climate, culture as well as the size of capital markets. The most oft-quoted studies on gender diversity of boards in a no-quota scenario are with respect to US firms, and those with respect to gender quota scenarios, and these are fewer, are with respect to countries that have introduced quotas, notably Norway and Denmark. The exceptions in this respect are two recent studies with respect to Vietnam (Nguyen et al., 2015) and China (Liu et al., 2014), both emerging economies with relatively weak corporate governance systems and both with not mandating quotas for women at the board level. Given that empirical findings have an influence on policy, we believe that we need a larger body of evidence on gender diversity on boards from a larger cross-section of countries across different institutional contexts to enable a more informed policy on gender quotas, especially for countries that are in the process of adopting or deliberating on such quotas.[4] While the weight of evidence of the effect women board gender diversity on firm performance coming out of developed country studies is towards the absence of a positive effect of women directors, the findings of developing/emerging economy studies on Vietnam and China point to a positive effect on firm performance, suggesting that institutional context of a country may matter in the relationship between board diversity and firm performance.

In order to estimate the relationship between women on board and firm performance in the context of family firms, we use panel data methods and instrumental variable approach to account for omitted variable bias, endogeneity and reverse causality which are the main empirical challenges in the literature (Adams and Ferreira, 2009; Liu et al., 2015). In addition, the long duration of the data, as well as the exogenous shock of quota legislation, offers us an opportunity to conduct difference-in-difference analysis to obtain further robust estimates of the effect of women directors on firm performance. Using our data set, we address the following key empirical issues, namely whether women on board matter for firm performance measured both in terms of market value and firm performance, whether the effect is different for family firms, whether the effectiveness of women directors depend on the extent of management control exerted by the founding family, and finally whether women grey directors in family firms are more effective than women independent directors. The key findings of our empirical analyses are as follows. Consistent with the findings with respect to Vietnam and China (Nguyen et al., 2015; Liu et al., 2014), we find robust evidence that presence of women directors on corporate boards has a positive effect on firm value and that market value increases with the number of women directors on board. We also find that the performance impact of women directors depends on the governance structure; the

[4] On last count, countries as diverse as Spain, Norway, Netherlands, Kenya, Italy, Israel, India, Iceland, France, Finland, Denmark, Canada (Quebec), Belgium, Greece have legislated gender quotas, countries such as Australia, China, Denmark, Finland, Germany, Hong Kong have regulations that require disclosure of gender composition of boards mandatory, and countries such as Brazil, Canada, along with EU which have legislative measures pending. See the weblink Increasing Gender Diversity on Boards: Current Index of Formal Approaches http://www.catalyst.org/knowledge/increasing-gender-diversity-boards-current-index-formal-approaches

positive effect of women directors on firm value is lower for family firms. Further, when we examine the relationship between the extent of family control on the board and the impact of gender diversity, we find the positive effect of women directors is weaker the more the promoter exercises control through key management positions on the board, with the weakest when a promoter acts as both the CEO and chairperson of the board. Additionally, given that the presence of grey directors is relatively more in family firms and that such directors have a positive role to play in governance (Anderson and Reeb, 2004), we estimate the whether the positive effect of women directors is on account of grey directors. , Both for our panel data and difference-in-difference estimations, we find robust evidence that grey women directors have no effect on firm performance both in terms of market value and profitability, whereas the positive effect of women directors in our study is driven by women independent directors. Finally, as in the case of several studies that look at both market based and accounting indicators, we find some disconnect in the results we obtain for market value and those with regard to profitability. While as in the case of market value, women directors positively impact profitability with the positive effect driven by independent directors, the effect does not vary with the extent of family control.

This paper is organised as follows. Section 2, this Section being the Introduction, discusses the background literature on women directors on family firms, as well as the institutional background of family firms in India. Data, variables and estimation methodologies are outlined in Section 3, whereas Section 4 presents the estimation results. Section 5 concludes the paper.

2. Women Directors in Family Firms

As discussed in the introduction, family firms are fundamentally distinct from their widely held counterparts with respect to a number of important parameters that are relevant for governance. Given this, how are women directors expected to fare relative to their male counterparts in the governance of such firms, with associated implications on firm performance? What are the distinct advantages/disadvantages of women directors, given the governance issues in family firms? We attempt to get some insights into these questions by drawing on the social psychology and governance literature.

Let us first consider the nature of the agency problem in family firms. The key agency problem is opportunistic behavior by founding family members as manifested in the extraction of private benefits of control at the expense of minority shareholders. As has been documented in the literature, such benefits take the form of insiders expropriating firms resources through excessive compensation, special dividends and perquisites, and self-dealing (Anderson and Reeb, 2003; Masulis, 2009). Such incentives as well as

the ability to expropriate are particularly strong when families not only have concentrated ownership but have management control through their presence on the board of directors. For instance, a family member as the Chief Executive Officer (CEO) has large discretionary powers as well as 'sufficient power' over firm decisions and can affect corporate decision making which in turn can facilitate expropriation of minority investors (Allen and Panian, 1982; Berkman et al., 2009). From the point of view of an outside director on the board, the problem of governance in family firms therefore shifts from devising strategies to align the interests of the manager and shareholders and maximising shareholder value, to balancing the conflicting interests of the two major blocks of shareholders. Under such circumstances, as DeMott (2008) observes, independent directors should be extra vigilant to guard against the expropriation of assets by a controlling shareholder whether in collusion with senior management or not. If conflicts between shareholder groups are not addressed, firm value can be affected adversely (Claessens and Fan, 2002, Maury, 2006).

With respect to the second important feature of family firms, it is observed in the context of examining the role of independent directors in such firms that family firms have a complex operating environment characterised by hierarchies, patterns of deference and nepotism, as well as intra-family conflicts that could include inter-generational squabbles, nepotism and entrenchment, all of which can distract from maximising performance (De Mott, 2008; Miller et al., 2007). Family owners and managers are not a homogenous lot with convergent expectations and objectives – individual roles as family member, equity owner or participant in business management and operations may sometimes overlap and sometimes collide. Family members, several likely to be present on the board as grey directors, may also be less responsive to outside suggestions or be ready to view facts objectively. Such characteristics, several authors (DeMott,2008; Anderson and Reeb, 2004 and the references therein) argue, make the functioning of a director, particularly an independent director, challenging. Effective service as an independent director requires maintaining objectivity while functioning within the bounds of family norms, buffering senior management from family shareholders whether they are or are not fellow members of the board, as well as assessing and moderating the stated preferences of family shareholders and the interests of the non-family shareholders. Under such circumstances, independent directors discharging their fiduciary duty should be capable of resolving difficult management and ownership issues with objectivity and with a sense of detachment, and ensuring that intra-family frictions do not stand in the way of firm performance and interests of minority shareholders.

Given the specific characteristics of family firms, how can gender on board matter in corporate performance particular with respect to this class of firms? Linking key family firm characteristics with

gender attributes, found both in the level of the general population as well as the director level, one can argue that attributes that are dominant in women may matter in ways that these would not in widely held firms. In arguing that gender diversity on boards can matter, the extant literature in general has identified certain qualities of women that may positively matter in governance, such as distinct leadership style, attitude towards risk in financial decision making, higher ethical standards, less conformist, and higher capabilities to reach out to stakeholders. Additionally, several attributes of women can be identified from the behavioral and experimental literature that may work to a greater advantage of women directors in family firms. For instance, attributes of benevolence and universalism[5] as identified by Schwartz (1992), that are found to be stronger in women directors compared to their male counterparts, may be more suitable for resolving various types of conflicts within family firms as also with minority shareholders, thereby contributing positively to firm performance. At the same time, evidence of women directors being less security-oriented and less tradition bound than men, found in the context of Swedish firms (Adams and Funk, 2011), suggests that women directors in family firms can be less influenced by norms and practices such as hierarchical structure and deference than male directors, and hence be more objective in monitoring, which in turn can impact family firm performance positively.[6]

Co-existing with the specific attributes of women directors relative to their male counterparts that can positively impact family firm performance, are potential drawbacks. Family firms are found to be more inclined towards stakeholderism as compared to shareholderism in widely held firms (De Mott, 2008). Stakeholderism is considered to be associated predominantly with attributes of security, conformity, tradition,[7] benevolence and universalism (Adams et al., 2009), found to be stronger in women directors. Thus, with women present on boards in family firms, the firm's focus on maximising profits and shareholder value may be impaired. Support for this contention is found in Matsa and Miller (2011), who

[5] According to Schwartz(1992), benevolence is defined as preservation and enhancement of the welfare of people whom one is in frequent personal contact (helpful, honest, forgiving, loyal and responsible). Universalism is defined as understanding, appreciation, tolerance and protection for the welfare of all people and for nature (bROAdminded, wisdom, social justice, equality) (Source: Adams et al. (2009), Table 1).

[6] The argument here is that of 'selection,' when women who make it to the top as directors, just having to survive against odds, care less about tradition, conformity, security and are more stimulation oriented than men contrary to what is found in the general population (Adams and Funk, 2011). If that is the case, then women directors could be in a better position not to be influenced by controlling shareholders, and would be more objective in strategizing and monitoring management.

[7] According to Schwartz values (1992), security is defined as safety, harmony and stability of society, of relationships and of self (family security, national security, social order, clean reciprocation of favours; Conformity defined as restraint of actions, inclinations and impulses likely to upset or harm others and violate social expectations or norms(self-discipline, obedient, politeness, honoring parents and elders; Tradition defined as respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide (Source: Adams et al., 2009; Table 1).

find in the context of the institution of gender quotas in Norway that Norwegian firms affected by gender quotas undertook fewer workforce reduction which in turn led to a reduction in short term profits and that the results are consistent with prior research suggesting that female managers may be more stakeholder or long-term oriented than their male counterparts. Additionally, the dominant attributes of women directors, such as benevolence, universalism, tradition and conformism can have a downside too and act as a disadvantage in this respect and adversely impact their ability to govern. Such value systems, while having their benefits in family firms, can also raise the prospect of women directors being less vigilant than their male counterparts, in monitoring minority shareholder expropriation. This can especially be the case when controlling shareholders camouflage private benefits under the garb of encouraging stewardship and responsibility rather than about personal benefits (DeMott, 2008). While this can be an area of concern, evidence on the ground seem to suggest that women directors can be more objective and prevent corporate corruption, are "bold enough to ask management the tough questions," and are more likely to raise questions related to multiple stakeholders (Rhode and Packel,2014).

The above discussion on the potential comparative advantages/disadvantages of women directors in the corporate governance of family firms suggests that the effect of gender diversity at the board level on firm performance is an open question. While certain attributes of women directors may act as an advantage for firm performance, some others may act as a disadvantage. Moreover, some attributes may have both positive and negative effects in the context of family firms, and hence it is *a priori* unclear as to the net effect of women directors on board. Our case study of Indian family firms with concentrated ownership and control is expected to throw some insights into the issue.

In order to gain a perspective on the empirical analysis undertaken with Indian data, it is important to briefly discuss the institutional context of family firms and the issues related to women on corporate boards in the country. As in most other countries, women have been consistently under-represented in corporate boards in the country with less than 5 per cent of board seats held by women in large Indian companies. Differences in labour force participation rate at the population level, as well as the phenomena of 'sticky floors,' and 'glass ceilings'[8] and leaking pipeline indicate that there are structural constraints on the way of up the corporate ladder for women professionals. These constraints are present disproportionately more in developing countries like India and can include differential access by gender

[8] Motherhood penalty captures the situation when employers discount the contribution of employees who are mothers as compared to that by fathers. Sticky floors capture gender bias in job promotions whereby women are less likely to start climbing the job ladder than men (Baert et al., 2014). Glass ceilings on the other hand describes that women, when compared to men, are less likely to reach the top of the job ladder.

to educational and employment opportunities (World Bank; IMF), preference for male workers as women are seen to have a weaker attachment to the labor market (Anker and Hein,1985) and, "structural distribution of rules, norms, assets and identities" built into market forces historically through discriminatory practices as well by powerful actors who exercise their bargaining power (Kabeer, 2012). Overall, India which has one of the lowest female labour participation rates in the world and ranks 114th out of 142 countries in the Gender Gap Index as of 2014 (WEF,2014),

To put the Indian gender gap in the corporate boardroom in perspective, according to available estimates, while the labour force in India comprise of 36 per cent of women, employment in organisations comprise of 26 per cent of women, only 3 to 6 per cent of women account for senior management positions and 4.7 per cent of board positions are accounted by women.[9] This phenomenon of attrition of women as one moves up the corporate ladder and dubbed as the "Leaking Pipeline" is widely prevalent in India, placing it among the lowest among its Asian cohorts (McKinsey, 2012; Community Business, 2011).[10] What is more significant is that India is that while the leakage in other countries is the highest between middle and senior level positions, in India, this attrition takes place much earlier between junior and middle level positions (Community Business, 2011).

With regard to the policy framework with respect to gender quotas in India, while corporate governance reforms started in earnest with the setting up of the Kumara Mangalam Birla Committee in 1999 and the subsequent institution of Clause 49 by the Securities Exchange Board of India based on the Committee's recommendations, it was not until the enactment of the Companies Act, 2013,[11] that gender diversity on corporate boards received any attention. The focus of all committees that were set up over the years to examine and recommend corporate governance best practices related to the functioning of corporate boards primarily deliberated on ways and means to ensure board independence. The first time the issue of gender diversity on boards came up was in the Draft Companies Bill, 2011, and the provision of having at

[9]Further details can be found at: http://www.catalyst.org/knowledge/india-case-gender-diversity-0. Estimates by McKinsey (2011) also paint a similar picture; while the proportion of women among entry level graduates is around 42 per cent, women constitute 29 per cent among entry level professionals, thereafter exhibiting a sharp drop as one moves up, with 9 per cent women comprising of mid to senior level management, 3 per cent present in executive committees, one per cent employed as CEOs and occupying 5 per cent of board positions.

[10] McKinsey (2011) for instance reports that while the proportion of women among entry level graduates is around 42 per cent, women constitute 29 per cent among entry level professionals, thereafter exhibiting a sharp drop as one moves up, with 9 per cent women comprising of mid to senior level management, 3 per cent present in executive committees, one per cent employed as CEOs and occupying 5 per cent of board positions.

[11] The recommendations of the J. J. Irani Committee set up in 2005 which largely formed the basis of the new Companies Act, 2013, replacing Companies Act 1956 did not include any provision on gender diversity.

least one woman director on the boards of Indian companies was finally enacted as Section 149(1) of the Companies Act 2013.[12] The requirement is not specified for any type of director, so that a woman on board can either be an executive director, grey director or independent director. This is in line with quota provisions in all countries where the quota is specified generally in terms of a woman director and not by her role on the board.

With regard to the compliance with the quota, the road map that was set at the enactment of the Act was altered from time to time; the first compliance date set was October 2014. This deadline was later extended and further regulations of all listed companies under Clause 49 of the Listing Agreement of the Securities Exchange Board of India require all listed companies to appoint at least one woman director on the board by April 1, 2015.

Along with providing evidence on whether family control matters in impacting the relationship between women directors and firm performance, analysing the impact within the Indian institutional context can throw light on an issue of general significance, that of tokenism (Kanter, 1977). Given that the quota in India is set at the bare minimum level of one woman director, would adding one woman to a board that had no women directors earlier, be just a token action dictated by normative considerations rather than the business case? As Liu et al. (2014) argue, the presence of only one female director, that is necessary to meet the gender quota, may be considered as only a token by both inside and outside shareholders so that her impact on firm value is likely to be limited unless the market values gender diversity as a desirable social goal in itself. However, an Indian case study is interesting as it throws up the possibility that a minimum addition of one director may matter after all if one considers the self-selection argument with regard to women directors. One of the reasons of a greater likelihood of a positive effect of women directors is because the costs of women vis-à-vis men of choosing a career path leading to board positions can be expected to be higher in developing countries than in developed countries and that women directors who survive in the labour market despite the various obstacles in the labour market, more capable women self-select themselves in directorial positions. At the same time due to challenges faced by women in general to pursue such high profile career, market can comprehend gender diversity as

[12] The rules to implement this Section, as under consideration specify that "For the purposes of second proviso to sub-section (1) of section 149 the following class of companies shall appoint at least one woman director within the period indicated against each of them, as under:-
(i) every listed company - within one year from the commencement of second proviso to sub-section (1) of section 149; (ii) every other company having a paid–up share capital of one hundred crore rupees or more – within three years from the commencement of second proviso to sub-section (1) of section 149. See http://www.taxmann.com/datafolder/News/CHAPTER%20XI.pdf

signal about reduced information asymmetry to small investors which in turn may result into higher valuation.

Corroborating the self-selection argument, Adams and Funk (2011) find in the case of Swedish firms that values such achievement, power, self-direction and stimulation that positively impact firm performance and are more prevalent in men in the general population, are stronger in women at the director level. Further, such differences in favour of women, the authors argue, are likely to be higher ('extreme') in countries where the costs of choosing a career are even higher. This in turn could be reflected in a positive relationship between women directors and firm performance. Evidence to this effect especially with respect to independent women directors in family firms, from a country like India which has one of the lowest female labour participation rates in the world and a low level of gender diversity, can provide support to such a hypothesis. On the other hand, if much of the compliance to gender quotas happens through the addition of women grey directors with family ties with regard to whom the selection argument does not necessarily apply, together with the fact that t grey directors are likely to be less objective, contribute little to corporate monitoring and side with the controlling shareholder, one can expect that women on boards are unlikely to have a positive effect on firm performance.

3. Data, Variables and Estimation Methodology

3.1 Data

The advantage of a case study of gender diversity on corporate boards with Indian data lies in the richness of firm level data on firm characteristics and corporate governance variables that are available in the public domain as per regulatory requirements imposed on listed firms by the country's securities market regulator, the Securities and Exchange Board of India (SEBI). Our sample consists of an unbalanced panel of all manufacturing companies for a ten year period, 2005-14, listed on the National Stock Exchange, India's premiere stock exchange, for which we could obtain information on the board of directors from the CMIE Prowess database. The Prowess database contains information on directors from company annual reports or corporate governance reports, and includes the names of the directors, director's designation as well as the identification of whether the promoter of a company holds management positions of CEO or chairperson on the board.

We correct for many issues in the data. Firstly, gender is not provided in the database directly. Therefore, we checked every director's name as well his/her initials to identify the gender of the director and also correct for any inconsistencies in the spellings/initials of the names to ensure tracking of the same

director. Secondly, the date of appointment is not available from the database for all the directors, so we used the initial sample from 2001 to identify firms with no woman director until 2011 which covers a decade of not appointing any woman director voluntarily. This information is used specifically for difference-in-difference analysis. The choice of the financial year 2005 as our first year for our empirical analysis is dictated by the fact that by this year, most of the corporate governance regulations for listed companies under Clause 49 of the Listing Agreement of SEBI, were adopted, firmed up and enforced.[13]

We further obtain detailed ownership information, financial data and stock price data from the Prowess database. The final sample is the sample of firms for which we have full information on board of directors, financial variables, ownership, and stock prices. We also obtain incorporation year, business group affiliation and National Industrial Classification (NIC) from CMIE-Prowess. We exclude firms that are controlled by the government or have joint public-private ownership as this could significantly affect the appointment of directors and also the market valuation of such appointments in general. We also exclude firms from industries such as real-estate, trading and utilities as measurement of performance of firms in these industries can depend on other factors such as valuation of intangible assets. Our final sample of complete director and firm-level data consists of 1,09,328 (director firm-years) in 10,218 firm-years of data on 1348 firms after correcting for outliers in the dependent variable.

Prowess also provides a classification of director as executive, promoter and independent. We verify this classification based on directors' designation and ownership. Directors are classified as independent if they do not hold executive position, or have not held executive position for last three years, do not hold one per cent or more ownership and are not related to the promoter/s of the firm.

3.2 Variables

The variables used in our empirical analysis can be grouped into three categories, (i) *dependent variables* measuring company performance (ii) *variables of interest* describing the measures of gender diversity and (iii) *control variables* describing the observable characteristics of the company which might also affect its performance.

[13] The implementation of Clause 49 took place in a phased manner. In 2001, the largest firms (those listed under flag "A" at the BSE) were expected to comply. Then in 2002, another, much larger, group of medium-sized firms were expected to comply. The remaining Clause 49 firms (the smallest in size) were expected to comply in 2003. Finally, in October 2004, there were further revisions made to Clause 49 and financial penalties were imposed on non-complying firms. While implementation was phased in for existing firms, all firms that listed for the first time in 2000 or subsequent years were expected to comply, regardless of their size, from the time of listing.

3.2.1 Dependent Variables

As is standard in the literature, we use two measures of performance as dependent variables in our regressions, namely, Tobin's Q that measures market value of a firm and Return on Assets (ROA) to measure firm profitability. Tobin's Q is defined as the ratio of market value of equity and market value of debt to the replacement cost of assets Tobin's Q is a market-based measure of financial performance and is a forward looking measure. However, in India, as in many developing countries, the calculation of Tobin's Q is difficult primarily because a large proportion of the corporate debt is institutional debt that is not actively traded in the debt market. Also, most companies report asset values to historical costs rather than at replacement costs. We, therefore, in line with earlier studies (Sarkar and Sarkar 2000, Chen et al., 2006; Nguyen et al., 2014), calculate a proxy for Tobin's Q by taking the book value of debt and the book value of assets in place of market values.[14] To mitigate the potential effects of outliers, we transform Tobin's Q into natural logarithmic form, *lnqratio* and also truncate 1 percent of top and bottom percentile.

The profitability measure, *ROA,* is defined as the ratio of net income before interest, taxes, depreciation and extraordinary items to its book value of assets. Being an accounting measure, *ROA* is a backward looking measure.

3.2.2 Variables of Interest

The key variable of interest in this study is gender diversity at the board level. We use the entire range of measures that have been used in existing studies. These are as follows:

(i) The presence of women directors on board (*dfdir*), measured as a dummy variable which equals one if the board has at least one woman director and zero otherwise.

(ii) The number of women directors on board (*nfdir*) measured as the total number of women directors in absolute terms.

(iii) The percentage of women directors on board (*pfdir*), one of the most common measures in the literature (Adams and Ferreira, 2009; Ahern and Dittmar, 2012). *pfdir* measures women directors on board as a percentage of total board size.

Under some policy scenarios, when quotas are stipulated in terms of absolute numbers rather than percentages as in the case of India, it is necessary to measure the effect of gender diversity without

[14] Another measure of company performance can be obtained by dividing the market value of the company (calculated by the market value of equity plus the book value of debt) by total sales instead by total assets. While this measure might have merit with respect to other countries, this was not the case for our sample of Indian companies where our analysis revealed a very low correlation of this measure with MBVR and PQ-Ratio. This was in turn on account of the inefficient asset utilization by many small and young firms that our analysis revealed.

normalizing with respect to board size. An absolute measure is also based on the idea of "critical mass theory" that it is the number of women directors that matters in firm performance, that one woman conveys tokenism, having two women signifies presence, and having three makes a difference in terms of voice and their influence on board deliberations;[15] if board size increases alongside an increase in the number of directors, a change in absolute numbers may not be reflected in a change in percentage, yet board dynamics may change once the number of women directors increases to reach a critical mass (Simpson et al., 2010). The choice of the measures of gender diversity under (i) and (ii) are particularly relevant to the Indian scenario where the quota has been defined in terms of absolute numbers.

While the above measures of gender diversity do not distinguish between the type of women directors, we also explicitly examine the effects of women director by the type of position held by women outside directors, namely woman independent director and woman grey director. Analogous to our general definition of gender diversity above, we define presence of woman independent director/grey director as a dummy variable, (*dfnedi/ dfgreydir*), the number of women independent director/grey director as (*nfnedi*/*nfgreydir*) and the percentage of women independent/grey director (*pfnedi*/*pfgreydir)* on the board.

3.2.3 Control Variables

In addition, we follow the recent literature and control for the firm specific characteristics that may also affect the firm performance. Specifically, we include, the following, namely firm age (*age*), board size (*bodsize*), leverage (*levrg*) and size measured as log of total assets (*size*) respectively.

Since our sample firms comprise of both family and non-family firms, we use a dummy to distinguish between the two ownership types. Using the commonly used definition of family controlled firms in the literature (Anderson and Reeb, 2003), we define the dummy variable *fam* using the following criterion, *fam* equals one if the family/promoter control in terms of voting rights is at least 20 per cent.

Finally, a key set of control variables that we use to examine how the effect of women directors on firm performance changes with variation in management control are defined in terms of whether the promoter (founding family) of a firm is occupying a key managerial position on the board. We consider two types of key managerial positions in this respect, one that of a Chairperson and the other of a CEO. As

[15] Please see Kristie (2011) and Kramer et al.(2007), cited in Liu et al. (2014).

discussed briefly in the introduction, following (Luo and Chung, 2012), we consider four types of management control across our sample firms and define the following dummy variables:

(i) No Control (*ctrl_1*): *ctrl_1*=1 when the promoter is neither a chairperson nor CEO; equals zero otherwise.

(ii) Full Control (*ctrl_2*): *ctrl_2*=1 when the promoter is both the chairperson and the CEO; equals zero otherwise.

(iii) Operational Control (*ctrl_3*): *ctrl_3*=1 when the promoter is CEO only; equals zero otherwise.

(iv) Strategic Control (*ctrl_4*): *ctrl_4*=1 when the promoter is Chairperson only; equals zero otherwise.

Along with these variables we include industry dummies as controls to account for the fact that some industries may be structurally more women-oriented than others (services, fast moving consumer goods for instance), and time dummies to account for changes in the macroeconomic environment.

Table 1 provides the names and definitions of all variables used in our empirical analysis.

3.3 Methodology

As the growing empirical literature on board diversity and firm performance testify, estimating the effect of women directors on board on firm performance throws up a number of empirical challenges that need to be addressed. The main estimation issues relate to accounting for unobserved/omitted variables that can lead to spurious correlations between gender diversity and firm performance, and secondly the issue of endogeneity of gender diversity *per se* where there firm performance can influence the presence of women on boards as could be the other way round. Given our panel data set of 10218 firm year observations, we use several econometric methodologies such as fixed effect, instrumental variable and difference in difference estimations to get unbiased and consistent estimates of the effect of women directors on firm performance.

3.3.1 Panel data estimation

Our baseline regression model is:

$$firm\_performance_{it} = \delta * gender\_diversity_{it} + \beta * firm\_characteristics_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Two sets of regressions are run for the two performance variables, namely *lnqratio* and *ROA* and three measures of *gender_diversity* mentioned above. The vector *firm_characteristics* include control variables such as age (*age),* firm size *(size),* board size *(bodsize),* and leverage (*lvrg),* respectively.

An important problem that arises in the estimation of the performance effects of women directors on board is unobserved firm heterogeneity due to the omission of variables that may affect both the selection of female directors and performance. Omitting unobserved firm variables could lead to spurious correlations between gender diversity and performance and bias the estimated coefficients. For example, it is plausible that firms with higher growth opportunities would have both better performance as well as more female directors. A second example would be the attitude of the CEO; a 'progressive' CEO can choose cutting age strategies for the firm which impacts firm performance positively, and also hire more women directors. To address the problem of omitted variable bias, we include firm fixed effects α_i, in our main regression model (1) along with year fixed effects, λ_t, to control for economy-wide yearly fluctuations.

The second concern in studies investigative firm performance is of reverse causality. Firms which are better performing can be more attractive to women directors and better performing firms can also pursue gender diversity as a goal (Adams and Ferreira, 2009; Liu et al., 2014) so that better quality women and hence the positive effect, and not because women directors positively impact firm performance. If this is the case, then the relationship between gender diversity and firm performance can be spurious. We address this type of potential endogeneity by using an alternative model specification with instrumental variable (IV) and estimating our main regression (1) with the two-stage least squares (2SLS) method. This is FE-IV method. We run the Hausman test to test for endogeneity in gender diversity measures as well as for the types of board positions held by women directors.

The problem of reverse causality in our opinion is specifically relevant for women independent directors who are hired from the managerial market. If on the other hand we consider women grey directors on company boards, especially with respect to family firms, the decision to appoint one would be more from the viewpoint of consolidating family control and representing family interest on boards (Anderson and Reeb, 2004). Grey directors in family firms are hypothesized to impact performance in two conflicting

ways, negatively by siding with insider management to facilitate appropriation of private benefits of control, or positively, by providing advice and counsel. Whatever the case, it is unlikely that performance of a firm will attract women grey directors; the decision to have grey directors, men or women, could just be determined by control considerations irrespective of how a firm is performing at any point of time. Further, unlike independent directors, sorting between male and female grey directors could be random depending on factors exogenous to the performance of the firm, such as size of founding family, gender composition, relationship with the promoter, succession norms, etc.

To take care of the problem of reverse causality with respect to the presence of women directors on the whole or women independent directors, we choose an instrument for the measures of gender diversity, that has been used in the empirical literature. Following Adams and Ferreira (2009), we define our instrument, *male-female_board connection*, as the percentage of male directors on the board of the firm under consideration who sit on other boards which have female directors. The basis of choosing this instrument as elucidated by Adams and Ferreira (2009) is that one of the reasons of low women representation on company boards is the lack of social connections. One of the mechanisms through which such social connections can be established is through being present on boards where women directors are present. The higher the fraction of men on a board are, sitting on boards of other firms with women directors, the higher is the likelihood of the board having a woman director. It is our contention that the instrument of social connection that we adopt is particularly relevant for countries like India with the dominance of firms affiliated to business groups and the prevalence of interlocking directorates. For example, Sarkar and Sarkar (2008) find in their study of multiple directorships in Indian firms that the average busyness of independent directors are much higher compared to the US. Further, an overwhelming majority of around 84 per cent of directorial positions for inside directors in group affiliated companies originate within group affiliates themselves with around 75 per cent of these positions originating within a single groups, and the picture is no different for independent directors with 67 per cent of their directorships located within other group affiliates and 43 per cent concentrated within a single group. Thus, there is an even higher likelihood in India that social connections between men and women are likely to happen through boards.

To estimate the effect of women director by type of director, for reasons specified above, we run a fixed effects IV model to capture the effect of women independent directors, and just a fixed effect model with regard to women grey directors. One of the key estimations of interest in our paper is the change, if any, in the effect of women directors , on account of variation in the extent to which the founding family exerts management control on a firm's board. To do so, we interact different measures of gender diversity, with

the three types of control dummies (keeping no control, *ctrl_1* as base) and estimate a fixed effects IV model to take account of the effect of both omitted variables and reverse causality.

3.3.2 Difference-in-difference Analysis

The final set of estimations that we conduct to determine the effect of women directors in family firms and ensure robustness of our results, seeks to exploit the changes in the law in India with respect to the inclusion of women on company boards. Specifically, the introduction of gender quota in the Companies Act 2013, and prior to it in the Companies Bill, 2011, can be considered as exogenous policy shocks, using which we estimate the effect on performance of additions of women directors on boards on account of the introduction of gender quotas. Using a difference-in-difference (DID) approach, we examine whether performance of firms improved or declined as a result of the addition of one woman director, the minimum mandated by the law. In the DID approach, the causal effect of an event, such as a regulatory change, is estimated by analyzing the change in pre- and post-event outcomes for a sample of firms that are affected by the event (the treatment group) against the change in pre- and post-event outcomes for a sample of firms that are unaffected the event (the comparison group). Thus, it is necessary to define both a treatment group and a comparison group as well as pre- and post-event time periods. The advantage of the DID approach is that it controls for time-series variation in the outcome variable that is common to all firms and separately identifies the effect of the event.

From the point of view of DID estimation, the different phases in the enactment and compliance of the gender quota in India throws up three scenarios for estimating the effect of women directors - (i) comparing the no appointments with the appointments post-2011 where no distinction is made between policy intentions and policy enactment (ii) comparing no appointments with appointments made in the transition period up to the enactment of the Act to capture the effect of appointments that were made pro-actively and perhaps strategically to comply with expected quota to signal the market, and (iii) comparing the effect of no appointments with post-2013 appointments to capture the formal impact of the law.

We separately select our comparison group for each of the three scenarios as the set of firms which did not appoint any woman director during these time periods namely between 2012-2015, 2012-2013 and 2014-2015 respectively. This is important as these are the companies by not appointing a woman director demonstrate the lack of willingness to achieve gender diversity in their boards. This in turn provides us a clean comparison sample. Similarly for each of the scenarios, the treatment sample is also selected separately.

For DID we select a base set of firms which *did not* appoint any women director voluntarily before 2011We begin with a sample of firms which did not have any woman director on their board between 2001 and 2011 for the DID analysis. Our choice of 2011 is driven by the fact that it is the first year when draft recommendation about at least one woman director was introduced for the first time in the draft Companies Bill, 2011 and legally enacted two years later. This created the expectation that firms would in all probability be required to appoint at least one woman director on their boards. To estimate the before and after effect, we construct the treatment group as a set of firms which had no women director at any point of time, between 2001 and 2011, but appointed only one woman director after 2011. Such an appointment clearly points to gearing up for the quota regime. To treat the appointment of women director following the quota as an event exogenous to firm performance, we restrict the sample to only those companies who appointed one woman director, and drop all other firms which appointed more than one women director post 2011. The interaction term *treatment*after* captures the effect of compliance of one woman director regulation of Companies Act 2013.

To estimate the effect of treatment (changes in firm performance on account of the addition of one woman on board), we estimate the following equation:

$$firm\_performance_{it} = \varphi + \gamma t * reatment + \delta * after + \beta * treatment * after + \phi * firm\_characteristics_{it} + \alpha_j + \lambda_t + \varepsilon_{it} \quad (2)$$

where *firm_performance* is the *lnqratio* or ROA, *firm_characteristics* is the set of control variables, α_j and λ_t are industry and time fixed effects and ε_{it} is the error term. The variable *treatment* is specifically defined in terms of three alternative dummy variables namely, *treatment1*, *treatment2* and *treatment3 respectively*. The variable *treatment1* takes the value one if firm *i* has appointed one woman director between 2012 and 2015, while the variable *treatment2* takes the value one if firm *i* has appointed one woman director between 2012 and 2013. These two variables identify those firms that appointed one woman director on the board in anticipation about the Act as well as the enactment of the Act itself.

In contrast, the variable *treatment3* takes the value one if firm *i* has appointed one woman director after 2013 i.e., in 2014 or 2015. This variable identifies those firms which appointed a woman director *after* the enactment of the Act. In similar spirit, the variable *after* is defined in terms of three dummy variables namely, *after1*, *after2*, and *after3*.The variable *after1* takes the value one for years 2012 to 2015, the variable *after2* takes the value one for the years 2012 and 2013, while the variable after3 takes the value one for the years 2014 and 2015.

Difference in difference is then captured by the generic interaction terms *treatment*after*. For example *treatment1*after1* captures the difference in difference in the performance of those firms which appointed one woman director either in anticipation or passage of the regulation in the years 2012 to 2015 vis-à-vis the control group, while *treatment3*after3* captures the difference in difference in the performance of those firms which appointed one woman director only after the passage of the regulation in the years 2014 and 2015. The difference-in-difference analysis is further extended to the type of woman director by modifying *treatment1*, *treatment2*, and *treatment3* as *treatment12*/*treatment13*, *treatment22*/*treatment23*, and *treatment32*/*treatment33* respectively to define the treatment group as firms that appointed grey/independent woman directors.

4. Empirical Analysis

4.1 Descriptive Statistics

Table 2(a) describes the summary statistics of variables and describes our sample for all firms in all years. The mean percentage of female directors on sample board for all years is 4.73 per cent, which is less than that reported by Sussmuth-Dyckerhoff et al. (2012) for the Asian region (6 per cent). More specifically, this is significantly smaller than 10.2 per cent for China and 12 per cent for Vietnam as reported by Liu et al (2014) and Nguyen et al. (2015) respectively. These countries are different in their institutional structures. Whereas in China, SOEs dominate and women directors are nominated, Vietnam has very high women employment in general. On average, 34 per cent of Indian boards have at least one women director. However, most of these boards have one woman director as is evident from the fact that 27 per cent of boards in our data have only one woman director (*onefdir)*. Also the table shows clearly that one woman director is more of a norm in India given that only 7 per cent of firms have two directors on their boards and only one per cent have more than two women directors on their boards.

Comparing the incidence of female directors by type of directorship, it is evident from the Table that female grey directors are more common than female independent directors. While the percentage of female grey directors is 1.73, that of female independent directors is 1.41 per cent. This is the case also with respect to the percentage of firm year observations with independent and grey directors on boards, 14 per cent and 16 per cent respectively. What is to be noted in the context of family firms is that the presence of grey women directors is at least as prevalent as the presence of independent women directors.

It is also evident from Table 2(a) that an average board in India has about 9 members, 48 per cent of which are independent and about 51 per cent of such boards have founding family members, i.e., promoters, holding both CEO and Chairperson positions (full board control, *ctrl2*). At the same time, about 95 per cent of our sample firms are family firms if we use promoter ownership exceeding 20 per cent as the cut-off to define such firms. The mean shareholding by promoters across all observations is around 52 per cent, which indicates high ownership concentration and control in terms of voting rights in Indian firms.

In terms of leadership positions, only 4 per cent of firms have female occupied CEO positions and about 2 per cent have female chairs, 28 per cent of the firms have male directors occupying both CEO and Chairperson positions which is much higher than the incidence of just 1 per cent of firms having female directors in a dual role. Given the predominance of male promoters in leadership positions, the management control variables that we consider essentially also proxy for the extent of male directors in positions of authority.

With regard to firm characteristics, the values of Tobin's Q as reported in Table 2(a) range from 0.02 to 34.34, with an average value of 1.14 which indicates on average Indian firms have higher growth opportunities similar to developed countries.

We now consider the distribution of our sample firms across all years classified by ownership groups and types of control as presented in Table 2(b). Firms are classified into three groups namely those belonging to business groups, those that are foreign controlled, and those that are standalone. The table shows that 53 percent of our sample firms are affiliated to business groups, nine percent are controlled by foreign promoters and the remaining 38 percent are standalone firms. We further classify sample firms based ownership concentration in the hands of promoters. Following La Porta et al. (1999) it is widely accepted that more than 20 per cent ownership is sufficient for exerting control over management. Based on this, we classify a firm as promoter controlled if promoter ownership is equal to or more than 20 percent. As in the case of Table 2(a), Table 2(b) shows, strikingly that 95 percent of the firms in our sample are promoter controlled, a feature observed in many emerging economies where dominance of concentrated ownership is the norm. Due to control possible through cross holdings, such concentration is even higher, nearly 98 percent, in firms belonging to business groups.

Finally, we classify firms based on promoter influence exerted directly through their presence on the board of directors. Following Luo and Chung (2012), we define three types of control namely: (i) *full*

control (ctrl_2) when both the positions of chairperson and CEO/MD are occupied by a promoter, (ii) *strategic control (ctrl_3)* when the position of the chairperson of the board is occupied by a promoter; and (iii) *operational contro*l *(ctrl_4)* when the position of CEO/MD is occupied by a promoter. Firms which are not subjected to any of these three types of control are then residually classified as *no control (ctrl_1)*. The last four columns of Table 2 (b) show the distribution of our sample firms according to the four types of board control in the hands of promoters. Strikingly, over 90 percent of the standalone firms and more than 75 percent of the business group affiliated firms are subjected to promoter control directly through their presence as chairperson or CEO/MD on the board compared to 33 percent for foreign firms. For standalone firms, promoters have full control in 64 percent of the firms, while they have operational control in 19 percent of the firms and strategic control in 8 percent. In contrast, in business group affiliated firms, promoters have full control in nearly half the firms and they exercise strategic control in 21 percent of the firms and operational control in only seven percent of the firms. Promoter control on board is much less in foreign firms with only 13 percent of the firms exhibiting full control, 7 percent operational control and 12 percent strategic control. The significant variation in the type of promoter control of the board provides a unique opportunity to see if the effect of women director on corporate boards is subjected to varying types of promoters' presence.

Table 3(a) describes the mean values for selected board level and firm level variables over the entire sample period. The proportion of firms having at least one woman director remained unchanged throughout the sample period between 33-34 per cent and has marginally increased to 39 per cent only in 2014 which is immediately after the mandate of Companies Act 2013. This trend is same for the proportion of firms with only one woman the board which remained unchanged at around 26 per cent until 2014. As the board size has also increased in 2014 this indicates that the firms have complied with the Act through new appointments of women directors. With respect to the board positions held by women directors, the proportion of firms having woman holding CEO or chairperson or both positions is unchanged for the entire sample period including 2014. On an average, number of women directors has increased by 11 per cent from 0.44 per cent in 2005 to 0.49 per cent in 2014. Before 2014, the number of women grey directors and number of women independent directors where very similar and have changed only very recently where due to the new Companies Act 2013, the number of women independent directors (0.21) is significantly higher than number of women grey directors (0.16). These observations also hold for proportion of board positions held by women over the study period. For example, the proportion of women directors on board increased by around 8 per cent from 4.82 per cent in 2005 to 5.21 per cent in 2014. Over the years, board independence has marginally increased from around 45 per cent to close to 50 per cent. Of the total independent directors' positions, only in 2014, 2 per cent is held by

women and rest 48 per cent is held by male directors. Over the period 2005-2013 the proportion of grey directors seems reducing in general. However, in 2014, the grey directors (both male and female) have increased. This seems counteracting with the increase in board independence in general.

The last panel of Table 3(a) shows the mean values of firm level variables over the years. On an average stock market valuation has increased marginally over the years whereas *ROA* remains same. Leverage has significantly increased since 2013 compared to the significant decrease in 2011.

Table 3(b) presents the descriptive statistics for selected board, and firm characteristics across sub-samples of firm-years by family control by ownership and family control through management. As can be seen in the Table, while means tests show that board level variables do not show statistically significant variation across firms distinguished by family ownership control (family versus non-family), most of these variables are significantly different across types of management control as we have defined in our analysis. Specifically, compared to a no-control scenario, if we consider the full control scenario, the proportion of firms that have a female director and has female grey director are higher in the latter than in the former. This is not the case with independent female director whereby the proportion of firms with such director is significantly lower under full control. This is along expected lines whereby firms with full management control, if going for gender diverse board would prefer a woman to be in the position of a grey director than as an independent director whereas a firm under professional management is likely to give less weight to such considerations. As can be noted from the Table, this consideration holds true whenever a promoter is present as a key management personnel, the difference with respect to no control being the highest when promoter is a chairperson only in charge of strategic decision making. Note also that the presence of female directors in key positions in boards is higher in promoter controlled firms than with firms with no control. Further, it is of interest to observe that while in the case of independent directors, the percentage of male independent directors is higher under all control types in comparison to the no control type, in the case of female independent directors, this is just reversed, with female independent directors being higher in firms with no promoter control in management. In the case of grey directors too, the picture is different for male and female directors across control types; while the percentage of male grey directors is statistically lower in the presence of promoter control, the percentage of female grey director is higher across all types of promoter control as compared to no control. The above sets of comparative estimates seem to suggest that there is indeed variation in the extent and type of gender diversity across control types with promoter control being associated with higher gender diversity. Further, the estimates also seem to point out that in India as in many other countries with family

dominated firms, the family rather than the external managerial market acts as a pool for women directors.

Finally, in Table 3(c), we compare the means of selected firm and board characteristics across firm-years by the number of women directors on board. Such a comparison is made in light of the policy of gender quotas which require a minimum presence of women directors. Keeping in the background, the Indian policy of listed firms mandated to have at least one woman director irrespective of the type, we compare the relevant estimates relative to a board with no woman director. The estimates also are relevant in view of the debate on whether a critical number of women directors is necessary for gender diversity to have a positive effect on governance and performance without which gender diversity would be nothing more than tokenism (Rhode and Packell, 2014; Liu et al., 2014).

The comparison of estimates in Table 3(c) shows first that a large majority of firm year observations (65.5 per cent) during the study period pertains to the absence of a woman director, and a miniscule percentage is associated with firms having more than two directors. The percentage of firms voluntarily or by mandate appointing one director too is also low, around 26 per cent, and lower than the estimate of 40 per cent reported for US firms (Adams and Ferreira, 2009). Considering the board size, firms with women directors have on the average larger boards than firms with no woman director. In fact the board size is seen to increase with increase in the number of women directors. Given the average board size of 9 (Table 2(a)), having one woman director amounts to around 11 per cent of women directors on board, which is much less than the gender quotas set in most countries. Two directors, which is also relatively rare in India would amount to a little over 20 per cent which is much lower than typically the 33 to 50 per cent levels that are fixed for countries that have instituted gender quotas.[16]

Turning to other firm level characteristics, estimates in Table 3(c) along with means tests show that firms with women directors perform better than firms without women directors, in terms of market value but not with respect to profitability. Firms with women directors are also on the average larger in size. An interesting point to note is that firms with two women directors are older than firms with less than two, whereas firms with more than two directors are younger by a much greater margin than the rest of the firms.

[16] Norway and Denmark are two such countries

4.2 Regression Results

4.2.1 Base Model

Table 4(a) and 4(b) present the results of standard fixed effects regression (baseline model Equation (1) above) to investigate the effect of gender diversity on firm performance for our sample of Indian listed firms. We use two measures of performance: Tobin's q and *ROA*. Table 4(a) reports the results for Tobin's and Table 4(b) reports the results for *ROA* respectively. All reported standard errors in all regressions are adjusted for potential heteroskedasticity.

As defined earlier, we use three measures of women on board: Presence of at least one woman director on board (*dfdir*), total number of women directors on board (*nfdir*) and percentage of women on board (*pfdir*), respectively. The first three columns in each of the tables indicate our base model of firm performance that includes measure of women on board along with the board and board specific control variables such as board size, log(sales), age, and leverage. In addition these three regressions contain year specific dummy variables and two-digit NIC industry specific dummy variables to control for possible unobserved time and industry related factors. As our earlier analysis shows, the proportion of women on board varies significantly across industries. For example, female directors are less prevalent in industries such as food and beverages when compared to consumer goods and pharmaceuticals. The next three columns of Tables 4(a) and 4(b) contain result of the regressions where we replace the industry dummy variables with firm specific dummy variables to control for observed firm level factors. The results for base model for Tobin's q are reported in first three columns of Table 4(a). The coefficient on presence of women on board is positive and significant at the 5 per cent level. The coefficients on number and percentage of women on board are also positive and significant at the 5 per cent level.

4.2.2. Firm Fixed Effects

To address the omitted variables bias discussed earlier, we add firm fixed effects in the next three columns of Table 4(a) for each of the measures of gender diversity. This is to check whether the positive relationship estimated in the baseline regression with year and industry fixed effects was driven by omitted variables bias. As is evident from the estimates presented in columns (iv), (v) and (vi), compared to the baseline model, the coefficients on the first two measures of gender diversity, namely *dfdir* and *nfdir* are positive and statistically significant each with a p-value of 0.05, whereas that with respect to gender diversity measured in percentage terms, *pfdir* is not significant. Comparing coefficient values of *dfdir* and *nfdir*, we also find that their marginal effects are lower for the FE estimations. The change in the results, especially with respect to *pfdir*, suggests, similar to other studies on gender diversity and firm performance, that not accounting for unobserved firm heterogeneity can be bias the results.

Table 4(b) reports the results of the base model and firm fixed effects for *ROA* as performance measure. Here too, as in the case with respect to market value in the baseline model, all the three measures of gender diversity positively impact firm profitability and are statistically significant with a p-value of 0.10 (cols (i)-(iii)). The results also hold under firm FE estimation, and the marginal effects of all the three gender diversity measures, unlike in the case of *lnqratio* appear to be higher as compared to the baseline model. All the measures of gender diversity are positive and statistically significant at the 5 per cent level.

As pointed out in almost all empirical studies on gender diversity, and discussed above, reverse causality can also be a concern when the causal effect of women board members on performance is analyzed. We address this issue by using an instrument which should be correlated with the presence, number and fraction of women directors on board but uncorrelated with firm performance. By including the firm-fixed effects along with IV estimation, we account for both unobservable firm characteristics as well as reverse causality.

4.2.3. IV-Fixed Effects Estimation

As discussed above, the instrument that we choose for our analysis and discussed in Section 3 is *male-female_board connection*. Table 5(a) presents the test for endogeniety for the performance regressions. The first three columns refer to *qratio* and last three columns refer to *ROA*. We report Hausman test of endogeneity which essentially includes the residuals from the auxiliary regression of the women participation (presence, number and fraction) on the instrument - *male-female_board connection*. The test statistic is significant at 5 per cent level for presence (*dfdir)* and the number of women directors on board (*nfdir*) and not with respect to the percentage of women directors (*pfdir*). This suggests that the correlation between our measures of gender diversity and instrument is significant for at least the first two measures.

The Hausman test results for endogeneity suggests that *dfdir* and *nfdir* are endogenous when the firm performance is based on market valuation, so that the use of IV regression to test for relationship between women participation and firm performance would be appropriate. This is not the case for *pfdir* at conventional levels of significance. Further the Hausman test in Table 5(a) also indicates that none of the three measures of women participation are endogenous in case of *ROA* as performance measure. This suggests that firm fixed effects can be used for regressions in the case of *ROA* so that the results obtained in columns (iv-vi) in Table 4(b) can be considered as unbiased and consistent estimates.

Table 5(b) shows the effect of gender diversity on performance using Fixed Effects with IV estimated using 2SLS methodology. As is evident from the estimates presented in the Table, consistent with our FE results in Table 4(a), both *dfdir* and *nfdir* are positive and significant at 10 per cent level and *pfdir* has no statistically significant effect on market value. Also, after controlling for both reverse causality and omitted variables, we find that the economic significance of the coefficients of both *dfdir* and *nfdir* are very strong as one standard deviation increase in presence of women director (number of women directors) improves market value by around 2.4 per cent and 1.7 per cent, respectively. With respect to control variables board size has insignificant impact on firm performance. Both size and leverage have a positive influence on firm performance. This is consistent with the existing studies on India where debt plays a significant role to limit agency problem along with the concentrated ownership structure (Sarkar and Sarkar 2008).

4.2.4. The Effect of Family Control

An important subject of inquiry in this paper is whether the effect of women directors on board is sensitive to the nature of founding family control in the functioning of the board. As discussed earlier, we seek to capture this in two ways, first through interacting each of the gender diversity variable with the family dummy *fam* defined in terms of ownership control, and second through interacting each of the gender diversity variables with the management control dummies, *ctrl_2, ctrl_3* and *ctrl_4* with *ctrl_1*, the no-control scenario taken as the base.

Table 6 (a) introduces the interaction effect of gender diversity with respect to our definition of family firm, *fam* and estimate the effect using the FE-IV model specification. As can be seen from the estimates, the coefficients of all three gender diversity variables, *dfdir*, *nfdir* and *pfdir* are positive and significant with respect to market value. Further, the coefficient of *fam* is positive and statistically significant with respect to *qratio* but not with *ROA* suggesting that family firms in India are valued higher than non-family firms. With regard to the coefficients of particular interest, those with respect to the interaction terms of *fam* each with *dfdir*, *nfdir* and *pfdir,* we find that in the market value regression, these are negative and significant at 10 per cent, 5 per cent and 5 per cent, respectively. While the positive sign on *fam* is in line with the existing literature that higher ownership concentration in family firms helps align the interests of inside shareholders-managers to outside shareholders and positively impact market value, family ownership has a negative impact on the effect of women directors on firm value. In other words, family ownership impinges on the effectiveness of women directors present on boards, with presence measured in how so ever way. If we consider the total effect on family value in the presence of women directors (adding the coefficient value of each gender diversity variable with its corresponding

interaction term), we find that the negative effects of family firms on account of private benefits of control almost washes away the positive benefits of family ownership. Consider for instance, the coefficient value of *dfdir* of 9.60 suggests that the market value of a board which has at least one woman director would be around 9 per cent higher than a board with no woman director. However, for family firms, owing to the coefficient value of -9.23 associated with the interaction term *dfdir x fam,* the net effect of a board with woman director relative to a board without such a director drastically decreases to less than one per cent. The result shows that women have little comparative advantage over men as directors in family firms. Generally speaking, the estimates with respect to market value presented in Table 6(a), when connected with our discussion in Section 1 and Section 2 implies that the market perceives women, owing to their observable and unobservable characteristics, to be less effective as directors when Type II agency costs are present in a firm. This, in turn could be due to the presence of women as grey directors connected with the founding family who could facilitate rather than prevent the expropriation of minority investors.

In contrast to our results with respect to Tobin's Q, once we control for family control in the profitability regressions, the positive effect of the gender diversity measures that was present in the fixed effects regression in Table 4(b) disappear. When *ROA* is considered as a firm performance measure, the coefficients of all the measures of gender diversity as well as the coefficient of *fam* are insignificant.

4.2.5 Promoter Influence on Board

Table 6(b) takes into account the fact that along with the ownership concentration, family can exert management control through holding key positions on the board, namely as a CEO, or chairperson or both. As discussed earlier, to examine whether promoter influence matters in the effect of gender diversity, we use three control dummies *ctrl_2*, *ctrl_3* and *ctrl_4* to capture three types of promoter influence relative to no influence. These are full control when promoter is both CEO and chairperson (*ctrl_2*), operational control (*ctrl_3*) when promoter is only the CEO and strategic control (*ctrl_4*), when promoter is only the chairperson. As is defined, the extent of promoter control declines relative to no control (*ctrl_1*), when one moves from *ctrl_2* to *ctrl_4*. If women directors are more deferential to authority, and in this case family authority, or are sympathetic to family concerns and objectives, one would expect that the effect of women directors will decline with increase in authority.

The effect of gender diversity continues to remain insignificant with respect to the accounting performance as showed in the last three columns. The coefficients of *ctrl_2-ctrl_4* are positive and significant suggesting that when promoters are in key positions on the board, this is beneficial for firm

valuation. This is consistent with the Type II agency perspective that controlling insiders have incentives to maximize firm value. With regard to the gender diversity measures, as with the earlier findings, board with at least one woman director fares better than a board with no woman director. The coefficient of *dfdir* is significant at 10 per cent. Similarly, the coefficient of *nfdir* positive and significant, implies that the number of women directors has a positive effect on performance. Turning to the interaction terms, consistent with the effect of family, promoter influence negatively impacts the performance effect of women directors. This holds for both *dfdir* and *nfdir*, irrespective of the nature of control. However, what is of interest to note is that the positive effect of boards with women directors is neutralized the most when the promoter has full control of the board, and neutralized the least when the control is strategic. When one considers the total effect of women directors after factoring in the nature of promoter control, the coefficient values suggest that the net effect is still positive, but much lower than the direct effect when control is not accounted for.

The effects of promoter control are not found to be significant if we measure gender diversity in percentage terms, nor is it significant with respect to profitability. These results are consistent with the results we obtain when we control for family ownership in Table 6(a).

4.2.6. Type of Women Directors

Next, we investigate the effect of type of board positions held by women directors by introducing presence, number and proportion of grey(independent) women directors. Grey directors are the women directors who are non-executive but not reported as independent. Table 7(a) reports the test for endogeneity for the independent women directors. It can be argued that appointment of independent women director depends on firm's existing board structure, performance or industry. The results of Hausman test confirm the endogeneity and validity of the instrument variable that is male-female connections with respect to presence and number of women directors. Similar to gender diversity in general, FE regressions on *ROA* is justified here as well.

In unreported results we also confirm that the female grey directors are not endogeneous which, as discussed above, is expected , as the appointment of grey directors is more likely to depend on founding family composition and internal dynamics rather than on on firm or industry specific factors.

Table 7(b) reports the results of FE-IV and FE regressions of independent women directors. The coefficients for independent women directors is positive and significant for both Tobin's q and *ROA* when

diversity is measured either as a dummy or in numbers, but not in percentage terms. This suggests that market in general value firms higher with presence of independent women directors than with boards that do not have any, as well as with the number of independent women directors. As in the earlier regressions, we do not find any effect of independent women directors with respect to profitability.

Table 8 reports the results with respect to grey women directors. The coefficients for all measures of grey women directors are insignificant irrespective of the performance measure. Thus, grey women directors have no effect on firm performance. One of the key reasons for this, as discussed in the literature on grey directors is that typically family ties impinge on the ability of such directors to monitor the firm objectively and effectively.

4.2.7. Difference-in-Difference Analysis

Table 9, 10 and 11 report the results for difference-in-difference analysis to investigate the announcement of inclusion of one woman director clause and the effect of Companies Act 2013. Table 9 reports the results for the firms that appointed one woman director either by responding to the announcement in 2011 or to the Companies Act 2013 mandate. First three columns present the results for the market valuation using Tobin's q as proxy for firm performance and last three columns present the DID results for *ROA* as a measure of firm performance. The underlying hypothesis is that the diversity enforced by the law-change itself would increase firm value (Higgs, 2003; Page, 2007).The coefficient of the interaction term of gender diversity (*dfdir*, *nfdir* and *pfdir)* and *after* is of interest which captures the effect of mandatory addition of one women member on boards of firms *which had no women director* between 2005 and 2011. The results are reported after controlling for industry fixed effects and heteroscedasticity. The coefficients for *treatment1*after1* and *treatment3*after3* are each positive and significant for the Tobin's q as performance measure. This suggests that after the passage of new Companies Act 2013, the market values of firms that have complied are significantly higher. However, insignificant coefficient of *treatment2*after2* suggests no effect of the 2013 announcement on firms that responded to the 2011 announcement when gender quotas were finally enacted and significant coefficient of *treatment3* suggests the positive effect of compliance of the Companies Act 2013. On average the market valuation is higher for companies that appointed one woman director by responding to the new Companies Act. This is in contrast with the effect of quota that is being observed in Norway and suggests that the diversity enforced by the law increases the firm's market value in India.

With regard to *ROA* too, as evident from the coefficients of *treatment*after* variables, accounting performance is higher for firms that appointed one woman director compared to the firms that did not

appoint any woman director when firms have appointed a woman director between 2012-2015 and 2014-2015, and not in the interim period, 2012-2013, between the drafting and the enactment of the gender quota provision. One possible explanation for this could be that once the provision was drafted, the first movers added women to their boards predominantly as grey directors whereas those who were appointed in the 2014-15 period were women independent directors. Support for this conclusion comes from the underlying data that shows that most of the post 2013 appointments were of independent directors but this was not the case before 2013. When coefficients are compared, the market valuation is higher for firms which complied to the Companies Act mandate in 2013. These findings are consistent with our panel data results in general that gender diversity is positively related to firm performance in family firms.

Table 10 presents the DID results that investigate the effect of announcement of the expected law mandate and the law itself and appointment of "grey" director. This is essentially to test if the firms are resorting to simple tokenism to comply. As hypothesized earlier, if tokenism is the consideration, the forced change in board characteristics will have no effect on firm value (Westphal, 1998; Helland and Sykuta, 2004; Farrell and Hersch, 2005). Insignificant coefficients of *treatment1* and *treatment3* suggest no effect of such tokenism.

Next, we investigate the effect of law when the firms responded by appointing an independent woman director. Table 11 presents the results. Positive and significant coefficient of *treatment12* suggests the positive effect of announcement of draft bill in 2011. Companies which responded to the expectation about the gender diversity by appointment of only one independent director experienced increase in firm value compared to their counterpart (control group) which did not respond to the expectation of the draft bill or to the Act itself. Another interesting result is that the effect of actual mandate is not significant for the companies that responded to the Act and not to the earlier announcement. Such companies were valued higher on average compared to their counterpart which did not appoint any woman director or appointed grey woman director. With respect to the accounting performance, the companies act or the announcement of the draft bill does not have significant effect. However, the accounting performance of firms that appointed independent woman directors is higher on average but did not increase due to the mandate.

The results with respect to addition of independent women directors under the DID estimation, together with the IV estimations earlier suggests that independent women directors in family firms, even if one in number on the board, are not perceived as tokens by the market. Instead, the

results suggest that women independent directors, irrespective of their numbers on the board, contribute positively to firm performance.

5. Concluding Comments

This paper seeks to contribute to the literature on gender diversity on boards by analysing the relationship between women directors and firm performance with respect to family firms. While there is a growing empirical literature on the subject of women on corporate boards, much of it is limited to widely held firms with separation of ownership and control, and little is known about the effectiveness of women on the boards of family firms with concentrated ownership and control. Juxtaposing the literature on gender attributes to that of characteristics of family firms and governance, this paper argues that women directors, vis-à-vis men directors, may have comparative advantage in monitoring and advising the management of family firms in some respects and disadvantage in others, but in ways that could be different from their roles in widely held firms. Considering the dominant attributes of women in general, and women directors in particular, this paper argues that attributes such as universalism and benevolence, along with issues related to ascension of women beyond the glass ceiling can have conflicting effects on firm performance, especially under the institutional settings which give rise to concentrated ownership structures and dominance of controlling owners on board. In such a scenario, the effect of having women on board becomes an empirical question.

By applying panel data estimation methods and difference-in-difference analysis, this paper finds robust evidence of a positive effect of women directors on firm value. Further, when we disentangle the effect of women directors by type of director, we find that women independent directors have a positive effect whereas woman grey directors have no effect. This positive effect of independent woman directors is also confirmed by the diff-in-diff analysis where the higher valuation of firms post the enactment of the gender quota in India in 2013 came from the appointment of a woman independent director, and not a grey director. The positive results with respect to women directors in general and independent directors in particular that we obtain with respect to market value are also confirmed with respect to profitability, where the coefficients of all gender diversity measures are statistically significant. Grey directors again have no effect on profitability.

One of the important contributions of this paper, in our opinion, is how the effectiveness of women directors changes with changes in firm governance structures. While this issue has received some attention in the literature there is little formal evidence on it. Given that family firms in India vary in the

extent to which family members are present in key management positions, we exploit this variation to test if the effectiveness of women directors varies with the extent of promoter's control. We find robust evidence that this is indeed true and the effect of women director on firm performance depends significantly on the extent of operational and strategic control exerted by the promoter. Notwithstanding the negative effects under family control, the net effect of women directors on board on market valuation remains to be positive. This is however, not the case with regard to profitability. Our results suggest that women attributes while beneficial for governance as such, is discounted by the market in settings where decision making is controlled by family.

Finally, the findings in our paper provide support to instituting gender quotas in emerging economies like India with dominance of family firms. Given the mandate of appointing at least one woman director on board, our study finds that firms which have at least one woman director on the board has higher market valuation and higher profits compared to boards with none. What is interesting is that this result is driven by independent woman directors and not by grey directors with the latter being a reflection of mere tokenism. The strong and consistent effect of woman independent directors in our study, in our opinion, is perhaps a combination of the comparative advantages of women as outside directors in family firms and the stronger forces of selection that takes place in developing countries like India whereby women have to overcome more obstacles and bear higher costs when they make their choices for a high-profile career path. Taken together, our results suggest that the institutional context in which women directors function may have important bearing on how gender diversity matters on corporate boards.

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Table 1: Variables Description

Variable	Description
Firm Level Variables	
Tobin's Q	Adj. Tobin's Q; calculated as the ratio of total sum of the book value of debt, book value of preferred stock, and market value of common stock, to the book value of assets of the firm.
ROA	Return on assets, calculated as the ratio of profit before taxes to the book value of assets for the firm
Levrg	Leverage, calculated as ratio of debt to equity of the firm
Age	Age of the firm
Size	Log of the book value of assets of the firm
Board Level Variables	
Bodsize	Number of directors on the board
Dfnedi	Dummy variable, takes the value 1 if the firm has a female independent director, and 0 otherwise
Dfgreydir	Dummy variable, takes the value 1 if the firm has a female grey director, and 0 otherwise
Nfdir	Number of female directors on the board
Nfnedi	Number of female independent directors on the board
Nfgreydir	Number of female grey directors on the board
Nmdir	Number of male directors on the board of a firm
Dfdir	Dummy variable, takes the value 1 if the firm has a female director on the board and 0 if it has no female directors on the board
Pfdir	Proportion of female directors on the board
Fnedi	Proportion of female independent directors on the board
Pfgreydir	Proportion of female grey directors on the board
treatment1	Dummy variable, takes the value 1 if the firm has appointed one female director to the board between 2012-2015 and 0 otherwise
treatment2	Dummy variable, takes the value 1 if the firm has appointed one female director to the board in 2012 or 2013, and 0 otherwise
treatment3	Dummy variable, takes the value 1 if firm has appointed one female director to the board between 2014 or 2015, and 0 otherwise
after1	Dummy variable, takes the value 1for the years 2012-2015, 0 otherwise
after2	Dummy variable, takes the value 1for the years 2012 and 2013, 0 otherwise
after3	Dummy variable, takes the value 1for the years 2014 and 2015, 0 otherwise
Control Variables	
ctrl_1	Dummy variable takes value 1 when the promoter is neither a chairperson or CEO; equals zero otherwise.
ctrl_2	Dummy variable takes value 1 when the promoter is both a chairperson or CEO ; equals zero otherwise.
ctrl_3	Dummy variable takes value 1 when the promoter is CEO only; equals zero otherwise.
ctrl_4	Dummy variable takes value 1 when the promoter is Chairperson only ; equals zero otherwise.
fam	Dummy variable with value 1 if promoter ownership in firm is greater than 20 per cent, and 0 otherwise.
industry dummies	Industry dummies, one dummy for each of the 22 industry groups, each taking value 1 for a particular industry, and 0 otherwise.
time dummies	Year dummies, one dummy for each of the years between 2005-2014, each taking value 1 for a particular year, and 0 otherwise
firm dummies	Firm dummies, one dummy for each of the 1348 firms, each taking the value 1 for a particular firm, and 0 otherwise.

Table 2(a) Summary statistics

Variable	Obs	Mean	Std	Min	Max
Board Level Variables					
Board size (*bodsize*)	10218	9.19	2.93	2.00	27.00
Has female director[1] *(dfdir)*	10218	0.34	0.48	0	1
Has female executive director	10218	0.12	0.33	0	1
Has one female director[1] (*onefdir)*	10218	0.27	0.44	0	1
Has two female director[1] (*twofdir)*	10218	0.07	0.25	0	1
Has more than two female director[1] (*g2fdir)*	10218	0.01	0.11	0	1
Has female chairperson[1]	10218	0.02	0.16	0	1
Has female ceo[1]	10218	0.04	0.19	0	1
Has female chairperson-ceo[1]	10218	0.01	0.07	0	1
Has male chairperson-ceo	10218	0.28	0.45	0	1
Number of female directors (*nfdir*)	10218	0.44	0.68	0	4
Number of female executive directors (*nfexdir*)	10218	0.14	0.40	0	4
Number of male executive directors (*nmexdir*)	10218	2.26	1.39	0	15
Number of female independent directors (*nfnedi*)	10218	0.14	0.38	0	3
Number of male independent directors (*nmnedi*)	10218	4.21	1.95	0	14
Number of female grey directors (*nfgreydir*)	10218	0.16	0.41	0	4
Number of male grey directors (*nmgreydir)*	10218	2.27	2.08	0	17
Percent female directors[2] (*pfdir*)	10218	4.73	7.49	0	66.67
Percent of female independent directors (*pfnedi*)	10218	1.41	4.16	0	50.00
Percent male independent directors (*pmnedi*)	10218	46.33	16.73	0	100.00
Percent female grey directors on board (*pfgreydir*)	10218	1.73	4.53	0	33.33
Percent male grey directors on board (*pmgreydir*)	10218	23.88	19.53	0	100.00
No board control (*ctr_l1*)	10218	0.22	0.42	0	1
Full board control (*ctrl_2*)	10218	0.51	0.50	0	1
Operational board control (*ctrl_3*)	10218	0.12	0.32	0	1
Strategic board control (*ctrl_4*)	10218	0.15	0.36	0	1
Board independence (%)	10218	47.73	16.80	0.00	100.00
Firm level variables					
Tobin's Q (Tobin's Q)	10218	1.14	1.29	0.02	34.34
Return on Assets *(ROA)*	10218	0.13	0.10	-0.59	1.50
Size *(size)*	10218	8.86	1.56	3.75	15.60
Age (*age* in years)	10218	31.59	21.87	0	151.00
Leverage *(lvrg)*	10218	1.69	15.46	0.00	1218.86
Promoter ownership >20 per cent *(family)*	10218	0.95	0.21	0	1
Promoter ownership	10218	51.86	17.13	0	93.15

Table 2(b): Distribution of Sample by Ownership Group and Type of Control

	Distribution of firm year observations Number (%)	Percentage of Promoter Controlled Firms[1]	Types of Promoter Control in Management (percentage)			
Ownership Group			No Control	Full Control	Operational Control	Strategic Control
Group affiliates	5353 (52.49)	97.48	23.44	48.29	7.29	20.98
Standalones	3920 (38.26)	92.27	9.49	63.98	19.06	7.47
Foreign	945 (9.25)	96.08	67.62	13.97	6.67	11.75
All	10218 (100)	95.35	22.18	51.14	11.74	14.94

[1]: Promoter controlled is defined as firms with promoter ownership (or ownership of the founding family) of at least 20 per cent.

Table 3(a): Summary Statistics of Board Level and Firm Level Variables (Sample Means)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Board Level Variables										
Board size (bodsize)	9.62	9.48	9.32	9.32	9.40	9.20	9.01	8.92	8.93	9.15
Has female director[1] *(dfdir)*	0.34	0.32	0.35	0.35	0.35	0.34	0.34	0.34	0.33	0.39
Has one female director[1] (*onefdir)*	0.26	0.24	0.27	0.26	0.27	0.26	0.26	0.26	0.26	0.31
Has female chairperson[1]	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.022	0.02
Has female ceo[1]	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04
Has female chairperson-ceo[1]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Number of female directors (*nfdir*)	0.44	0.42	0.46	0.44	0.44	0.42	0.42	0.43	0.42	0.49
Number of male directors (*nmdir*)	9.18	9.06	8.59	8.87	8.96	8.78	8.60	8.49	8.51	8.66
Number of female independent directors (*nfnedi*)	0.12	0.12	0.13	0.13	0.13	0.13	0.12	0.14	0.14	0.21
Number of male independent directors (*nmnedi*)	4.18	4.14	3.84	4.03	4.34	4.25	4.24	4.26	4.35	4.39
Number of female grey directors (*nfgreydir*)	0.19	0.17	0.19	0.17	0.17	0.14	0.15	0.15	0.14	0.16
Number of male grey directors (*nmgreydir)*	2.72	2.56	2.66	2.52	2.31	2.22	2.14	2.01	1.94	2.08
Percent female directors[2] (*pfdir*)	4.82	4.47	4.95	4.74	4.79	4.62	4.61	4.65	4.55	5.21
Percent of female independent directors (*pfnedi*)	1.21	1.24	1.32	1.30	1.34	1.36	1.24	1.45	1.43	2.10
Percent male independent directors (*pmnedi*)	43.96	43.97	41.45	44.04	46.53	46.54	47.46	48.28	49.25	48.46
Percent female grey directors on board (*pfgreydir*)	2.11	1.82	2.08	1.81	1.78	1.57	1.67	1.58	1.50	1.67
Percent male grey directors on board (*pmgreydir*)	27.40	26.48	27.81	25.90	23.76	23.36	22.90	21.86	20.88	22.21
Firm level variables										
Adj.Tobin's Q *(qratio)*	0.85	1.21	1.27	1.42	1.00	1.09	1.24	1.06	1.05	1.12
ROA *(ROA)*	0.15	0.15	0.15	0.15	0.14	0.13	0.13	0.12	0.11	0.13
Size *(size)*	8.31	8.43	8.54	8.70	8.79	8.87	8.96	9.02	9.14	9.35
Age *(age)*	31.67	30.84	29.69	29.57	30.08	31.03	31.28	32.06	33.59	35.74
Leverage *(levrg)*	1.11	1.32	1.11	1.30	2.71	1.74	1.29	1.62	2.18	2.09
No of firms	612	728	898	1048	1093	1162	1250	1266	1201	960

[1]: Proportion of sample observations [2]: all percentages are computed with respect to board size

Table 3(b): Summary Statistics of Board and Firm Level Variables by Control Types (Sample Means)

	Family Ownership Control		**Family Management Control**			
	FAM=0	**FAM=1**	**Ctrl_type 1**	**Ctrl_type 2**	**Ctrl_type 3**	**Ctrl_type 4**
	Promoter ownership <20 per cent	**Promoter Ownership >=20 per cent**	**No Control**	**Full Control**	**Operation Control**	**Strategic Control**
Board Level Variables						
Board size *(bodsize)*	9.70	9.17	9.58	9.12***	8.52***	9.40*
Has female director (*dfdir*)[1]	0.32	0.35	0.28	0.37***	0.35***	0.33**
Has one female director (*onefdir*)[1]	0.25	0.27	0.22	0.29***	0.29***	0.23
Has female independent director (dfnedi)[1]	0.10	0.13	0.14	0.12***	0.09***	0.13
Has female grey director (dfgreydir)[1]	0.12	0.15	0.11	0.15***	0.13*	0.19***
Has female executive director *(dfed)*	0.13	0.12	0.07	0.15***	0.17***	0.09***
Has female ceo *(dfceo)*	0.06	0.03***	0.03	0.04*	0.05**	0.01***
Has female chairperson *(dfch)*	0.01	0.03***	0.02	0.02	0.01	0.05***
Has female promoter ceo *(dfpceo)*	0.03	0.03	0.00	0.04***	0.05***	0.00
Has female promoter chairperson *(dfpch)*	0.01	0.02***	0.00	0.03***	0.00	0.05**
Number of female directors (*nfdir*)	0.39	0.44	0.37	0.47***	0.43***	0.45**
Number of female independent directors (*nfnedi*)	0.11	0.14**	0.16	0.14**	0.10***	0.13**
Number of male independent directors (*nmnedi*)	4.35	4.21	4.16	4.29***	3.77***	4.43***
Number of female grey directors (*nfgreydir*)	0.13	0.16**	0.12	0.16***	0.14	0.22***
Number of male grey directors (*nmgreydir*)	2.74	2.24***	3.25	1.76***	1.98***	2.79***
Percent female directors (*pfdir*)[2]	4.31	4.75	3.77	5.13***	5.19***	4.43***
Percent female independent directors (*pfnedi*)[2]	1.09	1.42**	1.60	1.42*	1.12**	1.28**
Percent male independent directors (*pmnedi*)[2]	45.56	46.36	43.84	47.25***	45.13**	47.79***
Percent female grey directors on board (*pfgreydir*)[2]	1.47	1.74	1.23	1.82***	1.69***	2.17***
Percent male grey directors on board (*pmgreydir*)[2]	26.79	23.74***	33.19	18.59***	21.94***	29.69***
Firm level variables						
Adj.Tobin's Q *(qratio)*	0.86	1.15***	1.33	1.05***	1.08***	1.20**
ROA *(ROA)*	0.09	0.13***	0.14	0.13***	0.13***	0.13*
Size *(size)*	9.42	8.83***	9.06	8.82***	8.40***	9.03
Age *(age)*	32.92	31.52	36.39	29.43***	25.98***	36.27
Leverage *(levrg)*	1.31	1.71**	1.93	1.67	1.63	1.45
No of firm-year observations	475	9743	2266	5225	1200	1527

[1]: Proportion of sample observations [2]: all percentages are computed with respect to board size.
***, **, * indicate significance at 1%, 5% and 10% respectively.

Table 3(c): Firms Characteristics by Number of Women Directors on Board

Firm level variables	No of Women on Board			
	None	One	Two	> Two
Board size (*bodsize*)	8.83	9.57***	10.65***	12.54***
Adj.Tobin's Q *(qratio)*	1.09	1.24***	1.19**	1.28***
ROA *(ROA)*	0.13	0.14	0.13	0.14
Size *(size)*	8.74	9.05***	9.09***	9.33***
Age *(age)*	31.32	31.91	34.38*	24.17***
Leverage *(levrg)*	1.78	1.44***	1.82	1.60
No of firm-years	6693 (65.5)	2722(26.6)	674 (6.6)	129 (1.3)

Note: Estimates in brackets is the number of firm year observations as a percentage of total firm year observations for our sample, 10218. ***, **, * indicate significance at 1%, 5% and 10% respectively.
Source: Author's computation based on a sample of 1348 companies between 2005-2014.

Table 4(a): Women Directors and Firm Performance - Regression Results (Tobin's Q)

	Two-way fixed effects (industry and year fixed effects)			Two-way fixed effects (firm and year fixed effects)		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Intercept	-0.7707**	-0.7421**	-0.7482**	-2.0763***	-1.016***	-2.0861***
dfdir	0.0715***			0.0379**		
nfdir		0.0390**			0.03642**	
pfdir			0.00249**			0.0017
bodsize	0.01158***	0.0115***	0.0133***	0.0189***	0.1828***	0.0200***
size	0.0349***	0.0356***	0.0358***	0.1285***	0.1281***	0.1287***
age	-0.0020***	0.00196***	-0.0020***			
levrg	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
industry dummies	Included	Included	Included	No	No	No
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	No	No	No	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10		10	10
Adj. R-square	0.07	0.07	0.07	0.63	0.63	0.63
Pr > F	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 4(b): Women Directors and Firm Performance - Regression Results (ROA)

ROA	Industry and Year Fixed Effects			Firm and Year Fixed Effects		
Intercept	0.1041**	-0.1065**	0.1054**	0.2241***	0.2241***	0.2221***
dfdir	0.0054*			0.0086**		
nfdir		0.0025*			0.0046**	
pfdir			0.0002*			0.0005**
bodsize	0.0021***	0.0021***	0.0023***	-0.0006	-0.0006	-0.0004
size	-0.0004	-0.0004	-0.0004	0.0122**	0.0122**	-0.0121**
age	0.0003***	0.0002***	0.0002***			
levrg	-0.0003***	0.0003***	0.0003***	-0.0001**	-0.0001**	-0.0002**
industry dummies	Included	Included	Included	No	No	No
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	No	No	No	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10		10	10
Adj. R-square	0.07	0.07	0.07	0.45	0.45	0.45
Pr > F	<0.0001	<0.0001	<0.0086	<0.0001		

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 5(a): Firm Performance and Presence of Women on Board – Tests for Endogeneity

	Tobin's Q			ROA		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Intercept	-0.3255***	-0.6138***	-1.5249	-0.3255***	-0.6138***	-1.5249
male-female_board connection	0.00064***	0.000941**	0.0070	0.00064***	0.000941**	0.0070
bodsize	0.0322***	0.0534***	0.1273***	0.0322***	0.0534***	0.1273***
size	0.0085	0.0191	0.0869	0.0085	0.0191	0.0869
levrg	-0.00038**	-0.00044**	-0.0050*	-0.00038**	-0.00044**	-0.0050*
industry dummies	No	No	No	No	No	No
time dummies	Yes	Yes	Yes	Yes	Yes	Yes
firm dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10	10	10	10
Adj. R-square	0.74	0.77	0.78	0.74	0.77	0.78
Pr > Chisq (Hausman test)	0.0532	0.0409	0.1023	0.1731	0.1453	0.2102

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 5(b): Women Directors and Firm Performance - Instrumental Variable Estimation with Fixed Effects (FE-IV)

	Tobin's Q		
	(i)	(ii)	(iii)
Intercept	-1.2990**	-1.0688*	-1.7484**
dfdir	2.4268*		
nfdir		1.6619*	
pfdir			0.2233
bodsize	-0.0574	-0.0679	-0.0077
size	0.1058**	0.0947**	0.1071**
levrg	0.0011*	0.0009*	0.0012
time dummies	Included	Included	Included
firm dummies	Included	Included	Included
No. of Obs.	10218	10218	10218
No. cross-sections	1348	1348	1348
No. of time series	10	10	10

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 6(a): Women Directors and Firm Performance – Effect of Family Ownership

	Tobin's Q IV model			ROA FE Model		
Intercept	-4.3321**	-3.8195***	-4.1027***	0.0162	0.0547	0.0331
dfdir	9.6042*			0.7850		
nfdir		6.8085**			0.5634	
pfdir			0.5415**			0.0445
fam	2.7505*	2.2428**	2.2966**	0.2443	0.2058	0.2085
dfdir xfam	-9.2321*			-0.7511		
nfdir x fam		-6.5645**			-0.5430	
pfdir x fam			-0.5134**			-0.0420
bodsize	-0.0017	-0.0095	0.0148**	-0.0022	-0.0028	-0.0008
size	0.0963**	0.1014**	0.1046**	-0.0145**	-0.0141**	-0.0138**
levrg	0.0002	0.0002	0.0002	-0.0001**	-0.0005**	-0.0001**
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	Included	Included	Included	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10		10	10

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 6(b): Women Directors and Firm Performance – Effect of Founding Family (Promoter) Influence on Boards

	Tobin's Q IV model			ROA FE Model		
Intercept	-2.3982***	-2.1730***	-2.6109***	0.2188***	0.2207***	0.2188**
dfdir	3.6534*			0.0076		
nfdir		2.7607*			0.0032	
pfdir			0.3129			0.0003
ctrl_2	1.0413**	0.9774*	1.1243	0.0058	0.0056	0.0049
ctrl_3	0.8904**	0.8389*	0.9930	-0.0006	-0.0003	0.0008
ctrl_4	0.8529*	0.7585*	0.9170	0.0041	0.0026	0.0024
dfdir x ctrl_2	-3.2114*			0.0027		
dfdir x ctrl_3	-2.9447*			0.0032		
dfdir x ctrl_4	-2.8633*			-0.0043		
nfdir x ctrl_2		-2.3355*			0.0027	
nfdir x ctrl_3		-2.1493*			0.0019	
nfdir x ctrl_4		-2.0416*			0.0004	
pfdir x ctrl_2			-0.2699			0.0004
pfdir x ctrl_3			-0.2483			-0.0001
pfdir x ctrl_4			-0.2549			0.0001
bodsize	-0.0328	-0.0445	0.0002	0.0076	-0.0006	-0.0004
size	0.1120**	0.1085**	0.0987**	-0.0006**	-0.0121**	-0.0121**
levrg	0.0008*	0.0008*	0.0008*	-0.0001**	-0.0001**	-0.0001**
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	Included	Included	Included	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10		10	10

Table 7(a): Test for Endogeneity of Presence of Women on Board – Independent Directors

	Tobin's Q			ROA		
Intercept	-0.2348**	-0.2905***	-0.9634	-0.2348**	-0.2905***	-0.9634
male-female_board connection	0.0006***	0.0008**	0.0047	0.0006***	0.0008**	0.0047
bodsize	0.0171***	0.0222***	0.0714***	0.0171***	0.0222***	0.0714***
size	0.0113	0.0091	0.0717	0.0113	0.0091	0.0717
levrg	-0.0003**	-0.00014	-0.0042*	-0.0003**	-0.00014	-0.0042*
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	Included	Included	Included	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10	10	10	10
Adj. R-square	0.61	0.66	0.66	0.61	0.66	0.66
Pr > F (Hausman test)	0.0355	0.0827	0.1198	0.1583	0.1949	0.2254

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 7(b): Women Directors and Firm Performance – Independent Directors
Instrumental Variable Estimation with Fixed Effects (FE-IV)

	IV regression for Tobin's Q			Fixed effects model for ROA		
Intercept	-1.5176**	-1.2242*	-1.7702***	0.2233***	0.2232***	0.2221***
dfnedi	2.4406**			0.0090**		
nfnedi		2.9505*			0.0069**	
pfnedi			0.3306			0.0009**
bodsize	-0.0211	-0.0428	-0.0029	-0.0005	-0.0005	-0.0004
size	0.0989**	0.0852**	0.1028**	-0.0122**	-0.0122**	-0.0122**
leverage	0.0009*	0.0010	0.0015	-0.0002**	-0.0002**	-0.0001**
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	Included	Included	Included	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10	10	10	10

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 8: Women Directors and Firm Performance – Grey Directors
Fixed Effects (FE) Estimation

	FE model for Tobin's Q			FE model for ROA		
Intercept	-2.09160***	-2.0911***	-2.0894***	0.2211***	0.2211***	0.2213***
dfgreydir	-0.018230			0.0012		
nfgreydir		-0.01320			0.0010	
pfgreydir			-0.0021			0.0001
bodsize	0.0205***	0.0205***	0.0203***	-0.0003	-0.0003	-0.0003
size	0.1288***	0.1288***	0.1288***	-0.0121**	-0.0121**	-0.0121**
levrg	0.0001	0.0001	0.0001	-0.0002**	-0.0002**	-0.0002**
time dummies	Included	Included	Included	Included	Included	Included
firm dummies	Included	Included	Included	Included	Included	Included
No. of Obs.	10218	10218	10218	10218	10218	10218
No. cross-sections	1348	1348	1348	1348	1348	1348
No. of time series	10	10	10	10	10	10

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 9: Regulatory Changes and Addition of Women Director on Board - Difference-in-Difference Analysis

The effect of announcement of draft bill in 2011 and the mandate of Companies act 2013 is analyzed through difference-in-difference methodology. *treatment1*, *treatment2* and *treatment3* are dummy variables that equal one for firms who have appointed one women director between 2012-2015, 2012-2013 and 2014-2015 respectively. Accordingly the time effects *after1*, *after2* and *after3* are assigned that equals one for 2012 and after, 2012 &2013, 2014 & 2015 respectively to capture the effect of post announcement of 2011, post 2011 but before 2013 mandate, and after 2013 mandate. The interaction terms *after*treatment* are assigned respectively between each type of *after* and *treatment.*

	Tobin's Q			**ROA**		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Intercept	-1.466***	-1.175***	-1.440***	0.076***	0.074***	0.098***
treatment1	-0.003			0.014***		
treatment2		0.009			0.005	
treatment3			0.003			0.015***
after1	0.643***			-0.051***		
after2		-0.112***			-0.021***	
after3			0.488***			-0.048***
after1 x treatment1	0.145***			0.011		
after2 x treatment2		0.012			0.007	
after3 x treatment3			0.184**			-0.004
bodsize	0.015***	0.014***	0.016***	0.003***	0.003***	0.002***
pct_indmdir(x100)	-0.023***	-0.025***	-0.023***	-0.033***	-0.033***	-0.026***
size	0.036***	0.038***	0.077***	-0.002**	-0.003***	-0.003**
age	-0.003***	-0.003***	-0.000	0.000***	0.000***	0.000***
leverage	-0.001	-0.000	-0.000	-0.001***	-0.001***	-0.001**
fam	0.624***	0.640***	0.199***	0.027***	0.031***	0.011
industry dummies	included	Included	Included	Included	Included	Included
year dummies	included	Included	Included	Included	Included	Included
Number of observations	5196	5267	4405	5196	5267	4405
Adj. R-square	0.12	0.10	0.13	0.09	0.09	0.09

Table 10: Regulatory Changes and Addition of Grey Women Director on Board: Difference-in-Difference Analysis

The effect of announcement of draft bill in 2011 and the mandate of Companies act 2013 is analyzed through difference-in-difference methodology. *treatment1*, *treatment2* and *treatment3* are dummy variables that equal one for firms who have appointed one grey women director between 2012-2015, 2012-2013 and 2014-2015 respectively. Accordingly the time effects *after1*, *after2* and *after3* are assigned that equals one for 2012 and after, 2012 &2013, 2014 & 2015 respectively to capture the effect of post announcement of 2011, post 2011 but before 2013 mandate, and after 2013 mandate. The interaction terms *after*treatment* are assigned respectively between each type of *after* and *treatment.*

	Tobin's Q			**ROA**		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Intercept	-1.482***	-1.178***	-1.442***	0.072***	0.074***	0.096***
treatment11	-0.082*			0.001		
treatment21		-0.060			0.006	
treatment31			-0.113***			-0.006
after1	0.750***			-0.034**		
after2		-0.113***			-0.021***	
after3			0.606***			-0.045***
after1 x treatment11	0.012					
after2 x treatment21		0.090		0.005	0.028	
after3 x treatment31			0.115			0.012
bodsize	0.016***	0.014***	0.017***	0.003***	0.003***	0.003***
pct_indmdir	-0.002***	-0.002***	-0.001***	-0.000***	-0.000***	-0.000***
size	0.036***	0.038***	0.076***	-0.002	-0.003**	-0.003**
age	-0.003***	-0.003***	-0.001	0.000***	0.000***	0.000***
leverage	-0.001***	-0.001	-0.001	-0.001***	-0.001***	-0.001**
fam	0.633***	0.641***	0.204***	0.030***	0.032***	0.013
industry dummies	included	Included	Included	Included	Included	Included
year dummies	included	Included	Included	Included	Included	Included
Number of observations	5196	5267	4405	5196	5267	4405
Adj. R-square	0.12	0.10	0.13	0.09	0.09	0.09

Note: *, **, *** indicate significance at 10%, 5% and 1% respectively.
Source: Author's computations based on a sample of 1348 companies between 2005-2014.

Table 11: Regulatory Changes and Addition of Independent Women Director on Board: Difference-in-Difference Analysis

The effect of announcement of draft bill in 2011 and the mandate of Companies act 2013 is analyzed through difference-in-difference methodology. *treatment1*, *treatment2* and *treatment3* are dummy variables that equal one for firms who have appointed one independent women director between 2012-2015, 2012-2013 and 2014-2015 respectively. Accordingly the time effects *after1*, *after2* and *after3* are assigned that equals one for 2012 and after, 2012 &2013, 2014 & 2015 respectively to capture the effect of post announcement of 2011, post 2011 but before 2013 mandate, and after 2013 mandate. The interaction terms *after*treatment* are assigned respectively between each type of *after* and *treatment.*

	Tobin's Q			**ROA**		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Intercept	-1.452***	-1.172***	-1.431***	0.075***	0.074***	0.098***
treatment12	0.069**			0.012***		
treatment22		0.024			0.003	
treatment32			0.061**			0.020***
after1	0.664***			-0.044***		
after2		-0.113***			-0.021***	
after3			0.542***			-0.042***
after1 x treatment12	0.156**			0.009		
after2 x treatment22		0.066			-0.004	
after3 x treatment32			0.148			-0.015
bodsize	0.014***	0.014***	0.015***	0.003***	0.003***	0.002***
pct_indmdir	-0.002***	-0.002***	-0.002***	-0.000***	-0.000***	-0.000***
size	0.035***	0.038***	0.076***	-0.002	-0.003**	-0.003**
age	-0.003***	-0.003***	-0.000	0.000***	0.000***	0.000***
leverage	-0.000	-0.001	-0.000	-0.001***	-0.001***	-0.001***
fam	0.616***	0.639***	0.192***	0.028***	0.032***	0.011
industry dummies	included	Included	Included	Included	Included	Included
year dummies	included	Included	Included	Included	Included	Included
Number of observations	5196	5267	4405	5196	5267	4405
Adj. R-square	0.13	0.10	0.13	0.09	0.09	0.09

*, **, *** indicate significance at 10%, 5% and 1% respectively.

Source: Author's computations based on a sample of 1348 companies between 2005-2014.