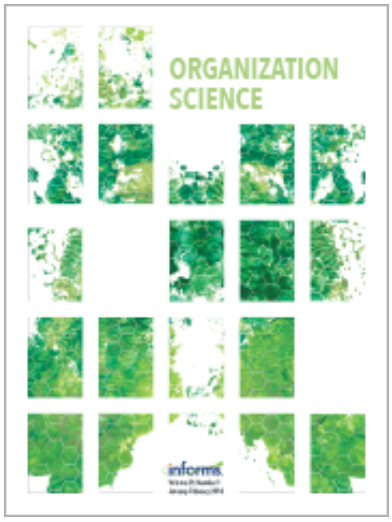

Organization Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

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To cite this article:
Isabelle Solal, Kaisa Snellman (2019) Women Don't Mean Business? Gender Penalty in Board Composition. Organization Science 30(6):1270-1288. https://doi.org/10.1287/orsc.2019.1301

http://pubsonline.informs.org/journal/orsc

ORGANIZATION SCIENCE
Vol. 30, No. 6, November–December 2019, pp. 1270–1288
ISSN 1047-7039 (print), ISSN 1526-5455 (online)

Women Don't Mean Business? Gender Penalty in Board Composition

Isabelle Solal,[a] **Kaisa Snellman**[a]

[a] Organisational Behaviour, INSEAD, 77305 Fontainebleau, France

Contact: isabelle.solal@insead.edu, https://orcid.org/0000-0003-2392-580X (IS); kaisa.snellman@insead.edu, https://orcid.org/0000-0002-1617-7957 (KS)

Received: September 12, 2017
Revised: April 16, 2018; November 7, 2018; February 7, 2019
Accepted: March 6, 2019
Published Online in Articles in Advance: October 1, 2019

https://doi.org/10.1287/orsc.2019.1301

Abstract. We examine investor responses to board diversity and highlight a previously unexplored mechanism to explain negative market reactions to senior female appointments. Drawing on signaling theory, we propose that an increase in board diversity leads investors to update their beliefs about firm preferences. Specifically, we argue that a gender-diverse board is interpreted as revealing a preference for diversity and a weaker commitment to shareholder value. Consequently, firms with more female directors will be penalized. We test our argument using 14 years of panel data on U.S. public firms. We find that firms that increase board diversity suffer a decrease in market value and that this effect is amplified for firms that have received higher ratings for their diversity practices across the organization. These results suggest that observers respond to the presence of female leaders not simply on their own merit but as broader cues of firm preferences and that firms may counteract any potential signaling effect through careful framing.

Funding: This work was supported by the INSEAD Alumni Fund.
Supplemental Material: The online appendix is available at https://doi.org/10.1287/orsc.2019.1301.

Keywords: diversity • gender • corporate boards • financial markets • shareholder value • social performance • market signals

Introduction

For decades, policymakers, social commentators, and academics have grappled with underrepresentation of women in top management and corporate boards. Proponents of gender diversity point to the potential economic gains resulting from appointing more female directors. According to a Credit Suisse report, "The question should be whether diversity is to the benefit of not just women themselves, but also to the benefit of other stakeholders, corporates, investors and the wider economic environment" (Dawson et al. 2014, p. 4; see also Wagner 2011). Increasing the number of female directors, it is argued, could increase the diversity of perspectives represented on the board and alter the way in which the board functions as a group, leading to an increase in firm value. Yet scholars have struggled to pin down exactly how, and how much, female directors actually differ from their male peers (Adams and Funk 2012, Zhu et al. 2014, Adams 2016, Bertrand et al. 2018), making it difficult to anticipate what their presence might mean both for actual board performance and for the bottom-line performance of the firm. How, then, might the gender composition of the board affect firm value?

We examine investor reactions to board diversity and propose that increasing the number of female directors may signal to investors that the firm is motivated by diversity preferences and cares less about maximizing shareholder value. Women selected into the upper echelons of corporate leadership attract a significant amount of attention (Lee and James 2007, Gaughan and Smith 2016), and that attention is often focused on their gender. Far from being gender neutral, female representation on corporate boards often constitutes a diversity measure or is perceived as such (Farrell and Hersch 2005, Broome et al. 2011). We argue that if investors believe that female board members have been appointed to satisfy a preference for diversity, then by increasing board diversity, a firm unintentionally signals a weaker commitment to shareholder value than a firm with a nondiverse board. Because investors, most of whom seek short-term returns (Bolton and Samama 2013), look for signals that firms prioritize shareholder value, and because a diversity preference may not send such a

signal, firms that increase board diversity will be penalized and suffer a decrease in market value. This will particularly be the case for firms that demonstrate a diversity preference in other ways.

We test our argument using 14 years of panel data on public firms in the United States, employing a number of different identification strategies to address potential endogeneity concerns, including fixed-effects regression, an instrumental variable approach, and a matched-sample design. We also conduct an experimental test of our proposed mechanism. We find that firms that increase board diversity over the course of the year will subsequently suffer a decrease in market value. We further find that this effect becomes more negative for firms that have received higher ratings for their diversity practices across the organization. Our findings suggest that the market relies on the gender makeup of a firm's board as a cue of firm preferences and that indications that a firm is motivated by a desire for diversity will lead to a gender penalty. Firms that have made no effort to promote diversity in the workplace, however, could find themselves insulated from the penalty associated with greater female board representation.

Our results imply that observers respond to the presence of female leaders not simply on their own merit but as broader cues of firm preferences and that firms may counteract any potential signaling effect through careful framing of their choice. We contribute to research on gender diversity and firm outcomes by providing evidence of a previously unexplored mechanism to account for the negative effect on firm value of promoting women to senior positions. More broadly, the paper contributes to the literature on gender and organizations, providing a novel perspective on the unintended consequences of discourse around social policy.

Board Diversity as a Signal of Firm Preferences

After over a decade of research on the question, it is still unclear what effect, if any, board diversity may have on a firm's market value. Whereas some early studies had found a positive correlation between firm value and gender-diverse boards (see, e.g., Carter et al. 2003), recent meta-analyses and studies based on longitudinal data have shown a null or negative effect of female board representation (Farrell and Hersch 2005, Adams and Ferreira 2009, Carter et al. 2010, Dobbin and Jung 2011, Ahern and Dittmar 2012, Matsa and Miller 2013, Pletzer et al. 2015, Post and Byron 2015).

It is difficult to predict how the presence of female directors might affect the actual performance of a firm's board. Research on groups and teams shows that diversity can have a positive impact on group performance (Hoffman and Maier 1961, Nemeth 1986; see Joshi et al. 2015 for a review), and thus gender-diverse boards may be more effective. However, scholars have also emphasized that the effect of diversity on groups is complex and often context dependent (Lau and Murnighan 1998, Williams and O'Reilly 1998, Jehn et al. 1999, Pelled et al. 1999, Kilduff et al. 2000). If the right conditions are not present, gender diversity on the board could lead to lower performance.

Female directors could also have an impact on board performance not because their presence changes board processes but because they are inherently "better" or "worse" board members. However, although there is some debate over whether the imposition of a gender quota might lead to the recruitment of female directors who are younger and less qualified than the men they replace (Ahern and Dittmar 2012, Bertrand et al. 2018), it is unclear to what extent female directors actually differ from male directors in nonquota countries, given the credentials and experience they need to exhibit in order to be selected for these roles (Zhu et al. 2014). Scholars suggest that director gender may be correlated with core values or risk attitudes. For example, gender-diverse boards may make different acquisition decisions if female directors are more risk averse than men. However, gender differences in the boardroom may not mirror gender differences in the broader population (Adams 2016), and some evidence suggests that female directors may, in fact, be more risk seeking (Adams and Funk 2012). How such differences translate into changes in actual board performance remains an empirical question.

Regardless of whether board diversity affects board performance, the presence of women on boards may also affect firm value by altering market expectations about the future performance of the firm. Scholars have suggested that investors may penalize firms with diverse boards because they "tend to believe that women lack the human capital and business experience to be board members" (Dobbin and Jung 2011, p. 822). This explanation, which builds on an extensive gender bias literature showing that female leaders are generally perceived to be less competent than men (see, e.g., Ridgeway 1991, Eagly and Karau 2002), implies that market reactions are determined by how investors *believe* female directors will impact board performance and, consequently, firm profits. However, women may add or detract value from the board without necessarily adding or detracting value from the firm because board performance has not been found to be systematically predictive of firm outcomes (Dalton et al. 1998, Pletzer et al. 2015). Thus, it seems unlikely that investors would expect one

incompetent female board member to single-handedly cause a decline in the firm's profitability.[1]

The market may struggle to predict how board diversity will impact the actual performance of the board and of the firm itself. However, investors may still update their valuation of the firm based on the gender composition of its board if they use that information to make inferences about the firm's preferences. Thus, we argue that the market's response to board diversity is determined by its perception of what motivates the firm to choose a gender-diverse board. Specifically, we posit that board diversity affects firm value because investors assume that the presence of female directors is more likely to be driven by a desire to increase diversity than by a desire to maximize returns to shareholders.

Higher levels of female representation on corporate boards may credibly signal that the firm is motivated by diversity concerns for several reasons. Gender continues to be both salient and available as a distinguishing feature when women are promoted to senior leadership positions. The relative rarity of such promotion events means that women, as tokens, "capture a larger awareness share" (Kanter 1977, p. 971) and tend to be perceived more as symbols than as individuals. The symbolic value of female appointments is reflected in the results of a recent survey, according to which 32% of female board directors indicated that their gender had been a "significant factor" in their appointment, compared with 2% of men (Heidrick and Struggles 2012). This is in line with research suggesting that female board appointments are usually motivated by internal or external calls for diversity (Farrell and Hersch 2005).

Research has also found that news articles about female chief executive officer (CEO) appointments systematically highlight gender, whereas gender is rarely mentioned in the announcement of male CEO appointments (Lee and James 2007). A study of CEO appointments between 2000 and 2014 (Gaughan and Smith 2016) found not only that media coverage of new female CEOs is more gendered but also that female CEO appointments garner close to four times more attention than appointments of male CEOs. One need only to scan the business headlines to see that the appointment of a woman to the board of directors similarly attracts more attention than the appointment of a man and that gender is systematically highlighted—whether she is the "first female director" (see Associated Press 2014 for Honda's announcement; see also, e.g., Dembosky 2012 (Facebook), Hume and Aglionby 2014 (Glencore), and Koh 2016 (Pinterest)) or, as with Linda Gooden's appointment to the board of General Motors, the "fifth female board member" (Welch and Green 2015). We know that investors do notice and react to changes in board membership (Rosenstein and Wyatt 1990; Fich and Shivdasani 2006, 2007; Yermack 2006). When gender is presented as the salient feature of that change, it is not unreasonable for investors to assume that gender, in fact, motivated the change. Yet, if investors believe that female board members have been selected to satisfy a preference for diversity, then they are less likely to believe that the firm is looking out for shareholder interests.

Financial Markets and the Pursuit of Shareholder Value

A contentious debate exists among scholars and pundits regarding the duties of managers, who exert control over corporate assets. The shareholder view of the firm posits that managers must invest corporate assets in a way that maximizes returns to the owners of the firm (Fama and Jensen 1983, Jensen 2002), whereas proponents of the stakeholder view argue that managers should take into account the interests of all stakeholders, without prioritizing one group over the others (Freeman 1984, Donaldson and Preston 1995). Both views have their advocates and are prevalent in the broader discourse around how firms should behave. Following the rise of shareholder activism (Davis and Thompson 1994) and the increasing influence of financial markets, however, corporations have shifted their orientation "toward shareholder value as their guiding star" (Davis 2009, p. 5). Market value today is largely driven by investors seeking short-term returns (Bolton and Samama 2013), emphasizing profits over growth (Zajac and Westphal 2004), in contrast to other conceptions of control that are increasingly relegated to niche investment strategies, even in traditional stakeholder capitalism economies such as Germany (Fiss and Zajac 2004) and Japan (Ahmadjian and Robbins 2005). The shareholder value approach to capital investment so dominates Wall Street that most analysts consider that "creating or reclaiming shareholder value [is] morally and economically the right thing to do; it [is] the yardstick to measure individual as well as corporate practices, values, and achievements" (Ho 2009, p. 125).

When estimating firm value, therefore, the market will watch firms closely for signs that they seek to maximize profits. Positive signals will be rewarded by investors, whereas suggestions that the firm is not fully committed to maximizing shareholder returns will lead to market penalties. Previous research has highlighted numerous ways in which a firm's strategic decisions can alter investor perceptions and, in so doing, affect the firm's market value (Certo 2003, Cohen and Dean 2005, Higgins and Gulati 2006, Westphal and Graebner 2010, Reuer et al. 2012). For example, Westphal and Zajac have shown across

multiple studies that firms tailor executive compensation plans to give at least the appearance of conformity with the shareholder value model (Westphal and Zajac 1994, 1998; Zajac and Westphal 1995). Other policies that may signal to the market that the firm is committed to its shareholders include the announcement of dividends or share repurchase programs, which typically lead to increases in market value (Miller and Rock 1985, Dittmar 2000, Rau and Vermaelen 2002, Louis and White 2007). Similarly, downsizing is both encouraged and rewarded by investors (Ahmadjian and Robbins 2005, Jung 2015) as a strong signal of shareholder value maximization, even if it does not lead to productivity gains (Budros 1997).

By contrast, research has shown that firm decisions perceived to be motivated by goals other than increasing short-term returns to shareholders may be penalized. One study found that firms that made significant cuts to their corporate social responsibility (CSR) program subsequently experienced a greater rise in market valuation than firms that made fewer or no cuts (Cheng et al. 2016). Furthermore, research shows that CEOs who use more shareholder-oriented language in their letters to shareholders receive higher compensation (Shin and You 2017), whereas CEOs who invest more in social initiatives are compensated less (Coombs and Gilley 2005) and are at greater risk of being fired in the event of poor financial performance (Hubbard et al. 2017).

Firms may, in certain cases, avoid market penalties associated with social initiatives. For example, they may be somewhat shielded from the short-termism of financial markets through an increase in hostile takeover protection (Kacperczyk 2009) or the enactment of legislation that specifically allows managers to take into account the interests of nonfinancial stakeholders when making business decisions (Flammer and Kacperczyk 2015). In addition, markets are less likely to respond negatively when the social initiatives that managers choose to invest in are potentially profitable because the interests of shareholders and other stakeholders are aligned in that case (Ioannou and Serafeim 2015). However, investors will object to initiatives perceived as more likely to result in a net cost to the firm, resulting in a tension for firms that may wish to engage in social initiatives that they believe will create long-term value but that must satisfy the demands of financial markets dominated by short-termism (Flammer and Kacperczyk 2015, Slawinski and Bansal 2015). This, we argue, is likely to be the case for board diversity (Hwang et al. 2019).

Interpreting Board Diversity

Similar to other firm decisions, board composition choices are evaluated by the market against the shareholder value standard. As noted by Yermack (2006, p. 34), "Investors are aware of the potential of individual board members to add or destroy shareholder value." The appointment of independent directors, assumed to be more likely to advance shareholder interests, is therefore generally welcomed by the market (Rosenstein and Wyatt 1990), although subsequent research suggests that this will not be the case if appointments are perceived as influenced by the CEO, if outside directors have a family relationship or personal business dealings with the firm (Shivdasani and Yermack 1999, Fich and Shivdasani 2007), or if outside directors do not benefit from stock option plans (Fich and Shivdasani 2005), because investors are less likely to believe that director incentives are aligned with those of shareholders. Corporate governance research has also found that markets penalize firms that appoint overly "busy" directors (Fich and Shivdasani 2006) but reward firms whose boards include directors with financial expertise (Defond et al. 2005) or CEO experience (Fich 2005), presumably because investors expect board performance to increase as a result. This is line with Certo's (2003) finding that firms with prestigious board members benefit from higher initial public offering stock performance.

As discussed earlier, however, female board representation is likely to be attributed to a preference for diversity, a preference that reflects a desire to attend to stakeholders other than financial market investors. Despite considerable efforts by policymakers and others to increase female representation on corporate boards, there is no evidence that investors, and activist shareholders in particular, perceive diversity as a potential source of value creation. A Bloomberg analysis published in March 2016 found that five of the biggest U.S. activist funds had sought at least 174 board positions since 2011—succeeding in 108 instances to get their nominee appointed—and yet had nominated a woman only seven times (Hymowitz et al. 2016). A 2017 study by the Investor Responsibility Research Center Institute found that firms were *less* likely to have at least one female director after becoming the target of shareholder activism than they were before (Borek et al. 2017).

Nonactivist shareholders are not necessarily any more open to diversity initiatives. For example, Apple's shareholders voted overwhelmingly to reject a proposal that would commit the firm to recruit more minorities among its top executives because this was seen to place an undue restriction on the company, limiting the company's ability to pursue profits (Yadron and Wong 2016). Managers themselves often reflect investors' views. A spokesperson for the U.S. footwear firm Skechers explained the company's decision to renege on an earlier promise to appoint its first female director by stating that the firm's "primary focus is on maximizing shareholder value"

(Morgenson 2014). The implication, of course, is that choosing to appoint a woman to the board would not have been in line with that overarching goal. Investors expect managers to make decisions with shareholders' interests in mind. If investors believe that the firm's choices are motivated by other objectives, they will penalize that firm.

Thus, to the extent that the presence of female directors is assumed to be motivated by diversity concerns, then, by increasing board diversity, a firm unintentionally signals a weaker commitment to maximizing returns for its shareholders. As a result, we should expect investors to penalize this choice. Following this, we predict the following.

Hypothesis 1. *An increase in board gender diversity will lead to a decrease in firm value.*

Social Performance Ratings and Firm Preferences

We argue that negative reactions to increases in board diversity result from the market's beliefs about what motivated the firm's board composition choices. If this is correct, then investors should be sensitive to additional information about the firm's preferences, which will reduce the ambiguity around the board diversity cue and strengthen the signal. We know from previous research that the same behavior will be received very differently depending on what else the audience knows about the firm.

For example, in a study of German corporations, Fiss and Zajac (2006) found that firms that framed controversial strategic decisions using language in line with shareholder expectations regarding appropriate firm behavior benefited from higher market returns than firms that did not make the same sensemaking effort. Similarly, studies suggest that firms facing employment discrimination lawsuits are assumed to be less blameworthy and more likely to be acting in good faith if they have an equal employment opportunity officer in place (Edelman 1992) or if they are a more prestigious firm (McDonnell and King 2018). Research has also found that earnings restatements, though generally perceived as a negative event, had a smaller effect when issued by organizations in more well-respected industries (Sharkey 2014), suggesting that they were less likely to be interpreted as indications of a serious problem within the firm.

Another series of studies found that atypical firms receive higher rewards for good performance and less punishment for poor performance (Smith 2011) in part because their performance is evaluated against a different benchmark, making good performance appear better and poor performance appear merely mediocre (Smith and Chae 2017). Meanwhile, firms perceived as presenting a higher liability risk because they were targeted by shareholder activists experienced a decrease in their market value despite having the same environmental performance as their peers (Vasi and King 2012).

Consistent with this line of research, we posit that the market will rely on available information regarding the firm's investments in diversity initiatives in order to interpret the firm's board composition decisions. Specifically, we expect that gender-diverse boards are more likely to be perceived as motivated by a preference for diversity when the firm has made greater efforts to address diversity concerns across the organization. However, when the firm has made no such effort, the market will be more likely to assume that director selection is driven purely by shareholder value concerns and therefore will be less likely to punish the firm if it increases board diversity. A finding that additional information about firm preferences will either amplify or mute market reactions in this manner is further evidence that the penalty associated with diverse boards results from investor beliefs about the firm and not simply investor expectations about female board member performance.

Information about firms' social performance frames board composition decisions such that the presence of female board members is less (more) likely to be perceived as motivated by diversity concerns and more (less) likely to be viewed as consistent with the shareholder value model. Specifically, a firm's investment in diversity initiatives will moderate the relationship between board diversity and market value. We therefore predict the following.

Hypothesis 2. *The negative effect of increasing board diversity on firm value will be greater for firms with higher social performance ratings for diversity.*

Methodology

Sample and Data Sources

We investigated the relationship between board diversity and firm value using panel data for publicly traded firms in the United States between fiscal years 1998 and 2011. We obtained board-level data from RiskMetrics for the period 2007–2011 and from the Investor Responsibility Research Center, Inc. (IRRC), for the period 1998–2006, including the name and gender of all sitting directors at the date of the annual meeting. We then merged these data with financial information from Compustat for the same period. We supplemented these data with data from KLD STATS (now MSCI ESG STATS) on the corporate social performance of U.S. publicly listed firms from 1998 to 2009.[2] In total, we have data on 19,418 firm-year observations for 1,889 unique firms. We have complete board and financial data for a sample of 11,387 firm-year observations and 1,644 firms; complete

financial and social performance data for 10,836 firm-year observations and 1,822 firms; and complete board, financial, and social performance data for 5,337 firm-year observations and 1,277 firms.

We found that over the entire period covered in our sample, women held approximately 10% of director positions per firm on average, or one seat per board. Yet this period has seen both a decrease in the percentage of firms that have no female directors and an increase in the percentage of firms moving beyond the token female director (Kanter 1977) to appoint more than one woman to their board. As illustrated in Figure 1, whereas only about 15% of the firms in our sample had more than one female director in 1998, by 2011, that figure had increased to 37%. However, even in 2011, less than 10% of firms had more than two women serving on their boards, and 28% still had all-male boards.

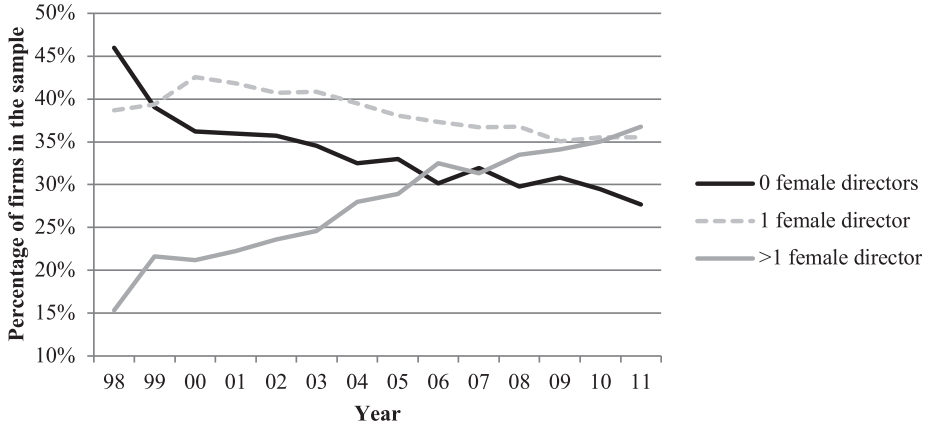
Measures

Dependent Variable. We use *firm value* as the dependent variable in our models. Consistent with extant literature on the relationship between gender diversity and firm performance (Adams and Ferreira 2009, Dobbin and Jung 2011, Dezső and Ross 2012), we operationalized firm value using a proxy of Tobin's q, a measure of the average value of the firm over the course of the fiscal year. Tobin's q is defined as the ratio of market value to book value of assets, and it is a broad-based reflection of the market's valuation of the firm as a whole, incorporating current performance as well as future growth opportunities (Anderson and Reeb 2004). A Tobin's q value above 1 indicates that the market values the firm above the replacement cost of its assets. We approximated Tobin's q using the sum of market capitalization and total debt over total assets, all annual measures for the fiscal year (Sandner and Block 2011). In additional tests not reported here, we reestimated the models using an alternative proxy for Tobin's q, measured as the ratio of the book value of a firm's assets plus the market value of the firm's common equity minus the book value of common equity to the book value of total assets (Younge and Marx 2016). Our results were unaffected. We used the natural log of Tobin's q in our analysis because its distribution is closer to normal.

Proxy measures of Tobin's q are commonly used in studies investigating the relationship between board-level variables and firm value (Westphal 1999, Anderson and Reeb 2004, Bhagat and Bolton 2008). An alternative approach is to look at short-term measures of stock performance, such as three-day cumulative abnormal returns, in an event-study framework. The approach we use has two advantages over event studies. First, changes in board composition are typically announced concurrently with other initiatives, such as dividend payments, stock repurchases, mergers and acquisitions, and the like. It is therefore impossible to attribute immediate changes in stock price to the composition of the board independent of market reactions to other company information disclosed at the same time (Adams et al. 2012). Second, because firms can choose when they issue statements, event studies based on announcement dates inevitably introduce bias that will be difficult to account for (Rosenstein and Wyatt 1990). Research has shown that firms time the release of corporate information in a deliberate attempt to manipulate stock price reactions (Ahern and Sosyura 2014). This is likely to be particularly problematic for the study of board gender diversity because female appointments tend to garner a disproportionate amount of media attention (Lee and James 2007, Gaughan and Smith 2016).

Independent Variables. Our primary independent variable is the level of gender diversity on the firm's board. We operationalized *board-level gender diversity* as the number of female board members at the time of the annual meeting in that calendar year. The

Figure 1. The Evolution of Tokenism on Corporate Boards



RiskMetrics/IRRC data classify directors as "employee/insider," "independent," and "linked." The models reported here do not distinguish between director classification, but our results were unchanged when we estimated the models using only independent female directors as our independent variable. This is not surprising because the vast majority of female board members (88% in our sample) are independent directors. Our results were also robust to measuring board diversity as the percentage of female directors on the board, as well as to using a categorical variable, grouping all observations with more than two female board members together. We note that our dependent variable is an average measure of firm value over the course of the fiscal year and that our primary independent variable represents the level of gender diversity at the time of the annual meeting. By construction, therefore, the way we define our variables implies a one-year lag between board diversity and firm value. To ensure that we measured our independent variable before our dependent variable, we therefore lagged the gender diversity measure by one year in all our models.

We tested the moderating impact of a firm's *social performance* on investor reactions to board diversity using the KLD STATS ratings. The KLD STATS environmental and social performance ratings have been widely used by academics and investors alike (Graves and Waddock 1994, Waddock and Graves 1997, Berman et al. 1999, Chatterji and Toffel 2010), and they constitute a reliable proxy for corporate social performance (Chatterji et al. 2009, Sharkey and Bromley 2015). The KLD STATS social performance ratings cover seven distinct dimensions of social and environmental performance: community, corporate governance, diversity, employee relations, environment, human rights, and product. For each dimension, the ratings identify specific items that constitute either a strength or a concern. Ratings are binary, with each firm receiving a score of 1 or 0 for any item for which a specific strength or concern was identified. We focus exclusively on strength scores in our analysis, in line with what is now standard practice in the field, because previous studies have found that strength and concern ratings are conceptually different and should not be combined into an overall measure of social performance (Mattingly and Berman 2006, Kacperczyk 2009, Flammer and Kacperczyk 2015). Each dimension-level strength score represents the total score for all strength items in that dimension, with the exception of the *diversity strengths* variable, from which we excluded the score for board diversity to ensure that board diversity was measured only once. Contrary to the board diversity measure, we did not lag our measure of social performance because KLD STATS ratings are by design retrospective and reflect the history of a firm's performance over preceding years (Chatterji et al. 2009).

Controls. In line with extant research, we controlled for firm size and corporate governance characteristics, factors that may have an effect on gender diversity as well as market value. We captured firm size using return on assets (ROA) and the natural log of total assets. Using the number of employees as a measure of firm size, in lieu of either logged assets or ROA, or both, did not impact our results. Our corporate governance controls include CEO gender (a binary variable equal to 1 if the CEO is a woman and 0 otherwise), the advent of a new CEO (also a binary variable), the size of the board, whether the CEO is also the chair, the fraction of independent directors on the board, and the average age of the board members as a proxy for experience. We further controlled for the extent to which the firm may be responding to pressure from institutional investors. We measured institutional ownership as a percentage of shares outstanding and controlled separately for ownership by pension funds, university endowments, and foundations, on the one hand, and financial institutions on the other hand.[3] Because the distinction did not affect our results, we report our findings using total institutional ownership. Summary statistics and correlation coefficients are shown in Table 1.

Model Specification

We first estimated ordinary least squares (OLS) fixed-effects regressions to examine the relationship between board diversity, and firm value (Models 1–3). In this way, we account for unobserved time-invariant firm-level variables, such as industry, region, or corporate culture, that may impact board diversity as well as firm value (Adams and Ferreira 2009, Dobbin and Jung 2011).[4] We also included year dummies to account for market-wide temporal effects. This was particularly relevant because our data cover the period of the financial crisis, during which we expected to see significant variation in the stock performance of the firms in our sample. Fixed effects eliminate omitted variable bias when the unobservable factors are time invariant but do not solve issues with time-variant omitted variables. To capture sudden changes in firm preferences that could result from a change in leadership, we controlled for the advent of a new CEO.

To further address the possibility that our error term contains time-variant unobserved factors correlated with board diversity, we employed two-stage least squares (2SLS) instrumental variable estimation (Models 4–6). The 2SLS estimator corrects for endogeneity that may result from omitted variable bias or simultaneity by isolating the causal effect of the

Table 1. Summary Statistics and Correlation Coefficients

Variable	*N*	Mean	Standard deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. *Number of female directors*	14,337	1.06	0.99																	
2. ln(*Tobin's q*)	18,399	0.24	0.71	−0.15***																
3. *CEO gender*	19,418	0.02	0.14	0.17***	−0.01															
4. *New CEO*	19,418	0.07	0.25	0.12*	−0.02***	0.02*														
5. *Number of directors*	14,337	9.44	2.63	0.50***	−0.30***	−0.04***	0.05***													
6. *Independent directors* (%)	14,337	0.72	0.16	0.24***	−0.12***	0.03***	−0.00	0.12***												
7. *CEO-chair duality*	14,337	0.70	0.46	0.08***	−0.03***	−0.03***	−0.08***	0.13***	0.03***											
8. *Average age of directors*	14,337	60.61	4.08	−0.01	−0.18***	−0.05***	−0.02	0.13***	0.17***	−0.04***										
9. *Institutional ownership*	19,418	0.75	0.20	−0.04	0.10***	0.03***	−0.02**	−0.22***	0.25***	−0.12***	0.04***									
10. *Assets* (logged)	19,412	7.85	1.67	−0.45***	−0.34***	−0.04***	0.03***	0.60***	0.21***	0.16***	0.17***	−0.12***								
11. *ROA*	19,325	0.09	0.10	0.03***	0.51***	−0.00	−0.02**	−0.05***	−0.04***	0.00	−0.02*	0.11***	−0.10***							
12. *Diversity strengths (excl. board)*	11,569	0.66	1.02	−0.04**	−0.01	0.04***	0.02	−0.02*	−0.01	−0.01	−0.04**	−0.02*	0.20***	0.02						
13. *Community strengths*	11,569	0.20	0.56	−0.05***	−0.02*	−0.01	0.02*	−0.02	−0.04**	−0.00	−0.10***	−0.06***	0.18***	0.01	0.49***					
14. *Environment strengths*	11,569	0.18	0.52	−0.04***	0.00	−0.00	0.03**	−0.05***	0.02	−0.03*	−0.04**	−0.01	0.09***	0.01	0.31***	0.27***				
15. *Corporate governance strengths*	11,569	0.15	0.38	0.01	−0.01	0.04***	0.01	0.00	0.06***	−0.02*	0.02	−0.02**	0.01	−0.01	0.18***	0.20***	0.26***			
16. *Human rights strengths*	11,569	0.01	0.08	−0.02*	−0.01	0.00	0.02	−0.02	−0.01	−0.01	−0.01	−0.01	0.02	−0.01	0.11***	0.16***	0.07***	0.16***		
17. *Product strengths*	11,569	0.08	0.29	−0.01	0.06***	−0.01	0.02	0.02	−0.04**	0.04***	−0.05***	−0.05***	0.07***	0.05***	0.21***	0.14***	0.25***	0.08***	−0.02*	
18. *Employee strengths*	11,569	0.39	0.70	−0.03**	0.02	−0.02	0.01	−0.02	−0.01	0.02	−0.02	−0.06***	0.12***	0.03**	0.33***	0.27***	0.34***	0.13***	0.07***	0.27***

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

independent variable. In the first stage, an exogenous instrumental variable—which, by definition, is uncorrelated with the error term—is used to obtain predicted values of the endogenous variable. These fitted values are then used in a second estimation stage to yield estimates that are more consistent, although less efficient, than OLS estimators.

We used as our instrument the average level of board diversity in the industry, which we calculated as the percentage of all board members in the industry that are female for that year, excluding the board members of the focal firm (Liu et al. 2014). We defined the focal firm's industry using two-digit industry codes. To be a valid instrument, this variable must be correlated with firm-level board diversity but should not have a direct effect on firm value other than through its effect on the firm's board composition choices. Institutional theory predicts that boards within an industry will tend to resemble each other, including in terms of gender diversity, meaning average industry board diversity should predict firm-level board diversity (DiMaggio and Powell 1983). This is confirmed by the results of our first-stage regression for Model 4, which we discuss further below. There is no theoretical reason to believe, however, that the average level of diversity at the industry level would have a direct impact on a firm's market value, other than through its mimetic effect on the firm's board composition choices.

In addition, we employed matching analysis to deal with the possibility that firms that choose to have a gender-diverse board may otherwise systematically differ from firms that do not, in a manner that affects firm value. Matching therefore helps to account for the fact that assignment to a condition is not random. We used the coarsened exact matching (CEM) procedure (Iacus et al. 2011) in order to match firms with at least one female director to a set of approximately equivalent control firms with all-male boards (Model 5). Similar to other matching methods, the purpose of the CEM procedure is to improve the estimation of causal effects by seeking to replicate a randomized experiment as closely as possible, by balancing covariates in the treatment and control groups in order to reduce bias (Stuart 2010). The CEM procedure has been found to perform well compared with other matching techniques, particularly because it is better able to reduce imbalance in covariates while requiring fewer assumptions (Blackwell et al. 2009, King and Nielsen 2019).

The relationship between board diversity and firm value could also flow in the opposite direction from the one we hypothesize—namely poorly performing firms could be more likely to appoint women to their board of directors. This is the so-called glass cliff effect (Ryan and Haslam 2007, Haslam et al. 2010). We specifically tested for reverse causation by estimating

a fixed-effects Poisson model with the number of female directors as our dependent variable (Model 8).

Although our analyses provide support for the causal relationship we suggest between board diversity and firm value, they cannot definitively rule out the possibility that our results are due to firm heterogeneity. For example, firms with gender-diverse boards could differ on some unobservable dimension that we are unable to capture with fixed-effects two-stage instrumental variable regression or matching techniques. Some could claim that it is this unobserved factor, rather than board diversity, that is responsible for decreases in market value. Moreover, archival data also do not allow us to observe how the presence of a female director influences investor perceptions of the firm. We therefore conducted a direct test of our proposed mechanism employing an experimental design to address these concerns. We provide an overview of the findings in the next section. Because of space constraints, a more detailed account of the research design and methods is provided in Online Appendix A.

Results

OLS Fixed-Effects Regressions

Results of the OLS fixed-effects regression estimations are presented in Table 2.[5] In Model 1, we found that the effect of board diversity on firm value is significant and negative ($p < 0.01$), providing support for Hypothesis 1. The beta coefficient for our diversity measure implies that one additional woman on the board results in a 2.3% decrease in Tobin's q on average.[6] This means that for a firm valued at the replacement cost of its assets, with a Tobin's q equal to 1, every increase in the number of female directors may lead to a 2.3% loss of market value, which could amount to hundreds of millions of dollars.

A postestimation margins analysis confirmed that the relationship between gender diversity and stock performance is both statistically and substantively significant (Figure 2). Holding all other variables constant at their means, we found that the predicted value of Tobin's q decreases with each additional female member on the board.

Before testing our prediction that additional information regarding firm preferences would affect the manner in which the market responds to board diversity, we first modeled the direct relationship between social performance and firm value (Model 2). Consistent with our findings on the effect of board gender diversity, Model 2 shows that firms that signal a higher preference for diversity have a lower market value ($p < 0.05$). This is also true for firms that have higher ratings on the corporate governance dimension. High ratings on the other dimensions, with the exception of the product dimension, are likewise associated with negative coefficients, although these do not reach statistical significance.

We include our measure of board-level diversity, all measures of corporate social performance and board-level controls, and a *board diversity* × *diversity strength* interaction term in Model 3 in order to test our hypothesis that the relationship between board diversity and firm value is moderated by the firm's social performance ratings for diversity. The coefficient for the interaction is negative and statistically significant ($p < 0.05$), although the main effects of board gender diversity and diversity strength lose their statistical significance. Thus, we find that firms that signal to the market that they have no particular preference for diversity will suffer either a smaller decrease or no decrease in market value resulting from higher levels of board diversity compared with firms that signal a strong preference for diversity, supporting Hypothesis 2.

The beta coefficient for the number of female directors in Model 3 corresponds to the impact of having one additional female director for a firm with a diversity strength score of 0 (approximately 60% of our rated sample). This coefficient is not statistically different from 0, meaning that these firms are neither penalized nor rewarded for including women on their boards. However, for a firm with a diversity strength score of 1, each additional woman on the board implies a decrease in the Tobin's q ratio of 1.7%, whereas for a firm with a diversity strength score of 3, one additional female director means a 5.9% decrease in Tobin's q—an economically as well as statistically significant result.

We represent the interaction between diversity ratings and board diversity graphically in Figure 3. As detailed in Online Appendix B, firms are awarded diversity strength points for having a female or minority director, as well as for things such as promoting women and minorities to positions of responsibility, having programs that address work/life concerns, providing domestic partner benefits, and more generally, taking steps to increase the diversity of their workforce, notably through recruitment efforts. Because we exclude the board diversity item from our diversity strength measure, a firm with a diversity strength score of 0 in our sample means that it has received a rating from KLD[7] but that besides obtaining one point for board diversity, it has not met KLD's criteria on any other diversity factor. Figure 3 shows that these firms do not experience a decrease in market value as they increase the number of female directors on their board. Yet, as firms demonstrate a broader concern for diversity across the organization and receive higher ratings from KLD, the relationship between the level of gender diversity on their boards and firm value becomes increasingly negative.

Table 2. Board Diversity and Firm Value

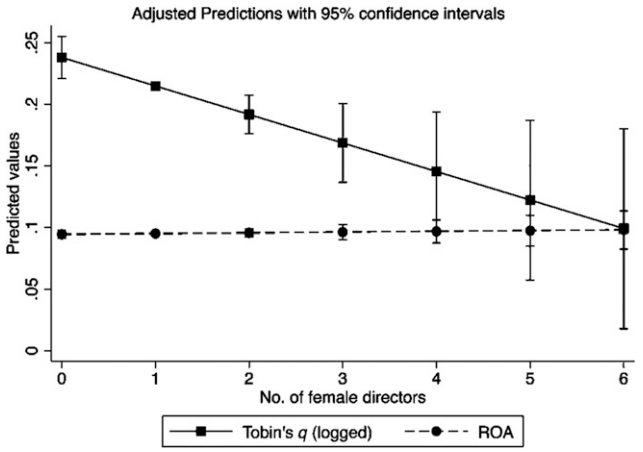
Variable	Model 1	Model 2	Model 3
No. of female directors	–0.023**		0.004
	(0.008)		(0.013)
Diversity strengths		–0.030*	0.021
		(0.013)	(0.017)
No. of female directors × Diversity strengths			–0.021*
			(0.009)
Number of directors	–0.001		0.004
	(0.004)		(0.005)
Independent directors (%)	–0.053		–0.060
	(0.050)		(0.075)
CEO-chair duality	0.017		0.020
	(0.012)		(0.018)
Average age of directors	–0.007**		–0.001
	(0.002)		(0.004)
CEO gender	–0.003	–0.179*	–0.033
	(0.052)	(0.080)	(0.075)
New CEO	–0.012	0.015	0.005
	(0.010)	(0.015)	(0.014)
Institutional ownership (%)	–0.061	0.140*	–0.068
	(0.046)	(0.066)	(0.057)
Assets (logged)	–0.182***	–0.142***	–0.176***
	(0.020)	(0.013)	(0.036)
ROA	2.048***	2.518***	1.902***
	(0.138)	(0.208)	(0.185)
Community strengths		–0.029	–0.006
		(0.031)	(0.021)
Environment strengths		–0.035	–0.007
		(0.023)	(0.020)
Corporate governance strengths		–0.050*	–0.017
		(0.024)	(0.020)
Human rights strengths		–0.021	–0.081
		(0.095)	(0.106)
Product strengths		0.020	–0.068
		(0.043)	(0.045)
Employee strengths		–0.002	–0.016
		(0.018)	(0.012)
Constant	2.032***	1.147***	1.625***
	(0.215)	(0.115)	(0.389)
Observations	11,387	10,836	5,337
Number of firms	1,644	1,828	1,277
R^2	0.343	0.366	0.366
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Notes. Robust standard errors in parentheses, clustered at firm level. Our dependent variable is the natural log of Tobin's *q*. The number of female directors is measured one year prior to Tobin's *q*. Model 1 is estimated on a sample for which we have complete board-level and financial data. Model 2 is estimated on a sample for which we have complete social performance and financial data. Model 3 is estimated on the overlap between these two samples, for which we have complete data on board composition, social performance, and financial data. FE, fixed effects.

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

Our results imply that when additional information on the firm's preferences is available, the market relies on that information in order to lessen the uncertainty surrounding the board diversity cue. Additional information may come from observing other choices the firm makes, notably in terms of diversity policies. Information that strengthens the market's belief that the firm has a preference for diversity will make it more likely that the presence of women on its board will be attributed to that preference and not to a desire to maximize shareholder value. In practical terms, firms that are not engaged in other diversity programs are

Figure 2. Predicted Values for Tobin's *q* (Logged) and ROA by Number of Female Board Directors

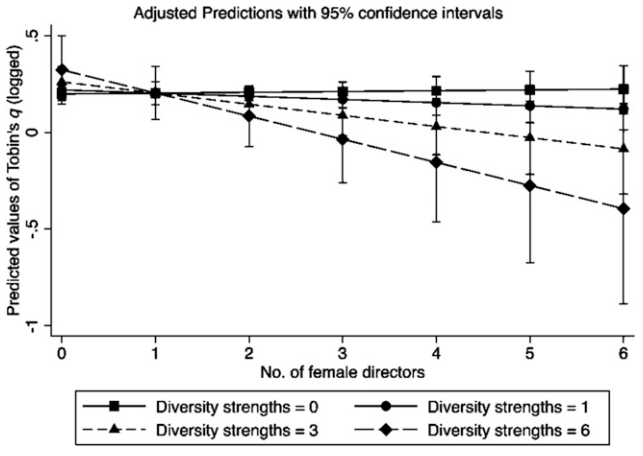


insulated from the penalty associated with diverse boards, making it easier for them to recruit female directors precisely because they make little or no attempt to support and advance women and minorities in the rest of the organization.

Instrumental Variable Estimation and CEM

The results of Models 4–6, employing instrumental variable 2SLS (IV-2SLS) estimation, are laid out in Table 3. We used the average level of board gender diversity in the firm's industry as our instrument for all three models. In Model 4, we used our instrument to predict the number of women present on a firm's board, using our full sample from Model 1, and confirm our earlier findings. We found that when instrumented by the average level of board diversity in the industry, higher numbers of female directors are associated with a decrease in firm value ($p < 0.001$). We also report the results of the first-stage regression, which indicate that the average level of board gender diversity in the industry strongly and positively predicts the number of female directors sitting on the board of the focal firm. The first-stage *F*-statistic of 100.65 allows us to reject the null hypothesis that our instrument is weak.

Figure 3. Predicted Values for Tobin's *q* (Logged), by Number of Female Board Directors and KLD Diversity Strength Score



Model 5 implements the CEM procedure. We first identified exact matches between firms with at least one female director (our treatment group) and firms with all-male boards (our control group) based on year, CEO gender, and CEO–chair duality. Observations were then matched one-to-one on coarsened values of board size, percentage of independent directors, average age of directors, percentage of shares held by institutional investors, and logged value of the firm's assets. This yielded a sample of 467 observations in each of the treatment and control groups. Comparisons of the two groups before and after implementing the matching procedure are presented in Table 4, and they confirm that the matched samples resemble each other on relevant dimensions.

We estimated an IV-2SLS regression on the matched sample using the original, uncoarsened variable values. We instrumented being in the treatment group—that is, having at least one female director—with the average level of board gender diversity in the industry, and we found a strong negative effect of the treatment ($p < 0.01$).

The results presented earlier estimate the relationship between a firm's board characteristics and market value. As an additional robustness check, we ran an IV-2SLS model using the firm's decision to appoint a new female director as our instrumented variable (Model 6). Our female appointment measure is a binary variable taking a value of 1 if the firm appointed at least one new female director in a given year and 0 otherwise. It therefore captures increases in board diversity, as well as instances where the firm is replacing one female director with another. Confirming our earlier results, we found that firm value was lower for firms that appointed a female director compared with firms that did not ($p < 0.01$).

A Direct Test of Investor Perceptions. Taken together, our results provide evidence for our argument that investors will penalize firms with more diverse boards, because this signals to the market that the firm has diversity preferences that may not be fully compatible with shareholder value maximization. To more directly test this proposed mechanism, we conducted an experimental study with a sample of MBA alumni and students to measure the effect of female board appointments on perceptions of firm preferences. We also evaluated the impact of the framing of board

Table 3. IV-2SLS Estimations

	Model 4		Model 5		Model 6	
	First stage	Second stage	First stage	Second stage	First stage	Second stage
Dependent variable:	*No. of female directors*	ln(*Tobin's q*)	*Has female director*	ln(*Tobin's q*)	*New female director*	ln(*Tobin's q*)
Industry diversity (%)	6.599***		3.288***		0.322***	
	(0.658)		(0.895)		(0.077)	
No. of female directors		−0.249***				
		(0.067)				
Has female director				−1.259**		
				(0.424)		
Appointed female director						−5.100**
						(1.789)
CEO gender	1.126***	0.270*			0.077**	0.384†
	(0.154)	(0.117)			(0.026)	(0.201)
New CEO	0.027	0.030	−0.009	−0.044	−0.008	−0.017
	(0.029)	(0.022)	(0.081)	(0.130)	(0.008)	(0.049)
No. of directors	0.119***	−0.008	0.019	0.013	0.007***	−0.004
	(0.010)	(0.011)	(0.017)	(0.028)	(0.001)	(0.015)
Independent directors (%)	0.724***	0.153†	0.291	0.119	0.034*	0.145
	(0.120)	(0.091)	(0.206)	(0.319)	(0.015)	(0.125)
CEO-chair duality	0.033	0.002	−0.022	−0.043	−0.006	−0.037
	(0.029)	(0.022)	(0.051)	(0.080)	(0.004)	(0.033)
Average age of directors	−0.030***	−0.020***	0.001	−0.008	−0.004***	−0.031***
	(0.005)	(0.004)	(0.008)	(0.011)	(0.001)	(0.008)
Inst. ownership (%)	−0.038	0.031	−0.102	0.227	0.014	0.112
	(0.092)	(0.077)	(0.167)	(0.261)	(0.012)	(0.097)
Assets (logged)	0.133***	−0.039*	−0.019	−0.089*	0.002	−0.064***
	(0.015)	(0.015)	(0.025)	(0.038)	(0.002)	(0.015)
ROA	0.491***	3.961***	0.235	4.365***	0.043*	4.056***
	(0.150)	(0.273)	(0.274)	(0.651)	(0.020)	(0.309)
Constant	−0.680**	1.524***	−0.005	1.284	0.139***	2.402***
	(0.287)	(0.239)	(0.514)	(0.788)	(0.036)	(0.415)
Observations	11,387	11,387	723	723	11,387	11,387
No. of firms	1,644	1,644	480	480	1,644	1,644
First-stage *F*-statistic	100.65		13.48		17.31	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	No	No
Matched sample	No	No	Yes	Yes	No	No

Notes. Robust standard errors are in parentheses, clustered at the firm level. FE, fixed effects.
***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; †$p < 0.10$.

Table 4. Results of the CEM Procedure

	Before matching			After matching		
	Means		Significance	Means		Significance
Variable	Treatment	Control	|*t*-Value|, *p*-value	Treatment	Control	|*t*-Value|, *p*-value
No. of directors	10.23	7.78	58.58, $p = 0.000$	8.32	8.22	0.96, $p = 0.337$
Independent directors (%)	0.74	0.67	29.17, $p = 0.000$	0.76	0.76	0.36, $p = 0.720$
CEO-chair duality	0.72	0.65	9.38, $p = 0.000$	0.72	0.72	0.00, $p = 1.000$
CEO gender[a]	0.03	0.00	12.19, $p = 0.000$	0	0	
Average age of directors	60.65	60.62	0.45, $p = 0.653$	60.80	60.80	0.02, $p = 0.982$
Institutional ownership (%)	0.749	0.756	1.96, $p = 0.050$	0.842	0.842	0.04, $p = 0.970$
Assets (logged)	8.28	6.92	48.49, $p = 0.000$	7.30	7.30	0.04, $p = 0.967$
Observations	9,464	4,652		467	467	

Note. Treatment is firms with female director(s); control is firms with all-male boards, in the same year.
[a]In the matched sample, all CEOs are male.

appointments by manipulating the inclusion or exclusion of explicit references to diversity. We found that firms that appointed a female director were perceived as caring less about profit goals than firms that appointed a male director. Female-appointing firms were also perceived as caring more about social performance. The effect was strengthened when diversity was made salient. Details of the experimental study can be found in the online appendix.

Ruling Out Alternative Explanations and Additional Analyses. ***Board Diversity and Profitability.*** The simplest alternative explanation for the negative relationship between board diversity and firm value is that the market is responding to a drop in profitability associated with more gender-diverse boards. It was this decrease in firm profitability that accounted for the adverse market reaction to the board quota imposed in Norway (Ahern and Dittmar 2012, Matsa and Miller 2013). We tested for this possibility by estimating the relationship between board diversity and profitability, measured using ROA, in line with extant literature (Adams and Ferreira 2009, Dobbin and Jung 2011). We computed ROA as the ratio of earnings before interest and tax to the book value of assets, and we controlled for firm size using the log of market value. The results of this analysis are presented in Model 7 (Table 5) and show that increasing the number of female directors has no impact on the firm's bottom line (see also Figure 2). These results are robust to alternative measures of ROA and are consistent with meta-analytic studies that find no relationship (or in some cases, a small positive relationship) between board diversity and firm profitability (Pletzer et al. 2015, Post and Byron 2015). We also estimated this model with an additional lag on the diversity measure as well as all controls in order to determine whether the drop in market value accurately reflects an anticipated drop in the firm's future profitability. We found no evidence of a relationship between the appointment of a female director and ROA after one, two, or three years.

The Glass Cliff Effect. Another explanation for our findings is that poorly performing firms are more likely to appoint female directors. Pursuant to the glass cliff theory, women are appointed to leadership positions at times of crisis (Ryan and Haslam 2007, Haslam et al. 2010). Thus, our findings could be consistent with the glass cliff effect if companies showed signs of poor performance prior to an increase in board diversity and if that prior performance were subsequently confirmed (Haslam et al. 2010). Our failure to find any relationship between the level of gender diversity on the board and firm profitability in subsequent years suggests that there is no glass cliff effect in our data, but to be certain, we tested for reverse causation in Model 8, using a fixed effects Poisson model in which we estimate the relationship between a firm's current market value and its future level of board diversity. We found no statistically significant relationship between a firm's Tobin's q ratio and the number of female directors on the board the following year, suggesting that the firms in our data are not choosing to diversify their boards because they experienced poor performance.

Additional Analyses. We ran additional analyses, not reported here, in which we tested for a possible nonlinear relationship between the number of women on the board and firm value. Although we were unable to come to a definitive conclusion given the small number of instances of adding a third or fourth woman to the board, we found no evidence supporting a nonlinear relationship. Our results suggest that firms continue to experience a decrease in market value as they increase the number of female directors, which may indicate that subsequent increases in diversity reinforce the signal to the market regarding the motivation behind this choice. We also explored whether market response varied according to the level of institutional ownership of the firm and particularly whether firms with a higher level of ownership by pension funds were able to avoid the market penalty associated with gender-diverse boards, but we found that the interaction term was not statistically significant. We did find, however, that the effect of board diversity on market value was more negative for firms with high levels of ownership by financial services institutional investors, who are more likely to expect a stringent adherence to the shareholder value paradigm. Finally, we tested the effect of board diversity over time by using different lags of our diversity measure, and we found that the negative effect of increasing female board representation remained significant for an additional year but was no longer significant in the third year.

Discussion and Conclusion

Drawing on 14 years' worth of panel data on public U.S. firms, we showed that firms with gender-diverse boards suffer market penalties and that this effect is strongest for firms that otherwise exhibit a preference for diversity. First, we found that as firms increased the number of female directors on their boards, they experienced a decrease in market value. We further found that firms that had made clear commitments to diversity initiatives across the organization suffered a greater decline in firm value when they increased female representation on their boards. An experimental test confirmed that director gender influences perceptions of the firm's preferences. Taken together,

Table 5. Ruling Out Alternative Explanations

Dependent variable:	Model 7 *ROA* (OLS)	Model 8 *No. of female directors* (Poisson)
No. of female directors	0.001	
	(0.002)	
Tobin's q (logged)		–0.025
		(0.026)
CEO gender	0.006	0.139**
	(0.008)	(0.054)
New CEO	–0.002	–0.016
	(0.002)	(0.017)
Number of directors	–0.001	0.049***
	(0.001)	(0.006)
Independent directors (%)	–0.006	0.325***
	(0.010)	(0.082)
CEO-chair duality	–0.004†	–0.014
	(0.002)	(0.020)
Average age of directors	–0.001	–0.023***
	(0.001)	(0.004)
Institutional ownership (%)	0.017†	0.177*
	(0.010)	(0.080)
Market capitalization (logged)	0.049***	
	(0.003)	
Assets (logged)		0.080**
		(0.031)
ROA		0.051
		(0.154)
Constant	–0.199***	
	(0.037)	
Observations	11,450	9,064
Number of firms	1,646	1,109
R^2	0.177	
Year FE	Yes	Yes
Firm FE	Yes	Yes

Notes. Robust standard errors are in parentheses, clustered at the firm level. FE, fixed effects.
***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; †$p < 0.10$.

our findings reveal that the level of female representation on a firm's board may send a negative signal to the market regarding a firm's commitment to shareholder value maximization if it is perceived as being motivated by a desire for diversity.

Earlier studies have suggested that, contrary to our findings, board gender diversity will lead to an increase in firm value (see, e.g., Carter et al. 2003) because diversity tends to have a positive impact on group performance (Hoffman and Maier 1961, Nemeth 1986). As we discussed earlier, the effect of diversity on groups is complex and often context dependent (Lau and Murnighan 1998, Williams and O'Reilly 1998, Jehn et al. 1999, Pelled et al. 1999, Kilduff et al. 2000). Moreover, we note that recent meta-analyses and studies based on longitudinal data or exogenous shocks have shown a null or negative effect of female appointments on market value (Farrell and Hersch 2005, Adams and Ferreira 2009, Carter et al. 2010, Dobbin and Jung 2011, Ahern and Dittmar 2012, Matsa and Miller 2013, Pletzer et al. 2015, Post and Byron 2015), consistent with our results.

Our findings differ from those of studies arising out of the Norwegian quota in one important respect. Those studies found that the restrictions corporations faced when choosing nominees, and the limited pool of female candidates available within Norway, led to a decrease in age, experience, and ability of appointed board members (Ahern and Dittmar 2012; see, however, Bertrand et al. 2018). Our study is focused on the United States, where female appointments are made voluntarily, demand is relatively stable, and the candidate pool is sufficient to meet demand.[8] Thus, there is no reason to suspect that U.S. female appointees are any less qualified than their male counterparts. The Norwegian studies also suggested that the sudden change in board member characteristics led to a decrease in operating performance (Ahern and Dittmar 2012, Matsa and Miller 2013), which, in turn, was reflected in lower market value. Our findings show that firm value may fall without any underlying drop in profitability, leading us to conclude that the market penalty observed in our data as a result of board diversity is unrelated to actual board performance. Instead, the explanation is to be found in how investors interpret the decision of a firm to place a greater number of women on its board.

An alternative explanation for our findings is that the market believes firms are yielding to pressure from public pension funds when they appoint female directors and are not motivated by a genuine preference for diversity. We do not deny that some firms may choose to appoint female directors because they feel pressured to do so (Farrell and Hersch 2005, Chang et al. 2019). Given the importance of signaling a commitment to shareholder value, however, and the limited threat of exit from public pension funds, it is likely that firms that do cave in to external demands for diversity are precisely those firms that attach more value to it. Therefore, whether a firm appoints a female director of its own accord or in response to an external request, the market will infer the firm's preferences from its level of board diversity.

Scholars have suggested that market reactions to board diversity can be attributed to personal prejudice against women or the belief that female appointees do not have the experience necessary to adequately fulfill their duties as board directors. Our results do not exclude investor prejudice. However, our finding on the moderating effect of social performance on the relationship between board diversity and firm value is consistent with investors relying on additional information to reduce the ambiguity inherent in the board composition cue. In any event, the signaling effect of board diversity complements,

rather than contradicts, explanations founded on prejudice. Indeed, the assumption that a firm that appoints women to its board cares less about maximizing shareholder value than a firm that appoints only men is, in itself, a form of prejudice.

One way to interpret our finding that a firm's diversity ratings moderate the relationship between board diversity and firm value is that investors do in fact value diversity but only if it remains below a certain threshold. But the question remains, why would investors accept "a little bit of diversity" but punish firms with "too much" diversity? We posit that this has to do with how investors interpret these signals. A modest level of diversity constitutes an ambiguous signal and may be assumed to be accidental, in the sense that investors believe the firm is not motivated by gender but simply happens to have higher levels of female or minority representation. However, as the diversity signal becomes stronger, investors will attribute increased female representation to diversity for diversity's sake, which will be penalized. Future research could usefully explore which other firm decisions or contextual factors may serve to strengthen, or dampen, the board diversity cue.

Another promising area for future research is whether increasing female board representation has positive consequences for women within the organization and in the wider labor market. A study by Bertrand et al. (2018) on the repercussions of the quota in Norway found no trickle-down effect on the advancement of women in the workplace or the gender wage gap. Research in the United States suggests that diverse boards are associated with less gender-segregated workplaces (Stainback et al. 2016), in line with our claim that firms that choose to appoint women also care about diversity more broadly, but whether board diversity remedies workplace inequality remains an open question.

The vast majority of research on board diversity focuses on gender, largely as a result of concerns regarding the availability and accuracy of data on other director characteristics such as race, ethnicity, or nationality. The diversity discourse surrounding leadership appointments, however, has also addressed the underrepresentation of racial minorities in top management (Park and Westphal 2013). As a result, the nomination of a nonwhite male director may also be seen by an external audience as motivated by diversity concerns, leading to the same market penalty as in the case of female appointments. If this were the case, what we refer to in this paper as a *gender penalty* would in fact be captured by a broader diversity penalty. At the same time, different forms of diversity, such as race and gender, have been shown to have different effects (Martin 2018), and if the discourse surrounding top management appointments does not make race salient as it does gender, then a penalty is less likely to be incurred (Younkin and Kuppuswamy 2017). We therefore encourage scholars to pursue work on the financial market effects of other forms of board-level diversity.

Our paper contributes to the literature on gender and organizations by offering a novel perspective on the advancement of women to leadership positions and the barriers women continue to face. Our findings indicate that market perceptions of the firms that choose gender-diverse boards must be examined separately from market perceptions of the women being appointed to those boards. The gender penalty associated with diverse boards suggests that female representation on corporate boards continues to be viewed first and foremost as a gesture designed to satisfy a desire for diversity. Although we also find that some firms may choose to have more women on their boards without this being attributed to a preference for diversity, this is only likely to be the case for firms that have made little effort to redress gender imbalances elsewhere within their organizations.

Our findings highlight the problematic consequences of the automatic evocation of the concept of diversity whenever a woman is appointed to a senior leadership position. This may be an instance of well-meaning attempts to encourage the promotion of women proving to be ultimately unhelpful (Merton 1936). Repeated calls for firms to demonstrate their commitment to diversity by improving female representation increase the salience of gender and lead to female appointments being perceived primarily as diversity measures. As a result, firms that might otherwise have considered female candidates may continue to appoint male directors in order to avoid signaling to the market that they are less focused on maximizing shareholder value. This could at least partly explain why female representation on corporate boards has plateaued in recent years—assuming, of course, that we have not reached the limits of the pool of qualified women (Fernandez-Mateo and Fernandez 2016). Shifting the diversity discourse to focus on educational and background diversity may be more beneficial for women. The discourse of diversity is far from neutral (Litvin 1997, Zanoni and Janssens 2015), and by highlighting an unintended signaling effect of efforts to promote female leadership (Leslie 2018), we hope to contribute to a broader discussion of the role of public discourse around social justice issues in general and gender in particular.

At first blush, our findings are not encouraging for the proponents of fairer outcomes for women in business. We did not find evidence supporting the suggestion that adding women to the board of directors is beneficial to a firm's performance. Instead, we found that firms with more gender-diverse boards

suffer a market penalty as a result. Inciting firms to appoint more women using economic arguments therefore appears unhelpful (Fanto et al. 2011), and the increased focus on boardroom diversity may itself be contributing to the view that female appointments must be motivated by a diversity preference. Nevertheless, the first step in addressing and eliminating damaging assumptions is to foster awareness, and we believe that our paper contributes to that effort. A clearer understanding of how gender affects perception, and the consequences for firm outcomes, is key to defining, implementing, and shaping the discourse around effective policies to promote diversity (Skrentny 1996). One implication of our findings is also that there is room for firms to counteract the potential signaling effect of board diversity by carefully framing female appointments and reassuring shareholders on corporate goals and values (Fiss and Zajac 2006). Over time, just as greater exposure to female leaders has been shown to reduce stereotype bias (Dasgupta and Asgari 2004, Beaman et al. 2009), the increase in female board appointments should likewise decrease the perception that firms select directors for any reason other than their qualifications.

Acknowledgments

The authors thank seminar participants at Columbia Business School, London Business School, and INSEAD, as well as Emilio Castilla, John-Paul Ferguson, Roberto Fernandez, Martin Gargiulo, Henrich Greve, Herminia Ibarra, Phanish Puranam, Olav Sorensen, Ithai Stern, Roderick Swaab, Stefan Thau, Eric Luis Uhlmann, Phebo Wibbens, and Timothy Van Zandt for helpful comments and suggestions. The authors are especially grateful to Senior Editors Ned Smith and Aleksandra Kacperczyk and to three anonymous reviewers for their valuable feedback throughout the review process.

Endnotes

[1] The anticipatory bias theory has been used to explain why investors, although not necessarily biased themselves, might react negatively to female CEO appointments because they expect other (biased) investors to do so (Gaughan and Smith 2016). We expect that in the case of board appointments, however, investors would predict that their peers would be equally unlikely to expect a drop in profitability resulting from the addition of a single female director.

[2] We do not include ratings for 2010–2011 in our data set because of significant methodological changes introduced at that time into the KLD STATS rating system.

[3] Institutional ownership data were obtained from Thomson Reuters Institutional Holdings (13f) database and data on outstanding shares from the Center for Research in Security Prices.

[4] A Hausman test allowed us to reject the null hypothesis that random-effects estimators would be preferred to fixed-effects estimators, indicating that the unique errors in our model are correlated with the covariates and that only a fixed-effects model would yield unbiased and consistent coefficients (Sargan–Hansen statistic = 94.46, $p < 0.001$). We nonetheless verified that our results were not due to a misspecification of the model by estimating random-effects coefficients instead of fixed-effects coefficients. The effect of board gender diversity remains negative and significant at the 1% level under this specification. We dealt with potential autocorrelation of errors over time in additional analyses, where we estimated the models using Stata's xtregar command (modified Bhargava et al. (1982) Durbin–Watson = 1.08; Baltagi–Wu (1999) locally best invariant = 1.469). Our results were unaffected. The results of all robustness tests are available from the authors upon request.

[5] The sample of firms for which we have board-level information does not perfectly overlap with the sample of firms for which we have social performance data. As a result, the number of observations varies across our models because the models are estimated based on slightly different samples.

[6] As a point of reference, a 10-point increase in the corporate governance index has been found to predict a 5% increase in Tobin's q, and a change from worst to best rated would result in a 47% increase (Black et al. 2006).

[7] Firms that have not been rated by KLD in a certain year are excluded from the sample.

[8] Identifying the proportion of women who are qualified for senior leadership positions is, of course, difficult. However, see Fernandez-Mateo and Fernandez (2016) for recent advancements on this front. See also Hwang et al. (2019), who find that markets anticipate a supply-side constraint for firms in California following the imposition of a board quota.

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Isabelle Solal is a PhD candidate in organizational behavior at INSEAD. Her research interests are in discrimination, financial and labor markets, and entrepreneurship. In particular, her research examines the influence of gender on market structures and processes.

Kaisa Snellman is assistant professor of organizational behavior at INSEAD. She received her PhD in sociology from Stanford University. Her main research interests are in organizations, labor markets, entrepreneurship, and inequality.