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A review of the gender effect on pay, corporate performance and entry into top management

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ABSTRACT

The frequency of women occupying the CEO office has increased but remains at low levels, less than 5% for the Fortune 500 companies. Several studies during the last decade consider the barriers that women may face when competing for top management positions. Other research examines potential compensation differences. More recently, some researchers show that CEO gender could affect corporate performance. This review paper summarizes these findings and suggests areas where more inquiry is needed to resolve conflicting results.

1. Introduction

There are two undisputed facts concerning women CEOs. First, there are few. Second, when comparing compensation by simple averages, women CEOs earn less money. In large publicly traded U.S. companies, female CEO compensation is 88% of male CEO compensation.[1] If the sample of firms is widened to include smaller companies, then average female CEO pay is 84% of male CEO pay.[2] Much empirical research during the last decade considers both the frequency of women CEOs and their lower pay. From the demand perspective, is there a discrimination hurdle for women to jump? From the supply side perspective, do women have alternative forms of human capital which are valued more highly? Or are there behavioral differences, such as lower preferences for risk and competition, which explain fewer women CEOs?

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[1] A recent study by Bugeja, Matolcsy, and Spiropoulos (2012) lists the mean total compensation (millions) at $5.3 for men and $4.6 for women. Data from Table 2.

[2] Current Population Survey, available from the Bureau of Labor Statistics (BLS). Reported data for 2012: Chief Executive median usual weekly earnings for men, $2275; for women, $1730.

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In a recent book Sheryl Sandberg, COO of Facebook, suggests that behavioral factors are at play. She encourages women to accept risky challenges instead of instinctively holding back and offers an anecdote from her career to illustrate. When Mark Zuckerberg offered her the position in 2008 she almost accepted the offer without negotiating terms. She was encouraged to reconsider:

> "And my husband is, like, 'Are you kidding? You can't take the first offer.' I'm like, 'Well, it's a generous offer, and I really want this job.' And finally with Dave there, my brother-in-law looked at me and goes, 'You know, goddammit, Sheryl, don't make less than any man would make doing this job. There is no man taking this job who would take the first offer'."[3]

Where do women stand in business? Is the door to the CEO office open if women push, as suggested by Sandberg? Or, are there higher hurdles for women to jump over in order to reach the door in the first place? Can the average pay difference for those women who reach the CEO office be explained by factors other than gender? Finally, if there is a gender behavioral difference, does it affect firm performance?

This review article answers the questions within the parameters of the current knowledge base and suggests areas of research for unanswered questions. The next section summarizes female CEO representation by year and industry. A discussion of the potential barriers to female participation in top management and compensation differences follows in Sections 3 and 4. A review of the effect of gender on firm performance is provided in Section 5. A conclusion suggests areas for additional study.

2. Frequency and industry representation of female CEOs

This section provides the frequency of female CEOs by year, starting in 1993, and the distribution of CEOs by the North American Industry Classification System (NAICS) for 2012.[4] The discussion begins with a brief introduction to the salient issue underlying all research on CEO gender: Are there documented differences in gender behavior that may explain the low frequency of women in senior management positions? The results of the behavioral studies give form to the hypotheses used to explain the low percentage of female CEOs for publicly traded companies and their concentration in certain industries.

2.1. CEO gender trends

When Katherine Graham became the first woman CEO of a Fortune 500 firm (The Washington Post Co.) in 1972,[5] she represented just .2% of that population. Twenty five years later, in 1997, there were two Fortune 500 women CEOs: Jill Barad of Mattel and Marion O. Sandler of Golden West Financial Corporation. Table 1 shows the number of female CEOs by year: Column A figures refer to the Fortune 500; Column B numbers are from the S&P 1500 ExecuComp database. For both series, the frequency increases over time. As of 2012, 4.2% of the Fortune 500 was led by women. That percentage was higher for the S&P 1500—5.1%—which implies that women-led firms are more common among smaller companies. The Current Population Survey of a broader range of companies, which encompasses smaller and non-public entities, supports this inference. According to the Bureau of Labor statistics, the percentage of female CEOs is 26.39% in 2013.

The distribution of female CEOs by industry appears in Table 2. Panel A contains the distribution during the period 1993 to 2012 for the S&P 1500. Panel B compares the 2012 distribution of female CEOs by industry to recently reported numbers by NAICS. Over time, the largest increase occurs in Manufacturing (NAICS code 31–33), followed by Retail Trade (44–45). Also, gains occurred in Information (51) and Finance and Insurance (52). The comparison of frequency by industry (Panel B) illustrates that women CEOs appear to be concentrated in Manufacturing (31–33), Retail Trade (44–45) and Utilities (22). Collectively these categories capture over 2/3 of the women CEO sample (2012). Women CEOs are under-represented in Construction (23), Professional, Scientific, and Technical Services (54), Administrative and Support/Waste Management/Remediation Services (56), Health Care/Social Assistance (62) and Public Administration (92). These categories represent 39% of U.S. businesses but only 10% of the women CEO sample. In summary, for large and public corporations there are few women in the CEO office and they are more likely to cluster in some industries. What explains these observations?

2.2. Generalized gender behavior patterns and CEO stereotypes

There may be behavioral differences in management style or propensity to take risk or engage in competition that may explain the low numbers of women in top management positions. Behavior traits are frequently referenced in pay and mobility papers and are summarized below.

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[3] From CBS News 60 Minutes Overtime, "Sheryl Sandberg pushes women to lean in," originally aired on March 10, 2013 and rebroadcast June 30, 2013. Transcript available at www.cbsnews.com/2102-18560_162-57591405.html, accessed on 7/17/13.

[4] Although this discussion centers on the distribution of women CEOs in the United States, it is interesting to note that the gender disparity is a global observation. According to the European Commission, four of the top 100 companies in Europe have female CEOs. http://www.europeanceo.com/home/featured/2013/10/is-this-a-mans-world/ (accessed February 28, 2014.) More women CEOs are emerging in China: approximately 5.5% of China's population of listed issues during 2008 Lam, McGuinness, and Vieito (2013).

[5] From: http://www.catalyst.org/knowledge/firsts-us-women.

Table 1
Female CEO trend.
Fortune 500 numbers provided by Catalyst[a] and are highest levels for each respective year. S&P1500 numbers determined by accessing ExecuComp[b]. Co-CEOs, Interim CEOs and CEOs for partial years are included.

	Fortune 500	S&P1500
1993	2	7
1994	2	7
1995	0	11
1996	2	13
1997	2	14
1998	2	18
1999	4	27
2000	2	32
2001	7	32
2002	7	33
2003	8	38
2004	9	39
2005	9	45
2006	12	53
2007	13	60
2008	15	62
2009	15	71
2010	15	73
2011	17	79
2012	21	77

[a] The Fortune 500 list was supplied through a request to Catalyst. The author thanks Emily Troiano, Senior Director, Information Center at Catalyst for her assistance in obtaining the list.
[b] S&P data obtained from Standard and Poor's ExecuComp database.

2.2.1. Masculine or feminine leadership style

A review of gender leadership style is provided in Psychogios (2007). Psychology studies suggest that women use co-operation and influence along with communication and other interpersonal skills to accomplish tasks. Additional descriptive traits include empowering and sharing both responsibility and the credit. Management studies document that some of these generalized traits may characterize women executives too (Bass, 1991; Helgeson, 1990; Rosener, 1990). Characteristics applied to male leadership include rationality, toughness, self-interest and domination. Men are more aggressive in negotiation and risk-taking and are more interested in self-achievement and power.

Table 2
Female CEO Frequency.
Panel A provides the frequency of female CEOs by year and NAIC code. Panel B provides the percentage distribution of Female CEOs and the distribution of businesses by NAIC code for 2012. Source: Standard and Poor's ExecuComp.

	Industry NAICS code																		
	11	21	22	23	31–33	42	44–45	48–49	51	52	53	54	55	56	61	62	71	72	81	92
Panel A. Female CEO frequency by industry																				
1993				1	1		2		1	1				1						
1994				1	1		2		1	1				1						
1995				1	3		3		1	1				1		1				
1996					6		3		2	1				1						
1997					7		2		2	1		1		1						
1998					9		3		3	1		1		1						
1999					11		4		4	2		2		3		1				
2000			2		12		5		3	2		3		3		1			1	
2001			1		11		5		6	2		3		2		1			1	
2002			2		11		4		6	2		3		2		1		1	1	
2003			2		13		8		7	2		3		1				1	1	
2004			2		15		8		6	2		3		1				1	1	
2005			2		15	1	10		7	3		3		1	1			1	1	
2006			1		16		12		6	7	1	3		1	1			4	1	
2007					18		14		6	10	3	2		1	1	1		4		
2008			1		19		14		8	8	3	3		1	1	1		3		
2009			2		22		13	1	9	9	3	2		2	1	1	2	4		
2010			3		22		13	1	10	9	3	3		2	1		2	4		
2011			4		27		13	1	10	7	3	4		2	1		2	5		
2012			6		28		10	1	7	7	3	4		4	1		2	4		
Panel B. 2012 comparison of female CEOs to US business distribution																				
CEO percentage	0%	0%	8%	0%	36%	0%	13%	1%	9%	9%	4%	5%	0%	5%	1%	0%	3%	5%	0%	0%
US Businesses	3%	0%	0%	9%	4%	4%	11%	3%	2%	4%	4%	13%	0%	16%	2%	8%	2%	4%	10%	1%

2.2.2. Competition and risk aversion

Women may be less inclined to engage in competition. Studies in psychology are responsible for much of this conversation, and these studies frequently involve students.[6] For example, competition results in higher male but not female performance (Gneezy & Rustichini, 2004). Women shy away from tournament style competition, even if their measured performance of the task is equal to that of men (Datta Gupta et al., 2013; Niederle & Vesterlund, 2007). However, there are studies that show no effect of gender on willingness to compete (Samak, 2013) or that women are competitive when familiar with the domain of knowledge (Wieland & Sarin, 2012).[7] A time element or a race to complete the task appears to encourage higher level of male competition (Cotton, McIntyre, & Price, 2013). Additionally, economists document investing style differences by gender when analyzing trading records for 37,664 households with accounts at a discount brokerage firm (Barber & Odean, 2001). Men trade stocks more frequently, which is consistent with over-confidence. Women professional investors (Chartered Financial Analysts and Certified Financial Planners) are more concerned about downside risk (Olsen & Cox, 2001). Women allocate fewer resources to risky assets (Charness & Gneezy, 2012). A study of corporate board members, though, suggests that women directors are less risk averse than their male counterparts (Adams & Funk, 2012).

The stereotype of women's behavior, if it exists, would be important when the Board chooses the CEO or senior management, because it could be factored into expectations of a CEO candidate. There has been some documentation that a CEO needs to be resolute and overconfident more so than exhibiting soft skills (Bolton, Brunnermeir, & Veldkamp, 2008; Kaplan, Klebanov, & Sorensen, 2012). The more competitive style may represent the typical CEO. Ibarra and Obadaru (2009) summarize survey results for 2816 executives from 149 countries attending INSEAD for executive education. Each participant completes a self-assessment and is also evaluated by peers and supervisors (20% of the assessed participants are women, 27% of the assessors are women). The survey results suggest that the missing leadership trait may be the ability to articulate a strategic vision. Self and peer evaluations of women executives are favorable on such leadership traits as energizing, designing and aligning, rewarding and feedback, team building and emotional intelligence. However, women are not perceived by male peers as visionary leaders.

The following three sections review the studies on gender barriers to top jobs, pay equality and gender effects on corporate and stock performance. Table 3 provides a concise summary of the recent articles that are discussed in these sections.

3. Research on gender barriers to top jobs

There are three common explanations offered to explain the low numbers of women in top management positions. Discrimination is one possibility, that is, given equally qualified candidates separated only by gender, there is a preference for men. However, differences in management style or propensity to take risk or engage in competition may explain the low numbers of women in top management positions. Finally, women may have alternative career choices that are more attractive than a career in a publicly traded corporation. This section reviews the results from studies on gender barriers to top management positions. The database common to all studies, unless otherwise stated, is ExecuComp, which provides the top five management positions for the S&P 1500 firms. This database provides position title and gender is identified.

3.1. The role of the board of directors

One line of research focuses on the Board of Directors (BOD), the institution responsible for choosing the CEO. Literature suggests that the job candidates are evaluated by both the written resume and behavioral attributes or traits—the evaluation of the latter being much more difficult. If boards have incomplete information about unobservable attributes for various candidates, then it will appoint a CEO who shares similar traits (Cornell & Welch, 1996). Accordingly, the Board of Directors, if predominately male, would favor a male candidate over a female due to its failure to recognize a set of valuable intangible traits that differ from those possessed by male executives. The end result: Men are more comfortable working with and for other men. Indeed, larger firms that have more male dominated boards have smaller numbers of female executives (Elkinawy & Stater, 2011). How, then, to push the Board outside of its comfort zone?

Studies suggest that women board members do have different core values compared to those of their male counterparts (Adams & Funk, 2012).[8] Therefore, adding women to the BOD can improve the probability of appointing females to CEO and upper management positions. However, the effect of a token female board member is small (Gupta & Raman, 2013). The marginal probability of selecting a female CEO increases with additional female BOD members—from 1.28% with one female BOD member to 24.66% with three BOD members. But which way does the causality lie? Does a female CEO seek out women to serve on the Board, or do women on the Board foster a female-friendly company? Matsa and Miller (2011) analyze data on corporate board members and top executives for traded U.S. companies from 1997 to 2009. ExecuComp data is combined with corporate board information from the Investor Responsibility Research Center's and RiskMetrics's director datasets. They caution that certain industries or companies might attract more women to both executive and board positions. If these factors are considered, then they confirm that an increase in female board

[6] Fourth graders (Gneezy & Rustichini, 2004), college students (Niederle & Vesterlund, 2007 and Datta Gupta, Poulsen, & Villeval, 2013), preschoolers (Samak, 2013). Croson and Gneezy (2009) offer a review of experimental evidence from multiple studies.

[7] The national spelling bee represents a competitive tournament in which individuals self-select to compete. Over the history of the competition, more than 50% of the winners are girls.

[8] Adams and Funk study Swedish boards and report that the core values of women can be described as relatively more benevolent. They value power less and security and tradition appear to be less important.

Table 3
Recent articles concerning the frequency of female CEOs and the gender effect on top management pay and corporate finance.

Gender barriers to top management positions	
Elkinawy and Stater (2011)	Larger firms that have more male dominated BODs have lower numbers of female executives
Gupta and Raman (2013)	The marginal probability of selecting a female CEO increases with higher female BOD and top management share
Matsa and Miller (2011)	The percentage of female BOD members is a positive predictor of female participation in top management
Wellington, Brumit-Kropf, and Gerkovich (2003)	The highest hurdle to advancement is the lack of general management or line experience
Gayle, Golan, and Miller (2011)	Attrition from top management rank could explain the lower numbers of female CEOs
Gender effect on pay	
Bugeja et al. (2012)	Gender does not affect CEO compensation after controlling for sales, board size and percentage of female directors
Bertrand and Hallock (2001)	Total compensation between genders for top management positions is mostly explained by age and experience factors or company size
Bell (2005)	Women executives earn higher compensation when they work in firms with a female CEO or Board Chair
Carter, Franco, and Gine (2013)	Lower total compensation for women executives could be due to pay packages with less incentive pay
Munoz-Bullon (2010)	Female executives exercise stock options earlier than male executives
Coxbill, Sanning, and Shaffer (2009)	Male-to-female CEO turnovers receive less cash and more incentive compensation compared to male-to-male CEO turnovers
Gender effect of firm performance and market evaluation	
Lee and James (2007)	Announcement of a male CEO is viewed more favorably by investors
Gondhalekar and Dalmia (2007)	Abnormal returns at announcement of female and male CEOs are not statistically different
Dezso and Ross (2008)	Participation of women in the top management team is strongly associated with better performance as measured by Tobin's Q, return on assets or return on equity
Khan and Vieito (2013)	Female-led firms have higher ROA and lower risk as measured by stock price volatility
Wolfers (2006)	Portfolios consisting of women-led firms perform as well as portfolios of male-led companies
Kolev (2012)	Female-led company portfolios underperform male-led company portfolios
Huang and Kisgen (2013)	Firms with female top executives grow more slowly and are less likely to make acquisitions or issue debt

membership is associated with a higher percentage of female top managers. Also, "the previous year's female share among directors is a significant positive predictor of the female share among top executives", while the percentage of female executives is not a significant positive predictor for female board member percentage.

In summary, one suggested explanation for the low percentage of female CEOs in large and/or publicly traded companies is the inability of the BOD to distinguish valuable leadership behavioral traits that are distinct from the traditional male CEO model. Implicit in this argument is the interpretation of behavioral characteristics of men and women and the fit of these characteristics for the top company job. This line of literature requires an assumption that leadership style is distinctly different between the genders at the CEO level.

3.2. Effect of management style differences

Dezso and Ross (2008) suggest that a management style which fosters collaboration and teamwork, a "female management style", is more valuable in industries/companies that rely on innovation. They report that, on average, firms that include a woman on the senior management team achieve higher Tobin's Q; however, the effect of a woman CEO is not significant. If the sample of firms is stratified by reported R&D expense (dummy variable), the female management team variable is significant for R&D firms only, after accounting for firm size and fixed effects. The researchers suggest that this result is consistent with their hypothesis that a female management style adds value; moreover, the added value occurs not at the CEO level but at the top management level. In contrast, CEOs operate in a highly competitive environment which requires an aggressive risk-taking behavior. "Even if female managers add value by fostering teamwork and creativity—or for some other reason—it does not necessarily follow that the 'female management style' would be conducive to success at the CEO level, given that position's symbolic and real role as 'top dog'."[9]

There are suggestions also, from those women aspiring for top jobs. According to a survey by Catalyst, of Fortune 1000 CEOs and women executives at the vice president level and above, the highest hurdle to advancement is a lack of general management or line experience, e.g., running a division, or a sales organization (Wellington et al., 2003). Arguably, line experience demonstrates CEO abilities on a lower level of exposure—a trial run of sorts. And, a higher number of top level female executives with this type of experience create a bigger pool for potential CEO positions. Gupta and Raman (2013) find that a larger number of female executives among the top 5 officers increase the likelihood of a female CEO appointment. Finally, there is a view that women can compete effectively within the current CEO selection model by more active participation.[10] If women "lean in",[11] that is, aggressively pursue promotions, value self-achievement, and negotiate harder, then more women will rise to top levels of management.

[9] Dezso and Ross (2008), p. 5. A similar finding by Adams and Ferriera (2009) suggests that diversity does not always add value in the boardroom. If firms have weak governance, then diversity appears to have a positive effect on firm value.

[10] In a recent opinion posted on the Catalyst website, Catalyst President and CEO Ilene Lang discuss benevolent sexism as the real barrier holding women back, "the belief that women are kinder, more moral, more fair, more nurturing, and generally, more virtuous than men seems positive on the surface. In reality, these benevolent stereotypes hurt women because they maintain inequality … (they become) a rationale for why she should be protected from activities and occupations that require stereotypically 'macho' qualities …" http://www.catalyst.org/blog/catalyzing/benevolent-sexism-real-barrier-holding-women-back.

[11] The term "lean in" is from Sheryl Sandberg's book, Lean In: Women, Work, and the Will to Lead. Alfred A. Knopf, New York, 2013.

3.3. Gender effect on career choices

Attrition from top management rank may explain the lower number of female CEOs. Gayle et al. (2011) construct a career hierarchy to study mobility patterns for top executives by combining data from ExecuComp with executive background and labor market experience from *Marquis Who's Who*. Although women are promoted more internally and at a younger age than men, the probability of a female executive becoming CEO is half of that of a male executive. This reduced probability can be explained by women's exiting their careers at an early age. Exit, in this study, is defined as retiring, accepting a less prestigious and less well-paid position within management, transferring to an organization not listed on an exchange or entering another occupation. "In fact, conditional on survival as an executive at any age, women have a higher probability of becoming CEO than men."[12] Although higher attrition rates for women senior management could be due to some type of unobserved gender discrimination not captured in the data, the authors offer one other explanation—women may have "an exogenously higher non-market outside option than men."[13]

Thus far, the research literature suggests that the cooperative management style associated with women would be valuable to companies/industries with innovative environments. Also, female board membership can be helpful in promoting women into senior management and CEO positions. The Gayle et al. study suggests that larger exit rates explain the smaller number of female CEOs. Their finding that women are promoted at a quicker internal rate suggests a smaller investment in human capital, as measured by job experience. If one accepts that the CEO position is won by competition, then women who do not display aggressive, self-achievement tendencies may not win. However, if the company selects a CEO based on a comprehensive succession policy which identifies talent early, then women may have a higher chance of success. An additional area of study may be to compare succession planning at firms that have/do not have female members of the top management team.

4. Gender effect on compensation

The following discussion reviews several studies on gender differences in pay for top executives. Unless otherwise noted, all studies use the ExecuComp database, which includes compensation for the top 5 officers of the S&P 1500 companies. Most studies focus on pay equity for the senior management team because the low frequency of female CEOs makes statistical inferences difficult. Although all companies would have a CEO and a Chair of the Board, the titles of the remaining officers may be different. Most studies document 10 or 11 job titles. The database is populated from proxy statements filed with the SEC. Reported compensation includes salary, cash incentive compensation such as bonus, contributions to the executive's retirement accounts, and the value of option plus stock incentive compensation. Total compensation sums all forms. The discussion below is organized into the groups of studies that find no or minimal gap in pay versus those studies that support persistent lower compensation for women.[14]

4.1. Studies that show small or no gender difference in pay

Two studies hand-collect (from proxy statements) small data sets for short periods of time. An analysis of Fortune 100 top executives during the period 2001–2003 (3 women CEOs [3%] and 24 female officers [5.8%]) suggests no statistical difference between the mean (or median) total compensation by gender, using simple t-tests for means or nonparametric tests for medians (Jordan, Clark, & Waldron, 2007). It is difficult, though, to generalize these results due to the small sample size, no specificity on incentive compensation and lack of other explanatory variables. Bowlin, Renner, and Rives (2003) do include control variables for company size and performance and a match by pay rank, i.e., the third highest-paid female executive is matched to a third highest-paid male executive in the same industry. Their female data consist of 46 executives who were the third, fourth, and fifth highest-paid executives in their respective companies. (This sample excludes two female CEOs and three other female executives who were the second highest-paid executives in their respective companies. The authors consider that the CEO salary affects the remaining executive salaries and therefore is used as an input variable for their model.) A DEA graphical frontier for total compensation is formed which provides the highest-paid executives at any given level of company performance (net income), size (total assets and sales) and CEO compensation. The remaining executives in the sample are evaluated relative to this frontier. If women are paid less, then, on average, their compensation would be farther from the established frontier. The researchers do not find any statistical difference between female executives and male executives for annual compensation measures. They report one statistical difference between female and male executives, which is that women receive more stock option grants and appreciation rights.

The increasing frequency of female CEOs after 2000 allows pay comparisons for the top job (Bugeja et al., 2012). A simple comparison of CEO pay by gender suggests higher total compensation to men during the period 2003–2008 because male CEOs continue to lead larger companies based on sales and market value and have longer tenures. However, if each female-led firm is matched to a male-led firm, then the compensation comparisons change. Using a matched sample approach (sales, board size, percent female directors) Bugeja et al. (2012) find no effect of gender on CEO pay. The result holds for total pay, salary and bonus. Coxbill et al. (2009) focus on male-to-female CEO turnovers. If this sample of male-to-female CEO change is matched to a male-to-male CEO

[12] Gayle et al. (2011), p. 2.
[13] Gayle et al. (2011), p. 28.
[14] This review summarizes studies that focus on U.S. executives. Studies on gender pay differences in other countries provide additional insights. For example, Smith, Smith, and Verne (2011) report persistent pay differences for women CEOs and top management in Denmark. And, Lam et al. (2013) report that pay, defined as total reward, for women CEOs of Chinese-listed firms is lower. Furthermore, the degree of state-ownership affects pay.

turnover there appears to be no statistical difference in compensation, although female CEOs received less cash and more incentive compensation.

4.2. Studies that show some unexplained differences in pay

The following five studies document small, unexplained differences in executive salaries earned by men versus those earned by women. Progressively, the studies cover longer time periods: Bertrand and Hallock (2001), 1992–1997; Bell (2005), 1992–2003; Elkinawy and Stater (2011), 1996–2004; Munoz-Bullon (2010), 1992–2006; Carter et al. (2013), 1996–2010. Finally, Vieito and Khan (2012) consider time period and industry type on gender pay gaps.

These studies do have similar findings. A simple comparison of total compensation uniformly shows that male executives earn more than female executives. For example Bertrand and Hallock (2001) report that women earn 45% less, while Carter et al. (2013) find a 25% difference in raw total compensation. However, most of the difference can be attributed to observations that women tend to work for smaller companies and are less likely to hold one of the top four positions. Women are more likely to hold divisional titles such as Divisional President or Divisional Chief (Carter et al., 2013) or staff positions such as Chief Financial Officer (Bertrand & Hallock, 2001). Other important explanatory factors are age and job tenure. All studies report that women executives are about 4 to 5 years younger and have shorter tenures (from 2 to 4 years). After accounting for company size, job title, age and tenure the unexplained compensation difference ranges from 5% (Bertrand & Hallock, 2001) to slightly less than 15% (Carter et al., 2013).

These studies offer some insights into the pay differences. Bertrand and Hallock (2001) observe a female/male pay ratio for CEO and Chair of 1.75—the few women who rise to the very top are paid more. Female CEOs are .52% of their sample. Elkinawy and Stater (2011) compare total compensation by title and suggest that women earn less than men "primarily among the middle or lower ranks of top management, where women appear to be relatively highly concentrated, and not in the highest corporate positions such as CEO/Chair or President, where women are relatively scarce".[15] A direct comparison of female and male CEO compensation is not provided by Bell (2005) as the number of female CEOs for this period is quite small. (The percentage of women CEOs or board chairs is 2.34%, which equals a small sample size of 32.) However, Bell reports that women executives earn higher compensation when they work in firms with a female CEO or board chair, an observation supported by Elkinawy and Stater (2011). Most likely, this is due to promotion of women to the higher-paying management positions when the company's CEO is female.

The difference in compensation may be explained by the possibility that females are less willing to accept riskier pay. Carter et al. (2013) measure equity incentives by portfolio delta (sensitivity of managerial compensation to stock price), option delta (the dollar change in an executive's wealth for a 1% change in stock price, option grants only) and option vega (dollar change in an executive's wealth for a 1% change in the standard deviation of stock returns, option grants only). On average, these three proxies are significantly lower for women, which could be interpreted as women's acceptance of pay packages with less incentive pay. The same control factors, such as company size and job title are used. An earlier DEA analysis by Mohan and Ruggiero (2003, 2007) is consistent with this interpretation. Their sample consists of 40 publicly traded companies with female CEOs matched by industry and firm size to 40 male-led companies for the year 2000. Results show that the potential total compensation, after controlling for experience and company size, is less for women for all measures of compensation other than cash salary. This is particularly true if option value is considered.[16]

Female executives may exercise their options earlier. Munoz-Bullon (2010) includes exercised stock option proceeds. Male executives cash out their options at higher realized values. This observation prompts an interesting question: Do women receive fewer options or do they have worse exercise timing? To answer this question, Munoz-Bullon (2010) analyzes a subsample of executives who exercise their options. The results indicate that the number of options exercised by women is not different, but the value upon exercise is different.

Finally, Vieito and Khan (2012) report that the gender gap in compensation is less after 2000. And there is no statistical difference in compensation for a subsample of new economy firms.

4.3. Exception to all existing literature: women are paid more

Gayle et al. (2011) report that men do earn $540,000 more than women. However, this study suggests that women executives are promoted more quickly and thus have less job experience and education. In their model total compensation includes changes in wealth from holding firm options and stock. If background and experience are included, then women are "paid more and have higher pay-for-performance sensitivity than men conditional on rank."[17]

To summarize, historically there appears to be some unexplained gap in executive salary between women and men. The difference is small after controlling for firm size and individual characteristics (age, tenure, experience). This gap could be due to incentive compensation, although much remains unclear: Women may receive the same number of options but exercise early.

[15] Elkinawy and Stater (2011), p. 36.

[16] Several theoretical models consider optimal incentive pay. For example, Wu (2011) suggests that stock options dominate restricted stock grants, when managers are assumed to be risk-averse. This model, like others, does not distinguish gender as a determining factor for optimal executive compensation.

[17] Gayle, Golan and Miller, p. 27. The change in wealth from holding a firm's stock is the value of the stock at the beginning of the period multiplied by the abnormal return, defined as the residual component return.

5. Firm performance and market valuation

Although the percentage of female top executives and CEOs is small, the frequency has increased sufficiently to study the collective market reaction to gender changes in the top office and the subsequent firm performance after the CEO takes office. Some studies document a company's stock price reaction surrounding announcement date. Other researchers consider the long-run performance of companies led by women. Competing hypotheses to explain stock performance include: (1) The token status of women CEOs creates uncertainty about management style; (2) The hurdles (including discrimination) that women face could suggest that those who are selected are better qualified on average and therefore these companies will outperform their peers; (3) BODs succumb to political and social pressure and appoint less qualified women. Data collection sources vary for these studies and are indicated per study.

5.1. Market reaction to female CEO appointments

A female CEO, occupying a seat almost always held by men, may encounter perception bias, that is, investors could focus more on gender stereotype than on leadership capabilities—a variation on Kanter's token status (Kanter, 1977). This perception bias predicts that an announcement of a male CEO appointment is viewed more favorably by investors (Lee & James, 2007). Their sample consists of 529 CEO appointments during the period 1990 to 2000 (17 female) and 1095 other executive appointments (69 female). Female CEOs, on average, are slightly younger (1.81 years), which is similar to prior-reported results from the compensation studies, but the firm size, as measured by assets, is larger, in contrast to prior studies. Consistent with a token status hypothesis, Lee and James (2007) report a three-day cumulative stock return of −2.47% for female CEO appointments versus −.05% for male CEO appointments. A text analysis of articles in the financial press on each CEO (such as *The Wall Street Journal*, *Forbes*, etc.) within one year of the appointment provides additional support for the perception bias hypothesis. Although the number of articles is not higher for women CEOs, the ranking of the most influential words differ. The words "women and family" rank in the top 10 for women, but rank 64 (man) and 52 (family) for men. As women no longer assume a token status, would the market evaluate their CEO appointment differently? Lee and James (2007) suggest yes. In their findings, the negative stock price reaction is moderated by the observation that the woman is promoted from within the company.

Three additional studies fail to confirm the perception bias hypothesis. Gondhalekar and Dalmia (2007) reference the Russell 3000 companies as of year-end 2003 and collect a sample of 50 female CEOs. These companies are matched to a sample of randomly chosen companies with male CEOs from the same industry. They report no statistical difference between the abnormal stock returns at announcement of CEO selection for male and female appointments, using the Fama–French three factor model. (Female companies are smaller in their sample, consistent with prior studies and the Fama–French model includes a factor for firm size.) Coxbill et al. (2009) investigate the stock price reaction of firms that switch from a male CEO to a female CEO during the period 1993–2005 and collect a sample of 33 male-to-female CEO appointments. Each firm is matched to a firm announcing a male-to-male CEO (by SIC code, market value of equity, leverage and time of announcement). This study finds that female CEO appointments experience small insignificant positive price reaction (.2%, three-day window), while male CEO announcements result in statistically significant negative returns (−3.6%, three-day window). Finally, Martin, Nishikawa, and Williams (2009) search Lexis/Nexis over the period 1985–2007. They document 70 announcements of female CEO appointments and create a matched sample of male CEO appointments by industry and firm size. The three-day cumulative stock return was significant and positive for both groups, but the difference between the groups was not (F, 3.55%, M, 2.63%, three-day window) using basic event methodology. Studies completed after Lee and James (2007), when using some type of sample match methodology, do not find evidence of adverse market reaction to the appointment of a female CEO.

Mohan and Chen (2004) collect data on women-led IPOs for the period 1999 to 2001: total sample size of 757, with 33 companies led by female CEOs. IPOs led by female executives appear to have the same firm characteristics as male-led IPOs. There is no statistical difference in the age of the CEO, the gross proceeds or the market value. The underpricing is not significantly different between the male and female led IPOs, after controlling for firm characteristics. These studies report on the differences in market reactions at the time of announcement of CEO appointment or when a firm goes public. The next section reviews the literature on firm performance over time.

5.2. Long run performance of women-led firms

Small sample sizes continue to be a challenge in designing, interpreting and generalizing results. Therefore, some studies aggregate the CEO position with top management team to generate a sufficient sample size. Welbourne (1999) considers IPOs with women in the top management team. She reports a positive correlation between the percentage of women in top management and price to book value for the three-year period following the IPO. Dezso and Ross (2008) segment their sample into companies with a female CEO and companies with females in the top management team below the CEO level. For example, in 2006, 2.5% of the S&P 1500 were led by women CEOs, but 29.2% reported at least one female senior executive below the CEO level. They report that participation of women in the top management team is strongly associated with better performance, as measured by Tobin's Q, return on assets or return on equity. The effect of a female CEO appears to be mixed: insignificant for Tobin's Q and ROA, and negative and significant for ROE and sales growth. Results from Khan and Vieito (2013) suggest that female-led firms have higher ROA and lower risk as measured by stock price volatility. They control for company size, ownership, industry and year. However, their sample, from ExecuComp for 1992 to 2004, consists of very few female CEO observations, approximately 1%.

Wolfers (2006) and Kolev (2012) consider longer period stock returns. Both studies calculate returns on investments in female versus male-led companies; however, their methodologies for calculating portfolio returns differ. Wolfers creates a portfolio by investing in women-led firms, shorting male-led firms. The returns from this zero investment portfolio are not significantly different from 0. He also employs a matched sample approach: Each female CEO firm is matched to a male CEO firm within the same industry and with a similar market capitalization. Again, there is no significant difference in average monthly returns. These results are consistent with the hypothesis that "markets do not systematically under-estimate female-headed firms". Small sample sizes are a problem and hinder the power of the test. Wolfers emphasizes there were few women overall and extremely few women in the early part of his sample. In some months, the average sample return for women-led companies would have a sample size of one or two.

Kolev (2012) offers an alternative statistical approach, Generalized Least Squares, and focuses on the firm-specific monthly total shareholder's return. He reports that female-led companies underperform their male counterparts by about .35% per month. The cause for the underperformance is not clear. Kolev suggests that the results are consistent with any of the following: (1) Shareholder returns are not independent of shareholders' beliefs and they believe that females are less effective; (2) Changing belief that female CEOs are as skilled as male CEOs takes a long time to accomplish, longer than sample period; (3) BODs practice affirmative action and pursue socially desirable goals at the expense of shareholders; (4) Female CEOs are perceived as less risky by investors, and required return is less.

5.3. Gender effect on management behavior

Research documenting gender and decision making on the corporate level is sparse. Huang and Kisgen (2013) consider two key financial decisions—acquisitions and debt issuance—and whether CEO and/or CFO gender affects the outcome. Their primary hypothesis is that men are more overconfident. They compare acquisitions and debt issuance transaction for firms that appoint female CEOs in two periods: before the appointment, when the CEO/CFO was male, and after the appointment. They also create a control sample of male-appointed CEOs and again compare the two types of transactions. During the period 1993–2005 there were 1750 male CEO/CFOs and 116 female CEO/CFOs. This difference-on-difference approach allows for comparison of firm behavior from male-to-female, versus remaining male-to-male. They find that firms with female executives grow more slowly and are less likely to make acquisitions. These acquisitions have higher announcement returns compared with those made by firms with male executives. Female executives are less likely to issue debt, and announcement returns for debt offerings are higher when the firm has a female executive. They also consider other proxies for overconfidence: (1) earnings forecasts made by firms with male CEOs have significantly narrower bands, consistent with overconfidence; and (2) male CEOs exercise stock options later (less likely to exercise in the money options). Reinforcing the value of female CEOs, women are slightly more likely to remain as CEO, that is, male CEOs are replaced more frequently. Other interesting findings include: Women are likely to be hired at firms with high market-to-book ratios; Female executives are more likely to be hired from within; Women executives tend to be younger in age.

Vieito (2012) draws conclusions about management style from the compensation gap between the CEO and the remaining executive team. He finds smaller gaps in compensation for the female CEO sample, which is consistent with the behavioral theory that higher performance may be achieved with a small compensation gap between the CEO and Vice President levels. He reports larger pay gaps for male-led companies, consistent with the tournament theory that suggests that a large gap in compensation leads to better performance. He believes that these results are consistent with the view that women are more cooperative and men are more competitive.

6. Summary and suggestions for additional research

To conclude, let's return to the introductory questions.

Where do women stand in business? Women CEOs are becoming more common. During 2012, over 5% of the S&P 1500 was led by women; 4% of the Fortune 500. These percentages represent large increases when compared to .2% for 1992. Yet, in absolute terms, women CEOs represent a minority of public company CEOs. Furthermore, women are relatively concentrated in some industries, such as manufacturing, retail and information, and under- or not represented in others, i.e., construction, healthcare and administration.

Is the door to the CEO office open if women push, as suggested by Sandberg? Or, are there higher hurdles for women to jump over in order the reach the door in the first place? Research that investigates this pattern—low numbers and industry clusters—is often based on behavioral differences between genders. There may be differences in management approach, with women portrayed as exhibiting a consensual, team building style. And this style may be undervalued by an all-male board of directors. Studies suggest that the difference in management style hurdle, if it exists, can be overcome by greater female participation on the BOD. Additionally, concentration of female management in certain industries may reflect the value of a team building style, in that industries which are innovative and require team work to maintain an edge perform better if management encourages collaborative behavior. Management style difference, though, remains an open issue. As seen in Table 2, there are large increases in the number of female CEOs in manufacturing after 2006. The results from earlier studies may be challenged if recent data is included.

Can the average pay difference for those women who reach the CEO office be explained by factors other than gender? Risk-taking behavior spills over into pay studies. There may be small unexplained total compensation differences, after accounting for firm size, age, and human capital skills. But the pay differences may be due to long term incentive compensation. Current studies suggest that either women negotiate pay packages with a lower combination of option/stock grants or they tend to exercise

them earlier. Therefore, lower risk preferences could explain differences in total compensation. Additional studies are needed in this area. In particular, small sample sizes precluded statistical inferences about CEO pay equity in early studies.

If there is a gender behavioral difference, does it affect firm performance? This remains an unresolved issue. The behavioral research, mostly from the psychology discipline, focuses on students. Women may be less competitive, less likely to take risks and not so over confident. Rather than using a hierarchical approach, women may use soft skills to manage. Can these results be extrapolated towards women who self-select to compete in business? Mohan and Chen (2004) surveyed the CEOs in their study and asked respondents to comment on managerial style differences between women and men. Although an insufficient response rate precluded statistical analysis, the comments do suggest that a more nuanced approach to gender leadership study is necessary. This response illustrates the issue complexity: "Don't necessarily see this as a gender issue, more of a personality trait/style. Women are not necessarily more nurturing …." An additional area of study could be a survey of risk attitudes and management styles, both male and female. Also, other negotiated contract items could be considered, such as change of control or termination payments. A cursory analysis of the 2012 variable values indicates that about 21% of top managers have negotiated these payments, regardless of gender, but the payouts are smaller for women.[18] Are these differences explainable by company size or industry?[19] Or is the lower change of control payout due to limited negotiation?

The most intriguing yet undeveloped area is the effect of women CEOs on firm value. Event studies, calculating daily returns around the announcement of a female CEO do not suggest that the market reacts to the gender issue. Two studies that compare the long-term stock performance of firms led by male versus female CEOs are non-conclusive, as one study finds no difference and the other study documents that portfolios consisting of male-led firms outperform. But company performance may be affected by leadership gender. In two decision-making areas, acquisitions and leverage, less overconfidence and lower risk preferences may be viewed positively by the market. For example, women-led firms make fewer acquisitions and have higher announcement returns. Additional research on salient financial decisions, such as major strategy changes, divestitures, major accounting changes, etc., would be an interesting addition to this research. Finally, there may be an international component to the frequency of women as CEOs and members of the top management team. Combining databases to include CEOs of several countries may offer insights on this issue.

Appendix A. 2012 North American Industry Classification System (NAICS) industry definitions

11	Agriculture, Forestry, Fishing, and Hunting
21	Mining
22	Utilities
23	Construction
31–33	Manufacturing
42	Wholesale Trade
44–45	Retail Trade
48–49	Transportation and Warehousing
51	Information
52	Finance and Insurance
53	Real Estate Rental and Leasing
54	Professional, Scientific, and Technical Services
55	Management of Companies and Enterprises
56	Administrative and Support and Waste Management and Remediation Services
61	Education Services
62	Health Care and Social Assistance
71	Arts, Entertainment, and Recreation
72	Accommodation and Food services
81	Other services (except Public Administration)
92	Public Administration

[1]Source: www.census.gov.

[18] The percentages for men and women are 21.05% and 21.5%. The average change of control payments is $10.8 million for male managers and $8.8 million for female managers. Data from ExecuComp.

[19] More than 70% of the change of control payments appear in Utilities, Manufacturing, and Finance and Insurance industries, where consolidation is occurring. Data from ExecuComp.

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