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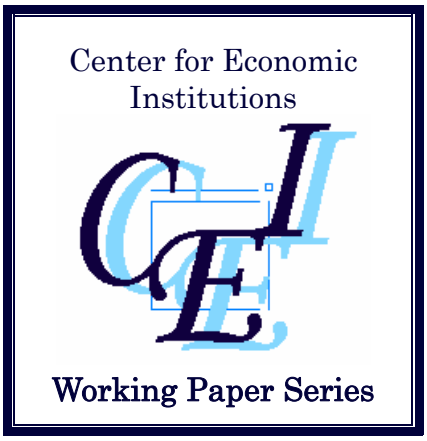

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Women in the Boardroom and Their Impact on Governance and Performance*

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Abstract

Although some argue that tokenism drives the selection of female directors, we show that they have a significant impact on measures of board effectiveness. In a large panel of data on publicly-traded firms from 1996-2003, we find that (1) the likelihood that a female director has attendance problems is 0.29 lower than for a male director, (2) male directors have fewer attendance problems the greater the fraction of female directors on the board, (3) firms with more diverse boards provide their directors with more pay-performance incentives, and (4) firms with more diverse boards have more board meetings. We also show that the positive relationship between corporate performance measures and gender diversity documented by previous studies is not robust to attempts to address the endogeneity of diversity. Instead, the average effect of gender diversity on both market valuation and operating performance appears to be negative. This negative effect is driven by companies with greater shareholder rights. In firms with weaker shareholder rights, gender diversity has positive effects. Our results suggest that diverse boards are tougher monitors. Nevertheless, mandating gender quotas in the boardroom may not increase board effectiveness on average, but may reduce it for well-governed firms where additional monitoring is counterproductive.

JEL classification: G30; G34; J16
Keywords: Board of Directors; Board Effectiveness; Gender; Diversity.

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1. Introduction

It is widely argued that women face a glass ceiling when it comes to holding top corporate officer positions.[1] Partly because they hold so few officer positions, women also hold few board seats. In the US, women held 13.6% of Fortune 500 board seats in 2003 (Catalyst, 2003). The percentage of female directors in Australia, Canada, Japan and Europe is estimated to be 8.7%, 10.6%, 0.4% and 8%, respectively (see Equal Opportunity for Women in the Workplace Agency (EOWA), 2006, and European Professional Women's Network (EPWN), 2004). Furthermore, many firms have only one female director which is often regarded as evidence of tokenism (see the discussion in Branson, 2006; Bourez, 2005, and Corporate Women Directors International (CWDI), 2007).[2]

This situation is likely to change because boards around the world are under increasing pressure to choose female directors. Many recent proposals for governance reform explicitly stress the importance of gender diversity in the boardroom. In the UK, the Higgs Report "Review of the Role and Effectiveness of Non-Executive Directors" (Higgs, 2003), commissioned by the British Department of Trade and Industry, argued that diversity could enhance board effectiveness (see also "The Tyson Report" (Tyson, 2003) on the recruitment and development of non-executive directors). If companies don't voluntarily see to it that 25% of their directors are female, Sweden has threatened to make diversity a legal requirement (see the discussion in Medland, 2004). The most extreme promotion of gender diversity occurs in Norway, where since 2006 all listed companies must abide by a 40% gender quota for female directors or face delisting.

One argument for such measures is that boards could enhance their effectiveness by tapping broader talent pools for their directors. The Higgs Review, for example, points out that although approximately 30% of managers in the UK corporate sector are female, women hold only 6%

[1] For example, Bertrand and Hallock (2001) found that women comprised only 2.5% of the 5 highest paid executives in the S&P 1500 from 1992-1997 and earned 45% less than men. While they argue that job characteristics explain part of this gap, others interpret their findings to be evidence of the glass ceiling.

[2] For example, in the top 200 companies in Europe, 62% of companies have at least one female director, but only 28% have more than one in 2004 (EWPN, 2004). In Australia, 50% of ASX200 companies have at least one female director, but only 13.5% have more than one in 2006 (EOWA, 2006).

of non-executive director positions. Precisely because they do not belong to the "old boys club," female directors may more closely correspond to the concept of the independent director emphasized in theory. Nevertheless, for several reasons it is not clear that adding female directors will enhance board effectiveness. For example, if female directors are chosen merely because of tokenism, their impact is likely to be minimal. Kanter (1977) argues that the contrast between tokens and the numeric majority may lead to both social and professional isolation of tokens. Subsequent tokenism research found evidence consistent with this hypothesis (e.g. Yoder, 1991). This suggests that token female directors are unlikely to be able to influence board effectiveness. Even if they can, if the effect of increasing gender diversity is to increase board independence, gender diversity should enhance board effectiveness only where greater independence is valuable.[3]

The purpose of this paper is to examine the relationship between board effectiveness and gender diversity, which we measure using the fraction of female directors on the board. In particular, we ask the following questions. First, do boards with greater gender diversity look different? If so, does diversity lead them to perform differently in terms of governance? Finally, does the effect of gender diversity on governance matter sufficiently to affect corporate performance?

The answers to these questions are interesting for several reasons. Most directly, they can shed light on whether tokenism prevents female directors from having an impact. They can also further our understanding of the effect group composition has on board effectiveness and the likely success or failure of recent governance proposals advocating greater diversity. Despite the importance of gender diversity in the policy debate, there is still relatively little research linking diversity and corporate governance (for a survey of this literature, see Fields and Keys, 2003). Carter, Simkins and Simpson (2003) document a positive relationship between gender and

[3]Other benefits and costs of gender diversity can be found in the finance and management literatures. For example, Ellis and Keys (2003) describe the idea that more diverse boards may have better relations with customers, suppliers and employees. On the other hand, management scholars have also pointed out that diverse top management teams may disagree more (e.g. Eisenhardt, Kahwajy and Bourgeois, 1997) or underperform (see the survey by Milliken and Martins, 1996).

ethnic diversity of the board and corporate performance, as proxied by Tobin's Q.[4] Farrell and Hersch (2005) find that gender systematically impacts the selection of directors to the board. However, when they examine the market's reaction to the announcement of the addition of female directors, the abnormal returns are insignificant. Rather than being performance based, they argue that their evidence is consistent with the idea that female directors are added to the board following internal or external calls for diversity. These papers do not fully address the endogeneity problems that arise because of differences in corporate culture across firms or reverse causality. Thus, their findings cannot always be given causal interpretations. Our paper complements these by providing a more comprehensive analysis of the effect of gender diversity in boards with an emphasis on the identification of causal effects.[5]

More generally, our paper contributes to the literature on the demography of organizations, which has been studied primarily by researchers in management and organization theory, but also increasingly in economics and corporate finance. Pfeffer's (1983) concept of organizational demography deals with the description of organizations "in terms of their sex composition, their racial composition, their age or length of service distributions, the educational level of their work forces, the socioeconomic origins of their members, and so forth" (p. 303). Empirical papers in this tradition have looked both at the effects of demography on outcomes and at the determinants of demography in organizations (Haveman, 1995; O'Reilly, Caldwell, and Barnett, 1989; Pelled, Eisenhardt, and Xin, 1999; Wagner, Pfeffer, and O'Reilly, 1984). In the economics and finance literature, Hermalin and Weisbach (1988) and Agrawal and Knoeber (2001) document that firms appear to optimally choose directors for their characteristics. Bertrand and Schoar (2003), Malmendier and Tate (2005) and Bennedsen, Péréz-Gonzalez and Wolfenzon (2007) provide evidence that personal characteristics of CEOs affect corporate policies. Bertrand and Schoar find that older CEOs pursue more conservative corporate strategies,

[4] Similar results have been documented by Adler (2001), although the focus of this study is more broadly on the gender diversity of senior management.

[5] Our paper also contributes to a large, mainly experimental, literature exploring whether women behave differently than men in different situations (see the survey by Croson and Gneezy, 2004). In the context of financial decision-making, Charness and Gneezy (2004) argue that women commonly invest less than men in experimental settings. Using data from an account brokerage, Barber and Odean (2001) find that women trade less, which leads them to outperform men.

while CEOs with MBAs are more aggressive. Malmendier and Tate show that measures of a CEO's overconfidence are related to firm outcomes. Bennedsen, Péréz-Gonzalez and Wolfenzon (2007) find that the death of immediate family members of CEOs have a negative impact on firm performance, suggesting that personal circumstances of the CEO are important for firm policies. Adams, Almeida and Ferreira (2005) argue that executives' characteristics only impact corporate outcomes when they have influence over decision-making. This argument suggests that female directors can only matter when they are not isolated as tokens.[6]

Our paper proceeds as follows. First, we analyze the relationship between gender diversity and several measures of board behavior and structure that the literature associates with good governance. Specifically, we focus on director attendance behavior at board meetings, director pay and the number of board meetings.[7] We address important endogeneity concerns in this analysis using firm fixed effects estimates. Although it is difficult to find valid instruments in this context, as a robustness check we also use an instrumental variable approach. Next, we use similar empirical techniques to analyze the relationship between gender diversity and measures of corporate performance.

We find that gender diversity has significant effects on board governance. Women appear to behave differently than men with respect to our measure of attendance behavior. Specifically, women are less likely to have attendance problems than men. Furthermore, the greater the fraction of women on the board, the better is the attendance behavior of male directors. Boards with more gender diversity also have more performance pay and more board meetings.

These results suggest that women have a positive impact on board governance. In particular, diverse boards appear to be tougher monitors: directors (both male and female) attend

[6]In the accounting literature there has also been a recent trend towards examining the effect of gender on accounting outcomes although the findings have been mixed. Green, Jegadeesh, Tang (2007) examine the impact of gender on earnings estimates of analysts and find that female analysts are less accurate. In contrast, Kumar (2007) finds that female analysts make bold and accurate estimates. Krishnan and Parson (2006) find that firms with more diverse top management teams in terms of gender have higher earnings quality. The fact that gender appears to affect policy outcomes has been documented by Chattopadhyay and Duflo (2004), in a quite different context from the one we examine. They find that gender affects investments in public goods by village representatives in India.

[7]Although we also analyzed the relationship between director independence and board size and gender diversity, we do not present this analysis here. As we discuss later, we believe these relationships are largely mechanical and difficult to interpret.

more meetings, schedule more meetings, and a larger fraction of their compensation is equity-based. However, although the correlation between the gender diversity of the board and either firm value or operating performance appears to be positive at first inspection, this correlation disappears once we apply reasonable procedures to tackle omitted variables and reverse causality problems. Our results suggest that, on average, firms perform worse the greater the gender diversity of the board. While this result appears counter-intuitive, some theoretical papers argue that boards that do not monitor too intensively may be equilibrium phenomena (e.g. Hermalin and Weisbach (1998)). Others argue that too much board monitoring can decrease shareholder value (e.g. Almazan and Suarez (2003) and Adams and Ferreira (2007)). Thus, it is possible that diversity only adds value when additional board monitoring is needed. To test this hypothesis, we examine whether diversity affects performance differentially in firms with different levels of shareholder rights defined using IRRC governance data as in Gompers, Ishii and Metrick (2003). Consistent with this hypothesis, we find that diversity has beneficial effects in companies with weak shareholder rights, where it is plausible that additional board monitoring can enhance value, but detrimental effects in companies with strong shareholder rights.

Although female directors may be chosen because of tokenism, our results show that they are able to impact board governance. In addition, gender seems to matter even after we control for measurable characteristics of directors, such as age, tenure, retirement status and number of other directorships. Nevertheless, our results suggest that mandating gender quotas in the boardroom may not increase board effectiveness on average, but may reduce it for well-governed firms where additional monitoring is counterproductive.

The structure of our paper is as follows. We discuss our data and basic facts about female representation on corporate boards in our sample in Section 2. In Section 3, we examine the relationship between gender diversity and board governance. We analyze the relationship between diversity and performance in Section 4. In Section 5, we show that our results are not driven by observable characteristics of female directors. Section 6 concludes.

2. Data

Our initial sample consists of an unbalanced panel of director-level data for S&P 500, S&P MidCaps, and S&P SmallCap firms collected by the Investor Responsibility Research Center (IRRC) for the period 1996-2003. This dataset is in part based on an IRRC annual publication (*Board Practices/Board Pay: the Structure and Compensation of Boards of Directors at S&P 1,500 Companies*). It contains information on directors from company proxy statements or annual reports, such as the director's gender, the number of other directorships each director holds, the director's tenure as director, age and retirement status. The SEC requires that in their proxy statements companies report the names of directors who during the previous fiscal year attended fewer than 75 percent of the total number of board and committee meetings they were supposed to attend. For all but two directors in our sample, the IRRC indicates whether they met this attendance threshold. The IRRC data also contain a classification of director independence. Directors are classified as independent if they have no business relationship with the firm, are not related or interlocked with management and are not current or former employees.[8] Directors who are not independent are either classified as inside directors, who are current employees, or affiliated directors, who have significant business or family relationships with the firm. Because director characteristics were not always collected in a consistent manner, we perform several steps to clean the data, which we describe in more detail in Appendix A.

To obtain financial data, director compensation data and the number of board meetings during each fiscal year, we merge our data with ExecuComp. We obtain SIC codes and business segment data from Compustat and stock prices from CRSP.[9] Our final sample of complete director and firm level data consists of 86,714 directorships (director-firm-years) in 8,253 firm-years of data on 1,939 firms whose number varies from a minimum of 968 (in 1996) to a

[8] Because it is the most difficult to collect, the independence of a director is the most likely to be measured with error. However, all of our results are robust to excluding board independence from our regressions, which suggests that the measurement error is white noise. These results are available upon request.

[9] In the original IRRC data, firms are assigned to industries according to two digit codes prior to 2003 and according to four digit codes in 2003. All industry codes are missing for 1996. Thus, we use the SIC codes from Compustat to assign firms to industries.

maximum of 1,146 (in 1997).[10]

Table 1A shows descriptive statistics for selected firm, board and director characteristics. In our analysis, we use a market-based measure of performance, a proxy for Tobin's Q, as well as an accounting measure, return on assets (ROA). Our proxy for Tobin's Q is the ratio of the firm's market value to its book value. The firm's market value is calculated as the book value of assets minus the book value of equity plus the market value of equity. ROA is the ratio of net income before extraordinary items and discontinued operations to its book value of assets. Our measure of firm risk or volatility is the standard deviation of monthly stock returns from CRSP over the previous five years.

Directors are generally paid an annual retainer, meeting fees for attendance at board meetings and some stock-based compensation in the form of restricted shares or options. Each director faces the same compensation schedule. We define total (individual) director compensation to be the sum of the annual retainer, the meeting fee times the number of board meetings and the value of all stock-based compensation. We discuss how we value stock-based compensation in Appendix B. For comparison purposes, we convert all director compensation variables into 2003 dollars using the CPI-U.

(Insert Table 1A about here)

2.1. Women in the boardroom-the basic facts

The IRRC dataset contains data on 24,820 unique directors holding a total of 125,319 directorships (firm-year board positions).[11] Women constitute 2,012 or 8.11% of directors, holding 8.87% of directorships. These numbers are consistent with Farrell and Hersch (2005), who find that female directors comprise 8.6% of board members in a sample of approximately 300 unregulated Fortune 500 firms over the period 1990 to 1999. Although it focuses on large firms, the 1999 Catalyst census of female directors documents only about 10% female directors in the

[10] The number of observations may vary across regressions due to multicollinearity and perfect prediction of the dependent variable. In some cases, we are able to exploit more of the merged data in our regressions.

[11] In this section, we use the entire IRRC database, not just the subsample for which we have complete data, to provide a broader picture of female representation in the boardroom. The summary statistics in our subsample are very similar.

Fortune 1000 (Catalyst, 1999). Women act as inside directors in only 727 (6.64%) female board positions. They serve primarily as independent directors (9,345 or 84.07% of female board positions) or affiliated directors (1,044 or 9.39% of female board positions). The primary reasons they are classified as affiliated are because they provide professional services to the firm (39.75% of affiliated directorships), they are related to a member of management (26.62%), they act on behalf of a supplier (19.44%), as a union or large shareholder representative (15.57%), or are former employees (13.02%). The second to last reason they are classified as affiliated is because they act on behalf of a charity the company donates to (0.4% of affiliated directorships).

The percentage of board seats women occupy has increased somewhat over time, rising from 8.10% in 1996 to 10.41% in 2003. Similarly, Catalyst (2003) finds that the proportion of board seats women held in the Fortune 500 rose from 9.6% in 1996 to 13.6% in 2003. The average fraction of women on the board in the IRRC data is 8.25%, rising from 7.5% in 1996 to 9.8% in 2003. In 1996, 59.57% of firms had at least one woman on the board; in 2003, 65.01% of firms had female directors. However, the proportion of firms with only one woman on the board remained roughly the same throughout the sample period. In 1996, 39.29% of firms had only one female director. In 2003, 39.88% of firms had only one female director. Thus, the majority of firms with female directors have only one and this pattern has not changed much over time.

2.2. Firms with female directors-are they different?

An interesting question is whether firms with female directors are different from those without. There are several reasons why this might be the case. For example, women may be more likely to be on the board of firms in particular industries. The fact that in 2003 women hold 9.8% of board seats in our sample but 13.6% of board seats in the Fortune 500 (Catalyst, 2003) suggests that large firms may be more likely to select female directors than small firms. One reason could be because larger firms have more diverse workforces, so it may be more important to have diverse leadership. To examine potential differences among firms with female board members, we examine the presence of female directors across industries and compare characteristics of

firms with and without female directors in Tables 1B and 1C.

(Insert Table 1B about here)

Tables 1B provides summary statistics for the fraction of women on boards, the fraction of firms with at least one woman on the board and the fraction with only one woman on the board by two-digit SIC codes sorted by the fraction of women on the board. The 5 industries with the lowest average fraction of women on the board are Special Trade Contractors (SIC 17), Oil and Gas Extraction (SIC 13), Transportation Services (SIC 47), Water Transportation (SIC 44) and Electronic and Other Equipment (SIC 36). The 5 industries with the highest average fraction of women on the board are Leather and Leather Products (SIC 31), Tobacco Products (SIC 21), Apparel and Accessory Stores (SIC 56), Food Stores (SIC 54) and Real Estate (SIC 65). Thus, female directors are less prevalent in firms that deal with infrastructure, energy or electronics than with consumer products. Casual observation suggests that the consumers of the products from the latter 5 SIC codes are more likely to be diverse. Having a woman's perspective may be particularly valuable in such industries.

(Insert Table 1C about here)

In Table 1C, we compare the means of various firm characteristics across firms with at least one woman on the board and firms without women for our sample. The comparison shows that firms with female directors are larger, have more business segments, have worse performance in terms of Tobin's Q, but better performance in terms of ROA and have lower volatility than firms without female directors. While it is not immediately clear whether firms with women are necessarily better performers, as Catalyst (2004) argues, the other comparisons suggest that firms' choices to nominate female directors are significantly influenced by firm and industry characteristics. Thus, it is important to control for these characteristics in our analysis, as we do.

3. Gender diversity and board governance

To examine whether diversity can enhance board effectiveness, as recent governance proposals argue, we first examine whether governance characteristics of boards that are more diverse are different from those that are less diverse. Consistent with the governance literature, which measures the independence of the board by the fraction of independent directors on the board, we measure the gender diversity of the board by the fraction of women on the board. In the numerator we include female inside directors, but because there are so few of them our results are robust to excluding them.

The governance characteristics we examine are director attendance behavior at board meetings, director pay and the number of board meetings. A large literature suggests that women behave differently than men in a variety of experimental settings (see e.g. Croson and Gneezy, 2004). However, it is not clear that we should expect female *directors* to behave differently than male directors. It is possible that all corporate directors share certain personality traits and that the women who become corporate directors are those who have these personality traits in common with male directors. But, if female directors always behave the same as male directors, we would not expect to find that diversity has any impact on board governance. Thus, we begin our analysis by examining the attendance behavior of directors at board meetings. Attendance behavior is interesting because it is the only measure of *individual* director behavior publicly available, so we can use it to examine whether female directors behave differently than male directors. Attendance behavior is also important from a governance perspective because the primary way in which directors obtain necessary information to carry out their duties is by attending board meetings. This is emphasized by bank regulators in particular. The OCC's *Director's Book* (1997), for example, lists attendance at board and committee meetings as the first out of five tasks a director can perform to be diligent in carrying out his duties. This suggest that a better governed board is one with better attendance behavior by directors.

We examine the relation between diversity and equity-based compensation for directors because the governance literature suggests that performance pay is an important mechanism

to ensure that directors act in the interests of shareholders (e.g. Shleifer and Vishny, 1988). We also examine the relation between diversity and total pay, although it is less clear whether better governance requires more or less total pay. Finally, we examine the relation between diversity and the number of board meetings. Since board meetings are an important source of information, more board meetings should enable directors to be more effective. Also, as discussed in Vafeas (1999), directors are often criticized for devoting too little time to the firms on whose boards they sit, for example, when they take on additional directorships. Holding more board meetings may be one way of ensuring directors spend sufficient time with the firm. Vafeas (1999) finds evidence consistent with the idea that board meetings serve an important monitoring function.[12]

Although we also analyzed the relationship between director independence and board size and gender diversity, we do not show this analysis. We believe these relationships are largely mechanical and difficult to interpret. For example, suppose that, as in Norway, regulators force a firm that previously had no women on the board to hire at least one woman. As a consequence, both board independence and board size would increase. Thus, although it is the increase in the number of women that is the "cause" of the increase in board size and independence, this is a mechanical relationship with no interesting economic implications.[13] However, we are careful in our analysis to control for board size and independence to ensure that the effects we document are due to gender diversity and not those variables.

When estimating the relationship between board governance and gender diversity, clear endogeneity concerns arise because of omitted unobservable firm characteristics. It is plausible, for example, that some firms are more "progressive" than others, so they have both better governance, as well as more female directors. Under the assumption that corporate culture

[12] Building upon arguments put forth by Blau (1977) and others, Eisenhardt, Kahwajy and Bourgeois (1997) argue that a benefit of diverse top management teams is that team members are able to provide different perspectives on important issues, which may reduce the probability of complacency in decision-making. However, since team members with different opinions are likely to disagree more, they also stress the importance of increasing the number of interactions between team members. Unless they learn to understand the viewpoints of dissenting members, teams members cannot work cooperatively. These arguments also suggest that to be effective a diverse board should have more board meetings.

[13] Not surprisingly, in our sample board size and independence are on average both significantly larger in firms with female directors.

does not vary much over time, which we believe is reasonable given that our panel is relatively short, we can use firm fixed effects to address the concern that omitted culture is driving our results. Another potential concern is reverse causality. However, the case for reverse causality is less clear for some governance mechanisms than others. In addition, it is well-known that in the context of corporate governance it is difficult to find valid instruments. Nevertheless, for the sake of completeness, we carry out an instrumental variable analysis as a robustness check in section 3.4.

3.1. Attendance at board meetings

If gender diversity is to affect the workings of the board, we argue that it must be the case that a) female directors behave differently than male directors in at least some respects and b) their presence affects the behavior of the board, i.e. there are some spillover effects. Thus, we begin by analyzing directors' attendance behavior. We examine first whether male and female directors exhibit different attendance behavior, then we examine whether gender diversity influences the attendance behavior of male directors.

We estimate a probit model in our directorship-level data in which the dependent variable is 1 if the firm's proxy reports that the director did not meet the SEC attendance threshold in a given year and 0 otherwise.[14] To interpret the results correctly, it is important to keep in mind that the dependent variable indicates those directors who missed more than 25% of the meetings they were supposed to attend, i.e. they experienced considerable attendance problems. Clearly, directors will not want to be named in proxies as having attendance problems, thus it is not surprising that the percentage of observations in which directors do not meet the 75% attendance threshold is small, 2.38%. Nevertheless, director characteristics affect this extreme measure of attendance problems in ways one would expect them to affect actual attendance behavior, as we show below.

Because the factors that cause insiders to fail to meet the 75% attendance threshold are

[14]Here we follow the same approach as in Adams and Ferreira (2006), which is the only prior analysis of director attendance behavior we are aware of. Unlike that paper, this one focuses on the effect of gender on the behavior of male and female directors separately.

unlikely to be the same as for outsiders, we first restrict our sample to outside directors. We also eliminate all observations in which the director's tenure is equal to one year. This ensures that we do not consider directors who were appointed in the middle of the previous year and were unable to meet the attendance threshold because of prior commitments.

We include a set of board, director and firm characteristics that are plausibly related to director attendance behavior. For example, Ferris, Jagannathan and Pritchard (2003) argue that as directors accumulate more directorships in other firms, they may become too busy to carry out their duties. This suggests that directors' opportunity cost of time increases with more directorships. Thus, we include the number of directorships directors hold in other firms as a control along with their tenure on the board, age and retirement status. We include some board level controls such as the meeting fee (see also the discussion in Adams and Ferreira, 2006), total director compensation excluding meeting fees, the number of board meetings, board size, and board independence (the fraction of independent directors on the board). Because independent directors are supposed to improve governance, we expect that director attendance behavior should improve with greater board independence. Finally, in the set of firm-level controls we include the two performance measures, Tobin's Q and ROA, a proxy for firm size, here the natural logarithm of sales, and the volatility of stock returns. All specifications include year dummies. All standard errors are corrected for potential heteroskedasticity and, in the specifications without firm fixed effects, group correlation within directorship (director-firm) units.

(Insert Table 2 about here)

Our main explanatory variable in column I of Table 2 is a dummy which is equal to 1 if the director is female. Because women may be overrepresented in some industries, as our summary statistics suggest, we include 2-digit SIC industry dummies in this specification. The signs of the coefficients on the right-hand side variables are consistent with expectations. For example, meeting fees are negatively correlated with the likelihood a director has attendance problems. Board size is positively correlated with attendance problems, as one might expect if directors free-ride more in bigger boards. It is also interesting to note that the likelihood of attendance

problems is significantly negatively related to board independence.

The coefficient on the female dummy is negative and significant, which suggests that female directors are less likely to experience attendance problems than male directors. To ensure that this result is not driven by the fact that most female directors are classified as independent and independent directors may have better attendance records than affiliated directors, we perform a robustness check by restricting the sample to independent directors. The results are very similar. The coefficient on the female dummy in the restricted sample is -0.113 with a significance greater than 1%. Thus, independence does not appear to be driving our results.

In column II, we investigate whether the better attendance behavior of women has spillover effects on the behavior of male directors. We restrict the sample to male directors and include the fraction of female directors as the main explanatory variable. The coefficient on the fraction of female directors is negative and significant at the 5% level. Thus, male directors appear to have fewer attendance problems the more diverse the board is.

It is possible that our results are driven by omitted unobserved firm characteristics, such as corporate culture. Some firms may be more likely to appoint women to their boards and may also encourage better attendance behavior of directors. To control for this possibility, in columns III and IV, we estimate a linear probability model of the specifications in columns I and II and include firm fixed effects. The coefficient estimates on the female dummy and the fraction of female directors remain significant at the 1% level in column III and at the 10% level in column IV. If we include firm fixed effects in the restricted sample of independent directors as above, the coefficient on the female dummy becomes -0.008 with a significance level of 1%. Thus, the results are robust to the inclusion of firm fixed effects.

We report the marginal effects of our main explanatory variables, evaluated at the means of the data, beneath their z-statistics in Table 2. We can use these to assess whether the gender effects are also economically significant. The results in column I suggest that if a director is female, the likelihood she has attendance problems decreases by 0.007. Given that the fraction of attendance problems in our data is 0.024, this amounts to a decrease in attendance problems of roughly 29.17%. From column II, a one-standard deviation increase in the fraction of female

directors, 0.083, is associated with a 0.002 reduced likelihood that a male director has attendance problems. The fraction of male directors with attendance problems in our data is also 0.024. Thus, this amounts to an 8.99% reduction in male director attendance problems.

The results above suggest that the overall attendance behavior of directors improves the more women are on the board. We confirm this by regressing the total number of directors named as having attendance problems in a given year on the fraction of women on the board and the firm-level averages of all other right hand side variables from column I including industry dummies. The coefficient on the fraction of women is -0.328 and significant at the 1% level. Similarly, the total number of male attendance problems is negatively and significantly related to the fraction of female directors.[15]

Our conclusion is that even after controlling for director characteristics such as independence, age, tenure, retirement status and number of other directorships, female directors appear to behave differently than male directors.[16] This is consistent with a large experimental literature arguing that women are intrinsically different from men (see Croson and Gneezy, 2004). However, it is also consistent with Kanter's (1977) theory of tokenism, since she argues that because tokens are more visible, they are under more performance pressure. This can leave them to perform worse than members of the numeric majority, but can also induce better performance at the individual level.[17] What is perhaps even more interesting is that the presence of women has a positive impact on the attendance behavior of male directors. This appears counter to the idea that women will have no influence over board processes because of tokenism. In addition, the presence of women appears to influence board behavior in ways that are consistent with better governance; in this case, better governance is promoted by improved

[15] For the sake of brevity, we do not report these additional regressions. They are available upon request.

[16] It is possible that female directors behave differently because they are held to higher standards than male directors. To shed some light on this we examined the relation between directors' past attendance records (the number of times a directors was named as having attendance problems during his tenure up until a given year) and the likelihood directors leave the board the following year. We find that past attendance records have a significant positive correlation with the likelihood of departure even after controlling for proxies for directors' opportunity cost of time. However, the effect of a director's attendance record is not different if the director is female, i.e. female directors do not seem to be punished more for poor attendance behavior. Although we cannot distinguish between voluntary and involuntary departures, we believe the results are still suggestive.

[17] However, we do not find that women's attendance behavior is sensitive to the fraction of male directors on the board, as one might expect if being in the numeric minority induces greater performance pressure.

attendance.

3.2. Director pay and diversity

In this section, we examine the relationship between director pay and gender diversity at the firm level. We focus on two aspects of director pay: the fraction of equity-based pay they receive and their total pay. We examine the fraction of equity-based pay because it is reasonable to assume that shares and options provide more performance-based incentives than salaries. We also examine total pay, although theory does not provide a clear prediction for the correlation of total pay with better governance. On the one hand, better governed firms will be less likely to overpay their directors. On the other hand, if better governed firms have more equity-based pay, standard principal-agent theories predict that they should also have higher total pay in order to compensate for extra risk.

(Insert Table 3 about here)

In columns I and II of Table 3, we analyze the relationship between the fraction of equity-based pay and gender diversity. Because the fraction of equity pay is bounded between 0 and 1, we use its logtransform as our dependent variable.[18] Principal agent theory suggests that volatility should be a key explanatory factor for the fraction of equity-based pay. In addition to volatility, our controls include board size, board independence, log(sales) as a proxy for firm size, the number of business segments as a proxy for firm complexity, Tobin's Q and ROA. We use firm fixed effects to address the concern that diversity is endogenous due to omitted corporate culture. It is plausible, for example, that some firms are more "progressive" than others, so they have both more incentive-based pay for directors, as well as more female directors.[19] All specifications include year dummies and, in the specifications without firm fixed effects, 2-digit SIC dummies. The standard errors are corrected for potential heteroskedasticity and, in the specifications without firm fixed effects, group correlation within firms. Column I of Table 3

[18] If the fraction is z, our dependent variable is $ln(\frac{z}{1-z} + \varepsilon)$, where ε is a very small number we add to ensure we do not take the logarithm of 0.

[19] While reverse causality is also a concern, we postpone the discussion of this issue to section 3.4.

shows the results of an OLS regression. The coefficient on the fraction of women is positive and significant at the 5% level. The coefficients on the control variables are generally consistent with expectations. Board independence is positively correlated with the fraction of equity pay. Volatility is also positively related with equity pay. Although this appears contrary to principal agent theory, which argues that performance pay should decrease with more uncertainty, it is not inconsistent with the differing effects of volatility estimated in the literature (see e.g. Prendergast, 2002).

In column II, we reestimate the specification in column I (excluding industry dummies) with firm fixed effects. The coefficient on diversity is still positive and now significant at the 1% level. This suggests that gender diversity appears to have a positive causal effect on performance pay for directors. It is perhaps also interesting to note that with firm fixed effects the effect of volatility is negative, as predicted by principal agent theory, suggesting that omitted variables can explain the puzzling result we find in column I.

In columns III and IV, we replicate our analysis in columns I and II after replacing the dependent variable with the natural logarithm of total director compensation. The results from the OLS specification in column III suggests that the fraction of women is negatively related to total compensation, although the coefficient is not significant. However, the coefficient on gender diversity in the fixed effect specification in column IV is positive and significant at the 10% level. Since the sign of the coefficient on gender diversity changes with fixed effects, omitted firm variables appear to be an important source of endogeneity. This suggests that the true effect of diversity is positive. As we discuss above, it is not clear whether more total pay for directors is consistent with better governance. However, principal agent theory predicts that total pay should rise with the amount of performance pay to compensate for risk. Because gender diversity is positively related to the fraction of equity-based pay, the results for total pay also seem consistent with theory.

We conclude that there is strong evidence that the proportion of female directors is associated with more equity-based pay for directors, which is suggestive of a board that is more aligned with the interests of shareholders. There is also some weak evidence of higher total

director compensation in boards with relatively more female directors.

3.3. Board meetings and diversity

To examine the relationship between gender diversity and the number of board meetings, we use the same specification as in Table 3, because we believe similar factors should affect the number of meetings.

(Insert Table 4 about here)

Although the number of meetings is count data, we use OLS to estimate the specifications in the first 2 columns of Table 4 to facilitate the use of firm and industry fixed effects. Column I reports OLS estimates. Column II reports firm fixed effects estimates. In column III, we reestimate the specification in column I using a Poisson regression. All specifications include year dummies. The standard errors are corrected for potential heteroskedasticity and, in the specifications without firm fixed effects, group correlation within firms.

Consistent with Vafeas (1999), the coefficients on performance, both Tobin's Q and ROA, are negative and significant which suggests that board meetings serve an important monitoring function when the firm is doing poorly.

Across all but the firm fixed effect specification, the coefficient on gender diversity is positive and significant at the 1% level. Once we include firm fixed effects, the coefficient remains positive, but is no longer significant. It is plausible that the within-firm variation in diversity is not large enough to explain the within-firm variation in board meetings.

At first glance, the economic significance of the results seems small. For example, the estimates in column I suggest that a one standard deviation increase in the fraction of female directors will lead to a 3.24% increase in the number of board meetings. However, the effect is of a similar magnitude as a one standard deviation increase in board independence, which would lead to a 3.14% increase in the number of meetings.

3.4. An instrumental variable approach

While we believe that omitted variables are an important reason why diversity may be endogenous in board and director behavior regressions, reverse causality may also be a concern. We believe reverse causality is less of a concern for attendance behavior and board meetings. It is hard to imagine that gender diversity will be affected in a significant way by the attendance behavior of individual directors or the number of board meetings. However, reverse causality is a concern for the pay regressions because of potential sorting of male and female directors to firms based on their preferences for specific types of pay schedules. In experiments, Dohmen and Falk (2006) show, for example, that men prefer variable pay schemes more than women and that this difference is partly explained by risk preferences. To address this concern, we need an instrument that is correlated with the fraction of female directors on the board, but (essentially) uncorrelated with director pay, except through variables we control for. In the context of governance regressions it is usually difficult to come up with valid instruments, because the factors that are arguably most correlated with the endogenous variable are other governance characteristics that are already included in governance regressions, such as board size, independence, etc. Thus, our approach is to find a variable that previous literature has not yet considered as an explanatory variable in governance regressions.

One reason that is often provided for the absence of women on boards is their lack of connections. Medland (2004), for example, argues that the most important impediment to female directorships is that the informal social network linking directors consists primarily of men. This suggests that the more connected male directors are to women, the more female directors we should observe. This idea is the basis for our instrument. While we cannot observe informal social connections between male and female directors, we can observe networks that occur because directors sit on multiple boards within our sample. If a male director, say Tom, of company X also sits on the board of company Y which has a female director, Janet, then Tom is connected to Janet. If connections matter for board appointments, then because Tom is connected to Janet, company X should be more likely to choose Janet as a director.

Another reason why company X might be more likely to choose a female director on the basis of Tom's connection to Janet is that Tom has experience working with a female director and may appreciate the value of a women's perspective. The diversity literature emphasizes that one cost of increasing diversity is that diverse groups may trust each other less, so that there is an initial stage in which they must learn to work together (see the discussion in "The Tyson Report" (Tyson, 2003)). Since Tom already has experience working with a female director, this start-up cost of increasing diversity may be lower. Finally, Janet may be well-connected to other women, so company X may be able to use Tom's connection to Janet to obtain names of promising female candidates.

If Tom is the only male director of company X connected to a female director, then he may not have much influence over the choice of a female director. Thus, we define our instrument as the fraction of male directors on the board who sit on other boards on which there are female directors.[20] We argue that the greater this fraction is, the greater the gender diversity on the board should be. Thus, this instrument should, at least in theory, satisfy the condition that it is correlated with the endogenous variable. We test this below. However, to be a valid instrument it must satisfy the second condition for an instrument, that it is uncorrelated with director pay except through control variables. One possibility is that the fraction of men connected to women is correlated with director pay through industry effects. For example, the fraction of connected men may be higher in certain industries and pay practices may vary across industries. To address this possibility, we control for both industry effects and firm fixed effects. Another possibility is that our instrument is a proxy for the connectedness of the board.[21] Connectedness may be correlated with pay because it is a proxy for directors' opportunity cost of time or because connectedness matters per se. If directors' opportunity cost

[20] Because we believe that the more exposure male directors have to female directors the greater the likelihood of appointing a female director, we do not distinguish unique connections to female directors, i.e. if all male directors of company X sit on the same board of company Y on which there is a woman, then the fraction of male directors connected to female directors is 1.

[21] We have also considered variations of this instrument, such as the fraction of total board seats in other firms with female directors. Our results are similar with these measures, but the correlation of our chosen instrument with gender diversity is much higher, probably because these other measures count female board connections as well. These may have less of an influence on gender diversity.

of time is very high because they sit on many boards, they may have to be incentivized more through compensation. Although it is not clear why connectedness per se would be correlated with the fraction of equity pay directors receive, Barnea and Guedj (2006) find evidence that firms whose boards are more connected award their *CEOs* more total pay. Thus, it is at least theoretically possible that *director* pay is also higher when boards are more connected. To address these possibilities, we confirm that our results are not sensitive to controlling for both the total number of external board seats by directors and the total number of male external board seats in our pay regressions.

It is difficult to come up with other reasons why the fraction of men connected to women should be correlated with pay. Thus, to the extent that our methods of controlling for the potential correlation of our instrument with pay are sufficient, we believe that our instrument is valid. However, it is also important to keep in mind that our instrumental variable (IV) estimates will only capture the effect of increasing gender diversity for those firms affected by the instrument, i.e. those firms for which connections through board memberships influence director recruitment. Some firms may rely more on Human Resource consultants for recruiting directors; for them, networks will be less important.

(Insert Table 5 about here)

To illustrate the frequency of board connections in the IRRC data, in Table 5 we report summary statistics for variables related to our instrument at the firm level, namely the number of male directors, the number of links between male directors and other boards with female directors, the fraction of male directors with board connections to female directors (our instrument), the sum of all other directorships across board members and the sum of all other directorships for male directors. On average, 2.6 male directors are connected to a board with a female director.[22] The average percentage of male directors with connections to female directors is 28.04%. In 3,129 firm-years, boards have no connections to female directors, but in 108 firm-years, all male directors are connected to boards with female directors. Given the low percentage of female directors in our sample, the fraction of boards' male directors who are

[22]The board which has 17 men connected to boards with women has 19 directors in all.

connected to female directors may seem high. However, female directors tend to have more directorships than male directors which increases the likelihood that male directors are connected to them. In fact, the cumulative frequency of male directors with less than or equal to a given number of other directorships is always higher than for female directors. For example, in 89.37% of director-firm-years male directors have two or fewer other directorships, while the equivalent number for female directors is 85.54%.

(Insert Table 6 about here)

In Table 6, we analyze the relationship between pay and gender diversity using IV techniques. We use the same specifications as in Table 3. Because we use the same set of explanatory variables for the fraction of equity-based pay and total pay, the first stage regressions are the same for both dependent variables. We report the first stage for the IV estimation of the specifications in columns I and III of Table 3 (with industry effects) in column I. From the first stage regression, it is evident that our instrument is statistically highly correlated with gender diversity (at greater than the 1% level of significance). The estimates suggest that a one-standard deviation increase in the fraction of male directors linked to female directors (0.25) leads to a 12.8% increase in the fraction of women on the board. This is strong evidence for the hypothesis that director recruiting is highly dependent on the board's existing connections.[23] In column II, we present the IV estimates for the fraction of equity-based pay. These estimates are consistent with the OLS estimates in column I of Table 3, i.e. the coefficient on diversity remains positive and statistically significant at the 1% level. At the bottom of column II, we report the Hausman test statistic for the hypothesis that the fraction of female directors is uncorrelated with the error term of the equity-based pay regressions. This statistic is 3.214, thus we reject the null. However, once we include firm fixed effects in column III, we can no longer reject the null.[24] This suggests that although gender diversity appears to be endogenous in the

[23]It is important to notice that we were careful in the construction of our instrument, so that there is no mechanical correlation between the instrument and the fraction of female directors. The statistically strong correlation between the instrument and the variable of interest must then be explained by truly economic arguments.

[24]Even after we include firm fixed effects, the fraction of female directors is highly correlated with our instrument in the first stage regression. As is to be expected, the magnitude of the coefficient drops (to 0.015) but it is still significant at the 1% level.

fraction of equity-pay regression in column I of Table 3, it is largely because of correlation with omitted firm effects. Once we include them, it no longer appears preferable to use IV estimates (since the Hausman test does not reject the null) than to use OLS as in column II of Table 3. As the Hausman test statistics at the bottom of columns IV and V suggest, we cannot reject the null that the fraction of female directors is exogenous in the total pay regressions, thus the estimates from Table 3 should be more efficient.

Of course, these conclusions depend on the quality of our instrument. To ensure that our tests are not driven by potential correlation between our instrument and pay through the "connectedness" factor, we replicate our results after separately controlling for total external board seats by directors and the total number of male external board seats in our pay regressions. The results are very similar. In the first stage regression, the fraction of female directors is not correlated with total number of board seats but is highly negatively correlated with total male board seats. However, in both cases the significance of the instrument is not affected, if anything it increases. When we perform our Hausman tests, we cannot reject the null that diversity is exogenous in the pay regressions, even without fixed effects. Thus, our analysis in this section suggests that although the endogeneity of gender diversity may be a concern in pay regressions, including firm fixed effects appears to solve most of the problem.[25]

Because we believe that reverse causality is less of a concern for board meetings, we do not present instrumental variable estimates for board meetings. However, under the assumption that our instrument is also uncorrelated with the error in the board meeting regression, we performed a Hausman test of the null that diversity is exogenous. We cannot reject the null. For example, the Hausman test statistic for the null that diversity is exogenous in the specification in column I of Table 4 (without clustered errors) is 0.764. This confirms that endogeneity due to reverse causality is not a serious concern for the board meetings regressions.

[25] One should keep in mind that Hausman tests are not tests of the validity of our instrument, but tests of exogeneity under the maintained assumption that our instrument is valid.

4. Diversity and performance

The results from the previous section suggest that boards with more female directors are characterized by greater participation of directors in decision-making (through attendance and more meetings) and by more alignment with the interests of shareholders (through equity-based compensation). An interesting question then is whether diversity impacts governance sufficiently to affect corporate outcomes and, most importantly, corporate performance. We examine this issue here.

More incentive alignment and greater participation by directors in decision-making could have both positive and negative effects on corporate performance. Because boards are seen as essential to overcoming the agency problem between managers and shareholders, the literature generally argues that stronger governance should increase shareholder value (see the survey by Hermalin and Weisbach, 2003). However, some theoretical papers also argue that too much board monitoring can decrease shareholder value (e.g. Almazan and Suarez (2003)). Adams and Ferreira (2007) point out that greater interference by directors in decision-making could lead to a breakdown in communication between managers and directors. If greater participation by directors leads to more interference, firms with diverse boards could perform worse. The literature on diversity also has ambiguous predictions for the effect of diversity on performance (see the survey by Milliken and Martins, 1996). Our results suggest that female directors are not mere tokens, thus they may be able to add value by bringing new ideas and different perspectives to the table. On the other hand, the more dissimilar directors are, the more they may disagree and the more conflict there may be on the board. Thus, it is not necessarily clear that decision-making improves with greater diversity. Because the predicted effect of gender diversity on performance is ambiguous, the net effect must ultimately be determined empirically.

Previous studies argue that gender diversity has a positive effect on proxies for Tobin's Q (Carter, Simkins and Simpson, 2003) and accounting measures of performance (Erhardt, Werbel and Shrader, 2003; Catalyst, 2004). The data used in these prior studies were cross-sectional

and none of these studies fully addressed the fact that gender diversity may be endogenous in a performance regression.[26] Endogeneity may arise because gender diversity is correlated with omitted firm specific variables, such as corporate culture. Firms that are more "progressive" may have better performances and also more female directors. Diversity may also be endogenous because past performance may influence firms' choice to select female directors. If female directors are appointed because of tokenism, for example, then boards may choose female directors when they believe they can afford to have tokens. On the other hand, Ryan and Haslam (2005, 2007) argue that women face a "Glass Cliff" in that they are more likely to be appointed to leadership positions where change is required, e.g. following poor performance. Ryan and Haslam (2005) find evidence that female directors were more likely to be appointed to the boards of FTSE 100 companies that experienced poor performance in the 5 months preceding the appointment. Finally, women may use firm performance as a criterion for accepting a directorship. All of these arguments suggest that corporate performance will influence the proportion of women on the board and highlight the importance of disentangling causality.

As before, we address these endogeneity problems using firm fixed effects and instrumental variable techniques. Because we have little reason to believe that our previous instrument, the fraction of male directors with board connections to female directors, is correlated with performance except through variables that we will control for, we continue to use it in our IV estimation. In addition, we use dynamic panel data estimation techniques to address endogeneity problems that arise because past performance may influence board diversity. If gender diversity is dynamically influenced by past performance, then omitting it from our performance regressions will lead to biased estimates. Simply including past performance in our regression is not sufficient to solve this problem, since past performance will generally be correlated with the

[26] Carter, Simkins and Simpson (2003) recognize the problem and address it using 2SLS estimation of a system in which Tobin's Q depends on gender diversity and gender diversity depends on Tobin's Q. The excluded variables from the diversity equation are board meetings, a dummy indicating that directors receive stock compensation, inside ownership and ROA. The excluded variables from the Tobin's Q equation are the average age of directors and a dummy indicating that a minority director is on the board. Our results from section 3 suggest that the excluded variables from the diversity equation are correlated with the error of the diversity equation, thus 2SLS estimation of this system will not result in consistent estimates of the effect of gender diversity.

error term of our current performance regression. Through the use of first differencing and lags of exogenous variables as instruments, Arellano-Bond estimation techniques provide consistent estimates even when we include firm fixed effects.

(Insert Table 7 about here)

We begin our analysis by attempting to replicate the positive correlation between diversity and performance documented in previous literature. As in this literature, we use two measures of performance, Tobin's Q and ROA. We estimate a simple model of performance which includes the fraction of women on the board, board size and independence, log(sales), the number of business segments, year dummies and 2-digit SIC industry dummies. We correct the standard errors for group correlation within firms and heteroskedasticity. The results for Tobin's Q are in column I of Table 7. Consistent with the positive relation between gender diversity and performance documented in previous studies, the coefficient on diversity is positive and significant at the 10% level.

Next we try to address the endogeneity of diversity by adding firm fixed effects in column II. Once we add firm effects the coefficient on diversity remains statistically significant at the 10% level, but the sign is now negative. This suggests that the positive correlation between diversity and performance in column I is driven by omitted firm specific factors. To address the fact that diversity could still be endogenous in the fixed effects specification due to reverse causality, we reestimate the specification in column II using IV techniques. The first stage is reported in column III, the second stage in column IV. The results from column IV are consistent with those in column II, i.e. the coefficient on diversity remains negative and is now significant at the 5% level.[27] In column V, we present the outcome of one-step Arellano-Bond estimates of the specification in column II augmented by one-period lagged Tobin's Q.[28] The coefficient on diversity is no longer significant in column V, however it is still negative. The conclusion we draw from Table 7 is that the positive correlation between performance

[27] Our results remain robust to controlling for the total number of external board seats of directors and the total number of male external board seats, i.e. the coefficient on diversity is always negative and significant in the second stage.

[28] In this specification we use two and all further period lagged Tobin's Q and one period lags of all right hand side variables except for year dummies as instruments. The standard errors are corrected for heteroskedasticity.

and diversity documented in prior literature is not robust to *any* method of addressing the endogeneity of diversity. If anything, the relationship appears to be negative.[29]

(Insert Table 8 about here)

In Table 8, we replicate the analysis in Table 7 for ROA. As for Tobin's Q, we confirm the positive relationship between gender diversity and ROA in OLS regressions with industry controls (column I). As for Tobin's Q, this relationship is not robust to any method of addressing the endogeneity of diversity. Instead, the coefficient on diversity is negative and significant in the firm fixed effect and IV specifications and is negative, although not significant in the Arellano-Bond specification.[30]

At first glance these results appear surprising in light of the fact that the previous section suggests that more diverse boards have stronger governance. The results suggest that on average tough boards do not improve firm value. However, they do not imply that tough boards never add value. Although the governance literature often argues that boards that monitor more strongly should have a positive effect on firm value, ex ante we do not believe we should expect tough boards to add value in *all* firms. Instead, the value of a tough board should depend on the strength of the firms' other governance mechanisms. If firms have otherwise strong governance, having a tough board may lead to overmonitoring. But if firms have otherwise weak governance, we would expect tough boards to be particularly valuable.

To examine this hypothesis, we use Gompers, Ishii and Metrick's (2003) governance index, which we call Gindex, as a proxy for the strength of firms' governance mechanisms other than the measures of board governance we examine above. Gindex is the sum of 24 dummy variables each of which measures whether a firm has a particular charter provision, bylaw provision or state of incorporation law that makes it more difficult for the firm to be taken over. A higher value of Gindex indicates a firm that is more insulated from takeovers and one in which, ceteris

[29] Although not the main focus of their paper, Bøhren and Strøm (2007) also find a negative effect of diversity on performance for Norway.

[30] As for Tobin's Q, our results remain robust to controlling for the total number of external board seats of directors and the total number of male external board seats. For example, if we control for the total number of male external board seats, the coefficient on diversity in the second stage is -76.926 and is significant at the 5% level.

paribus, one might expect agency problems to be higher. From our perspective, the benefit of using Gindex as a measure of governance is that it measures a completely different set of governance mechanisms than the ones we examine above. The average value of Gindex in our sample is 9.177, with a minimum of 2 and a maximum of 19.

(Insert Table 9 about here)

In Table 9, we rerun our performance regressions after including two new variables: Gindex and the product of Gindex and the fraction of female directors. We report both firm fixed effects regressions as well as Arellano-Bond one-step estimates. We omit IV estimates because we do not have an instument for Gindex. Although Gindex is usually taken as exogenous (Gompers et al., 2003), there are also arguments for its enodgeneity. In columns I and II, we first report firm fixed effect estimates for Tobin's Q and ROA regressions that include Gindex. Consistent with the idea that Gindex is a measure of agency costs, the coefficient on Gindex is negative and significant in both columns. In columns III and IV, we include the interaction between Gindex and diversity. In these regressions, the coefficient on Gindex is still negative, the coefficient on diversity is negative, but the coefficient on the interaction is positive and significant at the 10% level. This suggests that diverse boards add value in firms with otherwise weak governance, consistent with our hypothesis. In columns V and VI, we replicate this analysis using Arellano-Bond estimates. The results in column V are consistent with those in columns III and IV. The results for ROA in column VI provide no additional information since no variable is significant.

Our interpretation of the results is that diverse boards appear to be tougher monitors. Consistent with the idea that overmonitoring may decrease value, diversity does not add value on average. However, diverse boards appear to be particularly valuable for firms with otherwise weak governance. More generally, the results highlight the importance of addressing the potential endogeneity of diversity. If we do nothing to address the endogeneity of diversity we find that diversity has a positive correlation with performance. However, this is clearly not a robust result. While the idea that women improve performance may be more appealing, it is not a result that should be the basis of policy or business practice as it currently sometimes

is.[31] Instead, it is our belief that if firms simply add women to a board and expect them to automatically improve performance, they do women more of a disservice than if firms deliberately choose women where they can add value.

5. Differences in characteristics between female and male directors

The theory of tokenism (Kanter, 1977) suggests that if female directors are chosen to be tokens, they will have little impact on board processes. In this case, we should find little relationship between board characteristics and gender diversity. In contrast, as we show above, gender diversity seems to have a significant impact on board characteristics and performance. A natural question is what drives this relationship. It is possible that it is not gender diversity per se that drives it but the fact that the population of female directors happens to be substantially different from the population of male directors in terms of age and tenure, for example, for reasons uncorrelated with gender preferences. We do not believe the explanation is so simple, because in our comparison of female and male attendance behavior we control for a variety of directors characteristics and female directors still appear to behave differently than male directors. We also believe that it is difficult to find characteristics that will be uncorrelated with gender preferences.[32] For example, many argue that female directors may be less experienced than male directors. But experience can also be driven by sorting of women into specific types of professions, i.e. by gender preferences. Nevertheless, in this section we perform some robustness checks to ensure that our results are not driven by simple differences in observable characteristics other than gender.

(Insert Table 10 about here)

[31] For example, an article in Australia's *Financial Review Magazine* (Turner, 2007) describes one reason why a chief executive of Deloitte believes there is a business case for employing women as follows: "Swiegers was mindful, too, of a 2001 US study of Fortune 500 companies, which found that those with a high number of women executives outperformed median competitors in their industry, and that companies that scored best in terms of promoting women were consistently more profitable."

[32] This is a fundamental problem in all diversity literature (see e.g. Milliken and Martins, 1996).

In Table 10, we compare observable characteristics of female directors to those of male directors. Female directors have more directorships, lower director tenure, they are younger and are less likely to be retired from their main occupation than male directors. These differences are all statistically significant, but their magnitudes are not so dramatic that one would immediately conclude that female directors are substantially different from male directors. For example, while female directors are younger, the average age of female directors is 54.761 as opposed to 59.405 for male directors. Of course, such differences may still matter sufficiently to affect our results.

We begin our analysis by reexamining director attendance behavior. Although we show that female director attendance behavior is robust to individual level controls, it is possible that the spillover effect of diversity on male attendance behavior we document in section 3.1 is not driven by the fact that the behavior of female directors influences that of male directors but by the fact that male directors' attendance is a function of certain characteristics of female directors. For example, if female directors are less experienced than male directors, as measured, for example, by age and tenure, then male directors may feel more of a need to be present in board meetings. To examine whether male attendance behavior is influenced by the characteristics of women rather than by a gender-specific influence, we restrict our director level sample to male directors in firms with women on the board. This restriction reduces our sample to 37,354 directorship observations. We then estimate the same probit model as in column II of Table 3 augmented by the average number of external board seats, the average tenure, the average age and the average retirement status of female directors. For the sake of brevity, we report only the coefficients on diversity and the average female characteristics below:

$$
\begin{aligned}
\text{Attendance problem} \;=\; & -0.586^{**}\underset{[2.06]}{} \text{Fraction female directors} \\
& -0.008\underset{[0.59]}{} \text{ Average \# Other directorships of female directors} \\
& +0.004\underset{[1.10]}{} \text{ Average tenure of female directors} \\
& -0.007^{**} \text{ Average age of female directors} \\
& +0.007\underset{[0.11]}{}\text{Average retirement status of female directors} \\
& +\text{control variables} + \text{error term}
\end{aligned}
$$

None of the characteristics except for the average age of female directors has a significant effect on the attendance behavior of male directors. In contrast to what one might have expected, the coefficient on the average age is negative, i.e. male directors are less likely to have attendance problems the *older* the female directors are. Since older female directors are plausibly more experienced than younger ones, this suggests that male directors do not show up more to compensate for the lack of experience of female directors. In addition, the estimates suggest that even after controlling for average observable characteristics of female directors, male directors will be significantly less likely to have attendance problems the greater the fraction of female directors. Thus, our attendance results are not simply caused by the fact that female directors differ in observable characteristics.

(Insert Table 11 about here)

To examine whether our other results are driven by director characteristics other than gender, we examine whether our results for gender diversity are robust to controlling for the average number of external board seats, the average tenure, the average age and the average retirement status of all directors on the board. In essence, we are asking whether gender matters once these characteristics are held fixed at the board level. For the sake of brevity, in Table 11 we report only the results of augmenting the fixed effect models in columns II and IV of Table 3, column IV of Table 4 and column II of Tables 7 and 8 with these board characteristics. For

the number of board meetings, we also report OLS regression with industry dummies, but no fixed effects. Table 11 suggests that our results are not driven by the fact that the average characteristics of the board change with an increase in female directors. The coefficients on the fraction of female directors remain statistically significant in all but the ROA regression in column VI. Moreover, the magnitudes of the coefficients remain roughly similar. While they decrease for all but Tobin's Q, the magnitudes of the decreases are small. For example, the coefficient drops from 4.960 (0.372) to 4.874 (0.384) in the fraction of equity pay (total pay) regression.

6. Final Remarks

The gender diversity of the board is a central theme of many recent governance reform efforts. However, the consequences of changing the gender diversity of the board are, as yet, little understood. While a large literature documents that women behave differently in a variety of settings, ex ante it is not clear whether we should also expect women to behave differently than men in the boardroom. In this paper, we provide some new evidence that female directors behave differently than male directors, even after controlling for observable characteristics. We also find that the gender composition of the board is positively related to measures of board effectiveness. Female directors appear to have a similar impact as the independent directors described in governance theory do.

Our results highlight the importance of trying to address the endogeneity of diversity in performance regressions. Although a positive relationship between diversity and performance is often cited in the popular press, it is not robust to any of our methods of addressing the endogeneity of diversity. The true relationship between diversity and performance appears to be more complex. We find that diversity has a positive impact on performance in firms that otherwise have weak governance, as measured by its ability to resist takeovers. In firms with strong governance, however, enforcing gender quotas in the boardroom may ultimately decrease shareholder value. One possibility is that greater diversity may lead to overmonitoring in those

firms.

More generally, our results show that, although they may have been selected because of tokenism, female directors have a substantial and value-relevant impact on board structure. Thus, director demography appears to be an important element of governance.

7. Appendix A: Data cleaning

The IRRC data we use to construct our sample has various data issues concerning director characteristics which we address.

Age In some cases, directors were listed as being younger than 20. We eliminated these observations.

Tenure The IRRC data contains a variable which indicates the year a director was first appointed to the board. In some cases, there are multiple entries for a director at a given firm. We take the minimum value of these as a measure of the year a director was first appointed to the board. Our proxy for a director's tenure on the board is the difference between the current year and the year he began service. In cases where no beginning date was available for the director, we define tenure to be missing. In cases in which the director's departure date is less than his beginning date, tenure is negative, or tenure is greater than the director's age, we define tenure to be missing.

Retired To determine whether a director is retired, we use data on directors' titles available in the IRRC data. We classify a director as retired if his title contains the word "retired". We also classify a director as retired if data on his primary employer contained the word "retired".We are careful to account for changes in spelling. To account for missing information on a director's retirement status, we also classify directors over the age of 70 as being retired.

Gender The IRRC data contains a variable called gender, however this data is quite incomplete and sometimes inconsistent for the same director. To complete it, we use a director's first name to determine whether a director is male or female. In cases in which the name was difficult to classify, we used the internet to try and determine the director's gender. If this was not possible, we classified gender as missing. We also ensured that a director's gender was classified consistently across his directorships.

Number of Other Directorships The IRRC data contains data from company proxy statements on the number of other directorships a director has. We cross-checked this data using the number of other directorships directors hold within the sample. In cases in which the IRRC measure was less than the within-sample measure, we set the number of other directorships equal to the within-sample measure. In all other cases, we retained the IRRC measure.

8. Appendix B: Equity-based compensation data

To construct measures of director compensation, we need to estimate the value of the shares and options granted to directors. These shares and options almost always come with restrictions. Although restrictions vary across firms, a typical restriction is that directors cannot sell their shares until they leave the firm. Options usually come with vesting requirements and they may or may not be exercisable if the director leaves the firm. Although restricted shares should not have the same value as ordinary shares and options with different vesting requirements should be valued differently, restrictions vary too much across firms to justify any simple adjustment procedure. Thus, we follow the conventional practice (e.g. Jensen and Murphy, 1990; Aggarwal and Samwick; 1999) and ignore all restrictions and vesting requirements and assume that options and shares are priced as if they had no restrictions.[33]

We choose to value director options using a procedure that is as close as possible to Ex-

[33] Hall and Murphy (2002) show how undiversified executives will value their stock options and restricted shares less than the value implied by usual option-pricing formulas (such as Black-Scholes). Thus, one should keep in mind that the estimates of director's compensation are biased upwards, or that they can be best interpreted as an upper bound on actual compensation.

ecuComp's procedure for valuing options for the top 5 executives in each firm. To price the options we use the Black-Scholes formula, assuming continuously paid dividends. Estimates of firm volatility, dividend-yield and the risk-free rate are from ExecuComp. Expiration of director options usually occurs in ten years; we use seven years to be consistent with ExecuComp.

In most firms, the exercise price of an option is the stock price on the date of the grant. Since directors are generally elected at the annual meeting of the shareholders, the majority of firms grant directors shares and options at the annual meetings. Thus, we use the market price of shares at the end of the month of each firm's annual meeting at the beginning of the fiscal year as the exercise price of the options as well as the price of the stock granted during that year.

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Table 1A: Summary statistics

The sample consists of an unbalanced panel of 86,714 director level observations from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. The IRRC Director data consists of director level data for S&P 500, S&P MidCap and S&P SmallCap firms. Data on board meetings, director compensation and most financial data are from ExecuComp. We obtain additional financial information (e.g. SIC codes, business segment data and stock returns) from Compustat and CRSP. Tobin's Q is the ratio of the firm's market value to its book value of assets. Market value is book assets-book equity+market value of equity. ROA is net income before extraordinary items and discontinued operations divided by book assets. Volatility is the standard deviation of previous 60 month stock returns. IRRC Institutional ownership data is only available from 1999-2001. The IRRC classifies directors as independent if they have no business relationship with the firm, are not related or interlocked with management and are not current or former employees. Total Director Compensation is the sum of the annual retainer, # Board Meetings times Board Meeting Fee and the value of all stock-based compensation. Options were priced following the method in ExecuComp. We used the stock price at the end of the month of the firm's annual meeting for the exercise price of the options, as well as to value stock grants. All compensation numbers have been converted to 2003 dollars using the CPI-U. Firm has Female Director is a dummy variable which is one if the firm has female directors in a given year. Firm has Only One Female Director is a dummy variable which is one if the firm only has one female director. Attendance Problem is a dummy variable which is equal to one in a given fiscal year if a firm disclosed in its proxy statement that a director attended fewer than 75% of the meetings he was supposed to during that year. Tenure is equal to the number of years the director has served on the board. Retired Dummy is equal to 1 if the proxy indicated that the director retired from his primary occupation.

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
			Firm Characteristics		
Sales (millions)	8253	4348.442	9955.245	0.317	168919
Log(Sales)	8253	7.262475	1.490205	-1.14885	12.03717
# Business Segments	8253	5.907549	4.976611	1	32
Tobin's Q	8253	2.093564	2.073427	0.475928	77.63474
ROA	8253	3.195339	16.38234	-577.85	59.59
Volatility	8253	0.423223	0.199925	0.102	1.899
			Board Characteristics		
Board Size	8253	9.376227	2.675104	3	39
Fraction Independent Directors	8253	0.62989	0.18134	0	0.9375
# Female Outside Directors	8253	0.802254	0.821671	0	4
# Female Inside Directors	8246	0.04863	0.230879	0	3
Firm has Female Directors	8253	0.606567	0.488541	0	1
Firm has Only One Female Director	8253	0.399249	0.489774	0	1
Fraction Female Directors	8253	0.084518	0.082898	0	0.5
# Board Meetings	8253	7.172543	3.067631	1	36
Total Director Compensation (thousands)	8253	95.86699	198.9675	9.54E-07	7972.834
Fraction Equity Pay	8253	0.395027	0.358797	0	1
Meeting Fee (thousands)	8253	1.029881	0.847074	0	7.7
			Director Characteristics		
Female Dummy	86714	.0932721	.2908151	0	1
Attendance Problem	86714	0.023825	0.152506	0	1
# Other Directorships	86714	0.921708	1.306012	0	10
Tenure	86714	9.726861	8.143287	0	63
Age	86714	58.97163	8.643765	25	98
Retired Dummy	86714	0.18365	0.387201	0	1

Table 1B: Representation of female directors across industry

This table shows firm-level averages of variables describing the representation of female directors in each 2-digit SIC code. The sample is the intersection of the full IRRC data and Compustat SIC codes. Column II shows the fraction of female directors on boards. Column III shows the fraction of firm years in which firms had at least one female director. Column IV shows the fraction of firm years in which firms had only one female director on board. The table is sorted by column II in ascending order. The table continues on the next page.

2-digit SIC code	*Obs.*	*Fraction female directors*	*At least one female director dummy*	*Only one female director dummy*
17-Special Trade Contractors	11	0.02	0.18	0.18
13-Oil and Gas Extraction	292	0.04	0.31	0.24
47-Transportation Services	36	0.04	0.31	0.31
44-Water Transportation	46	0.04	0.37	0.28
36-Electronic & Other Equipment	794	0.05	0.36	0.27
15-General Building Contractors	75	0.05	0.40	0.33
42-Trucking And Warehousing	83	0.05	0.42	0.31
10-Metal Mining	59	0.05	0.53	0.46
64-Insurance Agents, Brokers, & Service	59	0.06	0.54	0.37
24-Lumber And Wood Products	81	0.06	0.47	0.43
37-Transportation Equipment	341	0.06	0.53	0.39
50-Wholesale Trade-Durable Goods	225	0.06	0.52	0.43
35-Industrial Machinery And Equipment	688	0.06	0.48	0.36
32-Stone, Clay, And Glass Products	70	0.06	0.46	0.31
87-Engineering & Management Services	88	0.06	0.55	0.43
34-Fabricated Metal Products	179	0.07	0.52	0.36
33-Primary Metal Industries	222	0.07	0.54	0.44
40-Railroad Transportation	50	0.07	0.68	0.64
14-Nonmetallic Minerals, Except Fuels	23	0.07	0.74	0.74
1-Agricultural production-Crops	19	0.07	0.53	0.37
73-Business Services	868	0.07	0.46	0.36
62-Security And Commodity Brokers	133	0.07	0.62	0.41
70-Hotels And Other Lodging Places	32	0.07	0.59	0.34
78-Motion Pictures	28	0.07	0.61	0.36
38-Instruments And Related Products	490	0.07	0.53	0.38
55-Automotive Dealers And Service Stations	48	0.08	0.58	0.44
61-Nondepository Institutions	96	0.08	0.58	0.30
25-Furniture and Fixtures	78	0.08	0.62	0.53
72-Personal Services	55	0.08	0.62	0.55
26-Paper And Allied Products	203	0.08	0.66	0.45
58-Eating And Drinking Places	169	0.09	0.60	0.40
79-Amusement And Recreation Services	60	0.09	0.58	0.42
39-Misc. Manufacturing Industries	84	0.09	0.58	0.31
67-Holding And Other Investment Offices	53	0.09	0.64	0.47
75-Auto Repair, Services, And Parking	21	0.09	0.62	0.33
22-Textile Mill Products	93	0.09	0.56	0.30
82-Educational Services	20	0.09	0.75	0.55
60-Depository Institutions	627	0.09	0.80	0.44
45-Transportation By Air	93	0.09	0.68	0.42
63-Insurance Carriers	431	0.09	0.70	0.39
99-Nonclassifiable Establishments	30	0.10	0.70	0.30
57-Furniture And Home furnishings Stores	58	0.10	0.64	0.50

Table 1B (continued): Representation of female directors across industry

2-digit SIC code	*Obs.*	*Fraction female directors*	*At least one female director dummy*	*Only one female director dummy*
28-Chemicals And Allied Products	766	0.10	0.68	0.41
51-Wholesale Trade-Nondurable Goods	124	0.10	0.66	0.35
80-Health Services	135	0.10	0.67	0.44
48-Communication	207	0.10	0.76	0.47
30-Rubber And Misc. Plastics Products	103	0.10	0.76	0.51
53-General Merchandise Stores	133	0.10	0.74	0.32
52-Eating And Drinking Places	28	0.11	0.71	0.25
29-Petroleum And Coal Products	114	0.12	0.89	0.46
83-Social Services	6	0.12	1.00	0.00
49-Electric, Gas, And Sanitary Services	729	0.12	0.87	0.53
16-Heavy Construction, Except Building	47	0.12	0.81	0.36
20-Food And Kindred Products	297	0.12	0.81	0.38
23-Apparel And Other Textile Products	111	0.13	0.71	0.45
12-Coal Mining	11	0.13	0.82	0.27
7-Agricultural Services	2	0.13	1.00	0.00
59-Miscellaneous Retail	194	0.14	0.79	0.49
41-Local And Interurban Passenger Transit	3	0.14	1.00	1.00
27-Printing And Publishing	218	0.14	0.85	0.35
31-Leather and Leather products	40	0.14	0.75	0.25
21-Tobacco Products	9	0.15	0.89	0.56
56-Apparel and Accessory Stores	164	0.15	0.84	0.45
54-Food Stores	76	0.15	0.88	0.32
65-Real Estate	6	0.16	1.00	0.33

Table 1C: Comparisons of firms with female directors to those without

This table shows comparisons of means of firm-level characteristics for firms with female directors to firms without for the sample of complete data resulting from the intersection of the IRRC Director data, ExecuComp, Compustat and CRSP. The number of observations is 8,253. Tobin's Q is the ratio of the firm's market value to its book value of assets. Market value is book assets-book equity+market value of equity. ROA is net income before extraordinary items and discontinued operations divided by book assets. Volatility is the standard deviation of previous 60 month stock returns. *** indicates significance at the 1% level.

Firm Characteristics	***Mean for firms with female directors***	***Mean for firms without female directors***	***Difference***
Log(Sales)	7.778	6.469	1.309***
# Business Segments	6.583	4.868	1.715***
Tobin's Q	2.028	2.193	-0.165***
ROA	4.517	1.157	3.36***
Volatility	0.374	0.5	-0.126***

Table 2: Relationship between attendance problems of directors and gender diversity in director level data

The sample consists of an unbalanced panel of director data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. We exclude inside directors from the sample, as well as all directors in a given fiscal year who were appointed that year. The dependent variable is a dummy variable that is equal to one if the director was named in the proxy as having attended fewer than 75% of the meetings he was supposed to attend during the previous fiscal year. Compensation measures are quoted in 2003 dollars. Remaining sample characteristics are as in Table 1A. Columns I-II contain probit regressions; columns III-IV show linear probability models. The specifications in column I-II include 2-digit SIC industry dummies. The specifications in columns III-IV include firm fixed effects. The sample is restricted to male directors in columns II and IV. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity and for group correlation at the directorship (director-firm) level in regressions without firm fixed effects. Absolute values of robust z-statistics are in brackets. Marginal effects for the female dummy and the fraction of women on the board are reported in parentheses in the probit regressions. The effect of the constant term is omitted. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels. The number of observations varies because of perfect predictability of the dependent variable.

	Dependent Variable: Attendance Problem			
	I	II	III	IV
Female Dummy	-0.116***	.	-0.007***	.
	(-0.007)	.	[3.04]	.
	[3.00]			
Fraction Female Directors	.	-0.417**	.	-0.035*
	.	(-0.026)	.	[1.71]
		[2.12]		
Meeting Fee	-0.043***	-0.045***	-0.001	-1.25e-4
	[2.66]	[2.64]	[0.34]	[0.07]
# Other Directorships	0.055***	0.061***	0.004***	0.005***
	[6.00]	[6.14]	[6.59]	[6.69]
Total Compensation (Excl. Meet. Fees)	-1.046e-4	-6.36e-5	-0.000**	-0.000*
	[1.38]	[0.88]	[2.26]	[1.89]
# Board Meetings	-0.020***	-0.018***	3.03e-4	0.001
	[4.63]	[3.90]	[1.01]	[1.56]
Board Size	0.036***	0.037***	0.002***	0.002**
	[7.07]	[6.87]	[2.69]	[2.35]
Fraction Independent Directors	-0.189**	-0.202**	0.020**	0.021**
	[2.42]	[2.44]	[2.31]	[2.29]
Tenure	-0.009***	-0.009***	-0.001***	-0.001***
	[3.80]	[3.56]	[5.04]	[4.67]
Age	-0.002	-0.002	-1.724e-4	-1.574e-4
	[1.11]	[0.73]	[1.52]	[1.27]
Retired Dummy	-0.129***	-0.132***	-0.006***	-0.006***
	[3.87]	[3.79]	[3.44]	[3.17]
Log(Sales)	-0.043***	-0.037***	-0.003	-0.003
	[3.80]	[3.02]	[1.04]	[1.04]
Tobin's Q	-0.009	-0.014	-3.643e4	-0.001
	[1.20]	[1.53]	[0.79]	[1.59]
ROA	1.255e-4	4.621e-4	4.04e-6	4.73e-5
	[0.14]	[0.48]	[0.05]	[0.60]
Volatility	0.138	0.118	-0.005	-0.006
	[1.39]	[1.13]	[0.42]	[0.46]
Observations	63998	56951	65480	58302
R-squared	.	.	0.069	0.075
Sample type	Full	Men only	Full	Men only
Industry effects	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes

Table 3: OLS and firm fixed effect regressions of measures of director pay on gender diversity

The sample consists of an unbalanced panel of firm level data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. Fraction Equity-based Pay is the ratio of the value of equity pay to total compensation each director receives in a year. Total Director Compensation is calculated as the sum of the annual retainer, # Board Meetings times Board Meeting Fee and the value of all stock-based compensation. Remaining sample characteristics are as in Table 1A. The dependent variable in columns I and II is log((Fraction Equity-based Pay/(1-Fraction Equity-based Pay))+ε), where ε is a very small number. The dependent variable in columns III and IV is Ln(Total Director Compensation). The specifications in column I and III include 2-digit SIC industry dummies. The specifications in column II and IV include firm fixed effects. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity and for group correlation at the firm level in regressions without firm fixed effects. Absolute values of robust t-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

	Dependent Variable: Logtransform(Fraction Equity-based pay)		***Dependent Variable: Ln(Total Director Compensation)***	
	I	II	III	IV
Fraction Female Directors	4.536**	4.960***	-0.124	0.372*
	[2.52]	[3.37]	[0.55]	[1.89]
Board Size	-0.150**	-0.112**	-0.031***	-0.007
	[2.26]	[2.34]	[3.51]	[1.11]
Fraction Independent Directors	5.155***	0.328	0.329***	0.007
	[5.83]	[0.50]	[2.73]	[0.08]
Log(Sales)	0.827***	0.741***	0.192***	0.350***
	[6.28]	[3.40]	[11.25]	[10.89]
# Business Segments	0.014	0.047**	-0.003	-0.006**
	[0.41]	[2.27]	[0.73]	[2.43]
Tobin's Q	0.341***	0.095**	0.072***	0.024***
	[4.04]	[1.97]	[6.08]	[3.41]
ROA	-0.004	0.004	0.001	0.003***
	[0.63]	[1.16]	[1.31]	[3.35]
Volatility	9.575***	-2.635***	1.744***	-0.298**
	[9.56]	[3.08]	[11.67]	[2.43]
Constant	-21.506***	-10.959***	1.427***	1.173***
	[6.49]	[6.56]	[6.13]	[4.75]
Observations	7856	7983	8123	8253
R-squared	0.165	0.791	0.276	0.807
Industry dummies	Yes	No	Yes	No
Firm fixed effects	No	Yes	No	Yes

Table 4: OLS, firm fixed effect and Poisson regressions of board meetings on gender diversity

The sample consists of an unbalanced panel of firm level data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. The dependent variable in all columns is the number of board meetings in a given year. Remaining sample characteristics are as in Table 1A. The specifications in column I and III include 2-digit SIC industry dummies. The specifications in columns I-II are estimated using OLS, the specification in column III is estimated using a poisson regression. The specification in column II includes firm fixed effects. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity and for group correlation at the firm level in regressions without firm fixed effects. Absolute values of robust t-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

	Dependent Variable: # Board Meetings		
	I	II	III
Fraction Female Directors	2.808***	0.774	0.394***
	[4.13]	[0.97]	[4.32]
Board Size	-0.017	-0.025	-0.002
	[0.73]	[0.95]	[0.57]
Fraction Independent Directors	1.252***	-0.727**	0.185***
	[4.38]	[2.16]	[4.53]
Log(Sales)	0.471***	0.400***	0.063***
	[10.23]	[2.98]	[10.43]
# Business Segments	0.026**	-0.014	0.004**
	[1.96]	[1.19]	[2.03]
Tobin's Q	-0.057***	-0.014	-0.009***
	[2.89]	[0.64]	[2.92]
ROA	-0.017***	-0.015***	-0.002***
	[5.13]	[3.67]	[5.52]
Volatility	4.029***	3.581***	0.557***
	[9.96]	[5.42]	[11.03]
Constant	5.525	3.572***	1.652***
	[1.62]	[3.55]	[4.88]
Observations	8176	8318	8176
R-squared	0.168	0.621	.
Industry dummies	Yes	No	Yes
Regression type	OLS	Firm Fixed effect	Poisson

Table 5: Summary statistics for variables related to the fraction of male directors with board connections to female directors

This table shows firm level averages of variables related to board connections from 1996-2003 in the complete IRRC data (13,087 observations). Number Males with Board Connections to Female Directors is the number of male directors on a board who sit on other boards with female directors. Fraction Males with Board Connections to Female Directors is Number Males Linked to Females Directors divided by the Number of Male Directors. The Sum of All Other Directorships is the sum of all external directorships across all board members. The Sum of All Other Male Directorships is the sum of all external directorships across all male board members.

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Number of Male Directors	8.748	2.767	1	37
Number Males with Board Connections to Female Directors	2.608	2.631	0	17
Fraction Males with Board Connections to Female Directors	0.280	0.251	0	1
Sum of All Other Directorships	6.567	7.035	0	50
Sum of All Other Male Directorships	5.825	6.183	0	43

Table 6: IV regressions of measures of director pay on gender diversity

The sample consists of an unbalanced panel of firm level data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. Fraction Equity-based Pay is the ratio of the value of equity pay to total compensation each director receives in a year. Total Director Compensation is calculated as the sum of the annual retainer, # Board Meetings times Board Meeting Fee and the value of all stock-based compensation. Remaining sample characteristics are as in Table 1A. The dependent variable in columns II and III is log((Fraction Equity-based Pay/(1-Fraction Equity-based Pay))+ε), where ε is a very small number. The specifications in columns III and V include firm fixed effects. The specifications in columns I, II and IV include 2-digit SIC dummies. Column I reports the first stage of an IV regression with Fraction Males with Board Connections to Female Directors as an instrument for Fraction Female Directors. Columns II-V report the results of the IV estimation with Logtransform(Fraction Equity-based pay) and Ln(Total Director Compensation) as dependent variables. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity in columns I, II and IV. Absolute values of t-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels. At the bottom of the table we report the Hausman test statistic for the null that Fraction Female Directors is exogenous.

	Dependent Variable: Fraction Female Directors	***Dependent Variable: Logtransform(Fraction Equity-based pay)***		***Dependent Variable: Ln(Total Director Compensation)***	
	I	II	III	IV	V
Fraction Female Directors	.	35.376***	-7.627	0.443	8.725*
	.	[3.67]	[0.24]	[0.38]	[1.71]
Board Size	0.003***	-0.245***	-0.111**	-0.033***	-0.008
	[6.91]	[4.92]	[2.57]	[4.98]	[1.19]
Fraction Independent Directors	0.071***	2.454**	1.029	0.280**	-0.446
	[13.91]	[2.47]	[0.55]	[2.08]	[1.54]
Log(Sales)	0.008***	0.458***	0.762***	0.186***	0.328***
	[10.25]	[3.31]	[4.16]	[11.00]	[10.60]
# Business Segments	2.097e-4	0.006	0.050**	-0.003	-0.008**
	[0.96]	[0.26]	[2.41]	[1.29]	[2.46]
Tobin's Q	0.002***	0.278***	0.095**	0.071***	0.023***
	[3.77]	[4.25]	[1.99]	[6.37]	[4.32]
ROA	2.54e-5	-0.004	0.004	0.001	0.004***
	[0.41]	[0.62]	[0.73]	[1.51]	[4.62]
Volatility	-0.032***	10.711***	-2.788***	1.764***	-0.192
	[5.24]	[14.63]	[3.47]	[17.68]	[1.49]
Fraction Males with Board Connections to Female Directors	0.043*** [10.14]	.	.	.	.
Constant	-0.061***	-18.683***	-10.605***	1.478***	1.001***
	[3.09]	[8.57]	[6.53]	[7.31]	[4.21]
Observations	7856	7856	7983	8123	8253
R-squared	0.268	0.073	.	0.274	.
Industry dummies	Yes	Yes	No	Yes	No
Firm fixed effects	No	No	Yes	No	Yes
Hausman test statistic	.	3.214	-0.395	0.487	1.636

Table 7: Performance: Ln(Tobin's Q) and gender diversity

The sample consists of an unbalanced panel of firm level data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. Tobin's Q is the ratio of the firm's market value to its book value of assets. Market value is book assets-book equity+market value of equity. Remaining sample characteristics are as in Table 1A. The dependent variable in columns I-II and IV-V is the natural logarithm of Tobin's Q. The specification in column I includes 2-digit SIC industry dummies. The specifications in columns II-IV include firm fixed effects. Column III reports the first stage of an IV regression with Fraction Males with Board Connections to Female Directors as an instrument for Fraction Female Directors. Column IV reports the results of the IV estimation. Column V reports the results of an Arellano-Bond one step regression. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity in columns I, II and V. Standard errors are adjusted for group correlation at the firm level in column I. Absolute values of t-statistics or z-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

	Dependent Variable: Ln(Tobin's Q)		***Dependent Variable: Fraction Female Directors***	***Dependent Variable: Ln(Tobin's Q)***	
	I	II	III	IV	V
Fraction Female Directors	0.221*	-0.135*	.	-5.924**	-1.895
	[1.72]	[1.67]	.	[2.21]	[0.56]
Board Size	-0.012***	-0.012***	3.593e-4	-0.010**	-0.103
	[2.81]	[4.14]	[0.89]	[2.56]	[0.89]
Fraction Independent Directors	-0.131**	0.04	0.051***	0.342**	-3.471**
	[2.29]	[1.11]	[9.89]	[2.32]	[2.20]
Log(Sales)	0.031***	-0.002	0.002	0.011	-0.553**
	[3.11]	[0.17]	[1.20]	[0.72]	[1.96]
# Business Segments	-0.016***	-0.003**	6.34e-5	-0.003*	0.098***
	[7.05]	[2.54]	[0.35]	[1.67]	[2.91]
Fraction Males with Board Connections to Female Directors	.	.	0.015***	.	.
	.	.	[3.39]	.	.
Lagged Ln(Tobin's Q)	.	.	.	.	0.480***
	.	.	.	.	[5.50]
Constant	0.886***	0.707***	0.017	0.808***	-0.127**
	[3.53]	[8.91]	[1.50]	[7.13]	[2.02]
Observations	9299	9477	9477	9477	5588
R-squared	0.254	0.105	0.08	.	.
Industry dummies	Yes	No	No	No	No
Firm fixed effects	No	Yes	Yes	Yes	Yes
Regression type	OLS	Fixed effect	First-stage IV with fixed effects	IV with fixed effects	Arellano- Bond one step

Table 8: Performance: ROA and gender diversity

The sample consists of an unbalanced panel of firm level data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. ROA is net income before extraordinary items and discontinued operations divided by book assets. Remaining sample characteristics are as in Table 1A. The dependent variable in all columns is ROA. The specification in column I includes 2-digit SIC industry dummies. The specifications in columns II and III include firm fixed effects. Column III reports the results of the IV estimation with Fraction Males with Board Connections to Female Directors as an instrument for Fraction Female Directors. The first stage of the IV estimation is the same as in column III of Table 7. Column IV reports the results of an Arellano-Bond one step regression. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity in columns I, II and IV. Standard errors are adjusted for group correlation at the firm level in column I. Absolute values of t-statistics or z-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

	Dependent Variable: ROA			
	I	II	III	IV
Fraction Female Directors	6.190*	-6.170*	-231.409**	-159.658
	[1.89]	[1.71]	[2.07]	[0.81]
Board Size	-0.327***	-0.276**	-0.189	4.552
	[2.84]	[2.20]	[1.18]	[0.67]
Fraction Independent Directors	-3.787***	1.997	13.719**	30.618
	[2.82]	[1.26]	[2.24]	[0.28]
Log(Sales)	2.716***	4.053***	4.603***	-25.254
	[6.09]	[8.31]	[6.97]	[0.86]
# Business Segments	-0.03	-0.063	-0.049	2.332
	[0.58]	[1.10]	[0.70]	[0.66]
Lagged ROA	.	.	.	0.271**
	.	.	.	[2.55]
Constant				-1.820
				[0.47]
Observations	9324	9553	9553	5656
R-squared	0.072	0.031	.	.
Industry dummies	Yes	No	No	No
Firm fixed effects	No	Yes	Yes	Yes
Regression type	OLS	Fixed effect	IV with fixed effects	Arellano- Bond one step

Table 9: Performance and interaction of gender diversity with the IRRC shareholder rights index

The sample consists of an unbalanced panel of firm level data from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. Tobin's Q is the ratio of the firm's market value to its book value of assets. Market value is book assets-book equity+market value of equity. ROA is net income before extraordinary items and discontinued operations divided by book assets. Gindex is the "Governance index" from Gompers, Ishii and Metrick (2003). This index is the sum of 24 dummy variables indicating a firm has a provision making it more difficult to be taken over. Data on governance provisions is from the IRRC. Remaining sample characteristics are as in Table 1A. The dependent variable in columns I, III and V is Ln(Tobin's Q). The dependent variable in columns II, IV and VI is ROA. The specifications in columns I-IV include firm fixed effects. Columns V and VI report the results of Arellano-Bond one step regressions. All specifications include year dummies. Standard errors in all columns are adjusted for potential heteroskedasticity. Absolute values of robust t-statistics or z-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

	Ln(Tobin's Q)	***ROA***	***Ln(Tobin's Q)***	***ROA***	***Ln(Tobin's Q)***	***ROA***
	I	II	III	IV	V	VI
Fraction Female Directors	-0.103	-5.036	-0.616*	-22.500*	-26.472**	1763.274
	[0.90]	[1.42]	[1.87]	[1.92]	[2.22]	[0.83]
Gindex* Fraction Female Directors	.	.	0.055*	1.857*	3.194**	-254.522
	.	.	[1.69]	[1.78]	[2.11]	[0.97]
Gindex	-0.015**	-0.411*	-0.019**	-0.561**	0.028	21.625
	[2.17]	[1.70]	[2.53]	[2.09]	[0.10]	[0.94]
Board Size	-0.005	-0.243*	-0.004	-0.233*	-0.189	10.398
	[1.56]	[1.91]	[1.46]	[1.83]	[-1.00]	[0.81]
Fraction Independent Directors	0.013	3.517**	0.012	3.502**	-3.970**	-96.215
	[0.28]	[2.18]	[0.27]	[2.17]	[2.15]	[0.41]
Log(Sales)	0.02	4.740***	0.02	4.759***	-0.419	-43.412
	[1.08]	[4.55]	[1.11]	[4.57]	[1.12]	[0.98]
# Business Segments	-0.002	-0.023	-0.002	-0.025	0.080*	3.840
	[1.20]	[0.62]	[1.24]	[0.67]	[1.8]	[0.83]
Lagged Ln(Tobin's Q)	.	.	.	.	0.299**	.
	.	.	.	.	[2.31]	.
Lagged ROA	.	.	.	.	.	0.474
	.	.	.	.	.	[1.17]
Constant	0.619***	-23.725***	0.653***	-22.588***	-0.122*	0.177
	[4.66]	[3.45]	[4.82]	[3.24]	[1.83]	[0.02]
Observations	7584	7642	7584	7642	4508	4556
R-squared	0.1	0.055	0.101	0.055	.	.
Regression type	Firm fixed effect	Firm fixed effect	Firm fixed effect	Firm fixed effect	Arellano-Bond one step	Arellano-Bond one step

Table 10: Difference in characteristics between female and male directors at the directorship level

The sample consists of an unbalanced panel of 86,714 director level observations from 1,939 firms for the period 1996-2003 which were both in the Investor Responsibility Research Center (IRRC) Director Data and ExecuComp. The IRRC Director data consists of director level data for S&P 500, S&P MidCap and S&P SmallCap firms. Tenure is equal to the number of years the director has served on the board. Retired Dummy is equal to 1 if the proxy indicated that the director retired from his primary occupation. *** indicates significance at the 1% level.

Director Characteristics	***Mean for female directorships***	***Mean for male directorships***	***Difference***
# Other Directorships	1.088	0.905	0.183***
Tenure	7.195	9.987	-2.792***
Age	54.761	59.405	-4.644***
Retired	0.103	0.192	-0.089***

Table 11: Robustness checks using characteristics of directors

Table 11 replicates the fixed effect specifications in columns II and IV of Table 3, column II of Table 4 and column II of Tables 7 and 8 with the addition of the firm-year-level averages of four director characteristics: # Other Directorships, Tenure, Age and Retirement Status. Column III of Table 11 reports the specification with industry effects but no firm effects of column I of Table 4 augmented by the same average director characteristics. All specifications include year dummies. Standard errors are adjusted for potential heteroskedasticity in all columns. Standard errors are adjusted for group correlation at the firm level in column III. Absolute values of t-statistics are in brackets. Asterisks indicate significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

	Logtransform(Fraction Equity-based pay)	***LN(Total Director Compensation)***	***# Board meetings***		***Ln(Tobin's Q)***	***ROA***
	I	II	III	IV	V	VI
Fraction Female Directors	4.874***	0.384*	2.678***	0.732	-0.180*	-5.471
	[3.29]	[1.87]	[3.83]	[0.91]	[1.84]	[1.55]
Average Other Directorships	-0.034	0.031	-0.076	-0.161	-0.037***	-0.504
	[0.17]	[1.11]	[0.86]	[1.37]	[2.72]	[0.77]
Average Tenure	-0.021	0.005	-0.068***	0.044*	0.009***	-0.117
	[0.43]	[0.72]	[4.65]	[1.84]	[3.31]	[0.85]
Average Age	-0.025	-0.001	0.027	-0.014	-0.010***	0.07
	[0.55]	[0.20]	[1.58]	[0.58]	[3.67]	[0.39]
Average Retirement Status	-0.974*	-0.117*	0.086	-0.192	-0.001	1.742
	[1.72]	[1.65]	[0.22]	[0.60]	[0.02]	[1.00]
Board Size	-0.122**	-0.006	-0.016	-0.018	-0.010***	-0.309**
	[2.51]	[1.02]	[0.71]	[0.67]	[3.39]	[2.13]
Fraction Independent Directors	0.294	0.007	0.831***	-0.617*	0.093**	1.835
	[0.44]	[0.08]	[2.65]	[1.78]	[2.22]	[0.86]
Log(Sales)	0.780***	0.347***	0.458***	0.402***	0.003	4.151***
	[3.55]	[10.60]	[9.01]	[2.96]	[0.17]	[3.96]
# Business Segments	0.047**	-0.006**	0.029**	-0.014	-0.003***	-0.061
	[2.26]	[2.38]	[2.23]	[1.24]	[2.59]	[1.59]
Tobin's Q	0.092*	0.024***	-0.054***	-0.015	.	.
	[1.91]	[3.46]	[2.78]	[0.69]	.	.
ROA	0.004	0.003***	-0.016***	-0.015***	.	.
	[1.19]	[3.35]	[4.94]	[3.64]	.	.
Volatility	-2.595***	-0.300**	3.815***	3.661***	.	.
	[3.00]	[2.42]	[9.18]	[5.48]	.	.
Constant	-9.360***	1.201***	5.021	3.890***	1.172***	-24.631**
	[3.42]	[3.36]	[1.46]	[2.72]	[6.45]	[2.48]
Observations	7867	8134	8057	8198	9305	9380
R-squared	0.091	0.224	0.172	0.618	0.109	0.032
Firm fixed effects	Yes	Yes	No	Yes	Yes	Yes