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**LIMITED PROGRESS?
THE EFFECT OF EXTERNAL PRESSURE FOR BOARD GENDER DIVERSITY ON
THE INCREASE OF FEMALE DIRECTORS**

Jennifer M. Knippen
Eckerd College
4200 54th Avenue S.
St. Petersburg, FL 33711
knippejm@eckerd.edu

Wei Shen
Arizona State University
WP Carey School of Business
30 E. Lemon Street
Tempe, AZ 85287
weishen@asu.edu

Qi Zhu
Arizona State University
WP Carey School of Business
30 E. Lemon Street
Tempe, AZ 85287
qzhu23@asu.edu

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Keywords:

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ABSTRACT

This study explores how external pressure for board gender diversity influences the increase of female directors. We propose that while external pressure has a positive effect on the increase of female directors on boards, it heightens the salience of gender in new director selection, making incumbent male directors more likely to treat the new female directors as outgroup members and consequently more likely to add them through addition of board seats rather than substitution of male directors. We further predict that new female directors added through additional board seats are less likely to serve on major board committees than those added through substitution of male directors. Results from a large sample of S&P 1500 firms during 2004 to 2015 provide support our theoretical predictions.

MANAGERIAL SUMMARY

Our study intends to enhance the understanding of how external pressure influences a firm's decision to increase the number of female directors on the board. We find that, although external pressure makes firms more likely to increase female directors, firms tend to do it through the addition of board seats rather than through the replacement of incumbent male directors to the extent that the increase is a response to the external pressure. Moreover, we find that new female directors added through addition of board seats are less likely to serve on major board committees than those added through replacement of male directors. These findings suggest that external pressure has a positive but limited effect on countering the gender bias on corporate boards toward female directors.

Keywords:

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INTRODUCTION

Although the low presence of women on corporate boards and major board committees has been long noticed (e.g., Daily, Dalton, and Certo, 1999; Harrigan, 1981; Useem, 1984), only recently have organizational scholars started to investigate more closely the barriers that hinder women's ascension onto corporate boards (Kogut, Colomer, and Belinky, 2014; Terjesen, Sealy, and Singh, 2009). A nascent but growing body of research reveals the existence of a gender-based intergroup bias in boardrooms that puts women at a disadvantage in obtaining board appointments (McDonald and Westphal, 2013; Westphal and Stern, 2006, 2007; Zhu, Shen and Hillman, 2014). According to this research, corporate directors, who are predominantly men, have a more favorable attitude toward men over women in new director selections because of their tendency to categorize men as ingroup members and women as outgroup members based on gender. Social psychological research has consistently shown that people treat ingroup members more favorably than outgroup members (Bodenhausen, Kang, and Peery, 2012; Hewstone, Rubin, and Willis, 2002). Thus, to increase the presence of women on boards and major board committees, it is important to counter this gender-based intergroup bias in director selections.

Our study attempts to contribute to the growing research on this important issue by investigating the extent to which external pressure for greater board gender diversity can help counter gender-based intergroup bias. The low presence of women on corporate boards has generated significant public interest and pressure for greater board gender diversity. For example, activists, advocacy groups, and the media have constantly called for firms to break the "glass ceiling" women face in director selection (Blackman, 2004; Catalyst, 1993; Economist, 2011). Scholars and proponents of corporate governance reforms have also long urged firms to increase board gender diversity to improve the quality of board decisions (Adams and Ferreira,

2009; Forbes and Milliken, 1999; Higgs, 2003). Moreover, having no female director creates a negative image and places the firm at risk of losing support from key stakeholders such as investors, suppliers, and customers who value equal opportunity for women (Hillman, Cannella and Shropshire, 2007). Thus, there have been constant external calls and pressure for firms to increase the presence of female directors (Kogut et al., 2014; Terjesen et al., 2009).

We develop a theory to suggest that this external pressure for greater board gender diversity has a positive but limited effect to counter the gender-based intergroup bias in corporate boardrooms. Specifically, our theory first predicts that firms under stronger external pressure for greater board gender diversity are more likely to increase the number of female directors, indicating a positive effect of this pressure. We then suggest that the external pressure does not help to eliminate gender-based intergroup bias; instead, it heightens the salience of gender in the selection process, making incumbent male directors more likely to view the new female directors as outgroup members. As a result, we predict that firms are more likely to increase female directors through addition of board seats rather than through substitution of male directors to the extent that the increase is a response to the external pressure for greater board gender diversity. Underlying this prediction is the argument that when firms increase female directors through addition of board seats rather than substitution of male directors, it reflects the existence of an intergroup bias in which incumbent male directors view the new female directors as outgroup members. To corroborate this argument, we further predict that new female directors added through addition of board seats are less likely to serve on major board committees than new female directors added through substitution of male directors, building on the recent finding that new directors viewed as outgroup members by the incumbents are less likely to serve on major board committees than new directors viewed as ingroup members (Zhu et al., 2014). Using

longitudinal data from the S&P 1500 firms between 2004 and 2015, we obtain results that support our theoretical predictions.

Our study makes several important contributions. First, it contributes to the literature on board diversity. Studies on the appointments of female directors show that a large majority of firms now have the presence of at least one woman on their boards (Farrell and Hersch, 2005; Hillman et al., 2007). In this context, it becomes increasingly important to understand what forces can help to further increase board gender diversity. However, extant research primarily focuses on the persistence of homogeneity on corporate boards and the social barriers such as intergroup bias that hinder the increase of board diversity (e.g., Domhoff, 2002; Kogut et al., 2014; McDonald and Westphal, 2013; Westphal and Stern, 2006, 2007). One exception is the recent study by Zhu et al. (2014), which investigates how incumbent directors address external pressure for board diversity and intergroup bias by selecting new directors who are different from them in some demographic attributes but similar in others. For example, incumbent male directors may select a female who is similar to them in ethnicity, age, education, and functional background so that they can meet the external demand for greater board gender diversity while simultaneously overcoming their outgroup bias against females by recategorizing the new female director as an ingroup member based on her similarity with them in other demographic attributes. Although Zhu et al. (2014) acknowledged external pressure as a driving force for greater board diversity, they assumed rather than empirically investigated its effect. In contrast, our study directly predicts and finds that firms are more likely to increase female directors if they are under stronger external pressure for greater board gender diversity. Meanwhile, our findings about the means firms use to increase female directors as well as its impact on the new female directors' membership on major board committees suggest that the external pressure for greater board

gender diversity is limited in its effect to counter the intergroup bias against female directors on corporate boards. These findings have important implications for understanding indicators of intergroup bias on the board and the effects of board gender diversity on firm performance.

Our study also contributes to theories and research on organizational response to external pressure in the adoption of socially desirable practices. Although some scholars have long argued that organizations do not passively conform to external demands (Oliver, 1991), the literature on this topic is still limited as only a few studies have examined the adoption of socially desirable practices (Greenwood et al., 2008), such as long-term incentive plans (Westphal and Zajac, 1994, 1998), environmental management system (Boiral, 2007), and work-family programs (Ingram and Simons, 1995). Together with Zhu et al. (2014), our study extends this research to another important issue, namely, organizational response to external pressure for greater board diversity. While Zhu et al. (2014) focus on the selection of new directors who are both similar to and different from incumbent directors, our study introduces the means of increasing female directors through addition of board seats as a response. Given that boards normally add new directors through substitution of incumbent directors to avoid an increase in board size (Adams, Hermalin, and Weisbach, 2010; Farrell and Hersch, 2005), our theory and supportive findings suggest that some firms choose to increase board size to reconcile the tension between the external pressure for greater gender diversity and the intergroup bias on their boards toward female directors.

Lastly, our study has important implications for research on female directors' influence over board decisions. Prior research shows that female directors tend to have less influence over board decisions than male directors due to the dominance of male directors and the existence of intergroup bias in corporate boardrooms (Westphal and Milton, 2000). Our study contributes to this research by suggesting that the means firms use to increase female directors may also affect

female directors' influence over board decisions. Specifically, female directors joined through addition of board seats are more likely to be viewed as outgroup members, thus are less likely to serve on major board committees and have less influence over board decisions. To better understand female directors' impact on board decisions and firm performance, researchers shall not only pay attention to their presence on the board (Abdullah, Ismail, Izah, and Nachum, 2014; Chen, Crossland, & Huang, 2014) but also the means through which they are added to boards.

THEORY AND HYPOTHESES

Intergroup bias and Low Presence of Women on Corporate Boards

One of the social barriers that puts women at a disadvantage in obtaining board appointments is the existence of a gender-based intergroup bias on corporate boards (McDonald and Westphal, 2013; Westphal and Stern, 2006, 2007; Zhu et al., 2014). Research in social psychology consistently shows that people routinely categorize others as ingroup or outgroup members based on their similarity or difference along salient, readily visible demographic attributes such as gender (Bodenhausen et al., 2012; Tajfel, 1982). Moreover, there is strong evidence suggesting that social categorization based on gender tends to happen automatically without conscious awareness (Islam and Hewstone, 1993; Ito and Urland, 2005; Schaller and Conway, 2000). This social categorization leads to intergroup bias, where people treat ingroup members more favorably than outgroup members (Hewstone, 1990; Hewstone et al., 2002). For example, people tend to view ingroup members as being more competent, cooperative, and trustworthy than outgroup members (Brewer, 1991; Pettigrew, 1998).

In the context of corporate boards dominated by men, social categorization based on gender places women at a disadvantage in director selections because incumbent male directors tend to categorize women as outgroup members and have a less favorable intergroup bias toward

their board appointments (Westphal and Stern, 2006, 2007). According to research on intergroup relations, a primary component of intergroup bias is the “ultimate attribution error”, in which people tend to attribute outgroup members’ success to external conditions and their failure to internal, dispositional factors (Chatman and von Hippel, 2001; Hewstone, 1990). Consistent with this research, there is evidence that men tend to implicitly presume that high-achieving women benefit from external help such as affirmative action for their career success, while perhaps unknowingly discounting their competence and dedication (Kane and Whipkey, 2009). Compared to female directors, male directors are more likely to attribute the low presence of women on corporate boards to a lack of qualified female candidates (Green, 2012; Women Corporate Directors, 2016). Because of this intergroup bias, incumbent male directors tend to have a less favorable attitude toward women in director selections, making women less likely to obtain board appointments than men (Westphal and Stern, 2006, 2007). There is also evidence that intergroup bias makes first-time female directors receive less mentoring from senior male directors, which results in fewer subsequent board appointments for them relative to first-time male directors (McDonald and Westphal, 2013).

Despite the intergroup bias of incumbent male directors that places women at a disadvantage in obtaining board appointments, there has been an increase of female directors over the past 20 years (Adams and Ferreira, 2009; Terjesen et al., 2009). To explain this increase of board diversity, Zhu et al. (2014) propose and find that incumbent directors are more likely to select female directors who are similar to them in other salient demographic attributes so that they are able to “reategorize” these new directors as ingroup members. Implicit in their study is the assumption that incumbent directors are pushed by external pressure to increase board diversity; as a result, the selection of new directors who are different from the incumbent

directors in some attributes but similar to them in others is a response that helps to reconcile the tension between the external pressure for greater board diversity and the incumbent directors' preference for ingroup members who are similar to them. To further enhance the understanding of the extent to which external pressure helps to counter intergroup bias in corporate boardrooms, next we propose our theory and hypotheses about how external pressure for greater board gender diversity affects the increase of female directors, the means firms use to increase female directors, and the new female directors' membership on major board committees.

External Pressure and Increase of Female Directors

Advocates and the media have been long calling for firms to increase the number of women on corporate boards for both social and strategic reasons (Blackman, 2004; Catalyst, 1993; Higgs, 2003). For example, a greater presence of female directors can create a positive image for the firm by promoting diversity and demonstrating equal opportunity for women (Catalyst, 1993). Some scholars argue that this positive image could result in a competitive advantage for a firm by allowing it to gain support from key stakeholders such as suppliers, customers, and investors and access to valuable resources (e.g., Hillman et al., 2007). Moreover, female directors can bring in unique expertise and perspectives to improve board decisions and corporate governance practices (Higgs, 2003). There is empirical evidence suggesting that female directors tend to be more diligent in carrying out their fiduciary duties than male directors (e.g., Adams and Ferreira, 2009). Because of these social and strategic reasons, proponents of equal opportunity for women and advocates of corporate governance reforms have been constantly urging firms to increase female directors (Terjesen et al., 2009; Zhu et al., 2014). Some advocacy organizations such as Catalyst track the presence of women on corporate boards annually and have publicized their reports for many years, in an effort to create external pressure for firms to increase board gender

diversity (Adams and Ferreira, 2009; Economist, 2011; Terjesen et al., 2009).

Research has shown that external pressure plays an important role in the diffusion of organizational practices (DiMaggio and Powell, 1983; Scott, 2001), including socially desirable practices that firms are initially reluctant to adopt (Greenwood et al., 2008; Oliver, 1992). For example, although many CEOs dislike long-term incentive plans (LTIPs) such as stock options and restricted stocks that increase their compensation risk, LTIPs have been increasingly adopted in U.S. firms to satisfy societal demands for greater incentive alignment between CEOs and shareholders (Westphal and Zajac, 1994; 1998). Similarly, many other socially desired practices, such as Equal Employment Opportunity Affirmative Action (Edelman, 1992) and work-family programs (Goodstein, 1994; Ingram and Simons, 1995), were met with resistance in the beginning but ultimately adopted by firms due to external pressure (Greenwood et al., 2008).

Although external pressure influences organizational decisions, firms are not equally responsive to societal demands (Oliver, 1991). Prior research (e.g., Goodstein, 1994; Ingram and Simons, 1995; Westphal and Zajac, 1998) suggests that firms are more likely to respond to societal demands when they are under greater external pressure. Such a relationship between external pressure and firm response can be especially true for the issue of board gender diversity, because of male directors' predominance on corporate boards and their intergroup bias in new director selections (McDonald and Westphal, 2013; Westphal and Stern, 2007). In this context, stronger external pressure will be more effective to counter incumbent male directors' intergroup bias against the appointments of female directors. Indeed, earlier studies showed that firms were more likely to have a presence of women on their boards when they were under stronger external pressure to appoint female directors (e.g., Hillman et al., 2007). We thus expect that the external

pressure for greater board gender diversity continues to exert a strong effect, making a firm more likely to increase the number of female directors when it is under stronger external pressure.

Hypothesis 1: A firm is more likely to increase the number of female directors when it is under stronger external pressure for greater board gender diversity.

Presence of multiple female directors on the board. Meanwhile, we expect a firm to face less external pressure if it has a presence of multiple (i.e., more than one) female directors on the board. In other words, we theorize the presence of multiple female directors on the board to be a key factor that reduces the external pressure for a firm to increase board gender diversity. Although the percentage of firms with a presence of female directors has increased significantly over time, most of these firms still have a very low representation of female directors, often featuring only one female director on the board (Farrell and Hersch, 2005; Hillman et al., 2007). A number of scholars thus point out that the current status of many firms with only one woman on the board is more an indication of symbolic tokenism rather than substantive improvement in board gender diversity (Kanter, 1977; Terjesen et al., 2009; Torchia, Calabro, and Huse, 2011). In this context, firms with no woman or a token representation of only one woman on the board are likely to be under strong pressure from proponents, advocacy organizations, and the media as they continue to push for greater board gender diversity (Economist, 2011; McGregor, 2016; Torchia et al., 2011). In contrast, the presence of multiple women on the board can help a firm avoid negative publicity and reduce the external pressure, as the firm can claim that its board is more diverse than others. Indeed, because of the overall low presence of female directors on corporate boards, firms with multiple female directors tend to be lauded as frontrunners in the promotion of board gender diversity. For example, Catalyst recognizes these firms as its “Blue Ribbon Board” members (Catalyst, 1999; McGregor, 2016). Given that the increase of female

directors is still primarily driven by external pressure to surmount the intergroup bias favoring men in director selections (Economist, 2011; Kogut et al., 2014; Terjesen et al., 2009), we predict that a firm with multiple women on its board is less likely to increase the number of female directors because it is under less external pressure than firms with no woman or only one woman on the board.

Hypothesis 2: A firm is less likely to increase the number of female directors if it has multiple women on the board.

The Means Firms Use to Increase Female directors

The degree to which an increase of female directors is a response to the external pressure is likely to influence the means the firm uses to add a new female director to its board. There are two means firms can use to increase the number of female directors. One is through substitution of male directors, in which they substitute incumbent male directors with new female directors while keeping board size unchanged. The other is through addition of board seats, in which they increase the number of board seats to accommodate the addition of new female directors while keeping the number of male directors unchanged. Firms normally add new directors through the substitution of incumbent directors to avoid an increase in board size (Adams et al., 2010), and there is also evidence that the average board size has become smaller (e.g., dropping from 12.13 in 1990 to 11.26 in 1999 among the Fortune 1000 firms, as shown in Farrell and Hersch [2005: 92]). Given this background, we contend that the means firms use to increase female directors may reflect whether incumbent male directors view the new female directors as ingroup or outgroup members. Specifically, when they view the new female directors as ingroup members, they are more likely to add them through the substitution of male directors. In contrast, when they view the new female directors as outgroup members, they are more likely to add them

through the addition of board seats to reconcile the tension between the external pressure for greater gender diversity and the intergroup bias toward the new female directors.

Although external stakeholders can pressure firms to increase the number of female directors on their boards, it takes time to reduce the negative consequences of intergroup bias in the corporate elite toward women. Moreover, an increase in the number of female directors on a board does not mean that the incumbent directors truly embrace the idea of board gender diversity or equal opportunity for women (Lukas, 2018). Research shows that firms that adopted socially desirable practices such as long-term incentive plans, environmental management systems, and Affirmative Action policies did not always implement them in actions; instead, many firms adopted these practices only symbolically to pacify external and internal demands (Boiral, 2007; Edelman, 1992; Westphal and Zajac, 1994). Such symbolic adoptions indicate that these firms did not truly embrace the principles underlying the practices but were primarily driven by the motive for social approval, particularly when these socially desirable practices are adopted under strong external or internal pressure (Boiral, 2007; Westphal and Zajac, 1998). Similarly, we expect that an increase of female directors is more likely to be a symbolic action driven by the motive for social approval when it is more a response to the external pressure for greater board gender diversity.

In this context, incumbent male directors are more likely to view the new female directors as outgroup members because gender tends to be more salient in the selection process to the extent that the new female directors' selections are a response to the external pressure for greater board gender diversity. When firms decide to add new female directors in response to the external social pressure, gender is a primary consideration in the identification of new director candidates. Although gender is generally a salient demographic attribute due to high visibility, its

salience is significantly heightened in this type of situation and consequently increases incumbent male directors' tendency to use it in their categorization of the new female directors (Bodenhausen et al., 2012; Tajfel, 1982). In contrast, when the increase of female directors is not driven by external pressure for greater board gender diversity, the new female directors' gender will not be of the same level of salience because it is not an emphasized criterion in the identification of new director candidates. In other words, the new female directors' professional qualifications become the primary selection criteria rather than gender. Consequently, they are less likely to be judged or categorized by incumbent male directors based on gender. Overall, the above arguments suggest that incumbent male directors are more likely to use gender to categorize new female directors as outgroup members to the extent that the new female directors are added in response to the external pressure for greater board gender diversity.

Because of the predominance of the incumbent male directors on most corporate boards, whether they categorize the new female directors as ingroup or outgroup members can influence the means boards use to add the new female directors. When incumbent male directors do not view a new female director as an outgroup member, they are likely to treat her as equivalent to a fellow male director and thus will support the decision to add her through the substitution of a fellow male director. Indeed, given that the addition of the new female director in this situation is not a response to the external pressure for greater board gender diversity, incumbent directors likely choose her to substitute the departing male director because of her unique expertise rather than her gender. In contrast, when incumbent male directors categorize a new female director as an outgroup member, they are likely to view her less favorably than fellow male directors whom they categorize as ingroup members because of intergroup bias (McDonald and Westphal, 2013; Westphal and Stern, 2007). Consequently, they may not treat her as equivalent to a fellow

ingroup male director. This intergroup bias based on gender may make incumbent male directors less willing to substitute a fellow ingroup male director with the new female director. To resolve the tension between their outgroup categorization of the new female director and the need to pacify the external pressure for greater board gender diversity, incumbent male directors likely choose to accommodate the new female director by adding a new board seat as a compromise. To the extent that an increase in the number of female directors is a response to the external pressure for greater board gender diversity, we expect that incumbent male directors are more likely to categorize the newly selected female directors as outgroup members and add them through the addition of board seats rather than the substitution of male directors.

Hypothesis 3: Among firms that increase female directors, they are more likely to add the new female directors through addition of board seats to the extent that the increase is a response to the external pressure for greater board gender diversity.

We predicted earlier that firms with a presence of multiple female directors tend to be under less external pressure for greater board gender diversity and thus are less likely to increase female directors in response. This prediction, however, does not eliminate the possibility for these firms to increase the number of female directors. Instead, it only suggests that when these firms increase the number of female directors, the increase is less likely to be a response to the external pressure for greater board gender diversity. As a result, we expect the increase to be more likely driven by the new female directors' human and social capital that these firms believe may help them to gain a competitive advantage (Castanias and Helfat, 2001). The fact that these firms have multiple female directors on their boards, as opposed to having no woman or a token presence of only one woman on the board, indicates that their incumbent male directors are not likely to have a strong intergroup bias against female directors; otherwise, they would not have

appointed multiple female directors. Moreover, having multiple female directors on the board provides incumbent male directors more opportunities to interact directly with female directors in board meetings. These direct interactions can help further reduce gender-based intergroup bias on the board because they enable the incumbent male directors to learn more about the female directors at a personal level, and consequently are more likely to treat them as individuals of unique qualities rather than stereotyped members of a social category (Hewstone et al., 2002; Pettigrew, 1998). Therefore, when firms with a presence of multiple female directors decide to add new female directors, it is less likely to be driven by the external pressure for greater board gender diversity and the incumbent male directors are thus less likely to categorize the new female directors as outgroup members based on gender. Consequently, we expect these firms to be more willing to add the newly selected female directors through the substitution of male directors and less likely to add them through the addition of board seats.

Hypothesis 4: Among firms that increase female directors, they are less likely to add the new female directors through addition of board seats if they have a presence of multiple female directors on the board.

New Female Directors' Membership on Major Board Committees

Our theory so far suggests that the means a firm uses to increase female directors (addition of board seats versus substitution of male directors) may reflect whether incumbent male directors categorize a new female director as an outgroup member based on gender. Following this theoretical proposition, we further predict that the means firms use to increase female directors influences the new female directors' likelihood to serve on major board committees, such as the audit, compensation, nomination and governance committees. Prior research suggests that directors who serve on major board committees tend to have more influence over board decisions

(Conyon and Peck, 1998; Finkelstein et al., 2009). Although it is long established that female directors are less likely to serve on major board committees than male directors (Bilimoria and Piderit, 1994; Kesner, 1988), some female directors do obtain membership on these committees. Thus, some scholars have started to investigate factors that may increase female directors' likelihood of obtaining membership on major board committees, such as their expertise from a resource dependency perspective (e.g., Peterson and Philpot, 2007). The recent study by Zhu et al. (2014) is particularly relevant to ours because it suggests that new female directors are less likely to serve on major board committees to the extent that they are categorized as outgroup members based on their difference with incumbent directors along gender and other salient demographic attributes. We extend their study by focusing on the means firms use to add the new female directors as an indicator of whether incumbent directors categorize them as ingroup or outgroup members, as opposed to the new female directors' similarity and difference with incumbent directors along gender and other demographic attributes studied by Zhu et al. (2014).

According to our theory, when firms add new female directors through addition of board seats rather than substitution of male directors, it likely indicates that the incumbent male directors categorize these new female directors as outgroup members based on gender. Social categorization theory and intergroup bias research consistently shows that people tend to have a less favorable attitude toward outgroup members, viewing them as less competent or trustworthy (Chatman and Von Hippel, 2001; Hewstone, 1990; Hewstone et al., 2002). Because serving on a major board committee can enhance one's influence over board decisions (Finkelstein et al., 2009), incumbent male directors may not be willing to elect the new female directors, whom they categorize as outgroup members, onto major board committees (Zhu et al., 2014). In contrast, when firms add new female directors through substitution of male directors, our theory

suggests that incumbent male directors are more likely to view these new female directors as equals and less likely to have an unfavorable attitude toward them. Consequently, they are less likely to discriminate against these new female directors in major board committee elections. Thus, compared with new female directors added through substitution of male directors, we expect that new female directors added through addition of board seats are less likely to serve on major board committees.

Hypothesis 5: Among firms that increase female directors, new female directors added through addition of board seats are less likely to serve on major board committees than new female directors added through substitution of male directors.

METHODS

Sample and Data

Our sample consists of all the U.S. companies listed in the S&P Composite 1500 from 2004 to 2015. Standard and Poor's created the Composite 1500 Index by combining its Large-Cap 500 Index (firms with a market capitalization of at least \$4 billion), Mid-Cap 400 Index (firms with a market capitalization between \$1 billion and \$4 billion), and Small-Cap 600 Index (firms with a market capitalization between \$300 million and \$1 billion). The S&P 1500 Index thus is a broad market portfolio, covering approximately 85% to 90% of the U.S. equity market capitalization (Standard and Poor's, 2010). Compared with prior research on female directors that focused primarily on large firms (Terjesen et al., 2009), our study had a more representative sample of U.S. firms by including firms with medium or small market capitalizations.

We gathered data from multiple sources. A primary source for board and director data was the BoardEx Database, complemented by Directors Dataset compiled by the Investor Responsibility Research Center, company annual reports, proxy statements, *Marquis' Who's*

Who, and *Business Week's Executive Profile and Biography*. We collected data on firm size and performance from COMPUSTAT, institutional ownership from Thompson Reuters, and industry employment data from the Bureau of Labor Statistics. After deletions of observations with missing data and firms without at least two successive years of data, we had 1,699 firms and 14,325 firm-year observations that were used to test the hypotheses on the likelihood of a firm to increase the number of female directors (H1 and H2).

To test the hypotheses about the means a firm uses to increase female directors (H3 and H4) as well as the new female directors' likelihood of getting on major board committees among firms that increase female directors (H5), we first identified 1,940 firm-year observations that experienced an increase in the number of female directors from the prior year using the longitudinal data described above. These observations involved 1,543 individual women who joined as new directors. We then collected information about their demographics and membership on major board committees. After deleting observations with missing data, we had a final sample of 1,578 observations that consisted of 987 firms and 1,310 individuals.

Measures

Dependent variables. To test our hypotheses about the likelihood of a firm to increase female directors, we measured the *increase of female directors* as a dummy variable. We coded it 1 if there was an increase in the number of female directors at the firm from the prior year ($t-1$) and 0 otherwise. We found it to be very rare for a firm to increase the number of female directors by two or more in a single year, which happened in less than 1% of the cases in our sample. To ensure that an increase in the number of female directors was not a temporary arrangement in anticipation of an incumbent female director's retirement, we checked the number of female directors in year $t+1$ and kept the coding as 1 only if the increase was maintained in year $t+1$.

We also measured the means a firm used to increase female directors as a dummy variable, which was coded 1 if the increase was accompanied by an increase in board size (measured by the number of directors) at the firm from the prior year ($t-1$). When there was an increase in the number of female directors but no increase in board size, it indicated that the increase of female directors was done through substitution of male directors and consequently was coded 0. We named this variable *increase through addition of board seats*. Again, to ensure that an increase in board size was not a temporary arrangement in anticipation of some incumbent male directors' upcoming retirements, we checked board size in year $t+1$ and kept the coding as 1 only if the increase in board size was maintained in year $t+1$.

We used a dummy variable, *major committee membership*, to measure whether a newly added female director served on major board committees. Prior research suggests that a board often has the following four major committees: audit, compensation, nomination, and governance (Finkelstein et al., 2009; Zhu et al., 2014). We coded *major committee membership* as 1 if a newly added female director served on any of these major committees during her first three years on the board. Social categorization theory and research (Hewstone et al., 2002; Brewer and Miller, 1996) suggests that direct interactions over time may help weaken social categorization based on salient demographic attributes such as sex as people get to know each other more as unique individuals. According to this argument, after a new female director serves a few years on the board, her direct interactions with male directors over these years may have a greater impact on her membership on major board committees. We thus decided to limit the observation period to the first three years, consistent with Zhu et al. (2014). This measure enables us to conduct a rigorous test of H5, as it gives us a relatively long period to examine the effect of increase through addition of board seat (as an indicator of intergroup bias at the time of

her appointment) on a new female director's major committee membership, while limiting the potential effect of direct interactions over time on the intergroup bias toward her. We also tested H5 using the new female directors' major committee membership during their first, second, and third year, respectively, and obtained consistent results.

Independent variables. To investigate the effect of external pressure on the increase of female directors, we draw from prior research to identify three indicators that we use to capture the *external pressure* for a firm to increase female directors – firm size, industry female employment, and female directors at industry peers. Proponents and advocacy groups for greater board gender diversity have largely targeted large firms in the *Fortune* 500 list (Catalyst, 1993; Singh, 2005), which were generated on the basis of annual revenues. We thus measured *firm size* as the logarithm of annual revenues, consistent with prior studies of organizational responses to external pressure in the adoption of socially desirable practices (Ingram and Simons, 1995; Westphal and Zajac, 1994). Following Hillman et al. (2007), we measured *female employment in industry* as the ratio of women in the workforce in the firm's industry at the two-digit SIC level. Given that firms tend to treat other firms of similar size within their industry as peers (Useem, 1984), we measured the presence of *female directors at industry peers* as the average number of female directors at firms that were within the same industry at the two-digit SIC level and listed in the same S&P large-cap, mid-cap, or small-cap index as the focal firm. Lastly, we measured the *presence of multiple female directors* as a dummy variable, coding it as 1 if the firm had two or more female directors on the board and as 0 otherwise. In robustness analysis, we measured *female directors at industry peers* at the four-digit SIC level and *presence of female directors* as the ratio of female directors on the board, and the findings are essentially the same.

Control variables. In the analysis of the likelihood of a firm to increase female directors, we

included a number of board, top management, and firm characteristics to control for potential confounding effects or alternative explanations. At the board level, we first controlled for the presence of woman on the nominating committee because it may influence a firm's decision to add female directors. We measured *presence of woman on nominating committee* as a dummy variable, which was coded 1 if the firm had at least one woman on the nominating committee and 0 otherwise. In an additional analysis, we also used the number of female directors on the committee as an alternative measure and obtained consistent results. Because this alternative measure was highly skewed (less than 8 percent of the observations had more than one woman on the nominating committee), we decided to use the dummy variable in the analysis. Because firms may add new female directors to fill board vacancies or in anticipation of board vacancies caused by director turnover (Tinsley, Wade, Main and O'Reilly, 2014), we used several variables to control for this alternative explanation, including *male director turnover* (measured by the number of male directors who left the board during the year), *female director turnover* (measured by the number of female directors who left the board during the year), and incumbent directors' *average age* and *board tenure*. We also included *board size*, measured by the number of directors, to control for the possibility that firms with a larger board may be under stronger external pressure to increase female directors.

Board diversity may also influence the appointment of female directors, as there is evidence that boards are less likely to appoint female directors if they have a higher percentage of male directors who are not prototypical of corporate directors (e.g., younger and more ethnically diverse) because their identity is already threatened by the diversity of the incumbents (Gregoric, Oxelheim, Randoy, and Thomsen, 2013). We used two indicators to measure board diversity. One is the presence of *ethnic minority directors*, measured by the number of directors

who are not Caucasians. The other is board heterogeneity along six demographical dimensions beyond gender and ethnicity, including age, functional background, highest degree obtained, elite education, top executive experience, and industry background (Zhu et al., 2014). We first calculated a board's heterogeneity in each of the six dimensions using Blau's index (Westphal and Zajac, 1995; Zhu et al., 2014), and then calculated *board heterogeneity* as the sum of the standardized scores of these six measures of heterogeneity. Because boards are more likely to appoint female directors when their incumbents have more exposures to female directors on other boards (Hillman et al., 2007), we included the number of incumbent directors who had prior *ties with female directors* on other boards. We also included the *proportion of independent directors* to control for the effect of independent directors on the increase of female directors.

Top management characteristics may also influence a firm's likelihood to increase female directors. Because one argument for increasing female directors is to improve corporate governance (Adams and Ferreira, 2009; Higgs, 2003), top managers may not have incentive to do it. In addition, because CEOs and other top managers are primarily men (Helfat, Harris, and Wolfson, 2006), they may also view female directors as out-group members based on gender and have a less favorable attitude toward their appointments. On the other hand, female top managers may have a more favorable attitude toward the appointments of female directors (Terjesen et al., 2009). Our controls for top management influence thus included CEO duality, top management ownership, female CEO, and female top managers. We coded *CEO duality* as 1 if the CEO also held the board chair position and 0 otherwise. Because top managers who are on the board are likely to have more influence over director selections, we calculated *top management ownership* as the percentage of the firm's stocks owned by top managers who served on the board. We

measured *female CEO* as a dummy variable, coded 1 if the CEO was a woman. We measured *female top managers* as the ratio of female top managers over the total number of top managers.

For firm characteristics, we controlled for performance and institutional ownership. Firms with higher performance may be more able to attract directors because they have more financial resources and directors may not want to join a firm with poor performance (Boivie, Graffin, and Pollock, 2012). We first calculated firm ROA as the ratio of net income before extraordinary items over total assets, and then calculated *industry adjusted ROA* by subtracting industry mean ROA from firm ROA (Zhu et al., 2014). We measured *institutional ownership* as the ratio of firm equity owned by institutional investors, using it to control for the possibility that institutional investors may have a strong interest in promoting board gender diversity (Blackman, 2004). Lastly, we created a set of year dummies to control for the year effects.

In the analysis of the means firms used to increase female directors and new female directors' membership on major board committees, we included all the above controls for board, top management, and firm characteristics because their impacts on the increase of female directors may affect the treatments of the new female directors as well. In addition, we added new female directors' demographic characteristics to control for their potential effects, including age, ethnicity, education level, prior board appointment, similarity with incumbents, and ties with incumbents (Westphal and Stern, 2007; Zhu et al., 2014). We measured ethnicity with *ethnic minority*, which was coded 1 if the new female director is not a Caucasian and 0 otherwise. We measured education level with *advanced degree*, which was coded 3 for those who received PhD degrees, 2 for Master degree, 1 for Bachelor degree, and 0 otherwise. To control for the social status of the educational institutions they attended, we created a dummy *elite education*, which was coded 1 if they received degrees from an elite educational institution

that was on the list compiled by Finkelstein (1992) and 0 otherwise. We used a dummy variable *first board appointment* to indicate whether the appointment to the focal board was the new female director's first corporate board appointment. Following Zhu et al. (2014), we calculated a new female director's *ties with incumbent directors*, and *similarity with incumbent directors* as their degree of similarity along seven demographic dimensions, including ethnicity, age, functional background, highest degree obtained, elite education, top executive experience, and industry background. We did not include gender in the calculation because our independent variable, *presence of female directors*, was essentially about similarity in gender.

We also added several variables to control for the impacts of new female directors' career backgrounds (Peterson and Philpot, 2007). Directors with more human capital are more likely to become the members of major board committees. We measured new female directors' human capital using the number of years they served in throughput, peripheral, and output functions as well as the number of years they served in the focal firm's industry as top executives. Next, we used a dummy variable to indicate whether a new female director was an *inside director* because inside directors may be treated differently from outside directors, given that their appointments can be driven by CEO succession planning (Daily et al., 1999).

In the analysis of new female directors' board committee membership, we included two more control variables. One is *committee size*, measured by the total number of seats on the four major committees we are interested in. The other is *committee turnover*, measured by the total number of turnovers on the four major board committees. Because both committee size and committee turnover can influence the chances for a new female director to join a committee, inclusion of these two controls can help us rule out this alternative explanation.

Statistical Analyses

Because all three of our dependent variables are dichotomous, we used maximum-likelihood logistic regression to test our theory and hypotheses. The logistic regression model is fitted by the logit transformation of the probability of the event of interest (i.e., $\Pr(y = 1 | X)$, where y is the dependent variable or the event of interest and X is a vector of independent and control variables), as illustrated below:

$$\Pr(y = 1 | X) = \frac{\exp(BX)}{1 + \exp(BX)}, \text{ where } B \text{ is a vector of the regression coefficients } (\beta_i \text{ for } x_i)$$

$$\text{Logit } \Pr(y = 1 | X) = \ln \text{ odds } (y = 1 | X) = \ln \frac{\Pr(y = 1 | X)}{1 - \Pr(y = 1 | X)} = \ln(\exp(BX)) = BX$$

$$\text{Odds } (y = 1 | X) = \exp(BX)$$

The above equations show that the logit transformation takes the natural logarithm of the odds of the event of interest. They also suggest that the coefficients B in a logit model can be interpreted in a way similar to those in an ordinary least squares (OLS) regression – a positive (negative) β_i means that x_i has a positive (negative) linear relation with the natural logarithm of the odds of $y=1$. Given that the odds and the likelihood of $y=1$ increase monotonically with the increase in the natural logarithm of the odds of $y=1$, a positive (negative) β_i means that x_i has a positive (negative), though not linear, effect on the odds and the likelihood of $y=1$ (Hoetker, 2007; Wiersema and Bowen, 2009). For example, when the event of interest is the increase in the number of female directors at a firm, a statistically significant and positive β_i for independent variable x_i suggests that x_i has a positive, though not linear, effect on the occurrence of the event. Specifically, one unit increase in x_i leads to an $\exp(\beta_i)$ unit increase in the odds that a firm will increase the number of female directors. Thus, $\exp(\beta_i)$ is the odds ratio and represents the marginal effect of x_i on the odds of $y=1$ ¹.

¹ Odds ratio = $\frac{\exp[BX + \beta_i(x_i + 1)]}{\exp[BX + \beta_i x_i]} = \frac{\exp(BX) \exp(\beta_i x_i) \exp(\beta_i)}{\exp(BX) \exp(\beta_i x_i)} = \exp(\beta_i)$, which is the marginal effect of x_i on the odds of $y=1$. When odds ratio is greater than 1, it suggests x_i has a positive effect on the event of interest;

In the analysis on the likelihood of a firm to increase female directors, we have a panel data in which each firm has multiple observations that are not independent of each other. A common approach to addressing this issue is to insert firm-specific effect terms that are either fixed or vary randomly over time for each firm. Although fixed-effects models are generally the choice by default because they do not require independence between firm-specific effects and the predictors, they are not appropriate for our study because over 67% of our sample firms did not experience an increase in female directors. If we use fixed-effects models, we will lose all these firms due to the lack of change in the dependent variable. Further, it will expose our study to sample-selection bias (Berk, 1983) because our analysis will include only firms that experienced an increase in female directors (i.e., our sample will be selected on the basis of the dependent variable). Given these concerns, we decided to cluster the observations at the firm level and conduct analysis using population-averaged logistic regression models, which use generalized estimating equations (GEE) to adjust for the potential correlations between firm-specific effects and the predictors (Stata, 2003). We also used robust estimate of variance to correct for the lack of independence between observations within the same cluster (Newey and West, 1987).

In the analyses of the means firms used to increase female directors and new female directors' membership on major board committees, we included only the firm-year observations that experienced an increase in the number of female directors to test our theory and hypotheses about the different treatments experienced by the new female directors. This dataset also has some firms with multiple observations because these firms either increased female directors in two or more years or added two or more female directors in the same year. Again, we clustered the observations at the firm level to control for unobserved firm-specific effects and used robust

when odds ratio is smaller than 1, it suggests x_i has a negative effect on the event. The marginal effect of x_i (e.g., when $x_i = a$) on the probability of $y=1$ is a function of both $\exp(\beta_i)$ and the probability of $y=1$ when $x_i = a$. For a more detailed discussion of this issue, see Wiersema and Bowen (2009).

estimate of variance to correct for the lack of independence caused by clustering (Newey and West, 1987). In additional analysis, we clustered the observations at the individual level to control for unobserved individual-specific effects and obtained consistent results.

RESULTS

Table 1 provides variable means, standard deviations and correlations for our panel data, and Table 2 reports results of logistic regression on the likelihood of a firm to increase the number of female directors. In Table 2, Model 1 includes only the control variables. Model 2 adds the independent variables to test Hypothesis 1 and 2. The results show that *firm size* (odds ratio=1.192, $z=4.403$, $p<.001$), *female employment in industry* (odds ratio=1.008, $z=3.538$, $p<.001$), and *female directors at industry peers* (odds ratio=1.313, $z=5.356$, $p<.001$) all have a positive effect, while *presence of multiple female directors* (odds ratio=0.578, $z=-6.847$, $p<.001$) has a negative effect on the likelihood of a firm to increase the number of female directors. Following Wiersema and Bowen (2009), we calculated the marginal effects of these variables on the probability of a firm to increase female directors. The marginal effect of *firm size* ranges from 0.03% to 7.85%, with a mean of 3.54% ($p<.001$); the marginal effect of *female employment in industry* ranges from 0.00% to 0.21%, with a mean of 0.09% ($p<.001$); the marginal effect of *female directors at industry peers* ranges from 0.03% to 6.19%, with a mean of 2.79% ($p<.001$); and the marginal effect of *presence of multiple female directors* ranges from -0.24% to -57.09%, with a mean of -25.78% ($p<.001$). These findings provide strong support for our hypotheses about the positive impact of external pressure (H1) and the negative effect of the presence of multiple female directors (H2) on a firm's likelihood to increase the number of female directors.

[Insert Table 1 and Table 2 about here]

Table 3 provides the means, standard deviations and correlations for variables used in the analyses of the means firms used to increase female directors and the new female directors' membership on major board committees. Table 4 reports results of logistic regression on the means firms used to increase female directors, specifically, the likelihood of increasing female directors through addition of board seats. Model 1 includes only the control variables, and Model 2 adds the independent variables to test Hypothesis 3 and 4. The results in Model 2 show that *firm size* (odds ratio=1.134, $z=1.284$, $p=0.199$) has no significant effect, *female employment in industry* (odds ratio=1.012, $z=2.521$, $p=0.012$) and *female directors at industry peers* (odds ratio=1.230, $z=1.842$, $p=0.065$) have a positive effect, while *presence of multiple female directors* (odds ratio=0.638, $z=-2.693$, $p=0.007$) has a negative effect on the likelihood of increase through addition of board seats. Again, we calculated the marginal effects of these variables on the probability of increase through addition of board seats. The marginal effect of *firm size* ranges from 0.00% to 3.13%, with a mean of 2.07% ($p=.215$); the marginal effect of *female employment in industry* ranges from 0.00% to 0.29%, with a mean of 0.19% ($p<.05$); the marginal effect of *female directors at industry peers* ranges from 0.00% to 5.18%, with a mean of 3.41% ($p<.10$); and the marginal effect of *presence of multiple female directors* ranges from -0.01% to -11.25%, with a mean of -7.41% ($p<.01$). The above results, with the exception for firm size, provide support for our hypotheses about the positive impact of external pressure (H3) and the negative effect of the presence of multiple female directors (H4) on a firm's likelihood of using addition of board seats to increase the number of female directors.

[Insert Table 3 and Table 4 about here]

Table 5 reports results of logistic regressions about new female directors' membership on major board committees at firms that increased the number of female directors. Model 1 includes

only the control variables, and Model 2 adds *increase through addition of board seats* to test its negative effect proposed in Hypothesis 5. The results in Model 2 show that *increase through addition of board seat* has a significant negative effect on a new female director's likelihood of serving on major committees (odds ratio=0.629, $z=-2.881$, $p=0.004$). Our further analysis showed that the marginal effect of *increase through addition of board seat* on a new female director's probability to serve on major board committees ranged from -0.49% to -10.56%, with a mean of -7.73% ($p<.01$). These results suggest that among firms that increased the number of female directors, new female directors joined through addition of board seats were less likely to serve on major board committees than new female directors joined through substitution of male directors, providing support for Hypothesis 5.

[Insert Table 5 about here]

DISCUSSION AND CONCLUSIONS

Our study investigates the extent to which external pressure for greater board gender diversity helps to counter the gender-based intergroup bias on corporate boards that puts women at a disadvantage in obtaining board appointments. We propose that firms are more likely to increase female directors if they are under stronger external pressure. Meanwhile, because the external pressure heightens the salience of gender in director selections, we predict that incumbent male directors are more likely to categorize the new female directors as outgroup members and add them through addition of board seats rather than substitution of male directors to the extent that the increase of female directors is a response to the external pressure. We further predict that new female directors added through addition of board seats are less likely to serve on major board committees than new female directors added through substitution of male directors. The results are consistent with our theoretical predictions, suggesting that the external pressure for

greater board gender diversity has a positive but limited effect to counter the intergroup bias on corporate boards. On the one hand, it has a positive effect on the increase of female directors; on the other hand, it makes boards more likely to add new female directors through addition of board seats and less likely to add these female directors onto major board committees.

Our theory and supportive findings make several contributions. Foremost, it contributes to the understanding of the forces that drive the increase in board diversity. Extant research so far has primarily focused on explaining the homogeneity of corporate boards and the social barriers such as intergroup bias that hinder the increase of board diversity (Domhoff, 2002; Kogut et al., 2014; McDonald and Westphal, 2013; Westphal and Stern, 2006, 2007). Although a few studies examined board gender diversity, they only looked at whether there was a presence of female directors (e.g., Hillman et al., 2007; Terjesen and Singh, 2008). One recent exception is the study by Zhu et al. (2014), which shows that incumbent directors select new directors who are different from them on some demographic attributes such as gender but similar to them on others such as elite education and functional backgrounds to address external pressure for board diversity and intergroup bias due to social categorization. Given that a large majority of firms now have a presence of female directors and often a token representation of one woman (Farrell and Hersch, 2005; Kogut et al., 2014; Terjesen et al., 2009), it becomes increasingly important to understand factors that promote further increase of female directors on a board. Although Zhu et al. (2014) acknowledged the effect of external pressure on the increase of board diversity, they did not examine it directly. Our study extends this research by explicitly theorizing and demonstrating the positive effect of external pressure on the increase of female directors.

Meanwhile, our study reveals external pressure's limit in countering intergroup bias on corporate boards by investigating the means firms use to increase female directors and its impact

on new female directors' membership on major board committees. We find that firms are more likely to add new female directors through the addition of board seats rather than the substitution of male directors when they are under greater external pressure to increase female directors. This finding supports our theoretical argument that when firms increase female directors to meet external demands, it heightens the salience of gender and makes incumbent male directors more likely to treat the new female directors as outgroup members. To further corroborate this argument, we propose and find that firms are less likely to add board seats to increase female directors when they do not have strong gender-based intergroup bias, as indicated by a presence of multiple female directors already on their boards. Moreover, we find that new female directors added through the addition of board seats are less likely to serve on major board committees during the first three years of their appointments than those added through the substitution of male directors. Taken together, these findings suggest that although external pressure for greater board gender diversity promotes the increase of female directors, it has a limited effect in countering the intergroup bias on corporate boards toward the new female directors.

Our study also contributes to research on organizational responses to external pressure in the adoption of socially desirable practices. Most of this research examines what factors influence a firm's decision to adopt a socially desirable practice in response to external pressure (DiMaggio and Powell, 1983; Scott, 2001). Although some scholars point out that organizations do not passively conform to societal demands (Oliver, 1991; Suchman, 1995), only a few studies have investigated the different actions firms undertook in the adoption of a socially desirable organizational practice because of the difficulty to empirically distinguish the different forms of adoption (Greenwood et al., 2008; Ingram and Simons, 1995; Westphal and Zajac, 1994, 1998). Our study contributes to this research in two ways. First, it provides a social psychological

perspective to explain why firms do not passively conform to the external pressure for greater board gender diversity. Namely, a firm's response to this external pressure heightens the salience of gender, making incumbent male directors more likely to view the new female directors as outgroup members. Second, it distinguishes two means firms use to increase female directors – addition of board seats versus substitution of male directors – and suggests that they reflect whether new female directors are treated as outgroup members and influence the new female directors' membership on major board committees. Our study thus adds new insights to the understanding of different actions firms undertake in the adoption of a socially desirable practice in response to external pressure. In this regard, our study also contributes to the literature on intergroup bias by revealing the increase of female directors through addition of board seats as a subtle exhibition of intergroup bias in the context of corporate boards' response to the external pressure for greater gender diversity.

Lastly, our theory and supportive findings have important implications for research on board diversity, particularly regarding the influence of female directors on board decisions and firm performance. While it is long recognized that women can bring in unique expertise and perspectives to improve corporate governance (Adams and Ferreira, 2009; Chen et al., 2014; Higgs, 2003), empirical evidence is mixed about the effect of female directors on firm performance (Abdullah et al., 2014; Post and Byron, 2015; Terjesen et al., 2009). One explanation is that intergroup bias held by male directors can significantly weaken the influence of female directors on board decisions (Westphal and Milton, 2000). Given the difficulty to directly measure intergroup bias on corporate boards, our study suggests that attending to the means firms use to increase female directors may help enhance the understanding of the effect of female directors on board decision and firm performance. Specifically, when female directors are

added through addition of board seats, they are likely to have a less significant effect on board decisions or firm performance than female directors added through substitution of male directors.

Limitations and Directions for Future Research

Like most studies using secondary data, we did not directly measure directors' perception of the external pressure they were under to increase female directors and their intergroup bias toward the new female directors. Thus, it is important for us to address alternative explanations through research design and analysis. One alternative explanation for the increase of female directors is strictly the value the new female directors brings to the firm (Chen et al., 2014; Haynes and Hillman, 2010). For example, female directors can be especially valuable for firms in industries with a higher ratio of female employees or for firms whose industry peers have a higher presence of female directors (Hillman et al., 2007). It is difficult for us to separate this alternative explanation from our theory because one of the reasons calling for greater board gender diversity focuses on its value to board decisions. We addressed this difficulty by examining the means firms use to increase female directors in response to the external pressure as well as its effect on new female directors' membership on major board committees, while including many variables to control for new female directors' human and social capital. Our theory suggests that firms are more likely to increase female directors through addition of board seats to the extent the increase is a response to the external pressure. In contrast, the above alternative explanation would suggest that firms in industries with a higher ratio of women employees or whose industry peers have a higher presence of female directors would be more likely to add female directors through the substitution of male directors, which is the opposite of our findings. Through additional analysis, we find that the positive effect of female directors at industry peers (as an indicator of external pressure) on the increase of female directors through

the addition of board seats is weakened for firms having a presence of multiple female directors (as an inverse indicator of intergroup bias). This finding further supports our theory that focuses on external pressure for greater board gender diversity and intergroup bias on corporate boards to explain the increase of female directors.

Meanwhile, we would like to note that our study does not exclude other theoretical explanations of the means firms use to increase female directors. Our theory only suggests that some firms choose to increase female directors through addition of board seats to reconcile the tension between the external pressure for greater gender diversity and the intergroup bias toward female directors. It is possible that a firm decides to add a female director through the addition of a new board seat even when there is no gender-based intergroup bias because the board simply wants to add the new female director while keeping all incumbent male directors so that they can benefit from the valuable resources provided by both the new female directors and the incumbent male directors. Indeed, we think that it is important for future research to explore the other motives for firms to increase female directors through the addition of board seats. Size has long been recognized as an important board feature (Adams et al., 2010; Finkelstein, et al., 2009). However, prior research primarily focuses on its effect on corporate governance and firm performance (Dalton et al., 1999; Finkelstein et al., 2009). Our additional analysis shows that firms sometimes add male directors through addition of board seats as well or drop a director without a replacement. Thus, it can be a fruitful direction for future research to further investigate the motives of firms to increase or decrease board size as well as the factors that influence their decisions.

Although we are confident in our theory and findings, it is important for future research to corroborate our study by measuring external pressure and intergroup bias more directly,

perhaps using data from interviews or surveys of top executives and directors. Our study has other limitations that present opportunities for future research. For example, although it investigates the effect of external pressure in countering the intergroup bias that favors men in director selections, it does not examine how the increase of female directors helps to reduce this intergroup bias over time. Extensive research in social psychology shows that direct contact over time can help reduce social categorization and intergroup bias based on demographic attributes such as gender (Hewstone et al., 2002). Thus, it is important for future research to investigate how direct interactions between male and female directors over time influence their relationship, as well as female directors' membership on major board committees and their influence over board decisions. If evidence indicates a reduction in intergroup bias, it suggests that an increase of female directors, even if merely as a response to external pressure for board gender diversity, provides an opportunity to reduce intergroup bias on boards over time. Our additional analysis shows that among firms that increased female directors, the new female directors added through the addition of board seats still had a lower likelihood of serving on major board committees than those added through the substitution of male directors three years into their appointments; meanwhile, it also shows that the effect seems to become weaker over each year. Clearly more research is needed to better understand how the increase of female directors may influence intergroup bias on the boards over time.

Future research can also investigate how investors react to the increase of female directors and the alternative means firms use to add new female directors, in addition to examining the new female directors' effects on board decisions and firm performance as we suggested earlier. The external pressure for greater board gender diversity has been primarily driven by advocates of equal opportunity for women (Blackman, 2004; Catalyst, 1993;

Economist, 2011). Although some investor activists and advocates of corporate governance reforms have also called for firms to increase female directors to improve board decisions (Adams and Ferreira, 2009; Hillman et al., 2007; Terjesen et al., 2009), it does not necessarily mean that investors in general would respond positively to a higher presence of female directors on corporate boards. There is evidence that investors react negatively to appointments of female CEOs (Lee and James, 2007; Knippen, Palar, and Gentry, 2018). Thus, an investigation of investor reactions to the increase of female directors and the means firms use to accomplish it can enhance the understanding of whether investors hold a negative bias against female directors.

Relatedly, future research can examine the effect of shareholder voting in the elections of female directors. In a study of shareholder voting on 2,099 nominees in a sample of Fortune 500 companies in 2006, Hillman et al. (2011) find that gender has no effect on the percentage of shareholder votes withheld against the nominees. While this finding suggests that shareholders do not have a negative bias toward female nominees, their study is not focused on the gender of director nominees or board diversity. Thus, more research is needed to systematically investigate shareholders' attitude toward the increase of female directors and board diversity, including how the attitude may vary across different shareholder groups. In addition to shareholders, security analysts represent another important group of stakeholders who can influence organizational decisions through their forecasts and recommendations (Gentry and Shen, 2013; Wiersema and Zhang, 2011). Future research may investigate whether they exhibit intergroup bias toward the appointments of female directors and how their recommendations influence investor voting and reactions to the increase of female directors.

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Table 1. Means, standard deviations, and correlations for variables used to analyze a firm's likelihood to increase female directors

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Increase of female directors	0.10	0.30													
2 Firm size	8.23	0.88	0.09												
3 Female employment in industry	39.07	14.23	0.03	-0.08											
4 Female directors at industry peers	1.05	0.66	0.09	0.52	0.19										
5 Presence of multi female directors	0.27	0.44	-0.01	0.38	0.08	0.35									
6 Women on nominating committee	0.43	0.50	0.00	0.27	0.06	0.24	0.41								
7 Female director turnover	0.06	0.25	-0.06	0.10	0.04	0.08	-0.01	0.13							
8 Male director turnover	0.53	0.86	0.11	0.12	0.02	0.08	0.04	0.05	0.15						
9 Director age	61.33	5.09	0.02	0.09	-0.02	0.15	0.01	0.01	-0.02	-0.01					
10 Director tenure	9.32	4.19	-0.02	-0.04	0.01	0.04	-0.08	-0.07	-0.05	-0.04	0.42				
11 Board size	8.07	2.49	0.04	0.42	0.12	0.40	0.37	0.22	0.10	0.21	0.14	0.04			
12 Board heterogeneity	0.58	2.78	0.05	0.51	-0.08	0.34	0.30	0.25	0.10	0.13	0.07	-0.05	0.47		
13 Ethnic minority directors	0.13	0.15	0.03	0.32	-0.08	0.22	0.20	0.16	0.07	0.07	0.06	0.05	0.20	0.43	
14 Ties with female directors	4.98	6.08	0.07	0.64	-0.04	0.39	0.38	0.27	0.10	0.13	0.05	-0.11	0.47	0.52	0.28
15 Independent directors	0.84	0.10	0.03	0.17	-0.07	0.14	0.17	0.15	0.06	0.09	0.10	-0.15	0.23	0.24	0.15
16 Female CEO	0.02	0.14	0.02	0.04	0.00	0.06	0.16	0.04	0.06	0.01	-0.01	-0.03	0.03	0.09	0.10
17 CEO duality	0.33	0.47	0.01	0.27	-0.05	0.17	0.16	0.12	0.03	0.03	0.05	0.09	0.18	0.33	0.36
18 Female top managers	0.16	0.10	0.05	0.13	0.13	0.19	0.20	0.15	0.07	0.03	0.01	-0.01	0.10	0.12	0.09
19 Top management ownership	0.01	0.05	0.00	-0.02	0.02	-0.02	-0.02	-0.03	0.01	0.01	0.01	0.06	-0.02	-0.01	0.00
20 Institutional ownership	0.68	0.18	-0.03	-0.26	0.08	-0.24	-0.19	-0.11	-0.05	-0.08	-0.11	-0.15	-0.22	-0.32	-0.36
21 Firm performance	0.04	0.11	0.01	0.08	0.00	0.06	0.03	0.01	-0.01	-0.07	-0.01	0.04	-0.01	0.02	-0.01

Variables	14	15	16	17	18	19	20
15 Independent directors	0.23						
16 Female CEO	0.06	0.04					
17 CEO duality	0.26	0.01	0.01				
18 Female top managers	0.13	0.06	0.13	0.04			
19 Top management ownership	-0.03	-0.04	0.04	-0.01	-0.01		
20 Institutional ownership	-0.22	-0.05	-0.08	-0.32	-0.06	0.60	
21 Firm performance	0.05	-0.08	-0.01	0.03	0.02	-0.01	0.06

N=14,325. Correlations are significant at $p < .05$ if greater than .02 or less than -.02.

Table 2. Logistic regression results on the likelihood of a firm to increase the number of female directors

Variables	Model 1			Model 2		
	Odds ratio	<i>z</i> value	<i>p</i> value	Odds ratio	<i>z</i> value	<i>p</i> value
Firm size				1.192	4.403	0.000
Female employment in industry				1.008	3.538	0.000
Female directors at industry peers				1.313	5.356	0.000
Presence of multiple female directors				0.578	-6.847	0.000
Women on nominating committee	0.863	-2.630	0.009	0.895	-1.812	0.070
Female director turnover	0.220	-8.442	0.000	0.178	-8.824	0.000
Male director turnover	1.465	13.151	0.000	1.457	12.906	0.000
Director age	1.006	0.979	0.328	1.003	0.501	0.617
Director tenure	0.977	-3.107	0.002	0.976	-3.182	0.001
Board size	0.979	-1.436	0.151	0.964	-2.363	0.018
Board heterogeneity	1.020	1.570	0.117	1.010	0.779	0.436
Presence of ethnic minority directors	1.291	1.358	0.174	1.221	1.031	0.303
Ties with female directors	1.026	5.275	0.000	1.017	2.900	0.004
Independent directors	1.229	0.658	0.511	1.500	1.268	0.205
Female CEO	1.152	0.759	0.448	1.378	1.719	0.086
CEO duality	0.932	-1.123	0.262	0.937	-0.996	0.319
Female top managers	4.570	5.531	0.000	4.063	4.715	0.000
Top management ownership	1.067	0.119	0.905	1.050	0.092	0.927
Institutional ownership	0.750	-1.538	0.124	0.777	-1.318	0.187
Firm performance	0.990	-2.143	0.032	0.992	-1.637	0.102
Wald χ^2		474.0			592.8	

N=14,325. Observations are clustered at the firm level. The z-tests are two-tailed for both hypothesized effects and control variables. Year dummies are included in the analysis but not reported.

Table 3. Means, standard deviations, and correlations for variables used to analyze the means firms use to increase female directors and the new female directors' membership on major board committees

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Major committee membership	0.74	0.44														
2 Addition of board seats	0.34	0.47	0.06													
3 Firm size	8.47	0.98	-0.07	0.00												
4 Female employment in industry	40.31	13.74	-0.05	-0.04	-0.09											
5 Female directors at industry peers	1.24	0.68	-0.08	-0.02	0.47	0.12										
6 Presence of multi female directors	0.26	0.44	-0.11	0.01	0.33	0.09	0.30									
7 Similarity with incumbents	0.59	0.12	0.04	0.02	-0.31	0.09	-0.20	-0.12								
8 Ethnic minority	0.33	0.47	-0.02	-0.03	0.01	-0.01	0.02	-0.02	-0.34							
9 Elite education	1.82	0.79	0.01	-0.02	0.06	-0.05	-0.05	-0.01	-0.07	0.01						
10 Advanced degree	0.29	0.45	-0.03	-0.06	0.09	0.01	0.01	0.04	-0.21	0.01	0.19					
11 First board appointment	0.69	0.46	-0.07	-0.02	-0.16	0.05	-0.05	-0.02	0.24	0.01	-0.07	-0.05				
12 Throughput experience	17.43	13.32	0.02	0.00	0.10	0.01	0.05	0.04	0.03	-0.01	-0.07	0.01	-0.13			
13 Peripheral experience	5.72	10.47	0.07	0.04	0.00	-0.08	-0.03	-0.02	-0.15	-0.03	0.10	-0.03	-0.07	0.18		
14 Output experience	4.32	8.00	-0.01	0.01	0.04	-0.02	0.03	-0.01	-0.11	0.02	0.15	0.06	0.00	0.08	0.05	
15 Focal industry experience	1.40	3.39	0.07	0.03	0.04	-0.01	-0.02	-0.03	0.09	-0.03	0.04	-0.01	-0.32	0.05	-0.01	-0.01
16 Inside director	0.23	0.85	-0.05	0.02	0.05	0.03	0.03	0.00	-0.01	0.04	0.05	0.01	-0.10	0.00	0.03	0.02
17 Ties with incumbents	0.96	0.20	0.33	0.02	-0.04	-0.03	0.00	-0.08	0.05	0.03	0.10	0.01	-0.03	-0.04	0.00	0.05
18 Committee turnover	3.37	2.41	0.17	0.00	0.15	0.08	0.18	0.08	-0.07	0.01	0.03	0.02	-0.06	0.07	0.03	-0.01
19 Committee size	6.80	1.94	0.03	0.15	0.29	0.02	0.29	0.29	-0.16	0.03	0.01	0.02	-0.07	0.07	0.03	0.00
20 Women on nominating committee	0.44	0.50	0.00	-0.04	0.26	0.05	0.25	0.37	-0.12	-0.01	0.02	0.07	-0.06	0.07	0.05	0.07
21 Female director turnover	0.04	0.23	0.02	0.07	0.05	0.03	0.09	-0.06	0.06	-0.05	0.01	-0.03	-0.03	0.04	-0.01	0.01
22 Male director turnover	0.89	1.17	0.06	0.44	0.11	0.02	0.08	-0.04	-0.01	-0.05	-0.02	-0.02	-0.09	0.07	0.02	0.01
23 Director age	61.67	5.02	-0.04	-0.04	0.07	-0.06	0.12	-0.01	-0.09	-0.02	-0.02	-0.05	0.05	0.03	0.04	0.01
24 Director tenure	9.02	3.88	-0.04	-0.01	-0.06	0.00	0.04	-0.06	-0.07	-0.04	-0.03	-0.05	0.08	-0.04	-0.02	0.02
25 Board size	8.38	2.42	-0.11	0.16	0.40	0.09	0.37	0.32	-0.16	0.02	0.00	0.00	-0.06	0.06	0.02	0.03
26 Board heterogeneity	1.02	2.69	-0.04	0.08	0.49	-0.10	0.29	0.27	-0.43	-0.02	0.03	0.05	-0.12	0.05	0.01	0.04
27 Presence of ethnic minority directors	0.14	0.16	-0.03	0.03	0.32	-0.08	0.20	0.18	-0.34	0.01	-0.03	0.04	-0.03	0.02	0.01	0.01
28 Ties with female directors	6.43	6.74	-0.08	0.03	0.65	-0.03	0.35	0.34	-0.29	0.01	0.06	0.06	-0.15	0.07	0.00	0.03
29 Independent directors	0.85	0.10	-0.04	0.06	0.17	-0.09	0.10	0.08	-0.07	0.00	0.03	-0.02	-0.10	0.08	0.01	0.04
30 Female CEO	0.03	0.17	0.00	-0.01	0.02	0.01	0.06	0.18	-0.06	-0.05	0.02	-0.01	-0.01	-0.01	-0.01	0.00
31 CEO duality	0.33	0.47	-0.01	0.00	0.25	-0.07	0.14	0.18	-0.24	0.00	0.00	0.01	-0.05	0.01	0.02	0.00
32 Female top managers	0.18	0.10	-0.06	0.01	0.11	0.12	0.20	0.25	-0.09	0.03	-0.06	0.01	0.02	0.04	-0.09	-0.01
33 Top management ownership	0.01	0.05	-0.02	0.01	-0.03	0.04	-0.02	0.01	-0.02	0.00	-0.02	0.02	0.00	0.00	0.00	0.06
34 Institutional ownership	0.66	0.19	0.04	0.00	-0.31	0.09	-0.26	-0.21	0.27	-0.03	0.00	0.00	-0.05	-0.02	-0.01	-0.01
35 Firm performance	0.04	0.11	-0.02	-0.02	0.07	0.01	0.02	0.04	0.00	-0.01	0.00	-0.03	0.02	-0.02	0.00	-0.02

Table 3 Continued

Variables	15	16	17	18	19	20	21	22	23	24	25	26	27	28
16 Inside director	0.08													
17 Ties with incumbents	0.00	-0.04												
18 Committee turnover	0.03	0.03	0.08											
19 Committee size	-0.01	0.07	0.01	0.26										
20 Women on nominating committee	0.03	0.03	-0.05	0.13	0.25									
21 Female director turnover	0.10	0.02	0.00	0.28	0.12	0.14								
22 Male director turnover	0.08	0.00	0.02	0.39	0.21	0.07	0.37							
23 Director age	-0.03	0.01	-0.02	-0.02	0.10	0.00	0.01	-0.06						
24 Director tenure	-0.04	0.01	-0.01	-0.05	-0.04	-0.07	-0.03	-0.04	0.37					
25 Board size	-0.01	0.10	0.04	0.25	0.64	0.19	0.07	0.22	0.11	0.07				
26 Board heterogeneity	0.05	0.04	0.01	0.13	0.36	0.23	0.09	0.14	0.06	-0.03	0.46			
27 Presence of ethnic minority directors	0.04	0.05	-0.03	0.07	0.22	0.14	0.05	0.08	0.03	0.08	0.22	0.46		
28 Ties with female directors	0.04	0.04	-0.05	0.13	0.37	0.25	0.06	0.13	0.04	-0.09	0.46	0.52	0.28	
29 Independent directors	0.06	-0.01	-0.04	0.10	0.32	0.13	0.11	0.09	0.11	-0.16	0.20	0.18	0.12	0.19
30 Female CEO	0.01	-0.03	0.02	0.02	0.01	0.02	0.03	0.05	0.00	-0.03	0.00	0.11	0.08	-0.01
31 CEO duality	-0.02	0.06	0.00	0.09	0.20	0.13	0.03	0.03	0.00	0.08	0.19	0.32	0.38	0.24
32 Female top managers	-0.01	0.00	-0.09	0.04	0.08	0.20	0.09	0.02	0.02	0.02	0.08	0.12	0.13	0.12
33 Top management ownership	-0.01	-0.02	0.00	0.02	-0.07	-0.02	0.03	0.03	0.04	0.13	0.02	0.01	0.03	-0.01
34 Institutional ownership	0.02	-0.05	0.00	-0.07	-0.19	-0.11	0.04	-0.04	-0.10	-0.70	-0.27	-0.34	-0.40	-0.26
35 Firm performance	-0.01	-0.01	-0.01	-0.02	-0.01	0.02	0.01	-0.04	-0.04	-0.02	-0.06	-0.03	-0.03	0.03

Variables	29	30	31	32	33	34
30 Female CEO	0.03					
31 CEO duality	0.02	-0.03				
32 Female top managers	0.04	0.10	0.06			
33 Top management ownership	-0.06	0.14	-0.06	-0.04		
34 Institutional ownership	-0.03	-0.02	-0.34	-0.06	0.60	
35 Firm performance	-0.02	0.00	0.00	-0.03	0.03	0.05

N=1578. Correlations are significant at $p < .05$ if greater than .05 or less than -.05.

Table 4. Logistic regression results on the likelihood of increasing female directors through addition of board seats

Variables	Model 1			Model 2		
	Odds ratio	<i>z</i> value	<i>p</i> value	Odds ratio	<i>z</i> value	<i>p</i> value
Firm size				1.134	1.284	0.199
Female employment in industry				1.012	2.521	0.012
Female directors at industry peers				1.230	1.842	0.065
Presence of multiple female directors				0.638	-2.693	0.007
Similarity with incumbent directors	0.195	-1.432	0.152	0.288	-1.611	0.107
Ethnic minority	0.962	-0.196	0.845	0.956	-0.316	0.752
Elite education	1.385	1.770	0.077	1.277	1.628	0.104
Advanced degree	1.016	0.160	0.873	1.038	0.445	0.657
First board appointment	1.057	0.282	0.778	1.048	0.307	0.759
Throughput experience	1.014	1.908	0.056	1.009	1.592	0.111
Peripheral experience	0.980	-2.587	0.010	0.986	-2.278	0.023
Output experience	0.998	-0.193	0.847	0.997	-0.334	0.738
Focal industry experience	0.993	-0.281	0.779	0.991	-0.438	0.661
Inside director	1.293	0.621	0.535	0.925	-0.245	0.807
Ties with incumbents	0.910	-1.114	0.265	0.937	-1.079	0.280
Women on nominating committee	1.702	2.750	0.006	1.528	3.026	0.002
Female director turnover	7.151	1.279	0.201	2.221	1.513	0.130
Male director turnover	0.217	-7.565	0.000	0.295	-8.611	0.000
Director age	1.023	1.107	0.268	1.017	1.198	0.231
Director tenure	0.985	-0.597	0.551	0.985	-0.778	0.436
Board size	0.845	-2.453	0.014	0.903	-2.575	0.010
Board heterogeneity	0.924	-1.747	0.081	0.936	-1.972	0.049
Presence of ethnic minority directors	0.959	-0.061	0.952	0.969	-0.062	0.950
Ties with female directors	1.033	1.554	0.120	1.014	0.983	0.325
Independent directors	0.302	-1.246	0.213	0.418	-1.236	0.216
Female CEO	1.912	0.798	0.425	2.638	1.765	0.078
CEO duality	1.212	0.779	0.436	1.106	0.637	0.524
Female top managers	0.481	-0.848	0.396	0.507	-0.972	0.331
Top management ownership	0.384	-0.522	0.601	0.389	-0.708	0.479
Institutional ownership	0.188	-2.448	0.014	0.314	-2.473	0.013
Firm performance	1.032	0.980	0.327	1.029	1.157	0.247
Wald χ^2		91.52			188.3	

N=1578. Observations are clustered at the firm level. The *z*-values are calculated using robust standard errors in two-tailed tests. Year dummies are included in the analysis but not reported.

Table 5. Logistic regression results on the likelihood of a new female director to serve on major board committees during the first three years

Variables	Model 1			Model 2		
	Odds ratio	<i>z</i> value	<i>p</i> value	Odds ratio	<i>z</i> value	<i>p</i> value
Increase through addition of board seats				0.629	-2.881	0.004
Committee turnover	1.247	6.057	0.000	1.269	6.485	0.000
Committee size	1.246	4.881	0.000	1.236	4.656	0.000
Similarity with incumbent directors	3.914	1.918	0.055	3.725	1.845	0.065
Ethnic minority	1.005	0.033	0.973	1.000	0.001	0.999
Elite education	0.873	-0.961	0.336	0.888	-0.841	0.400
Advanced degree	0.998	-0.027	0.978	0.995	-0.063	0.950
First board appointment	0.663	-2.679	0.007	0.660	-2.694	0.007
Throughput experience	0.996	-0.652	0.514	0.997	-0.545	0.586
Peripheral experience	1.020	2.305	0.021	1.020	2.227	0.026
Output experience	1.003	0.369	0.712	1.003	0.388	0.698
Focal industry experience	1.045	1.484	0.138	1.044	1.478	0.139
Ties with incumbent directors	0.850	-2.404	0.016	0.844	-2.595	0.009
Women on nominating committee	1.033	0.240	0.811	1.061	0.438	0.662
Female director turnover	0.574	-1.743	0.081	0.593	-1.613	0.107
Male director turnover	1.063	0.903	0.366	0.945	-0.750	0.453
Director age	0.995	-0.325	0.745	0.997	-0.194	0.846
Director tenure	0.995	-0.267	0.789	0.994	-0.335	0.738
Board size	0.787	-5.918	0.000	0.782	-6.153	0.000
Board heterogeneity	1.042	1.211	0.226	1.037	1.072	0.284
Presence of ethnic minority directors	1.088	0.172	0.863	1.104	0.203	0.840
Ties with female directors	0.981	-1.774	0.076	0.982	-1.582	0.114
Independent directors	0.125	-2.803	0.005	0.117	-2.866	0.004
Female CEO	0.920	-0.232	0.816	0.981	-0.054	0.957
CEO duality	1.017	0.115	0.908	1.014	0.095	0.925
Female top managers	0.414	-1.377	0.169	0.401	-1.424	0.155
Top management ownership	0.731	-0.269	0.788	0.627	-0.422	0.673
Institutional ownership	1.377	0.778	0.437	1.279	0.598	0.550
Firm performance	0.993	-0.476	0.634	0.994	-0.428	0.669
Wald χ^2		136.0			142.3	

N=1578. Observations are clustered at the firm level. The *z*-values are calculated using robust standard errors in two-tailed tests. Year dummies are included but not reported. Because none of the 66 new women inside directors was on major board committees, we dropped them from the analysis.