CEO Gender: Effects on Valuation and Risk

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Using 70 announcements of female CEO appointments over 1992-2007 and a matched sample of 70 male CEO appointments, we evaluate whether gender influences capital market measures of valuation and risk for CEO appointments. The three-day cumulative abnormal returns are not significantly different between female and male CEO appointments, indicating a gender bias is not reflected by the financial market. We find changes in risk following CEO appointments are significantly lower for female CEOs, supporting the view that the market perceives female CEOs to be relatively risk averse. Furthermore, we find evidence consistent with our hypothesis that firms with relatively high risk (total risk and idiosyncratic risk) are more likely to appoint female CEOs so that risk might decrease.

Introduction

Top female corporate executives have been an understudied group for one simple reason: historically there have not been many of them. Oakley (2000) reports that only seven of the Fortune 1000 firms had a female chief executive officer (CEO) in 1997. In their study of corporate board members, Carter, Simkins, and Simpson (2003) describe the average firm in their sample gathered from the Fortune 1000 in 1997 as having only 1.1 women board members of 11 total board members. It also has been reported by Catalyst (2006), a nonprofit organization that focuses on women in business, that the average Fortune 500 firm in 2005 had 21.8 corporate officers and 3.6 of these positions were held by women. They also specify that eight Fortune 500 firms in 2005 had women CEOs, which represents a slight increase in female CEOs in these high profile firms. In 2006 alone, PepsiCo and Archer Daniel Midland appointed female CEOs. Thus, as increases in the number of prominent

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female business leaders occur over time, attitudes toward female business leaders may be changing. The glass ceiling may be disappearing.

This study makes two contributions to the literature on women business leaders. We examine the differential effects of appointing female CEOs versus male CEOs on capital market measures of valuation and risk. Our study provides the financial market participants' point of view. Past studies that have used the perspective of the financial market to evaluate CEO appointments typically have not considered the role of gender on valuation or risk.

Reinganum (1985) finds the stock market response to CEO appointments, on average, to be statistically insignificant. In contrast, Denis and Denis (1995) report the response to be positive and significant. Warner, Watts, and Wruck (1988) report that CEO appointments involving outsider appointments have favorable announcement returns, which suggests that the characteristics of the new CEO are important in determining the market reaction to CEO appointment announcements. Similarly, Worrell, Davidson, and Glascock (1993) find significant positive market reactions to outsider appointments, while no significant stock reactions are reported with inside promotions. Beatty and Zajac (1987) consider the possibility that market risk may shift following CEO changes and document a significant proportion of firms experience shifts in market risk.

Examining appointments of females as CEOs is important because many studies suggest that there exists a gender stereotype (e.g., Heilman, Block, Martell, and Simon, 1989; Oakley, 2000; Atkinson, Baird, and Frye, 2003; Lee and James, 2007) and that gender influences performance and strategy (e.g., Hisrich and Brush, 1984; Powell and Ansic, 1997), which may influence the financial market. Recently, Lee and James (2007) examine female top executive appointments between 1990 and 2000, including a relatively small sample of 17 female CEOs. They not only find negative and significant valuation effects for firms that appoint female CEOs, but their analyses also indicate that female CEO appointments generate significantly more negative valuation effects than do male CEO appointments. They believe that investors may be more skeptical about the appointment of female executives due to the proportional rarity of female appointments and other gender stereotypes.

We identify 70 announcements of female CEO appointments over the 1992-2007 period and develop a matched sample of 70 male CEO appointments. Our results show that the market favorably greets the news of selecting a female (male) CEO with statistically significant abnormal stock price reactions, with a mean three-day cumulative abnormal return of 3.55 percent (2.63 percent) and median of 0.26 percent (0.87 percent). Finding positive average stock price reaction to CEO appointments is consistent with past studies (e.g., Denis and Denis, 1995). Tests of the difference between valuation effects of female and male CEO appointments show there is no significant difference. This key finding indicates that financial market participants are not less confident in women CEOs and do not reflect the stereotype

that women are less competent or more ambiguous CEOs. Our results contrast with those of Lee and James (2007), plausibly because our sample includes more recent and a greater number of female CEO appointments; attitudes toward women business leaders may differ in recent times. Additionally, our approach to comparing female CEO appointments to male CEO appointments differs in that we employ a matched sample of male CEO appointments.

Another key finding we document is that changes in risk differ between female and male CEO appointments. Reductions in all three capital market risk measures (total risk, market risk, and firm-specific risk) following the appointment of female CEOs are more pronounced than those following the appointment of male CEOs. This evidence supports the view that the market perceives female CEOs to be more risk averse than male CEOs. We further evaluate the role of risk in a multivariate framework so that we may assess whether risk characterizes female versus male CEO appointments while controlling for other factors. Our findings are consistent with the view that female CEOs are more likely selected by firms with relatively high risk (total risk and firm-specific risk) and an expectation of reduction in risk.

Impact of Female CEO Appointments on Valuation

The extant research does not provide a clear view on the relationship between female CEO appointments and valuation. There is a body of literature that would predict a more negative response from the stock market upon appointment of a female CEO. Early studies, such as Hisrich and Brush (1984), suggest that male-owned businesses outperform female-owned businesses.[1] Heilman, Block, Martell, and Simon (1989) and Oakley (2000) conclude that women often are stereotyped as being less competent managers than men. The meta-analyses of Eagly, Makhijani, Klonsky (1992) and Eagly, Karau, Makhijani (1995) find that women in leadership positions that are defined to be masculine or mainly occupied by males, such as the position of CEO, are less favorably evaluated and considered to be less effective than men in similar positions. Powell and Ansic (1997) believe that, because the strategies in financial-decision making adopted by females are different from those adopted by males and are readily observable, the view that females have less ability in financial matters may exist. Further, Estes and Hosseini (1988) and Barber and Odean (2001) show that females are less confident in their finance ability, which makes it difficult for females to overcome the stereotype. Atkinson, Baird, and Frye (2003) provide support for the gender-based stereotype that male bond fund managers are more capable than female bond fund managers; they show that net cash flows into female-

[1]Powell and Ansic (1997) summarize the early literature before 1980 as showing women "…have inferior leadership and problem solving abilities when making decisions under risk compared to men, reinforcing stereotypical views that women are less able managers."

managed funds are lower than male-managed funds, yet find no differences in performance.

A recent study by Lee and James (2007) also provides support for a gender bias. Based on a sample of 17 female CEO appointments from 1990-2000, they find the valuation effects to be significantly more negative than for a sample of male CEO appointments. They believe that investors have more difficulties judging the ability of female CEOs because they have no frame of reference due to the proportional rarity of female CEOs. Furthermore, they argue the gender bias is rooted in the fact that the role of managers is defined in masculine terms and is occupied mainly by men. To the extent that female CEOs are stereotyped as less competent or that their ability is more ambiguous, we expect to find a significantly more unfavorable response to appointments of female CEOs than male CEOs.

There is also a body of literature that would predict the response to appointments of female CEOs should not be more unfavorable than the responses to appointments of male CEOs. Kalleberg and Leicht (1991) examine the performance of small businesses and observe similar levels of performance across gender; businesses led by women are not more likely to go out of business and do not generate lower growth in earnings. The study by Johnson and Powell (1994) finds no differences in decision quality or risk propensity between groups of male and female managers. The experiments of Powell and Ansic (1997) find no significant differences between male and female business students in their financial decision-making ability. Carter, Simkins, and Simpson (2003) find that firms having two or more female corporate board members perform better, as measured by Tobin's q, and do not generate lower return on assets. Additionally, studies show that females are not less successful at investing than males (e.g., Estes and Hosseini, 1988; Barber and Odean, 2001; Atkinson, Baird, and Frye, 2003). Last, to the extent that increases in the number of prominent female business leaders have opened minds to the notion that females are not less capable business leaders or more ambiguous, the gender bias may have dissipated. Thus, it alternatively can be hypothesized that valuation effects are not significantly different between female and male CEO appointments.

Impact of Female CEO Appointments on Risk

We are aware of only the study by Beatty and Zajac (1987) that considers the possibility that risk may change with a change in CEO. Without regard to CEO gender, they examine the impact of CEO appointments on market risk and find a significant proportion of firms experience significant shifts in market risk.

There are few studies that examine the role of gender in the areas of business- or financial-risk taking. Lee and James (2007) argue that, because female executives are an unknown quantity, appointments of female executives may be perceived by the financial market as riskier than appointments of male executives. On the other hand, past studies mainly document that females are relatively more risk averse than males

(Powell and Ansic, 1997; Jianakoplos and Bernasek, 1998; Bernasek and Shwiff, 2001; Barber and Odean, 2001).[2]

The experiments of Powell and Ansic (1997) show that females have a lower preference for risk in financial decision making compared to males. Their finding is not dependent upon familiarity and framing, costs, or ambiguity. Jianakoplos and Bernasek (1998) and Bernasek and Shwiff (2001) find women are more conservative investors in that they have smaller proportions of their portfolios invested in risky assets than men. Sunden and Surette (1998) argue that the effects of gender on investment decisions are not straightforward. They evaluate the interaction between gender and marital status, and find it to be important. More specifically, they find single women and married men are less likely than single men to choose riskier investments. Barber and Odean (2001) show that women are more risk averse with regard to their common stock holdings. Together, these studies suggest the possibility that the degree of risk aversion might be higher among female CEOs than among male CEOs. To the extent that financial market participants believe female CEOs will set the strategy and tone of the firm in accordance with their relatively risk-averse nature,[3] we hypothesize that female CEO appointments are associated with greater risk reductions or lower increases in risk.

Sample and Methodology

The sample of female CEO appointments is identified through a search of Lexis/Nexis over the 1985-2007 period. We use key word searches, such as *CEO appointment*, *new chief executive officer*, and *new CEO*. Additionally, we identify the CEO as female from inferences in the news announcement (use of words such as *she* and *her*). Valuation and risk effects are estimated for the 70 announcements between 1992 and 2007 that have the necessary data from CRSP and Compustat.[4]

The distribution of the female CEO appointment announcements is summarized in Table 1, by fiscal year in Panel A and by industry in Panel B. We focus on fiscal year because in the next step we use fiscal year as one of the criteria to identify a matched sample of male CEO appointments. Panel A shows some clustering of female CEO appointments around the late 1990s. Thus, our sample reflects an increasing trend of hiring female CEOs in the 1990s. Panel B of Table 1 summarizes

[2]It should be recognized that Johnson and Powell (1994) conclude there is no difference in risk propensity between male and female managers. Therefore, their work would suggest that risk shifts following the appointment of a new CEO should not differ by gender.

[3]To improve performance, newly appointed CEOs sometimes take an *earnings bath* where they take excessive losses (e.g., write-off bad assets) shortly after their appointment (e.g., DeAngelo, 1989). It is plausible that less risk averse CEOs may take more aggressive earnings baths and thus increase stock return volatility.

[4]Nine women CEO announcements were deleted due to lack of necessary data, four were deleted due to confounding events, and seven were deleted due to lack of a matched firm.

Table 1—Sample Distributions

Panel A: Sample Distribution by Fiscal Year

Fiscal Year	Number of Announcements	Percent of Announcements	Fiscal Year	Number of Announcements	Percent of Announcements
1985	0	0	1997	6	8.57
1986	0	0	1998	9	12.86
1987	0	0	1999	8	11.43
1988	0	0	2000	8	11.43
1989	0	0	2001	2	2.86
1990	0	0	2002	4	5.71
1991	0	0	2003	2	2.86
1992	4	5.71	2004	1	1.43
1993	2	2.86	2005	3	4.29
1994	4	5.71	2006	5	7.14
1995	3	4.29	2007	2	2.86
1996	7	10.00			
Total				70	100

Panel B: Sample Distribution by Industry

Industry Description	Number of Firms	Percent of Firms
Consumer Nondurable	7	10.00
Consumer Durable	4	5.71
Manufacturing	7	10.00
Oil, Gas, and Coal Extraction and Products	0	0
Chemicals and Allied Products	2	2.86
Business Equipment	9	12.86
Telecommunications	2	2.86
Utilities	2	2.86
Wholesale, Retail, and some Services	15	21.43
Health Care, Medical Equipment, Drugs	9	12.86
Finance	8	11.43
Other	5	7.14
Total	70	100

the sample distribution by industry using SIC codes from Compustat to classify the firms into these Fama-French industry classifications. The female CEOs in our sample are most frequently appointed to companies in the wholesale and retail industry.

Next, we construct a matched sample of announcements of male CEO appointments. We identify potential matched firms using industry and firm size in the fiscal year end prior to CEO appointment. The fiscal year is used as opposed to calendar year to better align with the financial data in Compustat. We search for all firms within plus or minus 40 percent of the total assets and in the Fama-French industry that appointed the female CEO. Then, each potential matched firm in descending order from closest in asset size is screened through Lexis/Nexis to see if, during the same fiscal year of the female CEO appointment, the matched firm appointed a new male CEO and there are no confounding events.

We present descriptive statistics of the 70 female CEO appointments and the 70 matched-male CEO appointments in Table 2. These comparisons highlight differ-

ences that may exist between the gender groups. The comparisons focus on the types of firms and characteristics of boards, as well as traits of CEOs, that are associated with selecting female versus male CEOs.

Table 2—Descriptive Statistics

This table summarizes the descriptive statistics of the CEO announcement samples for 70 female CEO appointments and the 70 matched-male CEO appointments. Panel A measures are defined as follows: Total Assets are reported in millions of U.S. dollars, Asset Turnover is sales/total assets, Return on Assets is EBITDA/total assets, Leverage is long-term debt/total assets, Market/Book is stock price/book value of common equity, Firm Age is the number of years the firm has been incorporated, Sigma is standard deviation of weekly stock returns over the 25 weeks prior to announcement date, Beta is market risk from single index market model using both the equally-weighted and value-weighted index as the market portfolio over the 25 weeks prior to the announcement date, Idiosyncratic is the error variance from the single index market model using both the equally-weighted and value-weighted index as the market portfolio over the 25 weeks prior to announcement date. Panel B measures are defined as follows: Board Size is the total number of board members, Outside % is the proportion of outside board members, Female Board equals one when there is at least one female board member, and zero otherwise, Duality equals one when the CEO also is the board chairperson, and zero otherwise, Outside Appointment equals one when the CEO is not employed by the firm for more than one year prior to their appointment, and zero otherwise, Forced equals one when the old CEO was explicitly or implicitly forced to resign, and zero otherwise, CEO Age is the age of the CEO at the time of appointment. EW is equally weighted while VW is valued weighted. The mean (median) differences between groups are based on the t-statistic (Wilcoxon signed-rank test statistic), and p-values are reported for the tests of differences

	Female Sample		Matched-male Sample		p-values of Differences	
	Mean	Median	Mean	Median	Mean	Median
Panel A: Firm-Specific Characteristics						
Total Assets	4,211.5	271.6	3,968.5	315.1	0.8846	0.9269
Asset Turnover	1.042	0.957	1.110	0.971	0.6169	0.6556
Return on Assets	-0.004	0.108	0.033	0.079	0.3916	0.5049
Leverage	0.225	0.178	0.194	0.126	0.3949	0.3057
Market/Book	1.415	1.784	5.778	2.410	0.0338**	0.1458
Firm Age	15.17	9.00	14.60	10.00	0.8232	0.6996
Sigma	0.106	0.078	0.081	0.070	0.2876	0.7578
Beta (EW)	1.51	0.98	1.12	0.90	0.3152	0.6647
Beta (VW)	1.35	0.94	0.89	0.79	0.3468	0.4358
Idiosyncratic (EW)	0.100	0.076	0.073	0.059	0.2528	0.6738
Idiosyncratic (VW)	0.100	0.073	0.074	0.060	0.2583	0.6769
Panel B: Board- and CEO-Specific Characteristics						
Board Size	8.44	8.50	8.74	9.00	0.5536	0.4190
Outside %	0.689	0.750	0.690	0.714	0.9601	0.7479
Female Board	0.743	.	0.471	.	0.0009***	.
Duality	0.100	.	0.214	.	0.0639*	.
Outside Appointment	0.314	.	0.543	.	0.0060***	.
Forced	0.271	.	0.300	.	0.7107	.
CEO Age	46.97	46.00	50.09	51.00	0.0011***	0.0005***

*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significance at the 0.1 level

In Panel A of Table 2, we show a comparison of firm-specific characteristics for the two groups based on total assets, market values, sales, long-term debt, profitability, age, and risk of the firm. The last two columns report the p-values for the mean and median differences between groups based on the t-statistic and Wilcoxon signed-rank test statistic, respectively.

All financial data are based on the fiscal year end prior to CEO appointment from Compustat. Total Assets are reported in millions of U.S. dollars. Asset Turnover is sales divided by total assets. Return on Assets (ROA) is earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by total assets. Leverage is long-term debt divided by total assets. Market/Book is the market price of the stock divided by the book value per share of common equity. Firm Age is the number of years since the firm has stock price data listed in the CRSP database. Sigma is the total risk measure that we calculate as the standard deviation of weekly stock returns from CRSP over the 25 weeks prior to announcement date. Again using CRSP data, Beta and Idiosyncratic are estimated using the single market index model with the CRSP equally-weighted index as well as the CRSP value-weighted index as the market portfolio over the 25 weeks prior to the announcement date, where Beta is the systematic risk measure and Idiosyncratic is the firm-specific risk measure of the error term variance.

The average firm size, Total Assets, is not significantly different between the female CEO group and the male CEO group, as would be expected from our matching scheme. There are no significant differences between the performance characteristics of firms that appoint female CEOs and those that appoint male CEOs, with the exception of the mean values of Market/Book. This difference indicates that male CEOs are appointed at firms with higher growth expectations than those firms that appoint female CEOs.[5] While all three firm risk measures (Sigma, Beta, and Idiosyncratic) prior to the appointment of a new CEO are higher at the mean and median for the sample of female appointments, they are not statistically significantly different between the two groups. Overall, we can conclude that financial, performance, and risk measures are indistinguishable between the gender groups prior to the CEO appointment.

In Panel B of Table 2, we examine differences in board and CEO-related characteristics that may exist between the two gender groups. Information on board size, outside board, and presence of the female board member was obtained from the company's latest financial statements (including proxy statements and annual reports) just prior to the announcement date. CEO characteristics are gathered from the news announcements. That is, we collect the age of the new CEO, whether it is a dual appointment along with board chairperson, whether it is an outside appointment,

[5]We consider the possibility that an outlier may be influencing the mean values of Market/Book to differ from the median values. To control for the influence of outliers on our subsequent analyses, we winsorize this variable.

and the reason for a new CEO. Board Size is the total number of members on the board of directors. Outside % is the number of outside members divided by the total number of members on the board of directors. Female Board is an indicator variable set equal to one when there is at least one female board member and zero otherwise. Duality is an indicator variable set equal to one when the CEO is selected to also be the board chairperson and zero otherwise. Outside Appointment is an indicator variable set equal to one when the CEO is not employed by the firm for more than one year prior to their appointment and zero otherwise. Forced is the indicator variable of Lee and James (2007) set equal to one when the old CEO is explicitly or implicitly forced by the board to resign as opposed to natural succession.[6] CEO Age is the age of the CEO at the time of appointment.

Panel B of Table 2 shows there are several board- and CEO-specific characteristics that differ between the two groups. While the size of the board, degree of board independence, and when the old CEO is forced by the board to resign are not significantly different, there are several characteristics that are different. First, companies that appoint female CEOs more frequently have female board members than the matched-male sample, at the one-percent significance level. Approximately 74 percent of firms that select female CEOs have at least one female board member, but only 47 percent of the matched firms that select male CEOs have at least one female board member. This finding is consistent with the argument that there is substantial influence by powerful women to promote other women into important positions (e.g., Bell, 2005) and/or that people promoted into top management positions tend to have similar traits as the decision maker (e.g., Zajac and Westphal, 1996; Lee and James, 2007).

Second, we see that female CEOs are selected to be the board chairperson less frequently than the matched-male sample, where the difference is significant at the five percent level. Approximately 21 percent of the male CEO sample assumes the dual role of board chairperson compared to only 10 percent of the female CEO sample. Turning our attention to CEO-related characteristics, female CEOs more likely represent a promotion from within the firm where her talents would be well known; only about 31 percent of all female appointments are outsiders. This is statistically less than the male CEO appointments where outside appointments account for more than 54 percent of the sample.

Last, at the time of appointment, female CEOs are significantly younger compared to their male counterparts. The mean (median) age of female CEO at the time of appointment is approximately 47 years (46 years), while the male counterpart is

[6]Firms may not explicitly state that the old CEO is being forced to resign, but instead may state that a new CEO has been selected to improve performance, due to a restructuring, etc.

50 years (51 years). The differences between the two groups are statistically significant at the one percent level.[7]

Our main objective is to test whether the financial market reacts differently to CEO appointments on the basis of gender. To make this assessment, we evaluate the valuation effects and risk effects for female and male gender groups. To estimate the valuation effects, we employ basic event study methodology. We use the single-index market model to calculate abnormal stock returns. The CRSP equally-weighted index is employed as the market portfolio. We use a 200-day estimation period that ends 21 days before the announcement dates. Daily abnormal returns surrounding the announcements and cumulative abnormal returns over three standard event windows, (-1, +1), (-1, 0), and (0, +1), where day 0 is the announcement date, are calculated.

To evaluate the risk effects, we evaluate the changes in three capital market risk measures. First, we assess changes in total risk using monthly ($\Delta Sigma_{monthly}$) and weekly ($\Delta Sigma_{weekly}$) stock return data by calculating the difference in the standard deviation of stock returns over a pre-announcement period of six months and 25 weeks, respectively, and a post-announcement period of six months and 25 weeks, respectively.[8]

Second, we estimate changes in market risk by estimating the shift in beta that occurs following the announcement. Augmenting the single-index market model with an indicator variable that interacts with the market index captures changes in beta that occur in the post-announcement period. [9] Again, we use monthly and weekly return data to estimate market risk shifts as $\Delta Beta_{monthly}$ and $\Delta Beta_{weekly}$ with six months and 25 weeks of pre-announcement returns and six months and 25 weeks of post-announcement returns, respectively. Two sets of market risk changes are calculated that differ by the market portfolio used in the estimation; one set is calculated using the CRSP equally-weighted market index and the other set is calculated using the CRSP value-weighted market index.

Third, we calculate changes in idiosyncratic risk using monthly ($\Delta Idiosyncratic_{monthly}$) and weekly ($\Delta Idiosyncratic_{weekly}$) stock return data by calculating the difference in the error variance generated from the single-index market

[7]Lee and James (2007) also show that female CEOs are more likely promoted from within the firm and are younger than male CEOs, but they do not find the differences to be statistically significance possibly due to the small sample.

[8]We evaluate a relatively short horizon of six calendar months for the pre- and post-periods because we do not want to lose observations. Nevertheless, we estimate risk shifts with a one-year horizon and find gender differences to remain mainly significant as those reported in Table 3; in general, the risk changes are more positive for male CEOs and less negative for female CEOs.

[9]More specifically, the model is: $R_t = a + \beta_0 R_{m,t} + \beta_1 \delta_t R_{m,t} + e_t$, where R_t is the return at time t, and $R_{m,t}$ is either the CRSP equally-weighted or value-weighted market index return at time t, δ_t is set to one for the announcement period and thereafter, and zero otherwise. β_1 captures the change in market risk.

model over the pre-announcement period of six months and 25 weeks, respectively, and the post-announcement period of six months and 25 weeks, respectively. Two sets of idiosyncratic risk shifts are calculated that differ by the market portfolio used in the estimation; again we use both the CRSP equally-weighted market index and the CRSP value-weighted market index.

Results

The results from estimating the impact of female and male CEO appointments on valuation and risk are reported in Table 3 and Table 4, respectively.

Table 3—Impact of CEO Appointments on Valuation

This table reports valuation and risk effects surrounding 70 CEO appointment announcements for female appointments and 70 matched-male appointments. Panel A reports the daily abnormal returns that are estimated using parameters from the market model with 200 daily stock returns ending 21 days before the announcement and the CRSP equally-weighted market index as the market portfolio. Panel B reports cumulative abnormal returns (CARs). The mean (median) test of difference between groups reports the p-value from the t-statistic (Wilcoxon signed-rank test statistic)

Panel A: Daily Abnormal Returns (in Percent)

	Female Sample		Matched-male Sample	
Day	Mean	Median	Mean	Median
-10	0.27	0.26*	0.93	0.05
-9	-0.15	-0.33	-0.06	-0.21
-8	0.34	-0.05	0.30	0.27
-7	0.80*	-0.27	0.45	-0.25
-6	1.31**	0.43**	-0.56	-0.44*
-5	0.04	-0.18	-0.14	-0.21
-4	-0.05	-0.01	0.19	-0.34
-3	0.29	-0.04	0.54	0.16
-2	-0.38	-0.02	0.05	-0.01
-1	0.69*	0.16	1.52**	0.50*
0	1.91***	0.83**	-0.55	-0.06
1	0.95	-0.02	1.65***	0.95***
2	-0.24	0.12	-0.86**	-0.23*
3	-0.69**	-0.93*	-1.00**	-0.21*
4	-1.08***	-0.13	-0.00	-0.04
5	-0.76	-0.33	-0.92**	-0.66***
6	0.15*	0.00	0.12	0.14
7	0.38**	0.24*	-0.14	-0.03
8	-0.13	-0.25	-0.06	-0.20
9	-0.13	-0.15	-1.08	-0.12
10	0.78	-0.15	0.97*	0.23**

Panel B: Cumulative Abnormal Returns (in Percent)

	Female Sample		Matched-male Sample		p-values of Differences	
Event Windows	Mean	Median	Mean	Median	Mean	Median
CAR (-1, +1)	3.55***	0.26**	2.63***	0.87*	0.6640	0.4812
CAR (-1, 0)	2.60***	0.36**	0.98	0.08	0.2936	0.6860
CAR (0, +1)	2.86***	0.33**	1.10**	0.15	0.3568	0.8382

*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significance at the 0.1 level

Table 4—Impact of CEO Appointments on Risk

This table reports risk effects for 70 CEO appointment announcements of female appointments and 70 matched-male appointments. The changes in three capital market risk measures are computed: changes in total risk (ΔSigma), market risk (ΔBeta), and idiosyncratic risk (ΔIdsync). The risk measures are calculated using monthly and weekly stock return data as the difference between the risk measure during the six month and 25 week pre-announcement period, respectively, and the six month and 25 week post-announcement period, respectively. The mean (median) test of difference between groups reports the p-value from the t-statistic (Wilcoxon signed-rank test statistic)

	Female Sample		Matched-male Sample		p-values of Differences	
Risk Measures	Mean	Median	Mean	Median	Mean	Median
$\Delta Sigma_{monthly}$	-0.025*	-0.014*	0.032	0.008	0.0183**	0.0217**
$\Delta Sigma_{weekly}$	-0.027	-0.004	0.017	0.001	0.0348**	0.0749*
$\Delta BetaEW_{monthly}$	-0.31	-0.19	0.53*	0.15*	0.0338*	0.0160**
$\Delta BetaEW_{weekly}$	-0.45	-0.19	-0.33	0.14	0.4051	0.2426
$\Delta BetaVW_{monthly}$	-0.60	-0.43*	0.88***	0.85***	0.0019***	0.0002***
$\Delta BetaVW_{weekly}$	-0.53	-0.16	-0.42	0.01	0.4197	0.3647
$\Delta IdsyncEW_{monthly}$	-0.011	-0.014	0.013	-0.002	0.1700	0.2136
$\Delta IdsyncEW_{weekly}$	-0.026	-0.001	0.016*	0.002	0.0348**	0.0749*
$\Delta IdsyncVW_{monthly}$	-0.017	-0.019	0.015	-0.004	0.0757*	0.1106
$\Delta IdsyncVW_{weekly}$	-0.024	-0.003	0.018*	0.002	0.0302**	0.0463**

*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significance at the 0.1 level

Panel A of Table 3 reports the mean and median daily abnormal returns for the ten days prior to and the ten days following the announcements, and Figure 1 shows the cumulative effects of these daily abnormal returns. Panel B of Table 3 displays the mean and median cumulative valuation effects estimated over three standard event windows. First, in Panel A, along with Figure 1, our results show some significant stock price adjustments occurring prior to and following the event day, day 0. It is difficult to attribute the relatively distant adjustments in stock price to the actual appointment of a new CEO. It is not surprising to see adjustments in advance of the event, as the financial and business conditions are typically unstable and expectation formation on the future prospects of the firm may occur prior to the actual announcement of a new CEO. Additionally, in the period following the CEO appointment, further details may be released on the condition of the firm. Therefore, our discussion focuses on the traditional three-day (-1, +1) cumulative abnormal returns used in event studies, though we reach similar conclusions with the other two-day windows that we report.

The results in Panel B show that the market on average favorably greets the appointment of a new female CEO. The mean three-day CAR for female CEO appointments is 3.55 percent (significant at 1 percent level) and the median is 0.26 percent (significant at 5 percent level). Similarly, the matched-male sample reacts positively. The mean CAR for the male CEO appointments is 2.63 percent (significant at 1 percent level) and the median is 0.87 percent (significant at 10 percent level).

Importantly, the tests of difference between mean CARs and median CARs of the two groups show no statistically significant differences.[10] Thus, we do not detect a systematic bias of market reactions to the CEO appointment announcements based on gender, while controlling for industry and firm size. This finding is inconsistent with arguments that financial market participants stereotype female managers as less competent or more ambiguous, as lower firm values are not assigned to firms under the leadership of female CEOs. Rather, our results are in line with the views of Kalleberg and Leicht (1991), Johnson and Powell (1994), Powell and Ansic (1997), and Carter, Simkins, and Simpson (2003) that female business leaders perform on par with male business leaders.

Figure 1—Cumulative Mean Abnormal Returns Around New CEO Announcements

This figure plots the daily cumulative mean abnormal returns from 10 days prior to the new CEO announcement to 10 days after the announcement, where day 0 is the announcement date, for 70 female CEO appointments and 70 matched-male CEO appointments. The daily abnormal returns that are estimated using parameters from the market model with 200 daily stock returns ending 21 days before the announcement and the CRSP equally-weighted market index as the market portfolio.

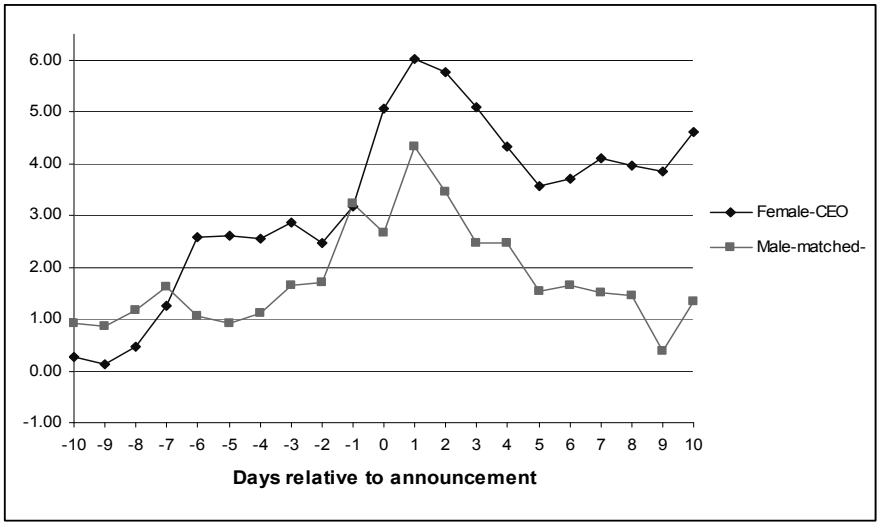

Table 4 displays the mean and median shifts in stock return volatility, market betas, and idiosyncratic risk following CEO appointment, by gender. Each of these risk shifts has been estimated using monthly and weekly return data. Across the risk

[10]We also examine whether the cross-sectional sensitivity of CARs to firm, board, and CEO factors differ by gender. While these results are not tabulated here, they do not show gender to be an important influence on the sensitivity of CARs to these factors. We interpret this as further evidence that the stock market does not have a gender bias because the valuation effects are not more or less sensitive to these factors for female CEOs. We thank our reviewers for prompting this analysis.

shifts, we find all of the risk changes at the mean and median are negative for female CEO appointments, while nearly all are positive for male CEO appointments. While we detect only a few of the risk shifts to be significantly different from zero, we are able to show that often the risk shifts for female CEOs appointments are significantly smaller than the risk shifts for male CEO appointments. Therefore, our evidence indicates that CEO gender influences changes in firm risk. With female CEOs showing greater risk reductions, our results are in line with those studies that find females have a greater degree of risk aversion (Powell and Ansic, 1997; Jianakoplos and Bernasek, 1998; Bernasek and Shwiff, 2001; Barber and Odean, 2001). More specifically, our results are consistent with the view that the financial market believes female CEOs will set the strategy and tone of the firm in accordance with their relatively risk-averse nature, which should lead to more pronounced risk reductions in firms led by female CEOs.

Because we find that CEO gender impacts risk shifts, we further explore the role of risk in determining whether a female or male is selected as CEO in a multivariate framework. More specifically, we develop a logistic regression model to evaluate whether risk, as well as other firm, board, and CEO characteristics differentiates between the genders of the selected CEOs. The dependent variable is set equal to one for female CEO appointments and zero for male CEO appointments. Based on the finding of studies that show females have a greater degree of risk aversion (Powell and Ansic, 1997; Jianakoplos and Bernasek, 1998; Bernasek and Shwiff, 2001; Barber and Odean, 2001), we believe that corporate boards are more likely to select female CEOs when the firm might benefit from risk reduction. Boards of risky firms may prefer female CEOs, to the extent that they expect female CEOs to reduce firm risk as a result of their relatively high risk aversion.

The six models in Table 5 differ by the risk measure included. Models 1, 2, and 3 include the change in the three risk measures that occurs following the announcement.[11] Firms expecting large reductions in risk may more likely select female CEOs to achieve risk reduction; thus, negative coefficients on the risk shift measures in these models are predicted. Models 4, 5, and 6 are developed to evaluate the hypothesis that firms with relatively high risk are more likely to appoint female CEOs so that risk might decrease. To this end, we construct an interaction term that captures those firms with relatively high levels of risk prior to the new CEO appointment (High Sigma, High Beta, and High Idiosyncratic) and the degree to which the risk changed following the appointment (ΔSigma, ΔBeta, and ΔIdiosyncratic). High Sigma, High Beta, and High Idiosyncratic are indicator vari-

[11]The measures in this table have been calculated using weekly return data and the equally-weighted market portfolio where appropriate. Our findings are similar when we instead use monthly return data or the value-weighted market portfolio.

Table 5—Evaluating Characteristics that Differentiate Gender of the Selected CEO

This table presents parameter coefficient estimates using logistic regression with 70 female and 70 matched-male CEO appointments. The dependent variable = 1 for female CEO appointments and 0 for male CEO appointments. All variables are the same as described in Table 2, except Ln(Total Assets) is the natural log of Total Assets, Market/Book is Winsorized, Ln(CEO Age) is the natural log of CEO Age at the time of appointment, High Sigma = 1 if Sigma is above the sample median and 0 if Sigma is below the sample median, High Beta = 1 if Beta is above the sample median and 0 if Beta is below the sample median, and High Idiosyncratic = 1 if Idiosyncratic is above the sample median and 0 if Idiosyncratic is below the sample median. The risk measures are those based on weekly return data and equally-weighted market portfolio where appropriate. Test statistics are calculated using White's (1980) correction. P-values are shown in parentheses

Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	20.813***	21.656***	20.688***	21.664***	20.382***	19.921**
	(0.009)	(0.006)	(0.010)	(0.006)	(0.008)	(0.013)
Ln(Total Assets)	0.002	0.027	-0.005	0.029	0.008	0.014
	(0.987)	(0.825)	(0.967)	(0.813)	(0.952)	(0.916)
Return on Assets	-1.094	-1.378	-1.103	-1.310	-1.072	-0.747
	(0.274)	(0.135)	(0.277)	(0.155)	(0.318)	(0.488)
Market/Book	-0.068**	-0.064**	-0.070**	-0.064**	-0.071**	-0.075**
	(0.039)	(0.031)	(0.040)	(0.029)	(0.041)	(0.035)
Board Size	-0.118	-0.133	-0.116	-0.133	-0.125	-0.113
	(0.182)	(0.134)	(0.191)	(0.133)	(0.161)	(0.201)
Outside %	-0.738	-1.115	-0.704	-0.999	-0.749	-0.560
	(0.644)	(0.470)	(0.660)	(0.538)	(0.638)	(0.719)
Female Board	1.926***	2.007***	1.933***	1.995***	1.913***	1.894***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Duality	-0.367	-0.337	-0.380	-0.322	-0.351	-0.329
	(0.532)	(0.582)	(0.515)	(0.602)	(0.554)	(0.565)
Outside Appointment	-0.915**	-0.958**	-0.908**	-0.961**	-0.932**	-0.966**
	(0.029)	(0.020)	(0.030)	(0.021)	(0.028)	(0023)
Forced	-0.356	-0.332	-0.380	-0.329	-0.377	-0.393
	(0.458)	(0.492)	(0.432)	(0.491)	(0.434)	(0.410)
Ln(CEO Age)	-5.084**	-5.249***	-5.043**	-5.269***	-5.079**	-4.951**
	(0.014)	(0.010)	(0.015)	(0.009)	(0.013)	(0.017)
ΔSigma	-4.411	-	-	-	-	-
	(0.217)					
ΔBeta	-	-0.016	-	-	-	-
		(0.830)				
ΔIdiosyncratic	-	-	-5.928*	-	-	-
			(0.086)			
High Sigma	-	-	-	0.047	-	
				(0.924)		
High Sigma * ΔSigma	-	-	-	-6.803**	-	
				(0.047)		
High Beta	-	-	-	-	-0.066	
					(0.875)	
High Beta * ΔBeta					-0.053	
					(0.610)	
High Idiosyncratic						0.440
						(0.400)
High Idiosyncratic * ΔIdiosyncratic						-7.140**
						(0.033)
Pseudo R-squared	0.2276	0.2179	0.2315	0.2187	0.2330	0.2383
Wald Chi-squared	34.78	37.15	34.99	36.74	37.69	38.22

*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significance at the 0.1 level

ables set equal to one when the risk level is above the sample median and zero when they are below the sample median. Negative signs on the interaction terms are predicted if high risk firms with the expectation of risk reduction are more likely to select female CEOs.[12]

While the signs on the coefficients in Models 1 through 3 are consistent with our predictions, only the change in idiosyncratic risk in Model 3 is statistically significant. Model 3 shows that firms with decreases (increases) in idiosyncratic risk are more likely to appoint female (male) CEOs. To the extent that the changes in idiosyncratic risk were anticipated or expected by the board, it appears that female CEOs are more likely selected to reduce this risk.

The negative and significant coefficient on High Sigma * ΔSigma in Model 5 and on High Idiosyncratic * ΔIdiosyncratic in Model 6 supports our hypothesis that female CEOs are more likely selected by firms with relatively high risk (total risk and idiosyncratic risk) so that the risks might be reduced. This interpretation requires the assumption that the risk reductions were desired and anticipated by the board when it made the decision to appoint a new CEO.[13]

Summary

We identify 70 announcements of female CEO appointments over the 1992-2007 period and develop a matched sample of 70 male CEO appointments in order to evaluate whether gender influences valuation and risk effects of new CEO appointments. We develop a hypothesis of lower valuation effects associated with female CEO appointments, to the extent that the female CEOs are stereotyped as less competent (for example, Heilman, Block, Martell, and Simon, 1989; Oakley, 2000; and Atkinson, Baird, and Frye, 2003) and an alternate hypothesis that valuation effects are not influenced by gender (Kalleberg and Leicht, 1991; Johnson and Powell, 1994; Powell and Ansic, 1997; Carter, Simkins, and Simpson, 2003).

[12]The signs on the other significant characteristics are consistent with the findings on previous comparisons in the univariate framework presented in Table 2. Female Board is associated with a greater likelihood of selecting a female CEO. Outside Appointment (Inside Appointment) more likely occurs with appointment of male (female) CEOs. Log (CEO Age) is significant and shows that younger CEOs are more likely to be female. The significance on Market/Book indicates that male CEOs are more likely than female CEOS to be appointed at firms with higher growth expectations.

[13]We also evaluate three models that instead just include the pre-announcement levels of risk Sigma, Beta, and Idiosyncratic as explanatory variables, respectively. These factors are not statistically significant, and for purposes of parsimony are not tabulated. While some firms with high levels of risk may more likely select female CEOs to help reduce the risk, Models 4, 5, and 6 are structured to capture these effects.

We also hypothesize that greater decreases in risk (or lower increases in risk) occur following the appointment of female CEOs on the basis of studies that show women are relatively risk averse (e.g., Powell and Ansic, 1997; Jianakoplos and Bernasek, 1998; Bernasek and Shwiff, 2001; and Barber and Odean, 2001).

Our results show that the financial market favorably greets the news of selecting a female CEO, as well as the news of selecting a male CEO. The mean and median three-day cumulative abnormal returns are not significantly different between female and male CEO appointments. Thus, we conclude that financial market participants do not stereotype women as less competent or more ambiguous CEOs. We document changes in risk following CEO appointments are significantly lower for female CEO appointments compared to the matched-male CEO appointments. Because the changes in all three capital market risk measures following CEO appointments are significantly lower for female CEOs, our evidence supports the proposition that the market judges female CEOs as more risk averse than male CEOs. Furthermore, we find evidence consistent with our hypothesis that firms with relatively high total risk or relatively high idiosyncratic risk are more likely to appoint female CEOs, who may be more averse to risk, so that these risks might decrease.

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