Spillover effects of women on boards

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Abstract

This paper presents evidence that female directors can influence fellow male directors and that their influence can spillover to the male directors' other directorships. When working on the same board as women, male directors who also work alongside women within their wider directorship networks are shown to have better attendance records, suggesting that they are more conscientious in their monitoring duty. Accordingly, the more male directors interact with women, the more we find higher CEO turnover sensitivity to poor performance and lower equity risk. Based on conversion theory from the psychology literature, our findings suggest that female directors can exert influence on firm-level decisions despite their minority status in the boardroom.

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1. Introduction

This paper documents spillover effects of female influence across boards of directors. We find evidence suggesting that male directors are more effective at monitoring in the presence of women when there are other women in their directorship network. We also show that the presence of these male directors can explain firm-level monitoring and equity risk measures when there is at least one women on the board.

In light of the growing pressures worldwide to increase female representation in the boardroom, the literature has investigated the impacts of female directors on economic outcomes. The results are mixed (e.g. Adams and Ferreira, 2009; Liu, Wei, and Xie, 2014; Gregory-Smith, Main, and O'Reilly, 2014). In particular, the literature finds little evidence that director gender affects firm-level risk outcomes[1]. Matsa and Miller (2013) look at the impact of gender quotas on Norwegian boards and conclude that "risk aversion may not be a distinctive part of women's approach to corporate decision making" (p. 161). A recent working paper by Adams and Ragunathan (2013) investigates the impact of female boardroom representation and firm-level risk measures in banks. They find no strong evidence that women in bank boards are associated with less risky policies. These findings appear to contradict the popular belief[2] and the prior empirical evidence that women are more risk averse than men (e.g. Croson and Gneezy, 2009). Nonetheless, existing empirical evidence shows a difference in other behaviors between male and female directors. In particular, evidence shows that female directors tend to be more conscientious and better at monitoring (e.g. Izraeli, 2000; Huse and Solberg, 2006; Adams and Ferreira, 2009; Adams and Ragunathan, 2013). Thus, the relation between firm-level risk and presence of women on boards needs not come from gender differences in risk aversion but from tougher monitoring to curtail extreme decisions made by management.

[1]Only Berger, Kick, and Schaeck (2013) finds the addition of female directors on bank boards to be positively related to risk. However, the authors attribute the differences in risk to the differences in age and experience.

[2]For instance, Christine Lagarde, Managing Director of the International Monetary Fund, famously stated that the recent financial crisis might not have been as severe if "Lehman Brothers" had been "Lehman Sisters'.

It is possible that women cannot make a firm-level impact because by and large they are a minority in the boardroom. Kanter (1977) postulates that minorities in group settings are usually seen as tokens; thus their performance is less likely to be noticed by the majority members of the group[3] and their opinions may not be readily accepted. It is also possible that, as minorities, female directors are more inclined to agree with the opinions of male directors in the boardroom, as a number of conformity experiments, pioneered by Asch (1951), show that minorities tend to conform to a group's way of thinking. This raises doubts as to whether women can ever make an impact on corporate boards whilst they remain in the minority. The lack of significant relation between the presence of female directors and some firm-level outcomes appears to suggest that their presence does not publicly influence firm-level choices in a group setting. However, even when the presence of female directors does not directly affect firm-level outcomes, their values and opinions may privately influence behaviors of individual male directors.

This paper investigates the impact of female directors on male directors. We rely on the conversion theory developed by Moscovici (1985), which suggests both majority and minority members influence each other in group decisions. Whilst minority members in a group generally conform to the opinions of the majority, minorities' opinions may still have an influence on the majority members of the group. Moreover, minority influences are found to be more persistent (Crano and Chen, 1998) and to have an indirect impact beyond the key message under discussion (Alvaro and Crano, 1997). This opens up the possibility that individual male directors are privately influenced by women, even if we do not observe a relation between the presence of these women and group-level decisions. In other words, their influences may have a private impact without any public evidence of it. Furthermore, due to its persistent nature, the influence of female directors on male directors may persist beyond the board on which they both sit onto other boards on which these male directors

[3]In her study of interaction between genders in a large corporation, Kanter (1977) finds that the dominance group (men) are more likely to notice tokens (women) based on "appearance and other non-ablity traits" (p. 217).

also sit. We call this the "spillover effect" of female influence.

We first test the existence of this spillover effect of women on individual male directors. Specifically, we test whether male directors behave differently when they are exposed to female influence from within other boards. For each male director in each of his directorships, we identify whether he is connected to female directors in his other directorships. If a male director sits on at least one other board that has female representation, we classify this director as being "externally connected" to women. We argue that these "external connections" to female directors leads to "external influences" from women to men. This occurs because when board-level decisions are made, all directors must persuade others of their views. Although the views of women directors are not necessarily taken directly into account when board decisions are made, it is possible that individual male directors may nevertheless be influenced by these different opinions and attitudes.

We find that in the presence of female directors on the board, male directors with external female connections are 13% less likely to exhibit absenteeism in director meetings. On the basis that these meetings are opportunities for directors to monitor performance of the firms and its executives (Adams and Ferreira, 2008), we can conclude from our results that male directors are tougher monitors when they have external influences from women through their other directorships. At the firm-level we further test whether the presence of these externally influenced men can explain the variation in outcomes. As most boards comprise a majority of male directors, the opinions of these influenced male directors would be more likely to be accepted by the group than if they were from minority members. As a result, their opinions may be more likely to affect firm-level outcomes. For each board, we measure the presence of these men as a proportion of all directors on the board and find that this measure can explain the probability of CEO turnover when the firm performs poorly. One standard deviation increase in the fraction of male directors with external connection is associated with a 19% increase in probablilty of the CEO being replaced when the firm's stock performance is below its median value. Finally, we look at the capital market implication of the presence of these

externally connected male directors. We find that the presence of these directors is negatively associated with equity risk measures. Our overall results suggests that the decrease in firm-level equity risk are due to the fact that male directors with external influence from women are tougher monitors.

We distinguish "external influences" from "internal influences" – potential influences that come from women within the current board under investigation – because of the endogenous nature of female boardroom representation. It is likely that firm characteristics and policies can influence female director appointments within its own board. However, it is less likely that these characteristics and policies would influence female director appointments on the boards of other firms. Thus, the presence of male directors who are externally connected to female directors is arguably less likely to be endogenous compared to the presence of female directors on board used in other studies (e.g. Liu et al., 2014). Nonetheless, our results remain robust when controlling for the fact that unobserved firm-level characteristics may cause these male directors to be appointed.

Overall, we show that the presence of women in the boardroom can impact firm behavior even when they represent only a small proportion of the board of directors. Our results also imply that gender diversity in the boardroom cannot be seen at the firm-level in isolation; director networks also have to be taken into account.

Our paper contributes to the literature in the following ways. First, to the best of our knowledge, we are the first to document the spillover effect of female director behaviors to male directors across different boards. Our paper is most closely related to studies on the impact of female boardroom representation (e.g. Ahern and Dittmar, 2012; Matsa and Miller, 2013). We extend the findings of Adams and Ferreira (2009) by showing that not only does the presence of female directors influence the behaviors of male directors on that particular board, but also influence their behaviors on other boards. We also show that the presence of these influenced male directors can determine the variations in firm-level outcomes. More broadly, we contribute to the literature on boardroom diversity (e.g. Bøhren and Strøm,

2010; Upadhyay, 2014) by showing a possible channel whereby female directors as minorities can influence firm outcomes.

Second, we contribute to the literature on governance mechanisms and firm-level risk. Prior literature has documented the relationships between performance variability and corporate governance environment including CEO gender (Faccio, Marchica, and Mura, 2014), financial expertise (Minton, Taillard, and Williamson, 2014), managerial ownership (Kim and Lu, 2011), managerial compensation (Coles, Daniel, and Naveen, 2006) and institutional ownership (Wahal and McConnell, 2000). Gonzalez and André (2014) find a negative relation between director independence and equity risk. They argue that monitoring from directors who have no ties with the executive can reduce systematic risk in equity prices. We show that individuals directors know from their professional network, in particular female directors, also have an impact on equity risk. Our evidence suggests that this impact on risk does not come from risk aversion but is likely to be due to the increase in monitoring intensity.

Third, our paper also contribute to the literature on the social networks of executives (e.g. Fracassi and Tate, 2012). Fracassi (2012) shows that social ties between two companies' executives and directors are positively related to similarities in firm policies. Shue (2013) documents similarities in behaviors of firms whose CEOs were randomly assigned into the same MBA class. We investigate professional connections at the director level and show that professional ties to female directors can influence male director behaviors.

Finally, our paper contributes more generally to the literature on the hitherto inconclusive debate over director gender and firm value. Many studies use operating performance measures which are not risk-adjusted (e.g. ROA, ROE or other accounting variables)[4]. These studies can reveal only part of the story, because two firms with identical cash flows can

[4]Some of these studies also examine Tobin's Q, which is measured as market-to-book ratio and is a proxy for a firm's growth opportunities. Although Tobin's Q is a risk-adjusted measure based on firm market value, Wintoki, Linck, and Netter (2012) argue that this measure is more likely to be a cause rather than a consequence of governance structure. This argument is supported by theoretical works such as Raheja (2005) and Harris and Raviv (2008). Various empirical works including Boone, Field, Karpoff, and Raheja (2007) and Linck, Netter, and Yang (2008) also find evidence that supports this argument.

exhibit different levels of risk. Even when operating performance is not affected, firm value may still be affected through risk (i.e. the discount rate)[5]. We contribute to this literature by showing that the presence of female directors in male directors' social networks can influence firm-level risk outcomes.

The rest of the paper is structured as follows. Section 2 discusses the relevant literature and hypotheses. Section 3 3 discusses data and summary statistics. Section 4 presents results and section 5 presents a number of robustness checks. Section 6 concludes the paper.

2. Literature and hypotheses

2.1. Differences between male and female directors

The literature documents differences in behaviors and attitudes between male and female directors[6]. Adams and Funk (2012) survey core values and attitudes[7] of directors and CEOs in Sweden and find that the women in their sample are more *benevolent*, more *universally concerned* and less *power oriented* than men. These women are also found to be slightly less *tradition-oriented* and less *risk averse*. Evidence shows that female directors are perceived to be more serious about their directorship and more conscientious at board meetings (Izraeli, 2000; Huse and Solberg, 2006). They also appear to be better at monitoring than their male counterparts (Adams and Ferreira, 2009; Adams and Ragunathan, 2013). Overall, the observable difference in behaviors between gender generally pertain to their monitoring intensity or conscientiousness.

It is important to note that the difference in conscientiousness is not necessarily an

[5]Other studies use risk-adjusted measures of performance changes, but reach conflicting conclusions. Ahern and Dittmar (2012) document a decline in equity prices following the introduction of a gender quota in Norway, while Adams, Gray, and Nowland (2011) find that appointments of female directors result in higher stock market performance than male director appointments.

[6]We only focus on the literature on gender differences using samples of directors and top executives. Croson and Gneezy (2009) provide an excellent literature review on gender differences in the general population.

[7]Apart from *risk aversion*, the values and attitudes are based on the 10 value constructs of Schwartz, Melech, Lehmann, Burgess, Harris, and Owens (2001).

intrinsic female directors trait. On the contrary, both Adams and Ferreira (2009) and Ferreira (2014) point out possible reasons why it is not. For example, women may be under higher performance pressure due to the visibility their token status confers (Kanter, 1977). Nonetheless, it is the visible differences in behavioral styles of female directors that can lead to influences on male directors.

2.2. Conversion theory

Serge Moscovici (1980, 1985) developed conversion theory to explain how influences are effected between individuals. Moscovici argues that any influence can lead to internal emotional conflict and that individuals are motivated to reduce this conflict. The process by which the conflict is reduced, however, depends on the source of the conflict. When the influence comes from the majority, individuals focus on the interpersonal relationship between themselves and members of the majority and the desire to conform tends to outweight the consideration whether they agree with the opinion. An extreme example comes from Asch's (1951) conformity experiment where participants are asked to say aloud which line from three choices has the same length as the reference line. This example is illustrated in Figure 1. When the participants are grouped with others who are instructed to give the wrong answer (A or B), 75% of these participants also give the wrong answer to this simple question which has only one objectively correct answer (C). This evidence suggests that individuals primarily seek to comply with the majority members with little consideration to the validity of the actual decision.

In contrast to majority influence, when the sources of influence comes from the minority individuals put greater focus on the message. Thus, the influence is believed to have a lasting impact on the influenced individuals. Many minority-influence studies employ a color perception task (e.g. Moscovici, Lage, and Naffrechoux, 1969) and find that when a minority member of the group consistently calls a perceptively blue slide green, some of the subjects who are members of the majority are also likely to call the same slide green. This effect is

intensified when participants are asked to identify the color in private instead of publicly in front of the group. This is the key element that distinguishes influences from the minority to those from the majority. Majority influence can result in a public consensus without the individuals agreeing with the idea privately. On the other hand, minority influence can lead to the influenced individuals agreeing with the idea even when they may not express the agreement publicly. Only when a sufficient number of individuals privately agree with the minority's idea can the influence of the minority develop into public influence. Moscovici (1980) argues further that the influence from minorities can lead to private validation by the majorities when the influence comes from various sources that are consistent in their behavior. That is, the more the majority is exposed to consistent minority positions, the more likely they are to be influenced by them. The documented effects of minority influence also extend beyond the color perception experiment to social issues such as homosexuality and gun control (Alvaro and Crano, 1997). Mugny (1975) documents similar results where the majority is exposed to extreme political ideologies. In addition, he finds that the influence is more powerful when the minority has a "flexible style of negotiation" i.e. they are willing to compromise. This finding has particular relevance for our study as Adams and Funk (2012) find that female directors are less power-oriented (defined by Schwartz et al. (2001) as being less inclined to exert control or dominance over people) and hence are likely to take a collegiate approach in discussions.

Maass, West, and Cialdini (1987) identify four dimensions that are used in research to compare the effect of minority and majority influences: time, specificity, privacy, and awareness. Crano and Chen (1998) find that influences asserted by the majority induce a temporary change in attitude whereas the influences asserted by the minority lead to more persistent impact. Minority influences are also found also have an indirect influence beyond the key message (Alvaro and Crano, 1997; Mugny and Perez, 1991) and those influenced are also less aware of these influences (Maass et al., 1987). Wood, Lundgren, Ouellette, and Busceme (1994) conclude in their meta-analysis of 97 studies that minority influence

"was most marked on measures of influence that were private from the source and indirectly related to the content of the appeal and less evident on direct private influence measures and on public measures" (p. 323). Overall, conversion theory suggests that numerical minorities can make a broad impact by influencing individual members of the majority. Therefore, even when it appears that women as minorities tend to conform to the majority point of view, it is possible that these female directors can nevertheless exert influence on individual male directors, and as they influence more individual male directors, their impact can manifest itself in firm level outcomes.

2.3. External female influence and attendance behavior

We argue that female directors, as minorities, can influence male directors, who are members of the majority. We see "conscientiousness" as a "behavioral style" of female directors and investigate whether male directors change their behaviors when exposed to female influences.

As there is no direct way to measure a director's attitude towards monitoring, we look at the board meeting attendance problem as reported in SEC's proxy statement. Board meetings provide the oppotunity for directors to evaluate the performance of the executive team, and the information obtained from these meetings is crucial in strategic decision making. It follows that attendance at these meetings can be considered an observable outcome whereby a director's attitude towards monitoring be assessed. This is argued by Adams and Ferreira (2009), who find that female directors are less prone to absenteeism and see this as evidence of women being better monitors. These authors also find that fewer male directors have attendance problems when there is a female presence in the boardroom. Their results support our narrative that women have some influence over the majority group i.e. male directors. However, their evidence only suggests "internal influence" where both male and female directors sit on the same board. We seek to test the spillover effect of this influence on male directors' behaviors on their other boards – an "external influence". If there is a spillover effect of influence, we should observe the relation between female connections of male direc-

tors in their other directorships (external connection) and their attendance behavior. Thus, our first hypothesis is as follows:

Hypothesis 1: Male directors are less likely to exhibit absenteeism when they are externally connected to female directors.

2.4. External female influence and firm-level outcomes

It is potentially more difficult for female directors to influence firm-level outcomes due to their minority status. Farrell and Hersch (2005) and Gregory-Smith et al. (2014) document some evidence of tokenism: female directors are more likely to be appointed after another female director's departure. As tokens, female directors are usually treated as symbols (Kanter, 1977). Not only are tokens under higher performance pressure, their performance and achievements are less likely to be noticed by the group majority. Thus, it is likely to be harder for female members of the board to exert public influence on board-level decisions. However, there remains the possibility that male directors can be privately influenced by female directors. This is illustrated in Figure 2. In this figure, the female director F1 exerts her influence on board level decisions in a board meeting. Although she may not be able to influence board-level decisions (public influence – represented by solid lines) due to her token status, male directors may be intrigued by her different opinions such that she may be able to privately influence other male directors on the same board (private influence – represented by dotted lines). Furthermore, conversion theory suggests that, as the difference in attitude of minorities can intrigue the majorities, the minority influence can be more persistent. If so, the influence on male directors may not only be from female members on the board (internal private influence) but they can also be influenced by female directors they know from other directorships (external private influence). One can also argue that the influence of female directors on M2 is stronger than the influence on M1, as M2 receives the influence from two different sources (F1 and F2), particularly if the influence received from

both sources is consistent. As illustrated in this figure, it is possible that the male director M2 may hold attitudes influenced by the female director F2, whom he knows from his other directorship, even when F2 is not present in the current meeting. It is possible that when there are a sufficient number of male directors who are influenced by female directors, female attitudes i.e. conscientiousness will be reflected in board level decisions. If this is the case, we should observe a relation between the proportion of men who are connected to women in other directorships and firm-level monitoring behavior.

One of the key responsibilities of the board is to monitor the CEO (Mace, 1986; Hermalin and Weisbach, 2003) and CEO turnover, particularly when the firm performs badly, can be considered an observable outcome of the board's monitoring ability. For example, Weisbach (1988) finds that CEO turnover is more sensitive to performance in an outsider-dominated board. CEO turnover also tends to be more sensitive to performance in firms with a smaller board (Yermack, 1996) and when the chair's position is separate from the CEO position (Goyal and Park, 2002). This suggests a positive relation between effective monitoring and CEO turnover sensitivity. If the board is more effective at monitoring due to the presence of externally-connected male directors (i.e. those who sit on other boards with women directors), then the CEO should be more likely to be dismissed when firm performance is low. We state this as the following hypothesis:

Hypothesis 2: The proportion of externally-connected male directors on a board is positively associated with the probability of CEO turnover when stock return is low.

Next we look at the relation between externally-connected male directors and equity risk measures, which are proxies for performance variability. Sah, Stiglitz, and Stiglitz (1986, 1991) argue that centralized decision making can lead to outcomes that can be either very good or very bad; thus, without checks and balances, firms might be managed in ways that result in extreme performance outcomes i.e. higher performance variability. Adams, Almeida, and Ferreira (2005) find that a powerful CEO is positively related to stock return

standard deviation. Stronger monitoring from directors can be a factor that moderates extreme decision making. Cheng (2008) finds a negative association between board size and return volatility; he argues that decisions of larger boards are less extreme and therefore the performance of these firms tends to be less volatile. Gonzalez and André (2014) find firm systematic risk to be lower when the firm has an effective board. We postulate that as female-connected men become better at monitoring, their presence can decrease equity risk measures. Thus, our third hypothesis is as follows:

Hypothesis 3: The proportion of externally-connected male directors on a board is negatively associated with equity risk measures.

3. Data

We obtain an unbalanced panel of director-level data for Standard & Poors (S&P) 500, S&P MidCaps and S&P SmallCap firms for the period 1998–2012. Our sample consists of 79,765 directorships (director-firm-years). We have information for 13,555 directors across 1997 firms in this sample period. When we consolidate the director data into firm-level variables we end up with 16,310 observations. Abbreviations and data definitions are summarized in Table 1.

Director characteristics are obtained from the RiskMetrics database. At the director level, we define *DFemale* as a dummy variable equal to one (zero) if the director is a woman (man). To proxy for the spillover effects of female influence, we define DFemCon as a dichotomous variable that takes the value of one if the male director sits on other boards on which there are female directors and zero otherwise. *DNoFemCon* is also a dichotomic variable which equals one if the male director is not externally connected to women. We note that lack of external connections to female directors is a result of either no women sitting on external directorships or a lack of external directorships. We measure the overall

external connections of each director by their number of other directorships (*DirExtSeats*). We also construct variables that measure age (*DirAge*), tenure (*DirTenure*) and number of external directorships (*DirExtSeats*) of each director. The RiskMetrics database indicates whether each each director attends fewer than 75% of board meetings in each year. We use this to construct a dummy variable which equals to one if the director is reported as having attendance problems (*Absenteeism).*

We consolidate director-level variables into firm-level variables. *%FemCon* is the proportion of male directors who has at least one external directorship in a firm with at least one female director (externally-connected male directors)[8]. *%Female* is measured as the proportion of directors on board who are women. *BoardSize* is the number of all directors on the board and *%Indep* is the proportion of directors who are considered by RiskMetrics as independent. For directors to be classified as independent, they cannot be executives (formerly or presently) and cannot have any other affiliation to the company. (AvgDirAge) and (*AvgDirTenure*) are the average age and tenure of all the directors on the board.

We calculate firm characteristics using financial accounting variables obtained from the S&P Capital IQ Compustat database mainly as control variables, although some risk-related variables are used in the robustness section as dependent variables. Firm characteristics included in some of our regressions are profitability, the market-to-book ratio and firm size. Profitability (*ROA*) is measured as earnings before tax and interest divided by the book value of total assets. Growth opportunities (*MTB*) and size are proxied by the market-to-book ratio and the total book value of assets, respectively. Size enters the model in log form (Log(*Size*)). In our risk equations we also control for a firm's investment policy, capital structure and diversification policy. Investment policy is measured by the levels

[8]This variable has been used in Adams and Ferreira (2009) as an instrumental variable for female boardroom representation in performance equations (ROA and Tobin's Q). They argue that the only channel whereby a male director's connection with women can affect performance is through the increase in female boardroom participation We find the same results as theirs for performance. However, in risk equations as shown in our results (Section 4), we find that the female connectness of male director variable is statistically significant even when female representation on board (*%Female*) is included in the model, which suggests that *%FemCon* belongs in the risk model as an explanatory variable. We argue that this is because it proxies for female influence on male directors.

of research and development expenditure (*R&D*) and capital expenditure (*CapEx*). Both measures are scaled by total assets. We also control for firm capital structure using book leverage (*Leverage*) i.e. total liabilities scaled by the book value of equity. To proxy for the level of firm diversification, we use a firms number of business segments in log form (Log(*#Segments*)) and the Herfindahl-Hirschman index (*HH*), which is the sum of squared segment sales divided by the square of total sales. Net property, plant and equipment is scaled by total assets (*NetPP&E*) and *SurplusCash* is cash from assets in place (the sum of operating cash flows and R&D expenditures less depreciation and amortization) to total assets.

We obtain variables concerning CEO characteristics and compensation, *Vega*, using the Execucomp database. *Vega* is the dollar change in CEO compensation per 0.01 unit increase in a firm's standard deviation of stock returns. The calculation of vega follows Core and Guay (2002) and Coles et al. (2006). This measure proxies for CEO pay incentives to take risk. We also collect the length of tenure (*CEOtenure*) and the dollar amount of their cash compensation (*CashComp*). Berger, Ofek, and Yermack (1997) suggest that CEOs with long tenure are more entrenched and avoid risk-taking. The high amount of cash compensation means the CEOs can easily diversify their wealth outside of the firm and thus they are likely to be less risk averse (Guay, 1999). *Duality* and *Turnover* are dummy variables that respectively take the value of one if the CEO is also the chair of the board and if the CEO leaves during the year, respectively.

Returns (*Return*) and risk measures are calculated from stock price data obtained from the Center for Research in Security Prices (CRSP). We use three variables to measure equity risk: the logarithm of total risk (Log(*TotalRisk*)), systematic risk (*Sys*) and the log of idiosyncratic risk (Log(*IdioRisk*)). *TotalRisk* is calculated as the standard deviation of daily stock returns over the last year. *Sys* is the coefficient of the stock market portfolio from a market-model regression. We use the CRSP NYSE/AMEX/Nasdaq/Arca equally-weighted index as a proxy for the stock market portfolio. *IdioRisk* is the standard deviation of the

residuals from the market model regression. All returns used for these calculations exclude dividends. To annualize total and idiosyncratic standard deviations, we multiply *TotalRisk* and *IdioRisk* by a square root of 250.

Table 2 shows descriptive statistics at the director-level, in Panel A, and at the firm-level, in Panel B. An average board consists of nine directors of which 70% are independent and only one is a woman. With regards to female representation in the boardroom, around 40% of the firms do not have female board members and only around 20% have more than one female board member. The percentage of men with external connections to female directors is, however, considerably higher; that is, an average board has around 2.5 male directors with external female connections. We also note that 25% of the firms have at least 4 male members who interact with women through their external directorships. If the strength of influence depends on the absolute number of people exerting the influence (Asch, 1951), then it would seem that men who are externally connected to women would have a better chance to influence board decisions than female board members in isolation. We also note that the percentage of observations in which directors do not meet the 75% attendance threshold is unsurprisingly small – 1.4%. Clearly, directors do not want to gain a reputation for not carrying out their duties.

Although not reported, we also find that female directors are younger and have shorter tenure than men. The average age of female directors is 56.51 years compared to 60.81 years for male directors (men who are externally connected to women are 62.76 years old and men with no external female connections are 59.80 years old). An average female director has spent 7.46 years on the board whereas the average tenure is 9.80 years for male directors (the tenure for men with external connections to female directors is 9.02 years and for men with no external female connections it is 10.12 years). Although some of these differences are small (especially between men with external female connections and men without external female connections) we still include them in our specifications as not controlling for them could have implications for our risk equations. Berger et al. (2013) show evidence that

younger directors are associated with higher risk taking. Adams and Ferreira (2009) find director tenure to be associated with board meeting attendance problem, which suggests weak monitoring. We also note that women are more similar in terms of age, tenure and attendance record compared to men (our unreported variance ratio tests indicate that the variances of these variables are statistically smaller for women directors than men directors). This fact could lead to women behaving more consistently, a condition for minorities to be able to influence majorities within the minority influence literature (Moscovici, 1980).

4. Results

4.1. Spillover effect and board attendance

In this section, we test our first hypothesis. If there is any spillover effect of female influence, we would observe differences in behavior between male directors with and without outside female contacts. As the board meeting is an important mechanism whereby directors obtain the necessary information to perform their monitoring function, we argue that attendance at these meetings reflects the director's attitude regarding their monitoring duty. Thus, we investigate whether the variation in female contacts of male directors can explain their board attendance behavior. We conduct probit estimations using *Absenteeism*, a director-level dichotomous variable that equals 1 when the director attends less than 75% of all board meetings in that year as the dependent variable. To eliminate the possibility that some directors start their directorship in the middle of the year, we remove the observations where tenure is equal to one year. All estimation models in this section include various director, board and firm characteristics. Specifically, director characteristics include number of board positions held in other firms, tenure, age, and retirement status. Board characteristics include board size, proportion of independent directors and total director compensation. Firm characteristics include Tobins Q, ROA, the natural logarithm of sales and the volatility of stock returns. All the regressions include year dummies and standard errors are corrected

for potential heteroskedasticity and in the specifications without firm effects we use group correlation within directorship units.

[Table 3 about here]

The results are presented in Table 3. Panel A reports Probit regression results. In Column 1, we regress *absenteeism* on the female dummy variable, *DFemale*, and controls. The reference group for this model is male directors. We find that the coefficient on *DFemale* is negative (-0.108) and statistically significant (p-value = 0.013), which suggests that female directors are less likely to miss board meetings. This is consistent with the findings of Adams and Ferreira (2009) and Adams and Ragunathan (2013). To assess its economic significance, we report the marginal effect of the female dummy, evaluated at mean values in square brackets. The results suggest that if a director is a woman the likelihood that she will reported as having attendance problems decreases by 0.003. Given that the fraction of attendance problems in our data is 0.014, this means that women are roughly 21% less likely to exhibit absenteeism than men. Our results indicate that female directors appear to behave differently than men in term of attendance behavior. Although these results do not allow us to distinguish whether the difference in attendance behavior is intrinsic (e.g. Croson and Gneezy, 2009) or a result of performance pressure (e.g. Kanter, 1977), this observable distinction can potentially lead to behavioral change in male directors.

We next assess the effect of external connections on attendance problems. In Columns 2, we substitute the female dummy variable for *DFemCon* and *DNoFemCon*. Here the reference group is female directors. We note that both groups of male directors, those who are externally connected to women and those who are not, are more likely to exhibit absenteeism than female directors; both coefficients are statistically significant. We also note that although men with external female connections are less likely to miss meetings than men with no external female connections, the marginal effect of the fraction of female directors is similar for both male classifications (approximately 0.003); thus the difference between men with external female connections and no external female connections is not

economically significant. So far our results do not appear to support the hypothesis that male directors are less likely to exhibit absenteeism when they are externally connected to female directors (Hypothesis 1).

In Columns 3-6, we restrict the sample to male directors and show the interaction effects due to the presence of women on the primary board. The results indicate that the presence of female directors on the board can reduce absenteeism in male directors, which again supports Adams and Ferreira (2009). However, we find that this interaction effect is largely related to male directors who are externally connected to women. We show the results for all male directors in Column 3, where the coefficient on the fraction of female directors is negative and statistically significant at 10%. A one standard deviation in the fraction of female directors (0.09) is associated with a 0.001 decrease in likelihood that a male director has attendance problems, amounting to a 6% reduction in male director attendance in the presence of women. Although statistically significant, the reduction is modest. We then split our male sample into those who are externally connected to female directors (Column 4) and those who are not (Column 5). In Column 4 when we look at the effect on attendance that the presence of women has on men with external female connections, the statistical and economic effect is very large – 13%. On the other hand, the coefficient for *%Female* is not statistically significant and has a coefficient close to zero in the sample of male directors who do not have any external connections to female directors (Column 5). This suggests that external connections to female directors play a role in determining whether the presence of female directors on board can affect attendance behavior of male directors – evidence of the spill-over effect.

We argue that, compared to director gender, it is less obvious that firms would choose to appoint directors based on their external connection with women. Thus, male directors' external connection to women can potentially be treated as random. However, the possibility of external connection of male directors being endogenous needs to be addressed. First, only those directors who have more than one directorship can be externally connected to female

directors and multiple directorships can be considered a proxy for director's abilities and reputation[9] (Fich, 2005; Masulis and Mobbs, 2014). Therefore, the attendance behavior of these directors may reflect their monitoring abilities or their tendency to build their reputation and not the influence of female directors from other directorships. We address this concern by controlling for each director's number of external directorships (*ExtSeats*). We also restrict our sample further to only those male directors who have other directorships but only in firms where boards are exclusively male and we find the results (unreported for brevity) that lead us to the same conclusion. Second, there could be unobserved firm-level factors that influence both the presence of externally connected male directors on a board and the attendance behavior of directors. For example, firms that are serious about their board meetings may appoint directors from firms in which directors do not have attendance problems and those firms are more likely to have female directors. We argue that the firm-level attitude towards director attendance behavior is not likely to change considerably over time. Thus, we also estimate all *absenteeism* regressions using a linear probability model with firm-level fixed effects and find that our results continue to hold.

Overall we find evidence for the so-called spillover effect of female influence. Male directors are not identical in terms of their board attendance behavior and this behavior can be explained by their exposure to female directors from their other directorships. We find evidence that partially supports our first hypothesis: male directors who are externally connected with female directors behave differently, but only on boards where there is at least one female director. Based on the evidence from the absenteeism regression, we find that male directors act differently in the presence of women and the difference can be explained by their external connections to female directors. If a better attendance record suggests better monitoring, we should also find differences across firm outcomes pertaining to monitoring. This leads us to distinguish male directors based on their external female connections in our firm-level analysis.

[9]It can also seen as a proxy for director's "busyness" (e.g. Kaplan and Reishus, 1990) but the results that are consistent with this story would be opposite to ours.

4.2. The presence of men externally connected to female directors and CEO turnover

The results from *absenteeism* estimations show that male directors with external connections to female directors are less likely to miss board meetings, which suggests that they may be more conscientious in regards to monitoring. In this section, we investigate whether the presence of these connected male directors on board can affect firm-level outcomes. As directors meet infrequently, the role of the board may not be obvious in day-to-day operations but may be more detectable in large and discrete corporate decisions (Levi, Li, and Zhang, 2013). Therefore, we look at CEO turnover as a possible manifestation of director monitoring (Mace, 1986; Hermalin and Weisbach, 2003). We argue that a more effective board is likely to dismiss the CEO in bad times, thus we anticipate a positive relationship between male directors with external female connections and the probability of the CEO being replaced when firm performance is low (Hypothesis 2).

To test this hypothesis, we conduct probit estimations of *Turnover*, a dummy variable equal to one when the CEO is replaced in the following year.

$$Pr(Turnover_{i,t+1} = 1) = \Phi(\beta_0 + \beta_1 \%Female_{i,t} + \beta_2 \%FemCon_{i,t} + \mathbf{CONTROL}_{i,t}\mathbf{\Gamma} + \varepsilon_{i,t}) \tag{1}$$

Here the cumulative probability of CEO turnover (denoted by Φ) is explained by the ratio of female directors, the ratio of men with external female connections and a set of control variables which include CEO characteristics that could also have an effect on CEO turnover: *CEOAge*, *CEOtenure*, CEO-Chairman *Duality* and the gender of the CEO (*FemaleCEO*). We also control for board characteristics that are related to the strength of governance (e.g. *BoardSize* and *%Indep*) as well as risk (Log(*TotalRisk*)), size (Log(*Size*)) and diversification (Log(*#Segments*)). Industry and time dummies are also included in all specifications. We distinguish between the states where each firm has good and bad performance by calculating

the median value of firm returns. Periods where returns are above (below) the median are regarded as periods of high (low) returns.

[Table 4 about here]

Our probit regressions in Table 4 (Columns 1-3) show results for periods of bad performance. In Column 1, we employ the probit model on the sample of all firms. The results show a positive and significant relation between *%FemCon* and *Turnover* at 10% level. This indicates that CEOs are more likely to be replaced in bad times when there are more male directors with external female connections. When we divide our sample into firm-years where firms have a female presence in the board room (Column 2) and those that do not (Column 3), we again see an interaction effect between *%FemCon* and the presence of female directors. The relation between *%FemCon* and *Turnover* is only significant when there is at least one female director in the boardroom.

Column 1 shows that %FemCon has a positive effect on turnover when performance is bad which provides evidence in favor of our third hypothesis. Although the presence of women has a positive effect on turnover, this is insignificant at any conventional statistical level. When we divide our sample into firms with women directors (Column 2) and firms with no women directors (Column 3), our results show that the effect of externally connected men to female directors is larger in the presence of female directors on board. The economic effect of *%FemCon* is also large. For the full sample, a one standard deviation in the fraction of men with external female connections (0.237) is associated with a 0.014 increased likelihood of CEO turnover. The fraction of CEO turnover is 0.074 and thus this amounts to a 19% increment in the probability of CEO turnover. The economic effect of %FemCon is even larger when the sample is restricted to firms where there are women directors: the increased probability of CEO turnover in bad times is 25%. We do not find *%FemCon* to have any effect on *Turnover* when stock returns are high. Although the coefficients for *%Female* are positive when returns are low, we do not find them to be statistically significant at any conventional level. Our firm-level results lend support to the interpretation that the interaction of male

directors with women outside and inside a specific board leads to tougher monitoring via higher CEO turnover in bad times.

4.3. The presence of men externally connected to female directors and equity risk measures

We have shown that male directors behave differently when they are externally connected to women in their other directorships and that the presence of these female-connected male directors can explain firm-level monitoring when the firm has at least one woman in their board room. In this section, we relate the presence of externally-connected male to equity risk measures. As firm performance is generally less volatile under effective monitoring (Sah et al., 1986, 1991), we anticipate a negative relation between *%FemCon* and equity risk measures (Hypothesis 3). We thus estimate the following equation:

$$Risk_{i,t} = \beta_0 + \beta_1 \%Female_{i,t} + \beta_2 \%FemCon_{i,t} + \mathbf{CONTROL}_{i,t}\mathbf{\Gamma} + \varepsilon_{i,t} \qquad (2)$$

The vector $Risk_{i,t}$ represents Log(*TotalRisk*), Sys and Log(*IdioRisk*). $\mathbf{CONTROL}_{i,t}$ is a matrix of control variables which include board characteristics, CEO characteristics and firm characteristics. Board characteristics include *BoardSize* and the proportion of independent directors (*%Indep*). *CEOTenure* and *CashComp* are included to control for CEO risk aversion. Firm characteristics include Log(*Size*), *MTB*, *R&D*, *CapEx* and *Leverage*. We assume that board variables are observed at the beginning of the period whilst other variables are recorded at the end of the period; thus, the relationship is modeled as contemporaneous. As it is possible that the influence of unobserved firm-level characteristics can affect both the appointments of externally-connected men and performance variability, all estimation models include firm-level fixed effects. Time dummies are also included.

[Table 5 about here]

Table 5 presents the results. Columns 1-3 show the results for all firms. We find the coef-

ficients for *%FemCon* to be negative and statistically significant at the 5% level for all three equity risk measures. The results suggests that the presence of externally-connected male directors is associated with lower firm-level performance variability. For firms with female board members, a 10% increase in the proportion of males with female external connections is associated with approximately a 1% decrease in the standard deviation of returns, a 0.15 unit decrease in the market model beta and a 0.9% decrease in the idiosyncratic risk measure. A 10% increase is roughly equal to one director on an average board of 9 people. Similar to our previous results, we find that the relation is stronger when these externally-connected men work on the same board as at least one female director. The coefficients are larger in magnitude when we restrict our sample to those firm-years with female directors (Columns 4-6). Conversely, the results for firm-years without any female director (Columns 7-9) are not statistically significant. Nonetheless, all the coefficients for *%FemCon* are negative. It is also important to note that the proportion of women directors has no statistically significant effect in all but one of our specifications. This is in line with existing empirical evidence on the relation between female boardroom representation and equity risk measures (e.g. Adams and Ragunathan, 2013).

Overall, we find that male directors behave differently when they are connected with women in their other directorships. We argue, based on the theory of minority influence, that these men are influenced by female directors from their different directorships. Consequently, they become more conscientious, a documented trait of female directors. Individually, we find that they are less likely to exhibit absenteeism compared to male directors without any external female connection. At the firm-level we find that the presence of these men on the board is associated with firm-level outcomes associated with monitoring. Having these male directors on board increases the likelihood of CEO replacement under poor performance and lower firm-level performance variability. Interestingly, all our results only show statistical significance when we focus on firms with at least one female director on board. In line with Moscovici's (1980) premise regarding repeated exposure to a constant message discussed

earlier, one possibility is that the exposure to female directors within the board allows the passive female influence to imperceptively manifest itself in the male director behavior. Another possibility is that male directors with external female influence are more actively receptive to female directors' suggestions; that is, more conscientious firm-level decisions are initiated by female directors and are agreed by female-influenced male directors. We cannot distinguish between these two possibilties without a data set with more variations in terms of number of female directors on board and number of external female connections for male directors. Nonetheless, our results suggest that gender diversity in each of the boardrooms cannot be seen in isolation as female directors from the wide directorship network can also have an influence on firm-level behavior.

5. Robustness checks

5.1. Difference-in-difference pairwise t-test for Absenteeism

To corroborate our findings on board meeting attendance, this section assesses the behavior of the *same* male director when he sits on *different* boards. Although the attendance results shown in Table 3 are robust to the inclusion of firm-level fixed effects, there remains a possibility that it is unobserved director characteristics that influence the results. In this section, we alleviate this concern by using a difference-in-difference pairwise t-test for each pair of the same director in two different directorships. The results are shown in Table 6. The sample of male directors are divided into two groups: men without any external female connection (Panel A) and men with at least one external female connection (Panel B). We find that on average men without external female connection behave similarly in terms of attendance in boards with and without female directors. On the other hand, male directors with external female connections are statistically less likely to be reported as absent directors when they sit on the same board as at least one female director (2.4% compared to 3.3%).

[Table 6 about here]

5.2. Gender effects or peer effects?

It is possible that externally-connected men attend more board meetings not because they have been exposed to female influence through their networks but because they are imitating behaviors of dutiful peers regardless of their gender. (Adams and Ferreira, 2008) show some evidence that newly appointed males, who may wish to impress their new colleagues, have better attendance records than male directors with long tenures. We assess whether the effect of *%FemCon* remains significant after incorporating *%NewMen* (the proportion of newly appointed men). We use the entire sample of directors (which includes the directors appointed in the current year) and add *DNewDirector*, a dummy variable that takes the value of one when the director has been newly appointed, to the specification in Table 3. For brevity, our results (displayed in Table 7) only show a subset of the control variables. Panel A summarizes results for a Probit specification and Panel B summarizes results for a linear probability model with fixed effects. We find newly appointed male directors attend more board meetings than those directors with longer tenures. Further, because we control for gender (through *DFemale*), we conclude that the better attendance of new directors is not driven by the possibility that they are predominantly women. In Columns 3-6 we restrict our sample to male directors who have not been recently appointed. If our findings in Table 3 were driven by peer effects rather than gender effects, we would expect that the attendance of men who have not been recently appointed to improve in the presence of newly appointed colleagues rather than female directors. That is, the coefficients for *%NewMen* should be significant instead of those for *%Female*. Similar to Adams and Ferreira (2008), we find in Column 3 that it is gender rather than peer effects that explain better attendance. We further restrict our sample to distinguish men who are externally connected to female directors (Column 4) and those who are not (Column 5). Results in both columns are in line with those in our baseline results in Table 3: it is only externally-connected men that behave differently in term of attendance in the presence of women, even after controlling for *%NewMen*. Men with no female contacts or no external seats are influenced by neither their

women counterparts nor new directors.

[Table 7 about here]

5.3. Monitoring versus risk aversion

The relation between the fraction of externally-connected male directors and risk measures can be driven by either monitoring or overall board risk aversion. In order to distinguish between these two sources of possible mechanisms whereby *%FemCon* and risk measures are related, we test whether *%FemCon* can explain the variation in a number of risk-related firm-level policy measures – *vega*, *R&D*, *CapEx*, *Leverage* and the Herfindahl-Hirschman Index as a proxy for revenue diversification (*HH)*.

Directors may induce the CEO to increase a firm's risk by increasing the risk-inducing incentives in CEO compensation (Coles et al., 2006; Belkhir and Chazi, 2010). Having high R&D expenditures is considered a risky firm policy, particularly if the firm decrease capital expenditures on properties, plants and equipment (Kothari, Laguerre, and Leone, 2002). Firms are also considered risky when they are undiversified (Tufano, 1996) and have high leverage (Ben Zion and Shalit, 1975). Thus, if *%FemCon* is negatively related to the risk measures because boards with high *%FemCon* are more risk averse, we should observe that higher *%FemCon* firms have *lower* CEO vega, *lower* investment in R&D expenditure, *higher* captial expenditures, *higher* degree of diversification and *lower* leverage.

The regression results for the risk-related firm-level policy measures are displayed in Table 8. We closely follow the existing literature (Coles et al., 2006) in regards to the control variables. We do not find any strong evidence that *%FemCon* is related to less risky firm policies. On the contrary, we find that the coefficient for *%FemCon* is positive in *Vega* and *R&D* equations (see Panel B). Overall, the results suggest that the negative relation between *%FemCon* and risk measures is due to the increase in monitoring.

5.4. Alternative proxies to %FemCon

We employ various alternative measures to *%FemCon* to make sure that our results are not sensitive to the way our variable is constructed. Instead of dividing by total number of directors, we divide the number of male directors with external female connections by the number of male directors. We also construct the measure by dividing the number of external connections with women by the total number of external connections. Our results remain qualitatively similar to those presented above.

6. Conclusion

In this paper, we show that the presence of female directors can reduce firm-level equity risk. However, this reduction in risk only applies to firms with externally-connected male directors i.e. male directors who also work with female directors in other boards. Based on conversion theory (Moscovici et al., 1969), we argue that male directors connection to female directors is a proxy for female minority influence. Thus the men who are connected to female directors become more conscientious, a trait of female directors as documented by prior literature (Izraeli, 2000; Adams and Ferreira, 2009). We show that individually externally-connected male directors are less prone to board meeting attendance problems and their presence on the board is positively related to CEO turnover and performance sensitivity. In addition, there is no evidence that the proportion of these externally-connected male directors on the board decreases risk-relevant firm policies. Our overall findings suggest that the reduction in risk is not due to risk aversion but because externally-connected male directors are tougher monitors. We rule out alternative interpretations using the inclusion of firm-level fixed effects and various other robustness checks.

Previous research has largely concentrated on the impact of women within boardrooms. Our results add to the existing literature by showing that the wider professional connections of externally-connected male directors are also important to the gender debate and provide

a mechanism by which female directors can make an impact on firm-level risk outcomes. The key implication of this paper is that female directors can have impacts on firm-level outcomes even when they are minorities on most boards. What we find, however, is not a direct impact. The proportion of women on boards cannot explain firm-level outcomes; it is the proportion of male directors who have more interactions with female directors in their directorship networks that can explain these outcomes. Thus, this paper suggests a new way in which gender diversity in the boardrooms can be viewed. Given that female representation in the boardroom is increasing due to both regulatory and social pressure, their impact on firm behavior may be more significant than previously documented.

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Table 1: Definitions of the Variables

Variable	*Definition*
Panel A: Director-level Variables	
DFemale	= 1 if the director is a women, and 0 if men.
DFemCon	= 1 if the male director sit on the same board as at least one women in his other directorships, and 0 otherwise.
DNoFemCon	= 1 if the male director does not know any female director from his other directorships, 0 and otherwise.
DirExtSeats	Number of other directorships held by the director.
DirTenure	Director's tenure.
DirAge	Director's age.
Absenteeism	= 1 if the proxy statement reports that the director misses more than 75% of boad meetings, and 0 otherwise.
Panel B: Firm-level Variables	
%FemCon	The number of male directors who sit on the same board as at least one women in his other directorships divided by the total number of directors.
%Female	The number of female directors divided by the total number of directors.
AvgDirAge	The average age of all directors.
AvgDirTenure	The average tenure of all directors.
ExtSeats	The total number of external directorships held by all directors.
BoardSize	The total number of directors.
%Indep	The number of directors who are non-executives and do not have any other affiliation with the managers divided by the total number of directors.
Ln(*Size*)	Natural logarithm of total assets.
MTB	Stock price at fiscal year end times the number of common shares outstanding divided by the book value of equity.
ROA	Return on assets, defined as net income divided by total assets.
R&D	Research and development expenditures divided by total assets. Missing values are replaced by zero.
CapEx	Capital expenditures divided by total assets. Missing values are replaced by zero.
Leverage	Total long-term debt divided by total assets.
Log(TotalRisk)	Natural logarithm of daily stock price volatility multiplied by a square root of 250.
Sys	The regression coefficient for market returns (using CRSP value-weighted index) from the single-factor market model.
Log(IdioRisk)	Natural logarithm of the residuals from the single-factor market model multiplied by a square root of 250.
HH	The Herfindahl-Hirschman Index for for sales concentration across business segments.
Return	Average daily stock return.
NetPP&E	Net value of properties, plants and equipments divided by total assets.
Log(*SalesGrowth*)	Natural log of annual sales growth.
CashComp	The cash component of CEO compensation (in dollars).
CEOTenure	CEO tenure.
Duality	= 1 if the CEO is also the chairman of the board, and 0 otherwise.
Vega	The dollar change in CEO compensation per 0.01 unit increase in a firm's standard deviation of stock returns.
Turnover	=1 if a new CEO is appointed in that firm-year, and 0 otherwise.

Table 2: Descriptive Statistics

Panel A: Director-level Observations						
Variable	*#Obs.*	*Mean*	*StDev*	*p25*	*p50*	*p75*
Absenteeism	79,765	0.014	0.120	0.000	0.000	0.000
DFemale	79,765	0.129	0.335	0.000	0.000	0.000
DFemCon	69,467	0.326	0.469	0.000	0.000	1.000
DNoFemCon	69,467	0.674	0.469	0.000	1.000	1.000
DirExtSeats	79,765	0.637	0.965	0.000	0.000	1.000
DirTenure	79,765	9.282	6.513	5.000	8.000	12.000
DirAge	79,765	62.010	8.203	57.000	63.000	68.000
Panel B: Firm-level Observations						
%FemCon	16,310	0.277	0.237	0.100	0.250	0.429
%Female	16,310	0.098	0.095	0.000	0.100	0.154
BoardSize	16,310	8.954	2.304	7.000	9.000	10.000
%Indep	16,310	0.699	0.170	0.600	0.727	0.833
AvgDirAge	16,310	60.017	4.388	57.417	60.273	62.889
AvgDirTenure	16,310	9.640	4.007	6.846	9.000	11.818
ExtSeats	16,310	0.536	0.468	0.167	0.438	0.778
Log(*Size*)	16,310	7.404	1.484	6.339	7.248	8.325
MTB	16,310	2.044	1.697	1.221	1.598	2.293
ROA	16,310	0.036	0.187	0.019	0.053	0.091
R&D	16,310	0.085	1.948	0.000	0.003	0.052
CapEx	16,310	0.113	3.480	0.020	0.036	0.066
Leverage	16,310	0.216	0.186	0.050	0.203	0.328
Log(TotalRisk)	16,310	-0.875	0.442	-1.174	-0.899	-0.595
Sys	16,310	1.309	0.653	0.879	1.223	1.631
Log(IdioRisk)	16,310	-1.038	0.464	-1.358	-1.063	-0.741
HH	16,310	0.701	0.391	0.439	0.703	1.000
Return	16,310	0.131	0.449	-0.102	0.134	0.362
NetPP&E	16,285	0.269	0.215	0.104	0.206	0.377
Log(*SalesGrowth*)	14,630	0.068	0.222	-0.008	0.071	0.153
Log(*#Segments*)	16,293	0.860	0.721	0.000	1.099	1.386
Log(*SurpCash*)	16,125	0.089	0.105	0.036	0.081	0.136
CashComp	15,495	1254.857	1655.692	600.000	904.288	1373.995
CEOTenure	15,188	7.127	7.564	2.000	5.000	10.000
Duality	15,495	0.460	0.498	0.000	0.000	1.000
Vega	12,963	163.541	323.693	23.267	66.607	174.183
Turnover	16,310	0.074	0.262	0.000	0.000	0.000

Notes:
The sample covers the period between 1996–2012. Descriptions of all variables are provided in Table 1. Directors' information is from the RiskMetrics databases. Accounting variables are obtained from the Compustat database. Equity risk measures are calculated using price data from Centre for Research in Security Prices. *DFemCon* and *DNoFemCon* are constructed for male director observations only. Number of observations vary for *NetPP&E*, Log(*SalesGrowth*), Log(*SalesGrowth*), *SurpCash*, *CashComp*, *CEOTenure*, *Duality* and *Vega* due to data availability.

Table 3: Regressions of *Absenteeism* on director's gender and boardroom female representation

Panel A: Probit Regression

			Male directors		
	All Directors		*All Men*	*Connected with Women*	*Not Connected with Women*
	(1)	(2)	(3)	(4)	(5)
DFemale	-0.108^{**}				
	(0.013)				
	$[-0.003]$				
DFemaleCon		0.093^{*}			
		(0.051)			
		[0.003]			
DNoFemaleCon		0.118^{**}			
		(0.015)			
		[0.003]			
%Female			-0.313^{*}	-0.785^{**}	0.001
			(0.100)	(0.023)	(0.534)
			$[-0.01]$	$[-0.023]$	$[-0.002]$
DirExtSeats	0.014	0.021	0.016	0.033	-0.016
	(0.325)	(0.231)	(0.316)	(0.202)	(0.229)
BoardSize	0.042^{***}	0.042^{***}	0.044^{***}	0.042^{***}	0.002^{***}
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
%Indep	-0.108	-0.105	-0.042	0.113	0.018^{**}
	(0.353)	(0.368)	(0.728)	(0.595)	(0.025)
DirTenure	-0.009^{***}	-0.009^{***}	-0.007^{***}	-0.006	-0.000^{**}
	(0.001)	(0.001)	(0.007)	(0.152)	(0.050)
DirAge	-0.006^{***}	-0.006^{***}	-0.007^{***}	-0.011^{***}	-0.000^{*}
	(0.003)	(0.003)	(0.001)	(0.005)	(0.058)
Log(*Size*)	-0.027^{*}	-0.027^{*}	-0.025	-0.076^{***}	-0.002
	(0.060)	(0.065)	(0.107)	(0.001)	(0.284)
MTB	-0.009	-0.009	-0.014	-0.022	-0.000
	(0.381)	(0.381)	(0.229)	(0.238)	(0.564)
ROA	0.111	0.110	0.140	0.010	0.010^{**}
	(0.275)	(0.277)	(0.221)	(0.946)	(0.020)
Log(*TotalRisk*)	0.068	0.067	0.056	0.009	-0.000
	(0.194)	(0.203)	(0.303)	(0.917)	(0.878)
Compensation	-0.000^{*}	-0.000^{*}	-0.000	0.000	-0.000^{*}
	(0.075)	(0.075)	(0.178)	(0.979)	(0.072)
Intercept	-1.508^{***}	-1.628^{***}	-1.611^{***}	-0.941^{**}	0.056
	(0.000)	(0.000)	(0.000)	(0.033)	(0.261)
#Obs.	79,765	79,765	69,467	22,650	46,817

Continued on next page

Table 3 – continued from previous page

Panel B: Linear Probability Model with Fixed Effects

DFemale	−0.003**				
	(0.017)				
DFemaleCon		0.002			
		(0.111)			
DNoFemaleCon		0.004**			
		(0.015)			
%Female			−0.019*	−0.035*	0.033
			(0.081)	(0.079)	(0.411)
DirExtSeats	0.001	0.001	0.001	0.002	−0.095
	(0.292)	(0.218)	(0.237)	(0.117)	(0.678)
BoardSize	0.003***	0.003***	0.003***	0.003***	0.045***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
%Indep	0.019***	0.019***	0.020***	0.019	−0.123
	(0.002)	(0.002)	(0.003)	(0.146)	(0.393)
DirTenure	−0.000***	−0.000***	−0.000***	−0.000	−0.008**
	(0.001)	(0.000)	(0.004)	(0.295)	(0.016)
DirAge	−0.000***	−0.000***	−0.000***	−0.000**	−0.006**
	(0.007)	(0.007)	(0.002)	(0.033)	(0.020)
Log(*Size*)	−0.004***	−0.004***	−0.003*	−0.006*	0.013
	(0.009)	(0.009)	(0.069)	(0.069)	(0.478)
MTB	−0.001	−0.001	−0.001	−0.002**	−0.010
	(0.240)	(0.239)	(0.120)	(0.038)	(0.461)
ROA	0.008**	0.008**	0.009**	0.005	0.245*
	(0.046)	(0.047)	(0.033)	(0.540)	(0.080)
Log(*TotalRisk*)	−0.000	−0.000	−0.000	−0.000	0.097
	(0.969)	(0.967)	(0.874)	(0.941)	(0.143)
Compensation	−0.000	−0.000	−0.000	0.000	−0.000**
	(0.203)	(0.202)	(0.318)	(0.790)	(0.034)
Intercept	0.092**	0.088*	0.087*	0.176	−2.003***
	(0.047)	(0.057)	(0.078)	(0.150)	(0.000)
#Obs.	79,765	79,765	69,467	22,650	46,817
R^2	0.056	0.056	0.061	0.121	0.306

Notes:

The dependent variable is *Absenteeism*, which is equal to one when the proxy statement reports that the director attend less than 75% of board meetings and zero otherwise. The main independent variable in Column 1 is *DFemale* which is equal to one for female directors and zero for male directors. In Column 2, DFemaleCon (DNoFemaleCon) is a dummy variable set to one when the male director sit (does not sit) on the same board as at least one female director in his other directorships. The key independent variable for Columns 3-6 is %Female. Control variables are defined in Table 1. Panel A present probit regression results with industry and year dummy variables. Panel B present results from firm-level fixed effects estimator with year dummy variables. In brackets are p-values calculated using director-level cluster robust standard errors. The marginal effects of the coefficients at the average values are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Probit Regressions of *Turnover* on *%FemCon*

	Low Return			High Return		
	All Firms (1)	With Women (2)	Without Women (3)	All Firms (4)	With Women (5)	Without Women (6)
%FemCon	0.403*	0.516*	0.138	0.029	−0.022	−0.027
	(0.081)	(0.062)	(0.754)	(0.895)	(0.933)	(0.946)
	[0.057]	[0.071]	[0.019]	[0.004]	[− 0.003]	[− 0.003]
%Female	0.343	0.314		0.166	−0.492	
	(0.237)	(0.492)		(0.582)	(0.315)	
ExtSeats	−0.125	−0.167	−0.031	−0.087	−0.089	−0.032
	(0.207)	(0.136)	(0.887)	(0.371)	(0.434)	(0.875)
BoardSize	−0.030**	−0.016	−0.043		−0.002	0.015
	(0.026)	(0.316)	(0.136)	(0.669)	(0.886)	(0.592)
%Indep	−0.011	0.194	−0.210	0.329*	0.592***	−0.059
	(0.952)	(0.416)	(0.483)	(0.061)	(0.009)	(0.837)
Log(Size)	0.044*	0.030	0.057	0.054**	0.025	0.128***
	(0.053)	(0.263)	(0.215)	(0.023)	(0.358)	(0.005)
Log(TotalRisk)	0.159**	0.157	0.175	0.273***	0.203*	0.417***
	(0.043)	(0.109)	(0.195)	(0.002)	(0.055)	(0.004)
CEOTenure	−0.004	−0.002	−0.004	−0.003	0.001	−0.009
	(0.272)	(0.629)	(0.421)	(0.438)	(0.760)	(0.139)
CEOAge	0.026***	0.033***	0.019***	0.021***	0.016***	0.033***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)
FemaleCEO	0.031	0.086		−0.020	0.000	
	(0.848)	(0.602)		(0.901)	(0.999)	
Log(#Segments)	−0.085**	−0.092**	−0.057	−0.029	0.015	−0.128*
	(0.021)	(0.044)	(0.363)	(0.447)	(0.756)	(0.053)
Duality	−0.335***	−0.306***	−0.439***	−0.440***	−0.414***	−0.544***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Intercept	−3.104***	−3.707***	−2.148***	−2.984***	−2.844***	−3.542***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
#Obs.	5,740	3,827	1,913	6,249	4,076	2,173

Notes:
This table reports probit regression results of CEO turnover on the proportion of male directors who sit on the same board as at least one female directors in their other directorships and control variables. Columns 1-3 (4-6) comprise firm-years where profitability (as proxied by return assets) is below (above) firm-level median. Year dummy variables are included in all specifications. Other control variables are defined in Table 1. In brackets are p-values computed using cluster-robust standard errors at firm-level. The marginal effects of *%FemCon* evaluated at mean are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Fixed Effects Regressions of Equity Risk Measures on *%FemCon*

	All firms (#Obs. = 16,310)			Firms with women directors (#Obs. = 10,175)			Firms without women directors (#Obs. = 6,135)		
	Log(TotalRisk) (1)	*Sys* (2)	*Log(IdioRisk)* (3)	*Log(TotalRisk)* (4)	*Sys* (5)	*Log(IdioRisk)* (6)	*Log(TotalRisk)* (7)	*Sys* (8)	*Log(IdioRisk)* (9)
%FemCon	−0.074**	−0.137**	−0.070**	−0.106**	−0.148**	−0.094**	−0.062	−0.227*	−0.060
	(0.029)	(0.047)	(0.037)	(0.011)	(0.044)	(0.026)	(0.259)	(0.093)	(0.261)
%Female	−0.055	−0.205*	−0.017	−0.047	−0.160	0.010			
	(0.397)	(0.089)	(0.794)	(0.609)	(0.297)	(0.910)			
#ExtSeats	0.026	0.038	0.032*	0.042*	0.035	0.046**	0.014	0.170**	0.012
	(0.150)	(0.247)	(0.074)	(0.054)	(0.340)	(0.038)	(0.666)	(0.020)	(0.700)
BoardSize	−0.010***	−0.026***	−0.009***	−0.003	−0.012**	−0.002	−0.018***	−0.037***	−0.018***
	(0.000)	(0.000)	(0.000)	(0.335)	(0.029)	(0.530)	(0.001)	(0.001)	(0.001)
%Indep	−0.060*	−0.072	−0.061*	−0.067	−0.029	−0.073*	−0.008	0.024	−0.023
	(0.066)	(0.273)	(0.055)	(0.104)	(0.692)	(0.073)	(0.879)	(0.831)	(0.654)
Ln(*Size*)	−0.093***	0.013	−0.115***	−0.103***	−0.048*	−0.119***	−0.055***	0.178***	−0.097***
	(0.000)	(0.563)	(0.000)	(0.000)	(0.086)	(0.000)	(0.002)	(0.000)	(0.000)
MTB	0.006**	0.049***	0.000	0.007*	0.054***	−0.001	0.004	0.040***	0.000
	(0.014)	(0.000)	(0.845)	(0.081)	(0.000)	(0.832)	(0.118)	(0.000)	(0.825)
ROA	−0.217***	−0.404***	−0.212***	−0.421***	−0.520***	−0.434***	−0.159***	−0.327***	−0.153***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D	−0.008	−0.032**	−0.006	−0.015	−0.066**	−0.010	−0.009	−0.016	−0.010
	(0.122)	(0.050)	(0.312)	(0.253)	(0.015)	(0.381)	(0.164)	(0.473)	(0.198)
CapEx	0.010*	0.033**	0.008	0.081*	0.245*	0.036	0.011*	0.017	0.012
	(0.057)	(0.048)	(0.174)	(0.086)	(0.073)	(0.397)	(0.098)	(0.460)	(0.125)
Leverage	0.159***	0.048	0.201***	0.147***	0.033	0.188***	0.100*	−0.011	0.145**
	(0.000)	(0.508)	(0.000)	(0.001)	(0.689)	(0.000)	(0.093)	(0.926)	(0.016)
AvgDirAge	−0.006***	−0.016***	−0.004**	−0.005*	−0.011**	−0.004	−0.008***	−0.021***	−0.006**
	(0.002)	(0.000)	(0.029)	(0.061)	(0.021)	(0.169)	(0.006)	(0.003)	(0.018)
AvgDirTenure	−0.003	−0.001	−0.003	−0.003	−0.003	−0.004	−0.002	0.003	−0.003
	(0.177)	(0.766)	(0.117)	(0.263)	(0.501)	(0.179)	(0.481)	(0.688)	(0.372)
R^2	0.586	0.156	0.589	0.617	0.189	0.603	0.558	0.161	0.566

Notes:
Panel A reports results from firm-level fixed effects estimations of equity risk measures on the proportion of male directors who sit on the same board as at least one female directors in their other directorships (*%FemCon*). The fixed effects estimations include year dummy variables as controls. Other control variables are defined in Table 1. Panel B reports results from ordinary least square estimations with industry and year dummy variables. In brackets are p-values computed using cluster-robust standard errors at firm-level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Paired two-sample t-test of *Absenteeism*

Panel A: Male Directors without External Female Connections (514 Observations)		
	Mean	Standard Error
(3): Without Female Directors	0.028	0.006
(4): With Female Directors	0.029	0.007
(3) – (4):	−0.001	0.008
Panel B: Male Directors with External Female Connections (2,535 Observations)		
	Mean	Standard Error
(1): Without Female Directors	0.033	0.004
(2): With Female Directors	0.024	0.003
(1) – (2):	0.009**	0.004

Notes:

This table shows the results from paired two-sample t-tests of director attendance behavior as proxied by *Absenteeism*. The sample in Panel A comprise male directors who sit on the same board as at least one female director on other boards whereas the sample in Panel B comprise male directors who are not externally connected with any female directors. Attendance behaviors of male directors on the boards with at least one female director (1 and 3) are compared with the behaviors of the sample directors when they are on the boards without any female director (2 and 4). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Regressions of *Absenteeism* (Controlling for Peer Effects)

			Male directors		
	All Directors		*All Men*	*Connected with Women*	*Not Connected with Women*
	(1)	(2)	(3)	(4)	(5)
Panel A: Probit Regression					
DFemale	-0.110^{***}				
	(0.009)				
	$[-0.003]$				
DFemCon		0.089^{*}			
		(0.060)			
		[0.003]			
DNoFemCon		0.126^{***}			
		(0.007)			
		[0.003]			
%Female			-0.314^{*}	-0.765^{**}	-0.110
			(0.100)	(0.028)	(0.633)
			$[-0.01]$	$[-0.022]$	$[-0.017]$
%NewMen			-0.008	0.244	-0.140
			(0.956)	(0.241)	(0.435)
DNewDirector	-0.328^{***}	-0.328^{***}			
	(0.000)	(0.000)			
Other Controls	Yes	Yes	Yes	Yes	Yes
#Obs.	79,765	79,765	69,467	22,650	46,817
Panel B: Linear Probability Model with Fixed Effects					
DFemale	-0.003^{***}				
	(0.008)				
DFemCon		0.002			
		(0.109)			
DNoFemCon		0.004^{***}			
		(0.005)			
%Female			-0.019^{*}	-0.033^{*}	-0.018
			(0.073)	(0.092)	(0.289)
%NewMen			-0.003	0.008	-0.008
			(0.545)	(0.432)	(0.241)
DNewDirector	-0.010^{***}	-0.010^{***}			
	(0.000)	(0.000)			
Other Controls	Yes	Yes	Yes	Yes	Yes
#Obs.	79,765	79,765	69,467	22,650	46,817
R^2	0.056	0.056	0.061	0.121	0.306

Table 8: Regressions of Risk-relevant Policies on *%FemCon*

Panel A: Boards with female directors					
	Vega	*R&D*	*CapEx*	*HH*	*Leverage*
%FemCon	0.335*	0.019**	0.001	−0.006	0.007
	(0.182)	(0.009)	(0.008)	(0.038)	(0.019)
%Female	0.232	−0.024	−0.027	−0.013	−0.010
	(0.399)	(0.034)	(0.019)	(0.093)	(0.033)
ExtSeats	−0.031	−0.007	−0.010***	−0.012	0.001
	(0.097)	(0.005)	(0.003)	(0.017)	(0.009)
BoardSize	−0.013	0.000	−0.000	−0.003	−0.000
	(0.013)	(0.001)	(0.001)	(0.002)	(0.001)
%Indep	0.634***	0.032	−0.003	−0.086*	−0.010
	(0.204)	(0.023)	(0.009)	(0.051)	(0.016)
Log(Size)	0.548***	−0.022	0.004	−0.033***	0.019**
	(0.062)	(0.015)	(0.003)	(0.011)	(0.008)
MTB	0.020	0.007	0.002**	0.003	−0.006**
	(0.018)	(0.010)	(0.001)	(0.003)	(0.003)
ROA	0.764***				−0.273***
	(0.209)				(0.044)
Leverage	−0.155	−0.016	0.003	0.002	
	(0.186)	(0.036)	(0.013)	(0.031)	
Log(TotalRisk)	−0.502***				
	(0.076)				
CEOTenure	0.002				
	(0.006)				
SurplusCash		−0.188	−0.025	−0.005	
		(0.223)	(0.019)	(0.069)	
Log(SalesGrowth)		0.004**	0.002**	−0.001	
		(0.002)	(0.001)	(0.003)	
Return		−0.012	−0.016***	−0.007	
		(0.012)	(0.003)	(0.007)	
NetPP&E					−0.005
					(0.039)
R&D					0.002
					(0.009)
Intercept	−1.080*	0.195*	0.067**	1.151***	0.129*
	(0.558)	(0.118)	(0.027)	(0.079)	(0.073)
#Obs.	8,986	8,256	8,256	8,256	11,261

(Continued)

Table 8 Continued

Panel B: Boards without female director					
	Vega	*R&D*	*CapEx*	*HH*	*Leverage*
%FemCon	0.143	−0.074	−0.040	−0.025	−0.024
	(0.234)	(0.072)	(0.066)	(0.040)	(0.026)
ExtSeats	0.050	0.064	0.049	0.001	0.010
	(0.127)	(0.069)	(0.059)	(0.024)	(0.020)
BoardSize	0.007	0.006*	−0.000	−0.002	−0.000
	(0.019)	(0.004)	(0.004)	(0.003)	(0.002)
%Indep	0.290	0.137	0.179	−0.019	−0.030
	(0.205)	(0.139)	(0.122)	(0.034)	(0.030)
Log(Size)	0.513***	0.007	0.048**	−0.017	0.024**
	(0.073)	(0.017)	(0.021)	(0.011)	(0.012)
MTB	0.015	−0.003	−0.000	0.001	−0.005**
	(0.010)	(0.006)	(0.005)	(0.002)	(0.002)
ROA	0.244				−0.060***
	(0.165)				(0.022)
Leverage	−0.815***	−0.013	−0.040	−0.011	
	(0.239)	(0.097)	(0.066)	(0.038)	
Log(TotalRisk)	−0.426***				
	(0.097)				
CEOTenure	−0.006				
	(0.006)				
SurplusCash		−0.072	0.101	0.080*	
		(0.092)	(0.122)	(0.046)	
Log(SalesGrowth)		0.001	0.005	0.006**	
		(0.012)	(0.008)	(0.003)	
Return		−0.016	−0.036*	−0.000	
		(0.017)	(0.019)	(0.005)	
NetPP&E					0.038
					(0.057)
R&D					−0.000
					(0.000)
Intercept	−0.353	−0.075	−0.246	1.049***	0.053
	(0.518)	(0.159)	(0.188)	(0.071)	(0.075)
#Obs.	5,364	5,216	5,216	5,216	7,099

Notes:

This table reports the results from fixed effects regressions of risk-relevant firm-level policies – CEO vega, research and development expenditures, capital expenditures, Herfindahl-Hirschman Index of revenue concentration and leverage – on the proportion of male directors who sit on the same board as at least one female directors in their other directorships and control variables. The sample in Panel A comprises observations with at least one female director on their board whereas the sample in Panel B comprises observations without any female director. Other control variables are defined in Table 1. Year dummy variables are included in all specifications. In brackets are p-values computed using cluster-robust standard errors at firm-level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

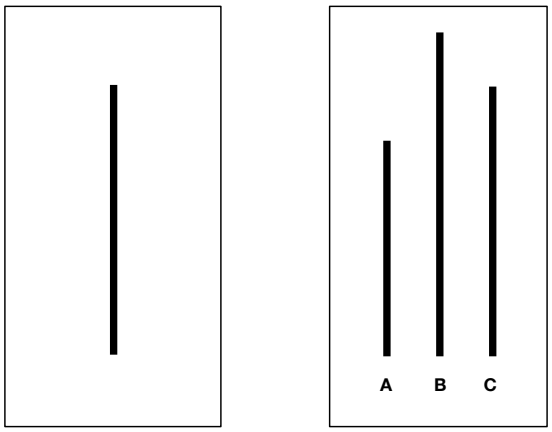

Fig. 1. Line Matching Task from the Experiment of Asch (1951).

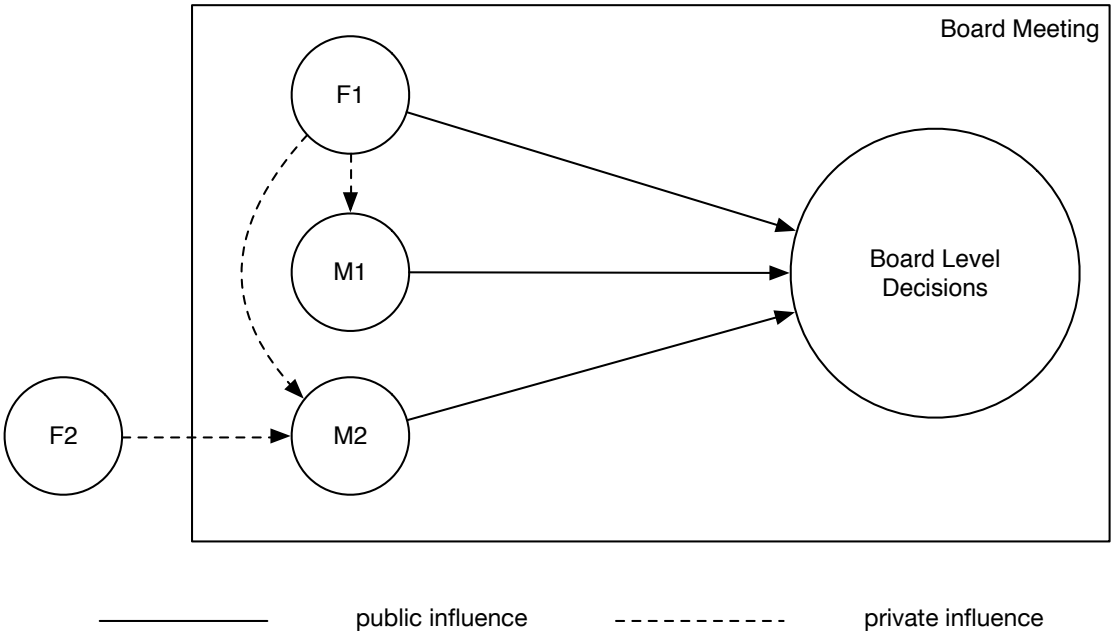

Fig. 2. Public and Private Influences Between Directors in a Board Meeting