Executive Gender and Overconfidence: The Effect on Mergers and Acquisitions

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Abstract

Existing research documents significant gender and overconfidence effects in the merger and acquisition (M&A) decisions of firms. Namely, firms with female leadership tend to be less acquisitive, while firms with overconfident executives are more acquisitive. What is less clear is how these personal characteristics interact. To understand the underlying dynamics, I examine the interplay between these two effects. I find that non-overconfident female executives drive the negative gender effect on M&A activity. By contrast, overconfident female executives behave similarly to non-overconfident male executives. This suggests that when studying how executive characteristics affect corporate decision-making, we need a more holistic approach: Gender is not simply a proxy for overconfidence and both gender and behavioral characteristics of the executive must be considered.

"I've made lots of mistakes. Probably the worst one - I would say they tie. It's either when I didn't move fast enough on something, or I didn't take a big enough risk."

– Virginia Rometty, chief executive at IBM.

1. Introduction

A growing body of research documents the effects of managerial characteristics on firm outcomes. Managerial traits linked to corporate risk-taking are of central importance. Among such characteristics are two managerial traits that have received increased attention in recent years – overconfidence and gender. Existing literature suggests that these two managerial characteristics have opposing effects on corporate risk-taking, with evidence indicating that overconfident executives take more risks while female executives take less, on average (Teodósio, João, Elisabete Vieira, and Mara Madaleno, 2021; Malmendier and Tate, 2005). Further, gender and overconfidence are not believed to be completely independent of one another. In fact, some argue that gender captures, at least to some degree, the effects of overconfidence (Barber and Odean, 2001; Huang and Kisgen, 2013).

While extant research examines both managerial characteristics individually, a systematic approach that incorporates both is currently lacking. I address this gap in the literature by jointly studying the impact of executive gender and overconfidence on corporate risk-taking in the context of M&A activity. My results suggest that the previously documented finding that firms with female management are less acquisitive is driven by non-overconfident female executives. By contrast, overconfident female executives do not have a significant effect on the firm's M&A strategy relative to non-overconfident male executives. Moreover, this highlights the importance of recognizing both gender and behavioral characteristics of executives when examining corporate risk-taking; empirical approaches that use gender as a proxy for overconfidence may lead to incomplete – or worse incorrect – conclusions.

Because overconfident executives overestimate their ability to generate returns, they often take

more and larger risks.[1] Consequently, firms led by overconfident executives tend to overinvest relative to their rational peers (Malmendier and Tate, 2005). However, Goel and Thakor (2008) and Campbell et al. (2011) argue that overconfidence does not necessarily lead to overinvestment. That is, an executive's overconfidence counteracts their risk aversion and alleviates a potential underinvestment problem. In this scenario, there is some optimal level of overconfidence that results in a first-best investment policy.

Empirical research documents both positive and negative effects of overconfidence. For example, overconfident CEOs have relatively larger investment-cash flow sensitivities, pay fewer dividends, employ a suboptimal capital structure, and engage in value-destroying mergers and acquisitions (Malmendier and Tate, 2005; Malmendier and Tate 2008; Malmendier, Tate, and Yan, 2011; Deshmukh, Goel, and Howe, 2013). On the other hand, overconfident CEOs are more innovative, attain more patents, outcompete rivals when competition increases, and are less likely to be forcibly removed (Campbell et al., 2011; Hirshleifer, Low, and Teoh, 2012; Adhikari et al. 2022). Although the literature is clear that overconfidence increases corporate risk-taking, the net effect of overconfidence on shareholder wealth remains uncertain.

Importantly, overconfidence is a latent variable that manifests itself via executive risk-taking. Because there is evidence that females are less overconfident than males, documented reductions in corporate risk-taking by firms with female leadership mimic the effects of overconfidence.[2] For example, Faccio, Marchica, and Mura (2016) find that firms with female CEOs have lower leverage, less volatile earnings, and a higher chance of survival than matched firms run by male CEOs. Similarly, firms with female managers do not conduct as many M&As (Huang and Kisgen, 2013; Levi, Li, and Zhang, 2014). Thus, we risk erroneously ascribing these findings exclusively to overconfidence when it may not be the sole determinant of observed risk-taking behavioral differences between male and female executives.

An important assumption, made implicitly in existing studies, is homogeneity across other personal traits that are not the focal point of the study. Specifically, the literature on gender differences assumes that

[1] Goal and Thakor (2008) define an overconfident executive as one who underestimates risk. The end result on risk-taking is the same using this definition of overconfidence.
[2] I find that 25% of male executives are overconfident compared to 17.2% for female executives.

all female executives share identical risk-taking preferences. Likewise, the overconfidence literature assumes that all overconfident executives are uniform across other risk-taking traits and biases. In large part, these two strands of literature – on gender and overconfidence – have evolved separately. I contribute to both by relaxing these assumptions and considering the *interplay* between these two (potentially conflicting) forces in the context of risk-taking behavior. By incorporating both overconfidence and gender executive characteristics, I offer a more nuanced view that could reconcile existing opposing results.

M&As are substantial investments, typically associated with considerable risk. Thus, they present a significant opportunity for the characteristics of the firm's executives to materialize and shape the strategy. To corroborate the underlying motivation, it might be useful to consider M&As in the framework of discounted cash flow analysis. When making M&A decisions, a firm's executives consider future cash flows and an appropriate discount rate. According to extant literature, overconfidence primarily affects the former, while gender primarily affects the latter.[3] That is, overconfident executives overestimate their ability to generate large cash flows, while female executives tend to adopt high discount rates. With this rationale, I examine the effect of gender and overconfidence on a firm's M&A strategy by allowing males/females to vary in their overconfidence. Overconfidence and gender may have conflicting effects on an executive's formulation of the NPV of a prospective M&A investment. As a result, I expect to find different effects for female executives depending on their overconfidence level and different effects for overconfident executives depending on their gender. Moreover, I also explore which effect dominates, both at the individual level (e.g., an overconfident female) and at the firm level (e.g., a firm that employs executives of different genders and overconfidence levels).

To test the effects of overconfidence and gender empirically, I examine the M&A activity of a sample of 665 firms during the period 1996-2021. I relate the firm's M&A behavior to the overconfidence

[3] In theory, overconfidence can impact either; however, the standard empirical measures of overconfidence are generally viewed as proxies for overestimating cash flows rather than underestimating risk. Further, in large part, research in economics and finance attributes the finding that females are more conservative when making financial decisions to risk aversion differences. See Sundén and Surette (1998), Agnew, Balduzzi, and Sundén (2003), and Ho, Li, Tam, and Zhang (2014)

and gender characteristics of the top 5 C-suite members. Using an option-based proxy for overconfidence introduced by Malmendier and Tate (2005), I categorize an executive as overconfident when they fail to exercise deep in-the-money options. Next, I assign each executive into one of four mutually exclusive groups: 1) overconfident male, 2) non-overconfident male, 3) overconfident female, and 4) non-overconfident female. This classification scheme shows that male executives are more likely to be overconfident, which is consistent with literature on gender differences. However, I also find that a substantial proportion of women are late option-exercisers, indicating that female executives can also be classified as overconfident. This suggests that, at least at the C-suite level, overconfidence prevails across both male and female executives, and gender does not appear to directly proxy for overconfidence.

Next, I explore how the overconfidence and gender composition of the firm's C-suite affects its M&A activity. First, I find that firms with a larger proportion of female executives are less acquisitive, consistent with Huang and Kisgen (2013). Second, after classifying both males and females as either overconfident or non-overconfident, I find that overconfident female executives don't appear to have a significant effect on the firm's M&A activity relative to non-overconfident male executives. However, firms with a higher proportion of non-overconfident females are significantly less acquisitive. In other words, the previously documented finding that firms with female leadership tend to be less acquisitive seems to be driven entirely by non-overconfident female executives.[4] The results are robust to controlling for gender and overconfidence characteristics of the rest of the C-suite, gender characteristics of the board of directors, firm-specific determinants of acquisition activity, various governance metrics, as well as time and firm fixed effects. In addition to analyzing the incidence of successful M&As, I also consider alternative measures related to the number and dollar value of the deals. Consistently, I find that firms with a larger proportion of non-overconfident female executives complete a significantly smaller total number of M&As and spend less on acquiring other firms. Further, these results are both statistically significant and

[4] In addition to Huang and Kisgen's (2013) finding that firms with female executives are less acquisitive, Levi et al. (2014) show that firms with female board members are also less acquisitive. My results show that the effect of non-overconfident female C-suite members subsumes the effect of female board members.

economically important. For instance, the average marginal effect of the proportion of non-overconfident female executives in the top 5 on the incidence of a successful M&A deal is about -19%. This reduction in M&A activity corresponds to a roughly 3.8% decrease in the probability of at least one merger or acquisition in a given year for each non-overconfident female in the C-suite. This is a 12% reduction relative to the unconditional probability of 32%.[5]

One concern regarding the validity of my findings is endogeneity. Specifically, executives are not randomly assigned to firms. Personal traits, among other factors, might be relevant as to who takes leadership roles. Firms may prefer certain executives depending on their overconfidence and gender characteristics, and this preference might be correlated with the firm's M&A strategy. To address this concern, I instrument the proportion of non-overconfident female executives of a firm with two instrumental variables. The first instrument, following the rationale of Adams and Ferreria (2009), is the fraction of the firm's board members who have had a positive experience with a non-overconfident female executive while serving as a board member for a different firm. While such an experience is likely to affect the willingness of the board to appoint a non-overconfident female executive at the focal firm, it is unlikely to drive its M&A strategy. The second instrument, in accordance with the reasoning of Huang and Kisgen (2013), is the total number of females (in millions) that have earned a masters, professional, or doctoral degree from a university that is in the state that the firm is incorporated in. The number of highly educated women is likely to influence the firm's propensity to employ female members in its C-suite, but unlikely to affect its M&A policy. Using this instrumental variables schema, the finding that firms with a larger proportion of non-overconfident female executives are significantly less likely to complete M&As continues to hold.

In addition to examining a broad set of M&A deals, I consider several deal characteristics to generate additional insights. First, using a subset of completed deals, I find that the proportion of non-overconfident females is associated with a smaller premium. Second, I find that my main result is

[5] For robustness, I repeat this test using indicators for executives' gender and overconfidence in Appendix C. I find that firms with at least one non-overconfident female are about 24% less likely to complete M&A in any given year.

concentrated in inter-industry M&As. Namely, firms with a larger proportion of non-overconfident female executives are significantly less likely to target firms operating in a different industry. Conversely, non-overconfident females have no effect on intra-industry M&As. Third, I investigate differential effects on M&A activity based on payment type. I find that firms with a higher proportion of non-overconfident female executives are significantly less likely to complete cash-only M&As when the firm's mangers are most likely to believe the market is undervaluing the firm. However, non-overconfident female executives have no effect on the firm's willingness to complete M&As with alternative payment methods. Last, I explore potential value implications. I do not find any significant link between executives' gender and overconfidence characteristics and the market's reaction to M&A announcements. I am agnostic about the interpretation of these results due to the myriad complexities involved.[6]

This paper relates to several areas of research. First, I elaborate on a previously documented finding that firms with female leadership are less acquisitive. I find that this effect is dominated by non-overconfident female executives. To my knowledge, this is a novel finding and suggests that we must consider overconfidence when studying risk-taking differences between firms with varying gender characteristics of their leadership. More broadly, this illustrates the need to consider multiple executive traits together. Additionally, my findings are consistent with the belief that overconfidence and risk-aversion are separate phenomena, although more research is needed to disentangle the two. Lastly, I find that the C-suite has a significant effect on the firm's M&A policy in addition to – and independent of – the CEO. This highlights the importance of exploring the implications of non-CEO executive characteristics when analyzing corporate decision-making.

The remainder of the paper is organized as follows. In Section 2 I motivate my main empirical prediction. Section 3 discusses data, empirical methodology, and the construction of key measures. Section 4 shows the main results and discusses alternative specifications and robustness checks. Section 5 concludes.

[6] Please see section 3.2.4 for more detail.

2. Motivation and Hypothesis Development

My study is motivated by two main strands of research. The first examines the effect of executives' behavioral attributes (e.g., overconfidence) on firm outcomes. The second analyzes variation in firm outcomes dependent on gender characteristics of the firm's managers. Importantly, a common theme in this area of research is that gender proxies for other behavioral characteristics that are more difficult to observe. That is, the contributions of both areas of literature do not exist in a vacuum - instead they overlap. Experts demonstrate decision-making differences across an array of disciplines, particularly in psychology and behavioral science. Researchers show that these differences manifest themselves in financial decision-making. For example, Sapienza, Zingales, and Maestripieri (2009) find that, due to differences in testosterone, male MBA students tend to choose riskier careers in the financial industry. Further, through experimentation, Powell and Ansic (1997) find that males employ riskier strategies in financial environments, although these strategies have no significant impact on one's ability to perform. Finally, Meng, Tang, and Xu (2014) provide a comprehensive review documenting that firms with female management are associated with a reduction in corporate risk-taking.

There are two closely related papers that underpin my primary motivation. Using them, I position my analysis within the context of two established empirical findings. The first is from Malmendier and Tate (2008) who document a positive overconfidence effect on M&As by showing that firms with overconfident CEOs are significantly more acquisitive. The underlying rationale is that such CEOs overestimate their ability to create value, which leads them to overestimate the returns on investment. As risky activities that often involve significant resources and uncertain potential for value creation, M&A decisions are an important manifestation of the CEO's behavioral characteristics such as overconfidence. However, their analysis assumes homogeneity within the cohort of overconfident CEOs. That is, they do not consider additional personal characteristics.

The negative gender effect on firms' M&A policy comes from Huang and Kisgen (2013) who find that firms that experience male-to-female turnover for CEO and/or CFO become significantly less likely to

complete mergers and acquisitions. Further, they consider two competing explanations for their findings: namely, male overconfidence or female risk aversion. They conjecture that both explanations result in value-destruction. Specifically, overconfident male executives overinvest in M&A while risk averse female executives underinvest in M&A. Neither achieves a first-best investment strategy. To determine which explanation likely drives their results, they test differences between males and females with respect to being forcibly removed. Finally, because they show that female executives are significantly more likely to remain in their positions with the firm, they argue that male overconfidence is the more likely explanation. Importantly, in their empirical framework risk-taking characteristics vary across genders, but not within genders. That is, all females are assumed to share identical risk-taking preferences.

In this paper, I expand upon this research by noting that overconfidence likely varies within groups of male and female executives as well as between groups. In other words, I relax the assumption of gender-based ordering of behavioral characteristics. Rather, both genders exhibit degrees of risk-aversion and overconfidence – albeit at different levels, on average. Most research studies a single executive trait in isolation, rarely examining how two or more characteristics work together. The goal of this paper is to gain a better understanding of the interplay between overconfidence and gender, not merely controlling for one or the other. In the context of M&A, it isn't clear that overconfidence has the same impact regardless of gender, that gender has the same impact regardless of overconfidence, or both.

Given the documented effects that overconfident CEOs are more acquisitive while female CEOs/CFOs are less acquisitive, a natural question arises: which effect dominates? In approaching this question, it is helpful to consider M&A decisions within the framework of discounted cash flow analysis. In its simplest form, the decision rule for investment in mergers and acquisitions is to pursue all M&As with a positive expected NPV and forego all M&As with a negative expected NPV. Thus, the two countervailing forces are excepted cash flows and the discount rate. Hence, overconfidence and risk aversion affect the M&A decision rule in a distinct way. That is, expected cash flows increase with overconfidence while the discount rate increases with risk aversion. A practical implication of this is to

examine the effect overconfident females have on a firm's merger and acquisition behavior, for example. For an overconfident female executive, we would expect positive pressure with her level of overconfidence and a negative pressure with her level of risk aversion. Thus, I predict that overconfident and non-overconfident female executives have contrasting effects on the firm's M&A behavior.

I also expand existing research by investigating these dynamics within the entire C-suite, not just the CEO. The reason for this is twofold. First, broadening the pool of executives that I study provides substantially higher variation. This is an empirical advantage that allows a more comprehensive analysis of the interplay between executive overconfidence and gender. Second, in addition to the research documenting the effect that CEOs have on shareholder value, another body of work shows that non-CEO executive characteristics are also consequential with respect to firm decision-making, including the gender composition of the C-suite (Hambrick and Mason, 1984; Hambrick, 2015; Doan, Trang, and Mai Iskandar-Datta, 2017). Hence, to ignore other top executives would be to ignore important information about the firm's primary decision-makers. Further, including multiple executives in the sample adds richness to the results. For example, a firm with a non-overconfident female in the C-suite may not implement the same M&A strategy as a firm with both a non-overconfident female and an overconfident male in the C-suite. The downstream effects of these dynamics is an empirical question.

3. Data and Methods

3.1. Data

The initial sample starts with all merger and acquisition transactions from 1992 to 2021 from SDC (via Refinitiv Eikon) for which the acquirer is a public firm. Following Bena and Li (2013), smaller M&A transactions, defined as total deal values below $10 million, are excluded from the sample. Firm-level financial data are from Compustat, executive-level data are from Execucomp, and governance characteristics are collected from ISS Risk Metrics. After excluding financial firms (SIC 6000:6999) and firms with missing data, my sample consists of 665 unique firms and 8,141 firm-years.

For executive overconfidence and gender measures, I begin by including all executives that are in

the top five in terms of total compensation (Execucomp variable TDC1), for each firm year. For firm-years in which there are five or fewer executives, I include all C-suite members regardless of compensation or their position with the firm. In almost all cases, the CEO is among the top five highest paid executives. However, in the cases in which the CEO is not in the top five highest paid executives, I still include him/her in the sample because the CEO regarded as the most influential C-suite member. In these cases, the firm-year consists of the CEO and the next four highest paid executives. I do this because all CEOs that are not in the top five have relatively large dollar amounts of outstanding options to compensate them for their relatively small salaries.[7] I further require that the CEO be identifiable in Execucomp for the firm-year to be included in the sample (Execucomp variable CEOANN). For simplicity, I refer to this group as "top 5" executives, though this is not always strictly the case. The sample of executives consists of 9,593 unique individual executives, 891 of which are female.

To construct the sample used to predict successful merger and acquisition bids, I include firm-years from Compustat in which a firm did not complete an M&A deal. To control for firm-specific unobservables, I exclude firms that never completed a single merger or acquisition. That is, I require within-firm variation in terms of annual merger and acquisition deals. Because predicting merger and acquisition events is a firm-level outcome, I adapt Malmendier and Tate's (2008) measures of vested options and stock ownership to include the top five executives. Specifically, I calculate Total Stock Ownership-top 5 as the total number of shares owned by the top five executives scaled by the total number of common shares outstanding. This reflects the total percentage of shares owned by the top five executives. In a similar fashion, I calculate Total Vested Options-top 5 as the total number of vested options owned by the top five executives, scaled by the total number of common shares outstanding. Additionally, I calculate Age-top 5 as the average of the top 5 executives and Tenure-CEO as the tenure of the CEO. I do not include the tenure of the rest of the

[7] Most of those CEOs are classified as overconfident as described in section 3.2, which gives me more variation if I include them. This intuition is consistent with Gervais, Heaton, and Odean (2011) who argue that overconfident executives overvalue options relative to salary, and thus, are willing to accept highly convex compensation contracts.

C-suite due to sparse data.

I measure firm size as the natural log of total assets and Tobin's Q as total market value of shares outstanding multiplied by fiscal year end price per share plus the book value of long-term debt divided by book value of total assets. Cash Flow is the earnings before interest and taxes normalized by beginning of the year working capital. I calculate Debt as current plus long-term debt scaled by total assets. Finally, I define R&D as research and development scaled by sales.

Board size is the natural log of the total number of members on the board of directors. P(Independent)-Board is the proportion of the board of directors who hold independent appointments. Because Levi, Li, and Zhang (2014) find that female board members reduce the likelihood of mergers and acquisitions, it is important to control for the gender make-up of the board of directors. P(Female)-Board is the proportion of the total member of the board of directors comprised of female members.

3.2. Measuring Overconfidence

Extant literature on executive overconfidence utilizes several different measures to proxy for executive overconfidence. The most widely used are option-based measures that were first introduced by Malmendier and Tate (2005), which rely on the boundaries of rational option-exercise behavior. Hall and Murphy (2002) show that undiversified executives are no longer utility-maximizing when they hold options too far into the money. Because executives face undiversifiable firm-specific risk, those who fail to exercise deep in-the-money options are identified as overconfident. Thus, I use *Holder67* as my primary measure of executive overconfidence which identifies an executive as overconfident if he/she decides not to exercise an exercisable option that is at least 67% into the money. This is consistent with Hall and Murphy's (2002) model assuming a constant relative risk aversion of three.

To identify consistent overconfident behavior, I follow prior convention and classify only those executives who have displayed this behavior at least twice. Further, I exclude executives who hold a trivial dollar amount of options that are far into the money. Specifically, I restrict the classification to executives whose dollar value of exercisable options is at least 50% of total annual compensation. Lastly, *Holder67*

takes a value of one throughout the executive's tenure beginning with the first observation in which this behavior was observed.

Following Campbell et al. (2011), I calculate average moneyness as the average realizable value per option scaled by the average exercise price. To obtain the average realizable value per option, I divide the total realizable value of exercisable options (Execucomp variable OPT_UNEX_EXER_EST_VAL) by the total number of exercisable options (Execucomp variable OPT_UNEX_EXER_NUM). I then subtract the average realizable value per option from the stock price at the end of the fiscal year (Execucomp variable PRCCF). I exclude unexercisable options to avoid misclassifying an executive who holds high moneyness options but is unable to exchange them for cash.

Next, I create several binary measures using the gender and overconfident characteristics of the CEO. I(Overconfident-Male)-CEO equals one for firm-years in which the CEO is an overconfident male, and I(Overconfident-Female)-CEO equals one for firm-years in which the CEO is an overconfident female. CEO-level variables are primarily used as controls. For my main analysis, I begin by categorizing the rest of the C-suite in the same manner as the CEO. That is, according to Execucomp, each individual is listed as either male or female and either overconfident or not overconfident - overconfidence changes at the individual level but gender does not.[8] Next, I calculate firm-level measures to capture gender and overconfidence characteristics. P(Overconfident-Male)-top 5 is the proportion of overconfident males in the C-suite, P(Female)-top 5 is the proportion of females in the C-suite, P(Overconfident-Female)-top 5 is the proportion of overconfident females in the C-suite, and P(Non-Overconfident-Female)-top 5 is the proportion of females in the C-suite who are not overconfident.[9]

Summary Statistics – Executive Characteristics

[8] Within my sample, there were no gender changes as determined by the Execucomp database. However, there were changes in overconfidence.

[9] As a robustness test, I use the binary measures of these same variables. These measures begin with a prefix "I" rather than "P". For example, I(Overconfident-Female)-top 5 is binary and indicates that a particular firm-year had at least one overconfident female in the C-suite The descriptions of other proportion measures are analogous to indicators described above. More detail can be found in Appendix C.

Table 1 presents summary statistics for overconfidence stratified by gender for the entire Execucomp database and describes overconfidence differences across gender on a broad sample of executives. Panel A reports the total number of executives at the individual level, limited to the top five executives. There are 48,793 unique individuals, 4,244 (8.7% of the total sample) of which are female executives, and 730 (1.5% of the total sample) are overconfident female executives. Lastly, 25% of all male executives are overconfident while only 17.2% of female executives are overconfident at any point during the sample period. This is consistent with the literature that argues men are more likely than women to be overconfident, on average (Barber and Odean, 2001). However, this difference is relatively small, suggesting that gender is a poor proxy for overconfidence. In an unreported tabulation, I find that CEOs are much more likely to be overconfident relative to the rest of the C-suite. Namely, 49% of CEOs are overconfident while only 27.4% of non-CEOs are labeled as overconfident. This is consistent with Goel and Thakor's (2008) prediction that overconfident managers are more likely to be promoted to CEO. Interestingly, 43.8% of female CEOs are overconfident compared to just 28.3% of non-CEO male executives. Further, 49.2% of male CEOs are labeled as overconfident indicating that the CEO-to-non-CEO difference is larger than the male-to-female difference, again implying that using gender as a proxy for overconfidence may be inappropriate.

Panel B of Table 1 gender and overconfidence characteristics at the executive-year level, limited to the top five executives, including the CEO. There are a total of 218,529 unique executive-firm-years, 15,676 (7.2% of total sample) of which are female, and 4,660 (2.1% of total sample) of which are overconfident females. This panel shows a similar overconfidence difference between genders as 29.7% and 39.2% of executive-years are overconfident females/males respectively. These figures are up from those reported in Panel A due to the construction of *Holder67*. This is because once an executive is identified as overconfident, he/she remains classified as overconfident as long as he/she is in the sample.

Table 2 presents summary statistics for variables used to predict successful merger and acquisition bids. This sample consists of 8,141 firm-years. The dependent variable, I(M&A Deal), is binary and

indicates a successful merger or acquisition bid, and make up 32.2% of firm-years. I(M&A Number) is the total number of successful M&As per firm-year. Most firm years have 0 M&As, with a mean of 0.46 and a max of 12. I(M&A Amount) is the total dollar amount (in millions) spent on M&A per firm year. This data is highly positively skewed as the mean total spent in a given year is $404M, while the max is $79,406.

Table 2 also presents descriptive statistics on variables of interest, namely, gender and overconfidence characteristics of the top 5 executives. For all gender/overconfidence measures, a "P" prefix refers to a proportion and an "I" prefix refers to an indicator. Finally, a "top 5" and "CEO" suffix refers to either the top 5 executives and the CEO, respectively. For example, P(Female)-top 5 indicates that the average firm-year's top 5 executives are 6.5% female. However, 23% of firm-years have at least one female in the top 5 executives. Further, the mean percent of (non)overconfident females is 3.2% and 3.1% respectively. Lastly, the average proportion of overconfident male executives is about 53%.

4. Empirical Analysis and Results

In this section, I summarize my empirical analysis that explores the connection between gender, executives' option-exercising behavior, and corporate decision-making. Specifically, I relate executive gender and overconfidence characteristics with the firm's merger and acquisition activity. Unlike related literature, I allow within-gender variation with respect to overconfidence. I conjecture that overconfidence and gender are jointly predictive of a firm's merger and acquisition behavior.

4.1. Predicting Successful M&As

I evaluate the impact of executive overconfidence and executive gender on the merger and acquisition behavior of the firm in a multivariate setting with controls. These regressions take the general form:

$$(1)\ Prob\{Y_{i,t} = 1 | O_{i,t}, G_{i,t}\} = F(\gamma_0 + \alpha_i + \tau_t + \gamma_1 OG_{i,t} + \theta X_{i,t} + \nu_{i,t})$$

Where equation (1) is estimate in a logistic regression. Y_{it} is binary and takes the value of one for a firm-

year in which the firm completed at least one successful merger or acquisition. α_i are firm fixed effects and τ_t are year fixed effects. $X_{i,t}$ is a set of control variables which includes characteristics of the firm, executives, and the board of directors. Firm controls include size, Q, cash flow, debt, and R&D. Executive-specific controls include the total number of stocks held by the top 5 executives as a proportion of total shares, the total dollar amount of vested options held by the top 5 executives, the average age of the top 5 executives, and the tenure of the CEO. Finally, governance controls include board size, the proportion of the board that is female, and the proportion of the board that are independent directors.

OG_{it} is a set of predictors that measures the intersection of overconfidence and gender. A binary rule is used to first identify gender and overconfidence separately, and then group individuals into four groups based on gender and overconfidence, as described in section 3. The covariates of interest are the proportion of the top 5 that make up each of the 4 categories (e.g., P(Overconfident-Female-top 5) is the proportion of the top 5 executives that are overconfident females).

Table 3 reports the results predicting M&A events based on the proportion of executives in each group (with non-overconfident male executives as the reference group). First, in column (1) I test the effect that female executives have on merger and acquisition activity. Consistent with related literature, I find a significant negative effect. Next, in column (2), I explicitly test my hypothesis that overconfident female executives have a different effect on M&A activity compared to non-overconfident female executives by splitting P(Female)-top 5 into P(Overconfident-Female)-top 5 and P(Non-Overconfident-Female)-top 5. In doing so, I find evidence supporting my hypothesis. In fact, the negative effect that female executives have on the firm's M&A strategy is driven entirely by females who are not overconfident. Further, overconfident female executives have no effect. In other words, we cannot claim that female executives have a uniformly negative effect on M&A deals. Rather, the effect of female executives seems to be non-monotonic in overconfidence. Finally, I consider the additional effect of overconfident men. In column (3), I find that firms with a higher proportion of overconfident men are significantly more acquisitive. Given that the vast majority of executives are male, this finding is unsurprising in light of Malmendier and Tate's (2008)

finding that overconfident CEOs are more acquisitive. Interestingly, the negative effect that non-overconfident female executives have on the firm's M&A behavior remains significant after controlling for overconfident males. That is, this effect is not subsumed by the positive effect of overconfident males while considering the cumulative effect of multiple overconfident male executives[10].

Next, I consider two dependent variable alternatives that capture the firm's propensity to make risky M&A investments. For both, I want to capture the magnitude of the firm's merger and acquisition behavior rather than merely the probability to acquire at all. Namely, first I aggregate the total number of completed M&A deals per firm-year and repeat the tests described above. In Table 4, I document results consistent with my previous findings. That is, firms with a larger proportion of non-overconfident female executives complete significantly lower total number of mergers and acquisitions – overconfident females have no effect. The positive effect of overconfident male executives remains significant. Lastly, in Table 5, I analyze the total dollar amount of all completed M&A deals in lieu of the total number of M&As. Using the natural log of one plus the dollar amount spent on merger and acquisition investments, I find consistency in my main finding. This provides additional evidence that female executives have differential effects on the firm's M&A policy.[11]

To my knowledge, these are novel findings indicating that not only do we need to consider overconfidence differences *between* genders, but it is also important to consider overconfidence differences *within* each gender. Lastly, this finding adds to the evidence that shows that personal characteristics of the entire C-suite are consequential for firm outcomes, not just the CEO.[12]

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[10] One may argue that firms are increasingly more acquisitive with each additional overconfident male executive in the C-suite. This is important to consider given that about 60% of firm-years have 2 or more overconfident male executives compared with just 1.4% of firm-years that have 2 or more non-overconfident females. Thus, using proportions is a more robust specification compared to using indicators. For comparison, this test is repeated using indicators for overconfidence/gender variables and can be found in Appendix C.

[11] I repeat these tests on a subsample of completed M&A deals and find that overconfident male executives acquire a larger number of total M&As, and invest more dollars in M&A, conditional on the firm completing at least one M&A. Non-overconfident female executives have no significant effect on the magnitude of M&A behavior for firms that decide to acquire. That is, it appears non-overconfident females significantly reduce the likelihood of the firm investing in M&A at all, but have no effect once the firm decides to invest in M&A.

[12] For robustness, I control for CEO gender and overconfidence characteristics and test non-CEOs gender and

4.2. Additional Tests

Following extant literature in this area, I perform several additional tests by examining several characteristics of merger and acquisition transactions. At least in part, the effects documented in Section 4.1 can be attributed to differences in risk-taking behavior. It follows that we would expect to see these differences manifest themselves across various M&A deal characteristics conditional on the relative risk associated with each. In other words, overconfidence and/or risk aversion may affect different types of M&As in distinctive ways and to varying degrees.

4.2.1. Premium Paid

In this section I investigate the effect that executive overconfidence and gender characteristics have on the premium paid for M&A investments. Levi et al. (2014) document a negative relationship between the fraction of the board composed of female directors and premium paid for M&As. In theory, I expect a similar effect from female executives and a pronounced effect from non-overconfident female executives. That is, because female executives apply a larger discount rate to the future cash flows of acquisitions, they will formulate a lower valuation. Further, because overconfident female executives overestimate cash flows relative to non-overconfident female executives, the net effect that overconfident female executives have on M&A valuation, and premium paid, is unclear.

In Table 6, I test the effect that executive overconfidence and gender characteristics have on premium paid using the total M&A deal value scaled by the target's EBITDA as a proxy. In doing so, I use a subsample of only completed mergers and acquisitions. In column (1) I find no significant relationship between female executives and premium paid after controlling for various firm characteristics, including the fraction of female directors. However, in column (2), I find a significant negative relationship between the proportion of non-overconfident female executives and premium paid, and no effect from overconfident female executives. Lastly, in column (3) I add the proportion of overconfident male executives and again

overconfidence characteristics separately. The negative from non-overconfident females holds. For details, please see the Appendix.

find a significant negative effect from non-overconfident females. That is, firms with a larger proportion of non-overconfident female executives pay a lower premium when investing in M&As. Although firms with a larger proportion of non-overconfident female executives are less likely to acquire at all, once the firm does decide to invest in M&A, non-overconfident females seem to reduce the premium the firm pays. Both findings are consistent with the theory that non-overconfident female executives tend to apply a larger discount rate when appraising prospective M&As, and in turn, estimate a smaller valuation relative to other executives, on average.

4.2.2. Inter-industry M&A

In the merger and acquisition literature, it is common to distinguish diversifying from non-diversifying M&As. For example, Malmendier and Tate (2008) find that overconfident CEOs have a significant positive effect on diversifying M&As, but no effect on non-diversifying M&As. These authors argue this is an example of overconfident CEOs making value-destroying acquisitions because diversifying acquisitions are a proxy for value loss (i.e., the diversification discount). However, this label is a misnomer. In the context of personal finance and portfolio theory, diversifying implies risk reduction. On the other hand, in the context of M&A decisions, this is not necessarily the case. In other words, acquiring a target firm that operates in a different industry relative to the acquiring firm is not sufficient to guarantee a reduction in the overall risk of the acquiring firm. This is because, among other things, it boils down to the covariance of each firm's cash flows. Further, it is typical for the acquiring firm's managers to make significant changes to the target firm's management and overall business strategy. Because of this, post-merger cash flows generated from the target firm may look very different relative pre-acquisition cash flows. A more straightforward interpretation is that because overconfident executives overestimate their ability to generate large returns, they are more willing to step outside their expertise, for example, the industry classification of the firm's primary operations. Hence, we would expect overconfident male executives to be more likely to make inter-industry M&As and non-overconfident female executives to be

less likely make inter-industry M&As.[13]

In columns (1) and (2) of Table 7, I present results predicting inter-industry and intra-industry M&As, separately. A merger or acquisitions is classified as inter-industry when the acquirer and the target operate in a different industry according to the SDC database. An intra-industry merger or acquisition occurs when the acquirer and target are in the same industry. In column (1) I find that firms with a larger proportion of non-overconfident female executives are significantly less likely to complete an inter-industry merger or acquisition, after controlling for the effect of overconfident male executives. Thus, the main result discussed in the previous section is concentrated in inter-industry M&As. Turning to column (2) of Table 4, I find that non-overconfident female executives have no effect on intra-industry mergers and acquisitions.

4.2.3. Payment Method

Another M&A attribute to consider is the payment method. Malmendier and Tate (2008) show that firms led by overconfident CEOs are more likely to pay with cash when the firm is most likely to be perceived as overvalued by the market. They conjecture that this is because overconfident executives overvalue their own firms. In other words, from the overconfident executive's point of view, the market undervalues the firm enticing overconfident executives to pay with cash rather than equity or some other payment method.

In column (3) of Table 7, I report results predicting M&As in which the payment method was cash only. Results indicate that firm with a higher proportion of non-overconfident females tend to complete significantly less cash-only mergers and acquisitions when the firm's Q is below the industry standard.[14] In other words, during times when overconfident executives are most likely to perceive the firm as undervalued by the market. This result is consistent with what we would expect given previously

[13] I use the labels "inter-industry" ("intra-industry") to describe M&As in which the acquirer and the target are in different (the same) industry. This naming convention avoids the confusion associated with "diversifying M&A" as described above.

[14] As an alternative test, I interact I(Below Industry Q) with all gender/overconfidence covariates. The results of this test are unreported due to multicollinearity issues.

documented differences between overconfident male executives and non-overconfident female executives.

4.2.4. Market Reaction

Lastly, when studying mergers and acquisitions, it is natural to investigate the value implications post-merger. In terms of expectations, there are many different mechanisms at play. To begin, because overconfident executives overestimate the cash flows they are able to generate, they also overvalue returns on M&As. Thus, if the market correctly values M&A deals made by overconfident executives, they will respond negatively resulting in value destruction. On the other hand, this is made more convoluted by the assertion that there is some optimal level of overconfidence for risk averse executives. If this is the case, value implications of M&As are contingent on the firm's pre-merger investment strategy with respect to the optimal level. In other words, if the firm is already overinvesting, M&As completed by overconfident executives will be viewed negatively. Conversely, if the firm suffers from an underinvestment problem, M&As completed by overconfident executives will be viewed positively. Finally, M&As made by firms with female executives induce additional complexity. That is, the market may perceive firm actions differently depending on the personal traits of the firm's executives, independent of the firm's optimal investment strategy. For example, Lee and James (2007) document a negative "gender bias" with respect to the market reaction to female CEO appointments. That is, when the firm announces that the next CEO will be female, the 3-day CAR tends to be negative. Together, these considerations make it very difficult to generate a prediction regarding the market's response to M&As completed by firms with varying executive overconfidence and gender characteristics. Given these dynamics, the market's response is an empirical question.

Table 8 reports results on the market's reaction to merger and acquisition announcements. I use a 3-day cumulative abnormal return (i.e., CAR) from a day before to a day after the event. Consistent with related literature, I test inter-industry and intra-industry M&As separately. I find that the overconfidence and gender characteristics of the firm's C-suite have no significant effect on the CAR surrounding the M&A announcement for both inter-industry and intra-industry deals. Further, I split the sample into cash-only and

other payment method M&A deals. Similarly, I find no significant effect on cash-only M&As for any executive overconfidence/gender variables. Lastly, for M&As completed using other payment methods, I find that the market reacts negatively to firms with a larger proportion of overconfident male executives. However, neither overconfident nor non-overconfident female executives have an additional significant effect. Due to the complex dynamics surrounding the market's reaction, I am agnostic about the interpretation of these results.

4.3. Instrumental Variables Approach

Although my main findings are largely robust to alternative specifications, I use an instrumental variables approach to address other endogeneity concerns. Namely, executives are not randomly assigned to firms. There may be some variable(s) that I am not considering that influence the firm's M&A policy and is also correlated with its preference to hire certain executives depending on personal traits, including overconfidence and gender. To address this concern, my instrument(s) must be correlated with the firm's propensity to hire executives based on their overconfidence and gender characteristics, but orthogonal to the firm's M&A behavior. To accomplish this, I implement two instrumental variables.

First, I adapt an instrument first introduced by Adams and Ferreira (2009). That is, the first instrument is the fraction of the firm's board members who have had a positive experience with a non-overconfident female executive at another firm, at some point in the past. If a board member has a favorable experience working with a non-overconfident female executive, they are likely to want to work with other non-overconfident female executives in the future. This could manifest itself as board members hiring non-overconfident female executives or retaining existing ones. I define a favorable experience as one in which the firm was above the 75th percentile in terms of industry-adjusted Tobin's Q in that year. This instrumental variable is denoted P(Non-Overconfident-Female-Connection)-Board.[15] Second, consistent with the logic of Huang and Kisgen's (2013) instrument, I use the total number of females (in millions) that have earned

[15] Please see Appendix A for full list of variable names and descriptions.

a masters, professional, or doctoral degree from a university that is in the state that the firm is incorporated in as my second IV. Similar to the first IV, a firm's M&A strategy is unlikely to be correlated with the number of highly educated women in the surrounding area but may impact the firm's willingness to compose its C-suite with female members.

The endogenous variable that I instrument for is the proportion of non-overconfident female executives in the C-suite. This is the lone variable I consider with respect to executive overconfidence and gender characteristics. There is both a theoretical and a practical reason for this. First, because executives are not randomly assigned to firms, it follows that all overconfidence/gender variables are endogenous. By addressing non-overconfident female executives in isolation, I no longer have a concern for the proportion of overconfident male executives and the proportion of overconfident female executives. Second, all three of these variables are mechanically related to one another, by construction. That is, the proportion of overconfident male, overconfident female, non-overconfident male, and non-overconfident female executives must sum to one. Thus, a large proportion of overconfident female executives necessarily increases the likelihood of a small value for the proportion of non-overconfident female executives, for example. Because of this, the proportion of overconfident male executives and the proportion of overconfident female executives are extremely good predictors of the proportion of non-overconfident female executives regardless of the instrument(s) I employ. Hence, from a practical standpoint, if I include the proportion of overconfident male executives and the proportion of overconfident female executives in the 1st stage, the F-statistic will be inflated to a large degree.

Table 9 presents the results from predicting M&As using an instrumented value for the proportion of non-overconfident female executives.[16] For the first stage, I use a tobit model with censoring at 0 and 1. Results, shown in column (1), indicate that the fraction of board members who have had a favorable experience with a non-overconfident female executive, as well as the number of highly educated women, satisfies the relevance restriction. That is, both instruments are positive and significant when predicting the

[16] I repeat this test instrumenting for I(Non-Overconfident-Female)-top 5 and find similar results.

proportion of non-overconfident female executives. Further, in an unreported OLS specification, I calculate an F-statistic with a value of 12.7, alleviating some weak instrument concerns. For the second stage, I use a logit model to predict a binary variable indicating the firm completed at least one acquisition in that year. Results are consistent with the main result discussed in section 4.1. That is, using an instrumented value, I find that firms with a larger proportion of non-overconfident female executives are significantly less likely to invest in M&As.

4.4. Robustness Tests

In this section I discuss several robustness tests that I conduct to strengthen the validity of my main result. First, I consider the widely held belief that the CEO is the most influential C-suite member – especially when it comes to major corporate decisions like mergers and acquisitions. Specifically, one may argue that the magnitude of any potential CEO effect is larger than that of non-CEO executives. Thus, treating them all the same is not appropriate. For example, the finding the firms with a larger proportion of non-overconfident (and non-CEO) female executives may not hold for firms with an overconfident male CEO. In Table 10, I control for CEO gender and overconfidence characteristics, and document the effect of the additional non-CEO executives. Interestingly, I find a small positive effect from an overconfident male CEO (significant only at 10%), but a much larger negative effect from the proportion of non-overconfident female executives. The latter finding is significant at 1%. In Table 11, I consider binary gender/overconfidence variables in lieu of proportions. Unsurprisingly, I find a very strong negative effect from the proportion of non-overconfident females. That is, firms with at least one non-overconfident female are significantly less acquisitive.

Last, I consider the entire SDC sample of merger and acquisition transactions from 1992-2021 (Execucomp data is currently incomplete for 2022). In doing so, I drop governance controls calculated using ISS data which begins in 1996. By doing this, I gain 3,199 firm-years. Results are shown in Table 12 and are robust to this specification.

5. Conclusion

Behavioral differences between men and women have implications for corporate risk-taking. This is of particular importance for mergers and acquisitions. Namely, firms with female managers are less likely to engage in M&A. However, although it is generally believed that men perceive risk in a more favorable light than women, it is not that simple. That is, females also display heterogeneity in their option-exercising behavior. In the context of M&A, I start with the assumption that overconfidence affects females' decision-making in a similar way as it does males. Using this framework, I find evidence that the previously documented result that firms with female leadership are less likely to complete M&As is driven entirely by female executives who are not overconfident. This result is confirmed using an instrumental variables approach. Additionally, firms with a larger proportion of non-overconfident females also tend to pay less when acquiring. Further, the effect that non-overconfident females have on the firm's M&A activity is concentrated in inter-industry mergers and acquisitions and in M&As in which a seemingly undervalued acquirer pays in cash. However, value implications are ambiguous and difficult to untangle.

To my knowledge, this is the first study that explores the interplay between overconfidence and gender. My results highlight the need to consider numerous executive behavioral characteristics/biases together, however difficult it may be. That is, executives are not simply the sum of their personal traits. Lastly, using mergers and acquisitions as a proxy, I find evidence that risk aversion and overconfidence have opposite effects on risk-taking behavior. My findings are consistent with the conventional belief that female executives are more risk averse than male executives, and that overconfidence and gender must be considered in tandem. However, more research is needed to disentangle these theoretically opposing forces.

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Appendix A: Variable Description

Variable	Description
I(M&A Deal)	Indicator for a successful merger or acquisition for any given firm-year
Total(M&A Number)	The total number of successful M&As per firm-year
Total(M&A Dollar Amount)	Total dollar amount (in millions) spent on successful M&A bids per firm-year
Premium Paid	Deal value scaled by target firm's EBITDA
Size	Log of firm's total assets
Q	Ratio of market value to book value
Cash Flow	Earnings before extraordinary items plus depreciation
Debt	Current plus long-term debt scaled by total assets.
R&D	Research and development scaled by sales
Total Stock Ownership-top 5	Stock ownership of top five highest compensated executives as percent of shares outstanding
Total Vested Options-top 5	Total dollar amount of vested options held by top 5 highest compensated executives scaled by common shares outstanding, and multiplied by 10 to match same scale as Total Stock Ownership-top 5
Board Size	Natural log of the total number of members on the board of directors
P(Female)-Board	Proportion of the board of directors made up of females
P(Independent)-Board	Proportion of independent appointments on the board of directors
Age-CEO	Age of the CEO
Tenure-CEO	Tenure of the CEO
I(Overconfident-Male)-CEO	Indicator for firm-year in which the CEO is an overconfident male
I(Overconfident-Female)-CEO	Indicator for firm-year in which the CEO is an overconfident female
I(Non-Overconfident-Female)-CEO	Indicator for firm-year in which the CEO is a non-overconfident female
I(Overconfident-Male)-top 5	Indicator that equals one if there is at least one overconfident non-CEO male executive in the top five executives for a given firm-year
I(Female)-top 5	Indicator that equals one if there is at least one non-CEO female executive in the top five executives for a given firm-year
I(Overconfident-Female)-top 5	Indicator that equals one if there is at least one overconfident non-CEO female executive in the top five executives for a given firm-year
I(Non-Overconfident-Female)-top 5	Indicator that equals one if there is at least one non-CEO female executive who is not overconfident in the top five executives for a given firm-year
P(Overconfident-Male)-top 5	The proportion of non-CEO executives that are overconfident males
P(Female)-top 5	The proportion of non-CEO executives that female
P(Overconfident-Female)-top 5	The proportion of non-CEO executives that are overconfident females
P(Non-Overconfident-Female)-top 5	The proportion of non-CEO executives that are female and not overconfident
P(Non-Overconfident-Female-Connection)-Board	The proportion of board members that have had a positive experience with a non-overconfident female while serving on the board of another firm
N(Female)-Higher Education	The total number of females who have earned a master's degree or above in the state that the firm is incorporated in

Appendix B: Primary Analysis

Table 1: Overconfidence Stratified by Gender

Panel A: By Executive (top 5 executives) *n = 48,793*

	Total			% of Total			% of Total Gender	
	Female	Male	Total	Female	Male	Total	Female	Male
Not Overconfident	3,514	33,414	36,928	7.2%	68.5%	75.7%	82.8%	75.0%
Overconfident	730	11,135	11,865	1.5%	22.8%	24.3%	17.2%	25.0%
Total	4,244	44,549	48,793	8.7%	91.3%	100.0%	100.0%	100.0%

Panel B: By Executive-firm-year (top 5 executives) *n = 218,529*

	Total			% of Total			% of Total Gender	
	Female	Male	Total	Female	Male	Total	Female	Male
Not Overconfident	11,016	123,364	134,380	5.0%	56.5%	61.5%	70.3%	60.8%
Overconfident	4,660	79,489	84,149	2.1%	36.4%	38.5%	29.7%	39.2%
Total	15,676	202,853	218,529	7.2%	92.8%	100.0%	100.0%	100.0%

Table 2: Summary Statistics

This table provides summary statistics for variables used to predict M&A occurrences. I(M&A Deal) indicates a firm had at least one successful M&A in a given year. Total(M&A Number) is the total number of successful M&As per firm-year. Total(M&A Dollar Amount) is the total dollar amount (in millions) spent on successful M&A bids per firm-year Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. P(Non-Overconfident-Male)-top 5 is the proportion of the top 5 executives who are male and not overconfident

Statistic	N	Mean	Min	25%	Median	75%	Max	St. Dev.
I(M&A Deal)	8,141	0.322	0	0	0	1	1	0.467
Total(M&A Number)	8,141	0.462	0	0	0	1	12	0.836
Total(M&A Dollar Amount)	8,141	403.9	0	0	0	61.6	79,406	2,495
Size	8,141	8.094	3.426	6.968	8.052	9.179	10.908	1.484
Q	8,141	2.149	0.445	1.284	1.703	2.417	37.772	1.557
Cash Flow	8,141	0.093	-1.385	0.062	0.094	0.133	0.359	0.088
Debt	8,141	0.261	0.000	0.137	0.257	0.361	3.892	0.202
R&D	8,141	0.058	0	0	0.008	0.053	17.444	0.274
Total Stock Ownership-top 5	8,141	0.016	0.0001	0.002	0.005	0.014	0.268	0.031
Total Vested Options-top 5	8,141	0.014	0.001	0.004	0.009	0.018	0.094	0.015
Age-top 5	8,141	53.781	34.500	51.000	54.000	56.667	80.000	4.635
Board Size	8,141	2.228	1.099	2.079	2.197	2.398	3.332	0.240
P(Female)-Board	8,141	0.136	0.000	0.071	0.125	0.200	0.625	0.107
P(Independent)-Board	8,141	0.689	0.000	0.625	0.778	0.875	1	0.255
Tenure-CEO	8,141	7.493	0	3	6	10	47	6.865
P(Female)-top 5	8,141	0.065	0	0	0	0	1	0.135
P(Overconfident-Female)-top 5	8,141	0.033	0	0	0	0	1	0.100
P(Non-Overconfident-Female)-top 5	8,141	0.032	0	0	0	0	1	0.095
P(Overconfident-Male)-top 5	8,141	0.531	0	0.200	0.600	0.800	1	0.361
P(Non- Overconfident-Male)-top 5	8,141	0.404	0	0	0.400	0.750	1	0.358
I(Overconfident-Male)-CEO	8,141	0.702	0	0	1	1	1	0.458
I(Overconfident-Female)-CEO	8,141	0.018	0	0	0	0	1	0.133
I(Non-Overconfident-Female)-CEO	8,141	0.006	0	0	0	0	1	0.078

Table 3: Predicting M&As – Completed Acquisitions

This table reports logistic regressions where the dependent variable is I(M&A Deal). P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
P(Female)-top 5	-0.145***		
	(0.005)		
P(Overconfident-Female)-top 5		-0.015	0.013
		(0.835)	(0.855)
P(Non-Overconfident-Female)-top 5		-0.252***	-0.188***
		(0.000)	(0.006)
P(Overconfident-Male)-top 5			0.084***
			(0.000)
Size	0.057***	0.055***	0.055***
	(0.000)	(0.000)	(0.000)
Q	0.003	0.002	-0.001
	(0.478)	(0.643)	(0.766)
Cash Flow	0.165**	0.162*	0.134
	(0.048)	(0.052)	(0.108)
Debt	0.051	0.053	0.061
	(0.292)	(0.270)	(0.209)
R&D	-0.000	-0.002	-0.008
	(0.995)	(0.955)	(0.835)
Total Stock Ownership-top 5	-0.281	-0.297	-0.301
	(0.344)	(0.319)	(0.314)
Total Vested Options-top 5	-0.158	-0.155	-0.097
	(0.793)	(0.797)	(0.873)
Age-top 5	-0.004**	-0.004***	-0.005***
	(0.011)	(0.010)	(0.003)
Board Size	-0.034	-0.034	-0.036
	(0.394)	(0.404)	(0.368)
P(Female)-Board	-0.113	-0.123	-0.116
	(0.211)	(0.172)	(0.200)
P(Independent)-Board	0.051	0.057	0.065
	(0.352)	(0.299)	(0.229)
Tenure-CEO	-0.002	-0.002	-0.002*
	(0.179)	(0.170)	(0.059)
Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	8,141	8,141	8,141

p-values in parentheses

Table 4: Predicting M&As – Total Number of Acquisitions

This table reports OLS regressions where the dependent variable is the total number of M&As in a given firm-year. P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
P(Female)-top 5	-0.303***		
	(0.001)		
P(Overconfident-Female)-top 5		-0.153	-0.097
		(0.225)	(0.441)
P(Non-Overconfident-Female)-top 5		-0.420***	-0.294**
		(0.000)	(0.011)
P(Overconfident-Male)-top 5			0.192***
			(0.000)
Size	0.130***	0.128***	0.127***
	(0.000)	(0.000)	(0.000)
Q	0.028***	0.027***	0.017*
	(0.002)	(0.003)	(0.055)
Cash Flow	-0.002	-0.006	-0.063
	(0.988)	(0.968)	(0.646)
Debt	-0.033	-0.031	-0.011
	(0.701)	(0.720)	(0.897)
R&D	0.049	0.048	0.038
	(0.223)	(0.233)	(0.340)
Total Stock Ownership-top 5	-0.495	-0.511	-0.499
	(0.302)	(0.287)	(0.297)
Total Vested Options-top 5	-0.474	-0.471	-0.415
	(0.644)	(0.646)	(0.685)
Age-top 5	-0.008***	-0.008***	-0.010***
	(0.007)	(0.007)	(0.001)
Board Size	-0.019	-0.016	-0.019
	(0.795)	(0.820)	(0.789)
P(Female)-Board	-0.319**	-0.332**	-0.317**
	(0.045)	(0.038)	(0.047)
P(Independent)-Board	-0.033	-0.028	-0.011
	(0.730)	(0.771)	(0.907)
Tenure-CEO	-0.001	-0.001	-0.003
	(0.474)	(0.464)	(0.176)
Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	8,141	8,141	8,141

p-values in parentheses

Table 5: Predicting M&As – Total Dollar Value of Acquisitions

This table reports OLS regressions where the dependent variable is the log of 1 plus the total dollar value of M&As in a given firm-year. P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
P(Female)-top 5	-0.708**		
	(0.020)		
P(Overconfident-Female)-top 5		-0.115	0.026
		(0.789)	(0.952)
P(Non-Overconfident-Female)-top 5		-1.172***	-0.852**
		(0.002)	(0.031)
P(Overconfident-Male)-top 5			0.487***
			(0.000)
Size	0.542***	0.534***	0.531***
	(0.000)	(0.000)	(0.000)
Q	0.062**	0.057*	0.033
	(0.039)	(0.060)	(0.282)
Cash Flow	0.307	0.293	0.148
	(0.510)	(0.529)	(0.751)
Debt	0.623**	0.631**	0.681**
	(0.035)	(0.033)	(0.021)
R&D	0.062	0.058	0.034
	(0.652)	(0.673)	(0.807)
Total Stock Ownership-top 5	-1.004	-1.068	-1.036
	(0.540)	(0.514)	(0.527)
Total Vested Options-top 5	-0.581	-0.570	-0.429
	(0.868)	(0.871)	(0.902)
Age-top 5	-0.024**	-0.025**	-0.028***
	(0.016)	(0.015)	(0.005)
Board Size	-0.266	-0.256	-0.264
	(0.276)	(0.293)	(0.279)
P(Female)-Board	-0.535	-0.583	-0.545
	(0.326)	(0.284)	(0.316)
P(Independent)-Board	0.090	0.110	0.153
	(0.786)	(0.739)	(0.643)
Tenure-CEO	-0.009	-0.009	-0.012*
	(0.176)	(0.171)	(0.068)
Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	8,141	8,141	8,141

p-values in parentheses

Table 6: Premium Paid for M&As

This table reports OLS regressions where the dependent variable is the premium paid for M&As that I define as the M&A Deal Amount scaled by EBITDA. P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
P(Female)-top 5	-31.448		
	(0.266)		
P(Overconfident-Female)-top 5		28.039	29.846
		(0.482)	(0.456)
P(Non-Overconfident-Female)-top 5		-81.442**	-76.262**
		(0.027)	(0.044)
P(Overconfident-Male)-top 5			6.041
			(0.524)
Size	-1.537	-1.177	-1.168
	(0.648)	(0.726)	(0.728)
Q	-4.373**	-4.548**	-4.737**
	(0.017)	(0.013)	(0.011)
Cash Flow	37.666	35.215	33.591
	(0.374)	(0.405)	(0.428)
Debt	11.605	10.430	10.414
	(0.504)	(0.547)	(0.548)
R&D	-39.569	-38.427	-38.523
	(0.316)	(0.329)	(0.328)
Total Stock Ownership-top 5	-249.333*	-247.514*	-257.039*
	(0.080)	(0.081)	(0.072)
Total Vested Options-top 5	-110.114	-105.243	-109.829
	(0.694)	(0.707)	(0.695)
Age-top 5	0.130	0.082	0.092
	(0.862)	(0.912)	(0.903)
Board Size	-24.492	-21.469	-21.281
	(0.170)	(0.230)	(0.234)
P(Female)-Board	-55.598	-60.933	-59.831
	(0.168)	(0.131)	(0.139)
P(Independent)-Board	-36.759	-35.598	-34.399
	(0.147)	(0.160)	(0.176)
Tenure-CEO	0.473	0.471	0.426
	(0.378)	(0.379)	(0.430)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Observations	1,143	1,143	1,143

p-values in parentheses

Table 7: Predicting M&As – M&A Characteristics

This table reports logistic regressions where the dependent variable is I(M&A Deal). P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. I(Below Industry Q) indicates that firm Q was below industry-adjusted Q. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis

	Inter-Industry M&A	Intra-Industry M&A	Cash Only	Other Payment Method
P(Overconfident-Female)-top 5	-0.129	0.039	0.036**	-0.024
	(0.164)	(0.602)	(0.031)	(0.780)
P(Overconfident-Male)-top 5	0.132***	0.063***	0.103***	0.091***
	(0.000)	(0.003)	(0.000)	(0.000)
P(Non-Overconfident-Female)-top 5	-0.272***	-0.111	0.071	-0.253
	(0.001)	(0.134)	(0.521)	(0.124)
P(Non-Overconfident-Female)-top 5 * I(Below Industry Q)			-0.320**	-0.022
			(0.014)	(0.906)
Size	0.065***	0.073***	0.061***	0.075***
	(0.000)	(0.000)	(0.000)	(0.000)
Q	-0.003	0.005	-0.005	0.016***
	(0.575)	(0.379)	(0.451)	(0.001)
I(Below Industry Q)			0.036**	0.087***
			(0.031)	(0.000)
Cash Flow	0.067	0.149	0.284***	-0.028
	(0.460)	(0.116)	(0.003)	(0.742)
Debt	-0.053	0.078	-0.002	0.056
	(0.383)	(0.124)	(0.964)	(0.309)
R&D	0.008	0.016	0.021	0.009
	(0.856)	(0.589)	(0.491)	(0.814)
Total Stock Ownership-top 5	-0.165	-0.267	-0.542*	0.090
	(0.613)	(0.412)	(0.089)	(0.780)
Total Vested Options-top 5	-0.901	-0.006	-0.648	0.186
	(0.223)	(0.992)	(0.320)	(0.781)
Age-top 5	-0.009***	-0.003	-0.004**	-0.008***
	(0.000)	(0.131)	(0.018)	(0.000)
Board Size	-0.012	0.006	-0.017	0.012
	(0.790)	(0.887)	(0.684)	(0.796)
P(Female)-Board	-0.232**	-0.089	-0.181**	-0.144
	(0.027)	(0.347)	(0.048)	(0.165)
P(Independent)-Board	0.136**	-0.001	0.088	-0.007
	(0.038)	(0.984)	(0.118)	(0.908)
Tenure-CEO	-0.001	-0.003**	-0.002	-0.002*
	(0.359)	(0.017)	(0.162)	(0.084)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	5,386	6,320	7,451	5,230

p-values in parentheses

Table 8: Market Reaction to M&A Announcements

This table reports OLS regressions where the dependent variable is the total number of M&As in a given firm-year. P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	Inter-Industry	Intra-Industry	Cash Only	Other Payment
P(Overconfident-Female)-top 5	-0.015	-0.002	-0.003	0.001
	(0.141)	(0.784)	(0.626)	(0.930)
P(Non-Overconfident-Female)-top 5	-0.001	0.005	0.004	-0.005
	(0.873)	(0.536)	(0.440)	(0.698)
P(Overconfident-Male)-top 5	0.001	0.001	0.000	-0.008**
	(0.518)	(0.804)	(0.876)	(0.015)
Size	-0.001	-0.003**	-0.003***	-0.002
	(0.513)	(0.019)	(0.006)	(0.279)
Q	-0.001***	0.001	0.000	-0.001
	(0.003)	(0.284)	(0.335)	(0.316)
Cash Flow	0.008	-0.011	0.003	0.010
	(0.292)	(0.223)	(0.681)	(0.446)
Debt	0.009	0.005	0.002	0.001
	(0.111)	(0.416)	(0.655)	(0.898)
R&D	0.001	-0.007	-0.005	-0.001
	(0.799)	(0.111)	(0.149)	(0.771)
Total Stock Ownership-top 5	0.017	-0.016	-0.010	0.013
	(0.645)	(0.672)	(0.722)	(0.822)
Total Vested Options-top 5	-0.138*	-0.073	-0.129**	-0.133
	(0.061)	(0.271)	(0.017)	(0.215)
Age-top 5	-0.000	0.000*	0.000**	-0.000
	(0.348)	(0.075)	(0.039)	(0.541)
Board Size	-0.003	0.004	0.003	-0.001
	(0.535)	(0.353)	(0.408)	(0.826)
P(Female)-Board	0.027***	0.002	0.008	0.019
	(0.005)	(0.829)	(0.249)	(0.223)
P(Independent)-Board	-0.011*	0.005	0.002	-0.008
	(0.096)	(0.403)	(0.652)	(0.361)
Tenure-CEO	-0.000	0.000**	0.000	0.000**
	(0.322)	(0.038)	(0.382)	(0.049)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,873	1,901	2,535	1,239

p-values in parentheses

Table 9: Predicting M&A Events – Instrumental Variable Analysis

This table reports both stages of an instrumental variables approach. I use an OLS regression in the first stage and a logit regression in the second stage. In the first stage, the dependent variable is the endogenous variable P(Non-Overconfident-Female)-top 5. In the second stage, the dependent variable is I(MA-Deal). P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis and are calculated using bootstrapped standard errors.

	First Stage	Second Stage
Instrumented P(Non-Overconfident-Female)-top 5		-0.645**
		(0.021)
P(Non-Overconfident-Female-Connection)-Board	0.017**	
	(0.047)	
N(Female)-Higher Education	0.056**	
	(0.025)	
Size	-0.005***	0.110**
	(0.000)	(0.042)
Q	-0.005***	-0.022
	(0.000)	(0.247)
Cash Flow	0.005	0.362
	(0.725)	(0.120)
Debt	-0.005	0.173
	(0.474)	(0.137)
R&D	-0.001	-0.158
	(0.763)	(0.253)
Total Stock Ownership-top 5	-0.056	-1.610***
	(0.126)	(0.007)
Total Vested Options-top 5	0.249***	-0.132
	(0.006)	(0.942)
Age-top 5	-0.001***	-0.017***
	(0.001)	(0.000)
Board Size	0.016**	-0.105
	(0.014)	(0.454)
P(Female)-Board	0.118***	0.681*
	(0.000)	(0.093)
P(Independent)-Board	0.034***	0.432***
	(0.003)	(0.005)
Tenure-CEO	0.000	-0.003
	(0.395)	(0.272)
Year*Industry Fixed Effects	Yes	Yes
Observations	8,598	8,598

p-values in parentheses

Appendix C: Robustness Checks

Table 10: Predicting M&A Events – Controlling for CEO Overconfidence and Gender Characteristics

This table reports logistic regressions where the dependent variable is I(M&A Deal). P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. I(Overconfident-Male)-CEO is an indicator for an overconfident male CEO. I(Overconfident-Female)-CEO is an indicator for an overconfident female CEO. I(Non-Overconfident-Female)-CEO is an indicator for a non-overconfident female CEO. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Age-CEO is the age of the CEO. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
P(Female)-top 5	-0.079**		
	(0.039)		
P(Overconfident-Female)-top 5		0.005	0.019
		(0.929)	(0.715)
P(Non-Overconfident-Female)-top 5		-0.157***	-0.141***
		(0.002)	(0.007)
P(Overconfident-Male)-top 5			0.034*
			(0.054)
I(Overconfident-Male)-CEO	0.046***	0.042**	0.033*
	(0.005)	(0.010)	(0.051)
I(Overconfident-Female)-CEO	0.065	0.066	0.053
	(0.239)	(0.234)	(0.336)
I(Non-Overconfident-Female)-CEO	-0.005	-0.002	-0.009
	(0.949)	(0.984)	(0.909)
Size	0.062***	0.059***	0.059***
	(0.000)	(0.000)	(0.000)
Q	0.001	0.000	-0.001
	(0.806)	(0.945)	(0.820)
Cash Flow	0.178*	0.176*	0.167*
	(0.053)	(0.056)	(0.069)
Debt	0.054	0.055	0.059
	(0.273)	(0.271)	(0.231)
R&D	-0.082	-0.087	-0.089
	(0.305)	(0.282)	(0.274)
Total Stock Ownership-top 5	-0.207	-0.219	-0.224
	(0.506)	(0.481)	(0.473)
Total Vested Options-top 5	-0.242	-0.204	-0.220
	(0.714)	(0.758)	(0.740)
Board Size	-0.053	-0.053	-0.052
	(0.195)	(0.199)	(0.205)
P(Female)-Board	-0.148	-0.149	-0.140
	(0.108)	(0.107)	(0.130)
P(Independent)-Board	0.062	0.067	0.070
	(0.265)	(0.227)	(0.205)
Age-CEO	-0.003**	-0.003**	-0.003**

	(0.018)	(0.019)	(0.021)
Tenure-CEO	-0.001	-0.001	-0.001
	(0.520)	(0.525)	(0.481)
Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	8,141	8,141	8,141

p-values in parentheses

Table 11: Predicting M&A Events – Binary Indicators for Gender and Overconfidence

This table reports logistic regressions where the dependent variable is I(M&A Deal). I(Female)-top 5 indicates that there is at least one female in the top 5 executives. I(Overconfident-Female)-top 5 indicates that there is at least one overconfident female in the top 5 executives. I(Non-Overconfident-Female)-top 5 indicates there is at least one female in the top 5 executives who is not overconfident. I(Overconfident-Male)-top 5 indicates there is at least one overconfident male in the top 5 executives. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Board Size is the log of the total number of board members. P(Female)-Board is the proportion of board members that are female. P(Independent)-Board is the proportion of independent board members. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
I(Female)-top 5	-0.055***		
	(0.000)		
I(Overconfident-Female)-top 5		-0.012	-0.019
		(0.582)	(0.398)
I(Non-Overconfident-Female)-top 5		-0.082***	-0.076***
		(0.000)	(0.000)
I(Overconfident-Male)-top 5			0.056***
			(0.002)
Size	0.058***	0.056***	0.054***
	(0.000)	(0.000)	(0.000)
Q	0.003	0.002	0.001
	(0.500)	(0.663)	(0.878)
Cash Flow	0.168**	0.164*	0.150*
	(0.045)	(0.050)	(0.072)
Debt	0.054	0.055	0.055
	(0.271)	(0.257)	(0.251)
R&D	0.000	-0.002	-0.005
	(0.991)	(0.966)	(0.893)
Total Stock Ownership-top 5	-0.284	-0.289	-0.301
	(0.340)	(0.332)	(0.312)
Total Vested Options-top 5	-0.100	-0.117	-0.181
	(0.868)	(0.846)	(0.764)
Board Size	-0.004***	-0.004***	-0.005***
	(0.008)	(0.007)	(0.004)
P(Female)-Board	-0.035	-0.034	-0.037
	(0.383)	(0.396)	(0.357)
P(Independent)-Board	-0.115	-0.118	-0.123
	(0.200)	(0.189)	(0.172)
Age-CEO	0.051	0.057	0.060
	(0.346)	(0.294)	(0.271)
Tenure-CEO	-0.002	-0.002	-0.002*
	(0.181)	(0.172)	(0.092)
Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	8,141	8,141	8,141

p-values in parentheses

Table 12: Predicting M&A Events – No ISS Data

This table reports logistic regressions where the dependent variable is the total number of M&As in a given firm-year. P(Female)-top 5 is the proportion of the top 5 executives who are female. P(Overconfident-Female)-top 5 is the proportion of the top 5 executives who are overconfident females. P(Non-Overconfident-Female)-top 5 is the proportion of the top 5 executives who are female and not overconfident. P(Overconfident-Male)-top 5 is the proportion of the top 5 executives who are overconfident males. Size is log of total assets. Q is the market value of assets scaled by the book value of assets. Cash Flow is earnings before extraordinary items and depreciation scaled by total assets. Debt is current plus long-term debt scaled by total assets. R&D is research and development scaled by sales. Total Stock Ownership-top 5 is the total number of shares held by the top 5 executives scaled by the total number of shares outstanding. Total Vested Options-top 5 is the total number of vested options held by the top 5 executives scaled by the total number of shares outstanding multiplied by ten to match the scaled of Total Stock Ownership-top 5. Age-top 5 is the average age of the top 5 executives. Tenure-CEO is the CEO's tenure with the firm. Coefficients are average marginal effects. P-values are shown in parenthesis.

	(1)	(2)	(3)
P(Female)-top 5	-0.129***		
	(0.002)		
P(Overconfident-Female)-top 5		-0.056	-0.034
		(0.322)	(0.545)
P(Non-Overconfident-Female)-top 5		-0.192***	-0.130**
		(0.000)	(0.019)
P(Overconfident-Male)-top 5			0.080***
			(0.000)
Size	0.075***	0.074***	0.074***
	(0.000)	(0.000)	(0.000)
Q	-0.001	-0.001	-0.004
	(0.777)	(0.681)	(0.211)
Cash Flow	0.211***	0.209***	0.180***
	(0.001)	(0.001)	(0.003)
Debt	0.018	0.019	0.024
	(0.590)	(0.574)	(0.483)
R&D	-0.004	-0.004	-0.007
	(0.842)	(0.834)	(0.743)
Total Stock Ownership-top 5	-0.039	-0.044	-0.048
	(0.848)	(0.827)	(0.813)
Total Vested Options-top 5	-0.404	-0.383	-0.362
	(0.349)	(0.374)	(0.401)
Age-top 5	-0.003**	-0.003**	-0.003***
	(0.029)	(0.027)	(0.009)
Tenure-CEO	-0.002**	-0.002**	-0.003***
	(0.018)	(0.016)	(0.003)
Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	11,340	11,340	11,340

p-values in parentheses