Gender Diversity in US Top Management: Impact on Risk-taking and Acquirer Performance

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Abstract

This paper studies gender diversity and its impact on risk-taking and acquirer performance in mergers and acquisitions. Based on a sample of 2527 acquisitions in the US during the period January 1, 1993 to December 31, 2004, we find that the presence of female CEOs is associated with increase in acquisition-related risk change during 3 years post-acquisition period. Regarding acquisition-related performance, we find that the market has more favourable response to the M&A deals conducted by female CEOs than those made by their male counterparts. However, in the long run, this difference reverses. Our empirical study suggests that risky corporate acquisitions undertaken by female CEOs destroy shareholder's value in the long run. Regarding the interaction between gender and managerial incentives, we find that female CEOs are more responsive to the risk incentive in compensation than male CEOs are. These results are robust to using different measures of post-acquisition performance of the acquiring firm.

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INTRODUCTION

The conflict between shareholders and corporate management arising from the separation of ownership and control in the publicly held corporation has been well recognized since Berle and Means (1932). Managers as agents of shareholders may make investment and financing decisions that serve their own interests to the detriment of shareholders. Since the seminal work of Jensen and Meckling (1976), the literature has focused on how managerial ownership and compensation contracting can help to align the interests of the managers with those of the shareholders.

One source of agency problem stems from different risk preferences of shareholders and managers in making investment and financing decisions. Shareholders are considered risk-neutral since they can hold their wealth in well-diversified portfolios and thereby diversify away firm-specific risk. On the contrary, managers whose human capital is invested in their own firm hold undiversified portfolios. Additionally, when their money capital is invested in their company's stock[3], the degree of non-diversification is intensified. The undiversified portfolio exposes managers to a high level of both systematic and firm specific risk, inducing managers to be risk averse. As a consequence, the risk-averse manager may behave opportunistically and pass up risky, but value enhancing, investment opportunities, leading to reduced shareholder value (Smith and Stulz, 1985; Guay, 1999).

An executive compensation package or equity ownership that enhances managers' wealth in line with increase in corporate performance or firm's stock value has generally been considered a solution to the agency problem (Baker et al, 1988). The past decade has witnessed an explosion in the grant of stock options to top corporate executives. An important characteristic of stock options is that they induce a convex relationship between pay and performance (Guay, 1999). Managers who hold company stock options are shielded from downside risk when the stock price falls below the strike price of the options but can reap enormous wealth gains when performance far exceeds that strike price. Stock options are thus intended to encourage managers to make high-risk investment and financing decisions, thereby offsetting managers' risk aversion to firm specific risk (Smith and Stulz, 1985).

[3] This is mainly achieved by the grant of equity-based compensation.

This paper extends the principal-agent paradigm by investigating another dimension of the agency problem, namely the impact of gender diversity among top managers on their risk preferences. To the extent that risk taking propensity is influenced by gender, the risk-related agency conflict may be mitigated or accentuated by the gender of the CEO or the gender diversity of the board or other top management.

Gender diversity is nowadays one of the most discussed topics in the press[4]. The common theme of these articles is the small proportion of women executives and directors of company top management. These articles all point to the fact that women only represent a "tiny minority" in top management and therefore urge the need to increase the percentage of women CEOs/executives/directors. The study of gender effect on firm performance is important in this context. However, few studies have yet examined the impact of gender on corporate risk taking and consequently, firm performance although psychological studies indicate that men and women may differ in their risk preferences. This paper seeks to fill this gap by studying the performance of women who have made to the top of a firm. We ask two questions: 1. *Do firms with women CEOs and women directors and executives display higher risk preferences in making acquisitions than firms without such female representation in their top management?* 2. *Do acquirers with top women managers i.e., CEOs, directors or executives perform better following their acquisitions than acquirers with an all male line-up?*

We focus on corporate acquisitions because they are major, influential, externally observable, and discretionary long-term investments that can alter the risk profile of acquirers substantially and thereby exacerbate the potential risk-related conflict of interests between managers and shareholders. Based on a sample of 2527 acquisitions in the US during the period January 1, 1993 to December 31, 2004, we find that the presence of female CEOs is associated with acquisition-related risk increase during the 3-year post-acquisition period. Regarding acquisition-related performance, we find that the stock market responds, at the time of deal announcement, more favourably to the M&A deals conducted by female CEOs than those made by their male counterparts. However, in the long run, this difference reverses. Our empirical analysis suggests that women CEOs undertake more risky corporate acquisitions although there is some evidence of sectoral variation in this propensity. Acquisitions undertaken by female CEOs destroy more shareholder value in the long run than

[4] For instance, "*Women still struggling to the summit*" by By Alison Maitland, Financial Times, November 10 2006; "*Not enough women at the top – anywhere*" By Maggie Urry Financial Times, November 6 2006; "*Fall in number of women at the top*" By John Willman, Financial Times, November 6 2006. See also Fels (2004)

those undertaken by male CEOs and more so when such acquisitions are risk enhancing. We also find interesting interactions among gender, managerial risk incentives and acquisition performance. Female CEOs receiving stock options and potentially high payoffs from risk taking achieve better post-acquisition performance than male CEOs. Thus gender seems to affect both risk behaviour and the responsiveness of CEOs to risk incentives. Non-CEO female directors and executives among the top five executives in sample firms have a less dramatic effect and do not influence the risk profile and performance of acquisitions very differently from those of acquisitions undertaken by firms with less gender diversity in top management.

The remainder of the paper proceeds as follows. Section II reviews the literature and develops the hypotheses being tested. Section III describes our data and methodology. Section IV presents the sample characteristics and the empirical findings. Section V concludes with the discussion of limitations and further studies

RELATED LITERATURE AND HYPOTHESES

Gender Diversity in Corporate Decision Making

In this section we develop a set of hypotheses to test the impact of gender on managerial risk-taking in acquisitions and the subsequent acquirer post-acquisition performance by controlling for the incentive effect of executive compensation, acquirer firm characteristics, and M&A deal characteristics. We draw upon the standard agency model and the role of executive compensation contracts in aligning shareholders' and managers' interests. We investigate whether the incidence of a female CEO and non-CEO female executives makes a significant difference to the relationships among managerial incentives, risk behaviour and corporate performance. For this investigation we use the M&A as the decision context.

Related studies of gender diversity point to gender being an influential factor in determining people's risk-taking behaviour. In a meta study of 150 prior studies that compared the risk-taking tendencies of male and female participants in various risky activities, Byrnes et al (1999) report that men tend to take more risk than women. The gender difference varied across activities and decision contexts. The gender gap in risk taking narrows with age. Barber and Odean (2001) analyze the common stock investment behaviour of men and women from February 1991 through January 1997 in US and document that men trade 45%

more than women. This higher trading frequency is attributed by the authors to men being more overconfident than women. Using results from controlled experiments, Charness and Gneezy (2004) report that women invest less and appear to be more risk averse than men. In a more recent study, Niessen and Ruenzi (2006) find that female fund managers "take less risk and follow a less extreme investment style", which again suggests that women are more risk averse. Women's relatively conservative investment strategy, however, leads to investment performance similar to that delivered by their male counterparts. For example, Niessen and Ruenzi (2006) find no evidence that risk-related behavioural differences between female and male fund managers are reflected in fund performance.

Most of the studies that look at the relation between gender difference and risk taking have been conducted at the individual decision level. In a corporate decision context, gender differences may be nullified by the collective decision making processes involving men and women managers. Or women may mimic men's risk-taking behaviour thereby again obliterating gender difference. Even more, women may try to out-macho men and assume even more risk than men. Do female executives display lower risk taking propensity than male executives? By examining the stock selling behaviour of male and female executives in response to stock option rewards, Zahid et al (2006) finds evidence suggesting that male executives are indeed more risk averse by engaging in higher diversification-related stock sales than female executives.

So far the empirical evidence on women's risk taking preference is mixed. As individual or institutional investors, women are inclined to take less risk and follow a less extreme investment strategy (Barber and Odean, 2001; Charness and Gneezy, 2004; Niessen and Ruenzi, 2006). As corporate executives, however, women are less risk averse than their male counterparts (Zahid et al, 2006). The focal interest of this paper is whether female executives including CEOs behave differently from male executives when they make corporate decisions on behalf of their shareholders. We propose the following null hypotheses in the context of mergers and acquisitions:

Hypothesis 1a. Corporate acquisitions undertaken by firms with female CEOs are as risky as those undertaken by firms with male CEOs.

Hypothesis 1b. Corporate acquisitions undertaken by firms with top female executives are as risky as those undertaken by firms with male only executives.

The alternative hypothesis is that they are less risky, consistent with the evidence from the female investor/ fund manager behaviour or more risky, consistent with the evidence from Zahid et al.

Some studies have examined firm performance following the appointment of female executives. Lee and James (2002) show that market reactions to female CEOs appointments are significantly more negative than reactions to male CEO appointments. However, other studies show that women are more likely to be appointed to a firm in distressed condition. Ryan and Haslam (2005) document that during a period of overall stock-market decline those companies which appointed women to their boards were more likely to have experienced consistently bad performance in the preceding five months than those which appointed men. Kin do Ryan and Haslam show that following the women's appointment the firms were turned around?

Empirical evidence concerning female executives' performance after they assumed their positions, however, is favourable. A study by Catalyst[5], the US non-profit organization for women's advancement, has shown that Fortune 500 companies with the highest proportion of women in senior management significantly outperform those with the lowest proportion, both on return on equity and on total shareholder return metrics. Specifically, the former achieve, on average, 35% higher return on equity and 34% higher total return to shareholders than those with the lowest percentages of women corporate officers (Catalyst 2004 report). In the context of mergers and acquisitions, we propose the following null hypothesis:

Hypothesis 2a. The post-acquisition shareholder value performance does not differ between acquirers with women CEOs and acquirers with male CEOs.

Hypothesis 2b. The post-acquisition shareholder value performance does not differ between acquirers with non-CEO women executives and acquirers with only male executives.

The alternative hypothesis is that women CEOs/ executives deliver superior/ inferior performance from the acquisitions their firms make.

After examining the impact of gender diversity on risk and performance separately, we investigate the joint impact of gender diversity and risk change on acquisition-related performance. We test whether any increase (decrease) in risk due to an acquisition undertaken by acquirers with female CEOs/ executives is associated with greater shareholder value enhancement (destruction) than one undertaken by male CEOs/ or all-male executives. The related null hypotheses are as follows:

Hypothesis 3a. A*cquisition-related shareholder value performance is independent of the presence of female CEO in the acquirer at different levels of risk.*

[5]www.catalystwomen.org/pressroom/press_releases/7_26_06%20%202005%20COTE%20release.pdf

Hypothesis 3b. A*cquisition-related shareholder value performance is independent of the presence of non-CEO female executives in the acquirer at different levels of risk.*

The alternative hypothesis is that female CEOs (executives) deliver superior/ inferior performance at high levels of acquisition related risk depending on their risk seeking or avoiding behaviour.

Impact of Executive Compensation

CEOs/executives are the agents of shareholders, regardless their sex. The compensation package is used by shareholders as a means of aligning managerial interests with their own. In this paper, we control for the risk incentive effect of executive compensation by interacting measures of managerial incentives with gender. The common folklore of stock option compensation is that it shields the managers from down-side risk since a stock option, in essence a call option on the firm's stock, only linearly relates to the stock price when the stock price exceeds the exercise price of the option (Feltham and Wu, 2001). Moreover, the convexity of payoff i.e. extremely high stock option value at high stock values implies that the value of the stock option increases with the company's stock return volatility. Hence, stock option compensation is able to counter managerial risk aversion and prompt risk-averse managers to engage in risky investment projects including risky acquisitions (Guay, 1999; Datta et al., 2001 and Coles *et al*, 2005). Given the risk aversion or risk seeking behaviour of women executives reported in earlier studies (see literature review above), they may also respond differently to risk incentives embedded in executive compensation.

Restricted stock, another form of equity based compensation, is linearly related to the stock price. It offers an incentive for managers to improve firm performance. However, the linear payoff, by not limiting the down-side risk, exposes managers' wealth to too much risk and thus increases managerial risk aversion (Smith and Stulz, 1985; Bryan, et al, 2000; Ryan and Wiggins, 2002). Bryan et al (2000) provide direct empirical evidence that option-based compensation dominates stock-based compensation in inducing risk-averse managers to pursue risky, yet value-increasing, investment projects. Once again, given gender differences in risk taking, male and female CEOs and executives may respond differently to the pay-for-performance incentives which nevertheless do not limit downside risk.

In the context of mergers and acquisitions, Datta et al. (2001) provide direct empirical evidence that, for acquiring firms, providing stock option incentives to top executives can have a large positive impact on shareholder wealth. In the long run, managerial

incentives can be effective in shaping long-term corporate investment policies and encourage managers to make decisions in the interests of shareholders. The measure of managerial incentives used in Datta et al (2001), i.e., the sum of the values of new stock options granted to the top five executives as a percentage of total compensation paid to them, however, is an incomplete measure of managerial incentives. According to Core and Guay (2002) and Coles et al. (2005), it is at best a proxy for the direct measure of managerial incentives, i.e., Delta and Vega (see Table 2 below for definitions of these terms). High Delta is a risk disincentive whereas high Vega is a risk incentive.

In the empirical analyses that follow we control for both Vega and Delta. We also interact them with gender to examine whether female CEOs/ executives make more risky acquisitions under the influence of these incentives. Similarly, we also examine whether they make more value enhancing acquisitions when incentivised by the compensation package.

DATA AND METHODOLOGY

Sample Formation and the Data Sources

We use the Securities Data Company's (SDC) on-line mergers database to obtain the sample of mergers and acquisitions made by U.S. companies during the period January 1, 1993 to December 31, 2004. We include the transactions that are:

(a) listed as completed with an announcement date and following effective date that happen during our sample period;

(b) identified as a merger or an acquisition of majority interest (over 50%) by SDC;

(c) identified as tender offers for majority interest (over 50%) by SDC.

Additionally, an acquisition is included only if the executive compensation data are available in ExecuComp. Standard & Poor's ExecuComp database provides data on salary, bonus, and total compensation for the top five executives (ranked annually by salary and bonus) for firms in the S&P 500, S&P Midcap 400, and S&P Smallcap 600, for the period from 1993 to 2004. Finally, we require that the stock return data and the accounting data of the acquirers be available from CRSP and Compustat, respectively.

Table 1 provides the details of the sampling process. The final sample consists of 2527 acquisitions with 2241 mergers and 286 tender offers. Using the traditional event study methodology, we study the announcement effect as well as the long-term effect of the corporate acquisitions on shareholder value. In the study of the acquisition announcement effect, we estimate 3-day cumulative abnormal returns (CARs) for the whole sample. In the

long-term study, we estimate the 1-year and 3-year buy-and-hold abnormal returns (BHARs) to the sample firm. In the estimation of 1-year BHAR, we include only the deals done during January 1, 1993 to December 31, 2003. Similarly, we include only the deals during January 1, 1993 to December 31, 2001 in the sample when we estimate 3-year BHAR. Furthermore, in order to sustain the independence of the observations, in the 1(3)-year long term study, we include the sample firm's acquisition only if the firm has not consummated deals in the 1(3)-year period prior to the effective date of the corporate acquisition. The number of observations in each sub-sample is provided in Table 1.

Insert Table 1 about here

Variables Estimation

Gender diversity

We use two binary variables to measure gender diversity, i.e., WOMENCEO and WOMENEXEC. WOMENCEO equals to 1 if a firm has a female CEO and 0 otherwise. WOMENEXEC equals to 1 if a firm has one or more female executives and 0 otherwise.

Corporate acquisition performance

We employ event study methodology to estimate corporate acquisition performance. The short term (announcement) effect and the long term post-acquisition performance are estimated as follows:

Announcement effect - cumulative abnormal return

Abnormal return is the return to the acquirer in excess of the 'normal' return earned by a benchmark asset or portfolio over a similar period. It is widely used as a measure of the impact of an event such as an acquisition. There are several alternative methodologies available to estimate abnormal returns. In this study, abnormal stock returns around corporate acquisition announcement are estimated using the market model and Scholes-Williams betas. The estimation period is from 200 days to 60 days prior to the acquisition announcement date (day 0). An event window is the time over which the value effects of an event are assumed to be reflected in stock prices. Empirical researchers often employ alternative even windows to allow for the difficulting in precisely locating the event in time. Our event window is (-1, +1) days.

Long term effect - buy and hold abnormal return

BHAR-based event study has become a standard method of event study in estimating long-term abnormal returns (see Barber and Lyon 1997; Lyon et al 1999) albeit not

free of criticism[6]. We estimate both 1-year and 3-year BHARs. The basic idea of BHAR is that it measures the average multiyear (1 year or 3 years) returns from a strategy of investing in all firms that complete an event and selling at the end of a pre-specified holding period in excess of the returns to a comparable investment strategy using portfolios of otherwise similar firms that do not undertake corporate acquisitions within a certain period[7]. The virtue of the BHAR is that it simulates the investor's actual experience. In our analyses, we employ the benchmark portfolio approach to estimate BHARs. Construction of the benchmark portfolio and calculation of BHARs are described in Appendix A.

Acquisition-related risk change

1(3)-year acquisition-related risk change (Δ RISK) is measured as the standard deviation of stock returns for the post-acquisition period (11 to 250 (750) days following the effective date) minus the pre-acquisition period standard deviation (300 (800) days to 60 days preceding the announcement date) adjusted for contemporary standard deviation change of market returns (CRSP value-weighted index)[8]. We also construct a binary variable, Δ RISKDUM, which equals 1 if the risk change is positive and 0 otherwise as an alternative risk change variable.

Measuring managerial incentives

Following Guay (1999) and Core and Guay (2000), we define Delta as the change in the dollar value of the CEO's wealth for a 1% change in stock price and Vega as the change in dollar value of the CEO's wealth for a 1% change in the annualized standard deviation of stock returns (see Appendix B for the details of the estimating procedure). In our ordinary least squares (OLS) regression analysis, we use lagged values of both Delta and Vega[9]. For instance, the lagged Vega and Delta values are estimated based on the compensation packages granted to executives in the year preceding the year in which the corporate acquisitions are announced. In the analysis, we separate CEO's VEGA and DELTA (CEOVEGA and CEODELTA) from other executives' VEGA and DELTA (EXECVEGA and EXECDELTA).

Other control variables

Managerial ownership is highly related to executive compensation. Preceding studies document that incentive effects of executive compensation may vary cross-sectionally with the level of managerial ownership (Morck, Shleifer, and Vishny, 1988; Ofek and

[6] Mitchell and Stafford (2000) and Fama (1998).
[7] In the estimation of 1-year (3-year) buy-and-hold abnormal return, the matching firms are chosen from a pool that consists of the firms that do not undertake acquisition during the period from 1 year (3 years) before the deal effective date to 1 year (3 years) after the deal effective date.
[8] The days are stock market trading days. A calendar year generally equates to 250 trading days.
[9] We employ lagged Vega and Delta values in order to control of potential endogeneity problem.

Yermack, 2000). However, according to Denis et al (1997), higher levels of managerial ownership reduce the effectiveness of internal monitoring mechanism in firms. Therefore, we include managerial ownership (OWNERSHIP) as an independent variable in the empirical analyses in order to control for the effect of different levels of managerial ownership. We measure managerial ownership as the sum of the previously granted/acquired common stock and restricted stock owned by the CEO at the year-end prior to the acquisition announcement divided by the contemporary total number of shares outstanding.

We control for cash compensation (CCOMP) in our regression models. Guay (1999) posits that CEOs with higher total cash compensation are better diversified because they have more money to invest outside the firm and therefore are less risk-averse. Following this line of argument, we expect CEOs with more cash compensation to be less risk averse. Nevertheless, other studies propose cash compensation as the proxy for CEO's level of risk aversion. Berger et al (1997) argue that CEOs with high cash compensation are more likely to be entrenched and hence likely to avoid risk. These CEOs are therefore more likely to avoid risk (Coles, et al., 2005).

As Guay (1999) notes, the risk-related agency problem is likely to be most serious in firms with better investment opportunities. Consequently, the expected loss to the shareholder of any valuable investment project passed up is expected to be positively related to firm investment opportunities. In this study, we use the book-to-market ratio as a negative proxy to capture the investment opportunities of the acquiring firm prior to the corporate acquisition. The book-to-market ratio is calculated by the formula [stockholders' equity+deferred taxes+investment tax credit-preferred stock] / market capitalization, which is computed at the end of the month preceding the month of the announcement date of the acquisition.

We use acquirer's past performance to control for management ability in the regression. Past performance is the market adjusted one-year pre-acquisition buy-and-hold-return for the sample firm. We also take into account the acquirers' past acquisition experience as it may reduce risk perceptions and improve the chances of successful acquisitions. Specifically, we define a binary variable, SERIALACQ, to control for the risk and performance effects of serial acquisition. The firm is a serial acquirer if it successfully acquires no less than five firms during the period of three year prior to announcement of M&As.

In order to control for the difference between the size of the acquirer and that of the target, we include the variable, relative size (RELSIZE), as the ratio of target market capitalization to the acquirer market capitalization. In our analysis, since most of the target

firms are private firms, we use the ratio of transaction value to the acquirer market capitalization to proxy for relative size. In the regression, we also control for the target's public listing status (PUBLIC).

The means of payment has been shown to be a significant determinant of acquisition wealth effects (Loughran and Vijh, 1997). We, therefore, distinguish the means of payment by cash (CASHPM), stock exchange (STKPM), and mixture of equity, cash, debt etc (MIXEDPM). The cash payment variable (dummy) equals 1 if the acquisition is financed 100% by cash and 0 otherwise. The stock payment variable equals 1 if the acquisition is financed 100% by issuing stock and 0 otherwise. Mixed payment is similarly defined. We also differentiate the type of acquisition (TENDER) by a binary variable which takes the value 1 if the acquisition is explicitly identified by SDC as tender offer and 0 otherwise. Additionally, we control for the hostility (HOSTILITY) of the deal as indicated by SDC. Last but not the least, a binary variable is introduced to account for the relatedness (RELATEDNESS) between acquirer and target. The variable equals to 1 if the acquirer and target are in the same 2-digit SIC industry.

Data Analysis

First, we directly investigate whether gender and managerial incentives influence the risk change 1 year and 3 years following corporate acquisitions to test ***Hypotheses 1a and 1b***. The risk model is as below.

$$\begin{aligned}\Delta Risk = {} & \alpha_0 + \beta_1 Gender\ Diversity + \beta_2 Managerial\ \ Incentives \\ & + \beta_3 Gender\ Diversity \times Managerial\ \ Incentives \\ & + \beta_4 Firm\ \ Characteristics + \beta_5 Deal\ \ Characteristics + \varepsilon\end{aligned} \qquad (1)$$

where $\Delta Risk$ is the 1(3)-year acquisition-related risk change. WOMENCEO and WOMENEXEC are two dummy variables measuring Gender Diversity in the model. *VEGA* and *DELTA* are two primary measures of Managerial Incentives while cash compensation and managerial ownership control for other forms of incentives. Firm Characteristics comprise book-to-market equity (BM), firm size (SIZE), past performance (PSTPF), and serial acquisition experience (SERIALACQ). Deal Characteristics include method of payment (CASHPM, STKPM and MIXEDPM), form of deal (TENDER), relative size (RELSIZE), hostility (HOSTILITY), target public status (PUBLIC), and relatedness (RELATEDNESS). Please refer to Table 2 for detailed definitions.

Insert Table 2 about here

We further link gender diversity, incentives, risk, and performance in the performance model specified in equation 2. In the OLS regression, in addition to the variables specified in the risk model, we harness interaction variables to investigate the interaction effect between risk and diversity as well as risk and managerial incentives. Using this model we test Hypotheses 2a and 2b. In order to test whether female CEOs and male CEOs respond to managerial incentives differently, we also include interaction variables between gender diversity and managerial incentives. The model takes the following form:

$$\begin{aligned} Performance= & \ \alpha_0 + \beta_0 \Delta Risk + \beta_1 Gender\ Diversity + \beta_2 Managerial\ Incentives \\ & + \beta_3 (Gender\ Diversity \times \Delta Risk) + \beta_4 (Gender\ Diversity \times Incentives) \\ & + \beta_5 Firm\ Characteristics + \beta_6 Deal\ Characteristics + \varepsilon \end{aligned} \quad (2)$$

where *Performance* is the 3-day CAR[10] in the study of announcement effects or the 1–year and 3-year BHARs in the study of long term performance. All other variables are the same as in Equation (1).

In order to mitigate the problems of skewness[11] and outliers, we log transform all the continuous variables. Following Datta et al (2001), we define the long-term performance measures, i.e., 1-year or 3-year abnormal returns, as the natural logarithm of (1+ the sample firm's BHR) minus the natural logarithm of (1+ the corresponding benchmark portfolio's BHR). The transformation can be expressed as $Ln\ (1+BHR_e) - Ln\ (1+BHR_{mp})$[12]. In our robustness tests, we use the raw BHARs by winsorizing the sample at both 1% and 99%.

In all of our OLS regressions, the t-statistics for the significance of the coefficients are White's (1980) heteroskedastisity consistent t-statistics. We also conduct tests of multicollinearity by estimating the variance inflation factor (VIF). In all of our regressions,

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[10] We include CAR regression to investigate the short term effect of managerial incentives and their interaction with CEO overconfidence. Hence, we do not include acquisition-related risk change in the CAR regression.

[11] Please refer to table 5 for the descriptive statistics of the variables

[12] The major reason for taking the logarithmic transformation of sample firm's BHR and corresponding portfolio's BHR separately instead of computing the natural logarithm of (1+ the sample firm's BHR minus corresponding portfolio's BHR) is because the latter may generate negative values and therefore render the results of log transformation meaningless. However, one may argue that this long-term performance measure is not actually measuring the buy-and-hold abnormal return as $Ln\ (1+BHR_e) - Ln\ (1+BHR_{mp}) = Ln\ [(1+BHR_e)/(1+BHR_{mp})]$, which is obvious unequal to $Ln[(1+BHR_e)-(1+BHR_{mp})]$. In order to validate this transformation, using the 3-year event study results, we regress $Ln\ (1+BHR_e) - Ln\ (1+BHR_{mp})$ on the raw BHAR: (BHR_e-BHR_{mp}). The coefficient of the term $Ln\ (1+BHR_e) - Ln\ (1+BHR_{mp})$ is 0.82 with a t-statistic of 28.94. The adjusted R^2 is 0.445 indicating that our log transformation value is highly correlated with the raw BHAR. The regression results using the 1-year data are similar to those of the 3-year data reported above. The coefficient is 0.84 with a t-statistic of 57.41 and the adjusted R^2 0.67.

except for the interaction variables, other variable's VIF value is lower than 10[13]. As a rule of thumb, this level of multicollinearity across the dependent variables is not strong enough to cause serious error in coefficient estimates[14].

EMPIRICAL FINDINGS

Sample Characteristics

Table 3 presents the descriptive statistics of our sample of 2527 completed acquisitions during the period January 1, 1993 to December 31, 2004. As shown in the panel A of Table 3, there is no temporal clustering of acquisitions in our sample. The mean (median) deal value increases steadily from $287.1 ($ 80.6) millions in 1993 to $1517.5 ($250.6) millions in 1999. The mean deal value then reduces to $733.7 millions in 2002 and rebounds to $1612.52 millions in 2004. These results are consistent with the recent merger wave trend, which further confirms that our sample is a subset of deals that can capture the general trend of merger and acquisition deals during the last decade.

As exhibited in panel B of Table 3, our findings confirm the findings in Datta et al (2001)[15] that a majority of tender offers (66.1%) are cash deals. However, the percentage of the mode of payment of the merger deals is different from theirs. Considering merger deals, the percentage of stock deals is 36.1 % and the percentage of mixed deals is 36.9% while the figures from Datta et al (2001) for these two categories are 56% and 29%, respectively. This suggests that during the period 1999 to 2004, the mixed payment method is more popular while the use of pure equity becomes less so. Panel C of Table 3 reports the characteristics of the acquirer and target as well as the acquisition premium. The average premium paid by the acquirer to the target shareholders is 49%. This is more than 10 percent higher than the number reported in Datta et al (2001), indicating the increase in premium during the period 1999 to 2004. Market capitalization is much higher than that of the target. The target's book-to-market equity is much higher than that of the acquirer suggesting that the acquirer's growth opportunities are greater than that of average target or the target is relatively undervalued.

Insert Table 3 about here

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[13] The VIF of the quadratic terms can be higher than 10 as the quadratic terms are obviously highly correlated with the original variables.

[14] Belsey, Kuh, and Welsch (1980) suggest that, when this number is around 10, weak dependencies may be starting to affect the regression estimates. When this number is larger than 100, the estimates may have a fair amount of error.

[15] The sample period of Datta et at (2001) is from 1993 to 1998.

Based on the data from ExecuComp, Table 4 reports the number and the percentage of female CEOs, directors, and executives across the sample period. Consistent with previous empirical evidence, female executives represent a "tiny minority" of US top management. In total, female executives, including CEOs and other high ranking executives, and board directors only represent 4.53% of the whole top US executive population. On average, there are only 229 out of 19452 female CEO years, representing 1.18% of the US CEO population in ExecuComp. Despite the fact that female executives are only representing small portion of firm executives, Table 4 is in fact showing an upward trend of the percentage of female executives over the years.

Insert Table 4 about here

In Table 5, we report on whether female executives are paid differently from their male counterparts. We compare cash compensation, total compensation, and two measures of managerial incentives, Vega and Delta, using the population of ExecuComp and the M&A sample. For the whole ExecuComp database, female executives are paid generally lower than male executives. At CEO level, only the cash compensation between female and male CEO is significantly different. Women directors and women executives receive significantly less cash and total compensation than their male counterparts. In terms of risk (Vega) and performance (Delta) sensitivity, there is little difference between the CEOs of either sex. However, both female directors and female executives have less risk and performance incentives than their male counterparts. The differences between the sexes in cash pay and total compensation and in Vega in the M&A sample are broadly similar to those in the ExecuComp sample for the three categories of executives. However, the female CEOs' Delta is significantly higher than that of male CEOs. This suggests that the former group has greater incentive to avoid risk. This may have implications for the acquisition-related risk and performance as we examine below.

Insert Table 5 about here

Table 6 shows the distribution of the female executives in the M&A sample across the sample period. As the last column of Table 6 indicates, there are about a quarter of the acquirers which have female executives. This number is much larger than the percentage of female executive in the whole ExecuComp database suggesting that companies with female

executives are in fact more likely to undertake corporate acquisitions. The number of deals conducted by female CEOs, however, does not spread evenly across the sample period. In total, there are 25 out of 2527 (0.99%) deals conducted by female CEOs. Given the average percentage of female CEOs of the whole ExecuComp is 1.18% (see Table 4), our M&A sample well represents the population. The majority of the deals done by female CEOs are concentrated in years 1999, 2000, and 2004. There are 11 deals undertaken by female CEOs in 1999, 4 deals in both 2000 and 2004. In total, there are 624 out of 2527 (24.69%) deals by acquirers who have at least one top female executive.

Insert Table 6 about here

In order to see whether female executives are clustered in certain industries, we further categorize the numbers of deals in which acquirers with female executives are involved by Fama French 48 industries classification[16]. Table 7 shows that 15 M&A deals done by female CEOs are in the Business Services industry. The other acquirers with female CEOs are from Recreation (2), Printing and Publishing (1), Automobiles and Trucks (3), Utilities (1), Computers (1), Retail (1), and others (1). The numbers in the parentheses are the number of deals by acquirers in the respective industry. The number of top female executives, however, is distributed more evenly across the 48 industries.

Insert Table 7 about here

The descriptive statistics of the variables used in the subsequent univariate and multivariate analyses are given in Table 8. In Panel A of Table 8, the mean 1-year BHAR and 3-year BHAR are insignificant while both medians are significantly negative. This is consistent with prior evidence that a high proportion of acquisitions destroy shareholder value (see Sudarsanam, 2003, ch.4; Weston et al, 2004, ch. 8 for a review). However, the pattern of means and medians also suggests that some acquisitions are very high value creators. We employ a logarithmic transformation of BHARs to reduce the influence of outliers. Based on the same argument, we also log transform other continuous variables used in the regression.

Insert Table 8 about here
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[16] The details of Fama French 48 industries classification can be found in the Kenneth R. French's Data Library (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

Sample acquisitions result in significant risk increase over three years but not over one year. On average, targets represent about a fifth of the acquirer size. Serial and hostile acquisitions are quite rare, about 5% of the sample. Two thirds of the acquisitions are related. Majority of acquisition targets are publicly listed companies.

Univariate Analysis

Table 9 and Table 10 are used to test whether acquisition-related risk change, acquisition-related performance, executive compensation, firm characteristics, and M&A deal characteristics are different between acquirers with female executives and those without. In Table 9 we examine the differences with all female executives - CEOs, directors, and executives – included in a single category. Table 10 examines only female CEOs. From Table 9, there is no evidence that acquirers with and without female executives perform differently in mergers and acquisitions. The difference in acquisition-related risk change is also statistically insignificant. However, for the CEOs of the acquirers with at least one female executive ("*female*" acquirers), the Delta of her/his compensation package is significantly lower than that of the CEOs whose companies do not have any top female executives ("*all male*" acquirers). In the case of Vega, the situation is reversed. CEOs of "*female*" acquirers (including the case that the CEOs are female) have significantly higher Vega value than the CEOs in "*all male*" acquirers. On the contrary, executives other than CEOs of "*female*" acquirers have significantly higher (lower) Delta (Vega) than their counterparts in "*male*" acquirers. There are thus significant differences in performance and risk incentives both at the CEO and at the non-CEO executive levels between all male acquirers and gender-diverse acquirers. We explore the impact of these differences on risk taking and acquisition performance further with our multivariate models.

Regarding firm characteristics, "*female*" acquirers i.e. with some female top executives have lower book-to-market equity ratio and better past performance, indicating "*female*" acquirers have experienced superior past performance before the M&A deals. As Table 9 shows, there are fewer serial acquirers in the "*female*" acquirer group. Compared to "*all male*" acquirers, "*female*" acquirers are more likely to acquire private targets. They also tend to acquire targets in the same industry[17].

[17] Classified by 2-digit SIC code.

Insert Table 9 about here

We consider the cases where the CEO of the acquirer is female in Table 10. It must be noted that this group is very small compared to the male CEO group. Acquirers with male CEOs outperform those with female CEOs, on average, by 24.32% in the 1-year post-acquisition period. The median difference is insignificant. Over the 3-year period neither group outperforms the other. In the 1-year sample, male CEOs make risk-increasing acquisitions while female CEOs make risk-reducing deals. The difference is statistically significant. Additionally, male CEOs are serial acquirers and make hostile bids whereas women CEOs are one-off deal makers and avoid hostile takeovers. Male CEOs head acquirers that are about three times the size of female-led acquires and also receive larger cash compensation than female CEOs.

Insert Table 10 about here

Multivariate Regression Analyses

Analyses of Acquisition-related Risk Change

In multivariate regression analysis, we firstly investigate whether gender diversity and managerial incentives as well as their interaction have any impact on acquisition-related risk change. The underlying risk model is as specified in Equation (1). Since female CEOs are clustered in certain industry (see Table 7), we control for the industry effect using industry dummy variables using Fama-French 48 industry classifications. Additionally, we also control for the year of the acquisition using year dummy as there is also some evidence that deals by female CEOs are clustered in certain years (see Table 6). Furthermore, we use three distinctive samples in all of our regressions, namely, whole sample (WHL sample), restricted (RSTD sample) sample, and business services industry sample (BSIS sample). Restricted sample comprises all the deals in an industry where there is at least one deal conducted by a female CEO. Business services industry sample comprises only the deals from Business Services industry.

In the Panel A of Table 11, the impact of risk incentive on acquisition-related risk is mixed. In the BSIS sample, Non-CEO executives' Vega (EXECVEGA) has a significantly positive effect in the regression of 1-year acquisition-related risk change while CEO's Vega

has a negative impact on risk change with same magnitude. But EXECDELTA has a negative effect on 1-year risk change while CEO's Delta has a significantly positive impact on risk change. In the RSTD sample, EXECDELTA and CEODELTA have equal but opposite effects on risk change.

Additionally, the coefficients of the interaction terms WOMENCEO*CEOVEGA and WOMENCEO*CEODELTA suggest that, compared to male CEOs, female CEOs are more responsive to managerial incentives. With female CEOs, increase in Vega is associated with more risky acquisitions. On the contrary, increase in Delta is associated with decrease in acquisition-related risk change. These are consistent with the *ex ante* incentive effects of Vega and Delta (see Section II above). In the unreported regressions where we separate our sample by "*female*" acquirers and "*all male*" acquirers, we find that the coefficient of Vega and Delta are only significant in the case of "*female*" acquirers. These empirical results suggest that gender diversity at the CEO level helps to increase the efficiency of executive compensation.

As Table 11 shows, firm characteristics have significant impact on 1-year risk change. Book to market ratio is negatively related to risk change while risk change increases with past performance. The deal characteristics also have certain impact on risk change. Firms that acquire publicly listed targets experience significant risk reduction during 1-year post-acquisition period. Using the RSTD sample, we also find that acquirers with deals financed by both shares and cash experience increased risk.

Insert Table 11 about here

We report the 3-year results in Panel B of Table 11. Different from the result in Panel A, using WHL and RSTD samples, we find that risk change is increasing with the presence of female CEOs. This result rejects ***Hypothesis 1a***. However, we find a significantly negative coefficient of WOMENCEO when we estimate the model using BSIS sample. This result reveals that, compared to their male counterparts of other acquirers within the business services industry where more women serve as CEOs, female CEOs are undertaking less risky M&A deals. This points to gender effects on risk taking being modified by industry factors, consistent with Byrnes et al's (1999) conclusion that the gender gap in risk taking is influenced by contextual factors. The empirical results of the interaction terms are consistent using three different datasets. Other empirical results are similar to those in Panel A. Although the negative effect of WOMENEXEC*EXECVEGA in the RSTD sample is

counterintuitive, it is only a marginal effect (significant at the 10%). Overall, the impact of non-CEO women executives on risk taking is independent of the level of risk incentives. We therefore find ***Hypothesis 1b*** supported[18]**.**

Analyses of Acquisition-related Performance

Table 12 reports the regression of 3-day CAR on gender diversity and managerial incentives as well as their interaction variables. The presence of a female CEO is associated with superior 3-day CAR. On average, the market has a more favourable initial view of deals conducted by female CEOs. However, women CEOs with high Vega underperform in the whole sample. Similarly, women CEOs with high Delta also underperform but in all three samples. This is a somewhat counter-intuitive result. Considering firm characteristics, we find that a value acquirer (acquirer with high *ex ante* book-to-market equity ratio) and an acquirer with good past performance experience better announcement returns. The empirical results of the impact of deal characteristics on 3-day CAR are consistent with those of previous related studies (see Weston et al, 2004, ch.8; Sudarsanam, ch 4, for a review).

Insert Table 12 about here

Table 13 reports the empirical results of the relation between 1-year and 3-year BHAR and gender diversity and risk incentives. We employ a binary variable (Δ RISKDUM) as the measure of acquisition-related risk change[19]. It has a value of 1 if risk change is positive and 0 otherwise. In the BSIS sample, the presence of a female CEO is associated with significant decrease (83.62%) in 1-year post-acquisition performance. The results of the 3-year sample are similar. In the 3-year BSIS sample, the difference of post-acquisition performance between female and male CEO is, on average, -242.96% and significant. In the whole sample, women CEOs are associated with a significant value decline of 130.57%.

Furthermore, the coefficient of (Δ RISKDUM* WOMENCEO) is significantly negative, indicating that risky acquisitions conducted by female CEOs may end up destroying

[18] As noted above, we control for year and industry in the regressions. In the unreported results, the variation in acquisition-related risk is mainly captured by the year dummy. The coefficients of year dummies for 1995 to 1999 are significantly positive while the coefficients of year dummies 2001 to 2003 are statistically negative. These results imply that, in our sample, acquirers during the period from 1995 to 1999 experience risk increase due to corporate acquisitions while acquirers during the period from 2001 to 2003 experience risk decrease. This suggests that, during the merger wave of the late 1990s, CEOs enjoyed doing risky acquisitions. During economic slowdown, however, CEOs behaved more conservatively and avoided risky acquisitions.

[19] We also use the direct measure of standard deviation change, Δ RISK. However, all of the coefficients of the interaction terms are statistically insignificant.

shareholder value. This rejects ***Hypothesis 3a***. In Table 11, we have seen that risk-incentivised (i.e. high VEGA) female CEOs take on more risk through acquisitions. In Table 13, we find that such risk-incentivised female CEOs (WOMENCEO*CEOVEGA) deliver superior shareholder value performance. In contrast to Vega, the performance incentive, CEODELTA, has little impact on women CEO performance. The empirical results of the impact of firm characteristics and deal characteristics on post-acquisition performance are consistent with those of previous studies.

Insert Table 13 about here

The 3-year results in Panel B of Table 13 are similar to the 1-year results in Panel A, suggesting that gender diversity, managerial incentives, and the interaction between them have significant effects on acquisition performance even in the long run. A combined interpretation of the impact of female CEO, Vega and risk change is that women CEOs may be making acquisitions that are more risky than male CEOs and this causes value destruction. However, this negative performance effect is mitigated by the risk incentives offered to female CEOs.

In Table 13, we do not find that non-CEO female executives have any significant impact. This supports our ***Hypothesis 3b***. As regards the control variables, we find that value acquirers generate a superior performance to glamour acquirers, serial acquirers destroy value over 3 years, non-cash payment methods cause value decline. Related acquisitions have a weak positive impact on shareholder value but hostile bids create more value than friendly ones but this effect is again weak and varying across samples.

Robustness Tests

Alternative event study methodology

We alternatively use the three-year buy-and-hold abnormal returns calculated by employing the matched firm approach to re-run the regression. The results are qualitatively similar. We estimate the 1-year CARs using the market model and Scholes-Williams betas and re-run the analyses. The estimation period is from 200 days to 60 days prior to the announcements of the acquisitions. The results are again qualitatively similar.

Raw BHAR and winsorizing data

Instead of using natural logarithm transformation, we estimate the empirical model with raw 1-year and 3-year BHARs and winsorize our sample at 1% and 99%. We also use

raw Vega and Delta in the regressions. The empirical results are broadly similar. We re-estimate the empirical models using a smaller common sample with both 1-year and 3-year BHARs. The empirical results are qualitatively and quantitatively similar.

Separation of female directors

When we separate female directors from female CEOs and executives in further regressions, the empirical results are generally similar and the coefficient of female directors dummy variable is qualitatively similar to that of female executives dummy variable.

CONCLUSIONS

Summary of the Empirical Results

Based on a sample of 2527 acquisitions in the US during the period January 1, 1993 to December 31, 2004, we find that top women managers are paid similar compensation to their male counterparts'. Considering risk change, we find that the presence of female CEOs is associated with increase in acquisition-related risk change during 3 years post-acquisition period. Regarding M&A performance, the market receives the M&A deals conducted by female CEOs better than those made by male CEOs, which is reflected by superior abnormal announcement returns in deals by female CEOs. However, in the long run, this difference reverses. We find that risky corporate acquisitions undertaken by female CEOs destroy shareholder's value in the long run. Our empirical results also suggest that women CEOs are more likely to respond to the incentives package and react accordingly. These results are robust to using different measures of post-acquisition performance of the acquiring firm.

Limitations and Further Study

Despite the empirical results that are generally significant to support or reject the hypotheses we propose in the paper, there are actually several points we need to address in the future. The measures of the long term firm acquisition performance are noisy and they can vary due to different event study methodologies. Further tests are still needed in order to further validate the calculated 1-year and 3-year buy-and-hold abnormal returns. Related studies suggest that age and education are two important factors we need to take into account. In the current study we do not control for these two factors mainly because of non-availability of these data in ExecuComp database. In future studies, researchers may include this information in the analysis as these factors may influence the gender gap in risk taking and sensitivity to risk incentives in executive compensation.

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Appendix A: Description of BHAR Event Study Approach

We construct benchmark portfolios based on firm size, book-to-market equity, and prior 12-month stock return to estimate BHARs. Following Mitchell and Stafford (2000), the benchmark portfolios exclude event firms, but otherwise we include all CRSP firms that can be assigned to a size-BM-momentum portfolio. Size is measured as the firm's market capitalization. The BM ratio is calculated by the formula: [stockholders' equity +deferred taxes + investment tax credit - preferred Stock] / market capitalization. For an event firm, the BM ratio is computed at the month-end preceding the effective date of the acquisitions. We measure the momentum as the 12-month pre-acquisition buy-and-hold return beginning 13 months prior to, and ending at the end of one month prior to, the effective date.

Following Daniel, Grinblatt, Titman, and Wermers (1997), we form 5×5×5 =125 passive portfolios. The portfolios are all value-weighted[20], buy-and-hold portfolios. The composition of each of the 125 portfolios is based on a triple-sort on each firm's market capitalization (proxying for size), book-to-market ratio, and momentum. At each formation date, the CRSP universe of common stocks is first sorted into quintiles based on each firm's market capitalization just prior to the formation date, which, in our case, is the last day of June each year. Even though NYSE, AMEX, and Nasdaq stocks are included in the analysis, the breakpoints for the firm's market capitalization are based on the NYSE firms only.

Subsequently, the firms within each size quintile are further sorted into quintiles based on their book-to-market ratio. The book-to-market ratio is the ratio of the book equity value at the end of the firm's fiscal year during the calendar year preceding the formation date to the market equity value at the end of the same calendar year preceding December. In order to ensure that the book value of the equity is publicly available when it is used to calculate the BM ratio to avoid the look-ahead bias, it is not used unless at least four months have elapsed after the end of the fiscal year as the annual report is not available up to four months after the fiscal year end.[21] Finally, the firms in each of the 25 size/BM portfolios are then further sorted into quintiles based on their preceding 12-month returns, which provides us with a total 125 portfolios.

[20] Based on firm's market capitalization.

[21] This ensures that accounting data are publicly available on the date of computation of the BM ratio.

The BHARs using the benchmark portfolio can then be calculated as:

$$BHAR_i = \left[\prod_{t=1}^{T}(1+\mathrm{Re}_{i,t})\right] - \left[\prod_{t=1}^{T}(1+Rmp_{i,t})\right]$$

Where *Re* is stock return of event firm, and *Rmp* is the value-weighted stock return for the matched portfolio. The mean buy-and-hold abnormal return is the equally weighted average of the individual BHARs:

$$\overline{BHAR} = \frac{1}{N}\sum_{i=1}^{N} BHAR_i$$

We also calculate the value weighted average of the BHARs, which can be expressed as:

$$\overline{BHAR} = \sum_{i=1}^{N} \omega_i BHAR_i$$

Where $\omega_i = \left(\frac{Market\ Capitalization\ of\ Firm\ i}{Total\ Market\ Capitalization\ of\ all\ Sample\ Firms}\right)$ is the weight of the sample firm *i* based on acquirer market capitalization.

Appendix B: Calculation of Vega and Delta measures

In the appendix, we follow the methodology discussed in Core and Guay (2002), Guay (1999), and Coles, Daniel, and Naveen (2005) to show how the Delta and Vega measures used in our study are calculated.

Estimating Delta and Vega of a single option

We calculate the option value based on Black-Scholes European option pricing formula (Black and Scholes, 1973), as modified by Merton (1973) to account for dividend payouts.

Option value= $Se^{-dT}N(d_1) - Xe^{-rT}N(d_2)$

Where $d_1 = \dfrac{\ln(S_0 / X) + (r - d + \sigma^2 / 2)T}{\sigma\sqrt{T}}$

$$d_2 = \frac{\ln(S_0 / X) + (r - d - \sigma^2 / 2)T}{\sigma\sqrt{T}}$$

S = price of the underlying stock
X = exercise price of the option
T = time to maturity
R = ln (1+ risk-free rate)
D = ln (1+ dividend rate), where the expected dividend rate is the per-share dividends
σ = annualised volatility
N ( ) = cumulative probability function for the normal distribution

Delta = the sensitivity of the option value with respect to a 1% change in stock price

= [∂ (option value) / ∂ (stock price)] $\times$ (stock price/100)

$= e^{-dT}N(d_1) \times (S/100)$

Vega = the sensitivity of the option value with respect to a 0.01 change in stock volatility

= [∂ (option value) / ∂ (stock volatility)] $\times 0.01$

$= e^{-dT}N'(d_1) \times S\sqrt{T} \times 0.01$

Where $N'(d_1)$ is the normal density function. We multiply the sensitivity and Delta by the number of options to obtain the total dollar values of the change in CEO's wealth that will result from a 1% change in stock price and 0.01 changes in stock volatility.

Estimating Delta and Vega of portfolio of options

We calculate fiscal year end value and sensitivities of executives' option portfolios using the Core and Guay (2002) approximation method. Regarding US data, we use ExecuComp data, which gives the realisable value, i.e., the potential gains from exercising all options on the fiscal year end price, and the number of options separately for both exercisable and unexercisable options and also details of the current year's option grant.

- For the current year's grant, we compute the Black-Scholes value and sensitivities using the above formulae.
- For previously granted options, we compute the Black-Scholes value and sensitivities (Delta and Vega) separately for exercisable and unexercisable options.
    - We compute the average exercise price separately for the portfolio of exercisable options and unexercisable options. First, we divide the realisable value by the number of options, which gives the average of (stock price-exercise price). We then subtract the number from the stock price to obtain the average exercise price.
    - For exercisable options, we set the time to maturity as three years less than the time to maturity of the current year's options grants, or 6 years if no grant was made in the current year.
    - For unexercisable options, we set the time to maturity equal to one year less than the time to maturity of the current year's options grants, or 9 years if no grant was made in the current year.
    - We then calculate the Black-Scholes option value, Delta, and Vega using the average exercise price and time to maturity.
- We compute the Delta of the CEO's portfolio of stocks and options by adding the Delta of restricted stock and shares held by the CEO to the Delta of his options portfolio. We do not estimate the Vega of restricted stock and share as Guay (1999) finds that this value is trivial compared to the Vega of options.

  The Delta of stock = the fractional shareholding * 0.01 * stock price

The Vega of the manager's portfolio of stock and options = Vega of new options granted +Vega of all exercisable option held + Vega of all unexercisable options held.

Table 1
Description of the sampling process

The final sample consists of 2527 acquisitions with 2241 mergers and 286 tender offers completed during the period from January 1, 1993 to December 31, 2004. In the long term study, we estimate one-year and three-year abnormal returns of the sample firms. In estimation of one-year abnormal return, we include the deals completed during the period from January 1, 1993 to December 31, 2003. Similarly, we include the deals completed during the period from January 1, 1993 to December 31, 2001 when we estimate three-year abnormal returns. In order to sustain the independence of the observations, in the one (three) years long term study, we include the sample firm only if the firm does not have consummated deals that meet our inclusion criteria one (three) years prior to the effective date of the corporate acquisition.

Panel A: Sampling Process

Data sources	Description	Observation
SDC	Mergers and acquisitions data	18444
ExecuComp	CEO compensation data	3092
CRSP	Stock return data	3076
CompuStat	Accounting data	2527

Panel B: Sample for regression analysis

Event study type	Event Window	Sample size
Announcement effect	(-1 day,+1 day)	2527
1 year abnormal return	(0, 1 year)	1205
3 year abnormal return	(0, 3 year)	736

Table 2
Definitions of the Variables

Variable name	***Definition***
WOMENEXEC	A binary variable equals to 1 if *there is at least one top 5 women executives in the management team*
WOMENCEO	A binary variable equals to 1 if the company has a female CEO
BHAR	Acquirer's buy-and-hold returns (BHR) minus the benchmark portfolio's BHR over same post-acquisition periods, i.e., 1 year and 3 years. 125 benchmark portfolios are constructed based on the firm's size, book-to-market equity, and momentum
Δ *RISK*	1 (3) -year risk change is measure as the standard deviation of stock returns for the post-acquisition period (11 to 250 (750) days following the effective date) minus the pre-acquisition period standard deviation (300 (800) days to 60 days preceding the announcement date) adjusted by contemporary standard deviation change of market returns.
Δ *RISKDUM*	A binary variable equals to 1 if Δ *RISK is positive and 0 otherwise*
CEOVEGA	Dollar change in the value of the CEO's stock and option portfolio for a 0.01 change in standard deviation of stock returns
CEODELTA	Dollar change in the value of the CEO's stock and option portfolio for a 1% change in stock price
EXECVEGA	Sum of dollar change in the value of the executives' (excluding CEO's) stock and option portfolio for a 0.01 change in standard deviation of stock returns
EXECDELTA	Sum of dollar change in the value of the executives' (excluding CEO's)stock and option portfolio for a 1% change in stock price
TOTAL COMPENSATION	Sum of cash compensation, restricted stock granted, stock options (using modified Black-Scholes method), LTIP, and other annual compensation.
CCOMP	Sum of salary and annual bonus in $.
OWNERSHIP	Previously granted/acquired common stock and restricted stock owned by CEO at the year-end prior to the acquisition announcement divided by the contemporary total number of shares outstanding
TENURE	Number of the years a manager serves as Chief Executive Officer.
BM	Book-to-market equity is calculated by the formula [stockholders' equity+deferred taxes+investment tax credit-Preferred Stock] / market capitalization, which is computed at the end of the month preceding the month of the effective date of the acquisition.
PASTPERFORMANCE	12-month market adjusted BHR of the acquirer prior to the effective date of the acquisition
CASHPM	A binary variable equals to 1 if the acquisition is financed by 100% cash and 0 otherwise
STKPM	A binary variable equals to 1 if the acquisition is financed by 100% stock and 0 otherwise
MIXEDPM	A binary variable equals to 1 if the acquisition is financed partially by stock and partially by cash
TENDER	A binary variable equals to 1 if the acquisition is explicitly identified by SDC as tender offer
HOSTILITY	A binary variable equals to 1 if the acquisition is hostile
PUBLIC	A binary variable equals to 1 if the target is a public company
RELATEDNESS	A binary variable equals to 1 if the acquirer and target are in the same industry, i.e., the acquirer and the target share the same first two digit of their SIC codes.
SIZE	Market capitalization of the acquirer at the fiscal year end immediate before deal announcement date
RELSIZE	Ratio of the transaction value to acquirer market capitalization at the month-end preceding acquisition announcement
SERIALACQ	A binary variable equals to 1 if the firm acquires no less than 5 firms during previous 3 years

Table 3
Distribution and Descriptive Statistics of Corporate Acquisitions, 1993-2004

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. The firms are listed in the Securities Data Company's (SDC) on-line Mergers and Corporate Transactions database and have executive compensation data in Standard and Poor's ExecuComp database. In addition, company stock returns data and company accounting data are obtained from CRSP and CompuStat, respectively. Transaction value is the total value of consideration paid by the acquirer, excluding fees and expenses. The dollar value includes the amount paid for all common stock, common stock equivalents, preferred stock, debt, options, assets, warrants, and stake purchases made within six months of the announcement date of the transaction. Mergers are transactions that are identified as a merger or an acquisition of majority interest by SDC. Tender offers are transactions explicitly identified by SDC as tender offers. Cash refers to acquisitions financed with 100% cash. Equity refers to acquisitions financed with 100% equity securities. Mixed refers to all the other deals. Market capitalization is measured at the month-end prior to the announcement of the deals using CRSP. Book-to-market equity is calculated by the formula [stockholders' equity+deferred taxes+investment tax credit-Preferred Stock] / market capitalization, which is computed at the end of the month preceding the month of the announcement date of the acquisition. Acquisition premium offered is the difference between the highest price paid per share and the target share price four weeks prior to the announcement date as a percentage of the target share price four weeks prior to the announcement date. Both of these two variables are identified by SDC. Transaction value is adjusted to 2004 dollar.

Panel A: Distributions of Mean and Median Transaction Value by Year

Year	Number of acquisitions	% of sample	Mean Transaction Value ($m)	Median Transaction Value ($m)
1993	63	2.49	287.06	80.60
1994	147	5.82	290.35	91.76
1995	212	8.39	594.64	89.90
1996	228	9.02	660.44	106.54
1997	238	9.42	619.09	157.31
1998	293	11.59	1378.03	150.57
1999	311	12.31	1517.49	250.56
2000	314	12.43	1400.49	268.25
2001	223	8.82	986.36	144.86
2002	172	6.81	733.66	105.66
2003	184	7.28	974.36	141.91
2004	142	5.62	1612.52	170.80
Total	2527	100	921.21	146.56

Panel B: Distributions of Medium of Payment of Mergers and Tender Offers

	Mergers		Tender Offers	
Model of Payment	Number of Acquisitions	% of Subsample	Number of Acquisitions	% of Subsample
Cash	682	26.99	189	66.08
Equity	913	36.13	16	5.59
Mixed	932	36.88	81	28.32
Total	2527	100	286	100

Panel C: Descriptive Statistics of the Sample firm

Variable	Observations	Mean	Median
Acquirer Market Capitalization ($ m)	2527	17295.24	3009.82
Target Market Capitalization ($ m)	1190	1137.02	216.73
Acquirer Book-to-market equity	2527	0.37	0.31
Target Book-to-market equity	250	0.62	0.50
Acquisition premium (%)	1185	48.86	39.08

Table 4
Female CEOs/Directors/Executives in a Nutshell

Table 4 reports the number of women CEOs/Directors/Executives from 1992 to 2004, which is based on 136628 observations from Execucomp (6/2005 version). The percentages of CEOs/Directors/Executives to all CEOs/Directors/Executives are in parentheses.

Year	*Number of CEOs*	*Number of Women CEOs (Percentage)*	*Number of Directors*	*Number of Women Directors (Percentage)*	*Number of Executives*	*Number of Women Executives (Percentage)*	*Number of CEOs &Directors &Executives (Percentage)*	*Number of Women CEOs &Directors &Executives (Percentage)*
1992	433	1 (0.23%)	2363	24 (1.02%)	5241	105 (2.00%)	8037	130 (1.62%)
1993	1157	5 (0.43%)	2417	29 (1.20%)	6238	164 (2.63%)	9812	198 (2.02%)
1994	1549	7 (0.45%)	2046	27 (1.32%)	7084	257 (3.63%)	10679	291 (2.72%)
1995	1600	10 (0.63)	1866	25 (1.34%)	7681	343 (4.47%)	11147	378 (3.39%)
1996	1651	12 (0.73%)	1565	23 (1.47%)	8480	409 (4.82%)	11696	444 (3.80%)
1997	1674	13 (0.78%)	1287	18 (1.40%)	9102	484 (5.32%)	12063	515 (4.27%)
1998	1731	19 (1.10%)	1076	12 (1.12%)	9849	564 (5.73%)	12656	595 (4.70%)
1999	1811	23 (1.27%)	839	11 (1.31%)	9564	614 (6.42%)	12214	648 (5.31%)
2000	1792	28 (1.56%)	694	11 (1.59%)	9053	630 (6.96%)	11539	669 (5.80%)
2001	1671	29 (1.74%)	552	10 (1.81%)	8881	662 (7.45%)	11104	701 (6.31%)
2002	1669	33 (1.98%)	433	7 (1.62%)	8606	654 (7.60%)	10708	694 (6.48%)
2003	1672	34 (2.03%)	342	4 (1.17%)	7539	561 (7.44%)	9553	599 (6.27%)
2004	1042	15 (1.44%)	168	4 (2.38%)	4210	315 (7.48%)	5420	334 (6.16%)
Total	19452	229 (1.18%)	15648	205 (1.31%)	101528	5762(5.68%)	136628	6196 (4.53%)

Table 5
Are Female CEOs/Directors/Executives Paid Differently?

The mean (median) value is in $000s. The significance of mean (median) difference is indicated by t (z) statistic. The results in Panel A are based on 136628 observations from Execucomp (6/2005 version). The results in Panel B are based on the M&A sample. Note that an acquirer may have more than one female director or female executive.

Panel A: Tests Based on ExecuComp Database

Categories	*Observations*	*Cash Compensation*	*Total Compensation*	*Vega*	*Delta*
Women CEOs	229	1119.10 (765.00)	4597.77 (1749.43)	134.97 (38.51)	996.31 (164.35)
Men CEOs	19223	1262.22 (879.98)	4296.99 (1942.07)	139.39 (42.75)	1333.31 (208.84)
Test of Difference		-1.97[b] (-1.79[c])	0.54 (-0.24)	-0.23 (-0.70)	-1.58 (-1.04)
Women Directors	205	513.03 (396.29)	1384.57 (695.09)	32.24 (11.70)	345.87 (75.41)
Men Directors	15443	739.81 (521.17)	1897.18 (922.44)	50.01 (13.49)	475.68 (73.48)
Test of Difference		-6.99[a] (-5.80[a])	-2.23[b] (-4.21[a])	-3.39[a] (-2.22[b])	-1.64 (0.22)
Women Executives	5762	440.88 (315.36)	1316.45 (656.02)	24.10 (3.43)	59.15 (9.69)
Men Executives	95766	485.73 (345.00)	1428.28 (679.72)	28.90 (5.26)	100.18 (16.16)
Test of Difference		-6.48[a] (-9.98[a])	-2.61[a] (-3.69[a])	-5.15[a] (-7.21[a])	-8.17[a] (-11.51[a])

Panel B: Test Based on M&A Sample

Categories	*Observations*	*Cash Compensation*	*Total Compensation*	*Vega*	*Delta*
Women CEOs	25	886.51 (609.5)	7161.80 (1646.7)	279.14 (28.62)	6585.89 (1056.57)
Men CEOs	2502	1522.96 (1023)	7190.48 (2809.82)	229.17 (70.08)	2953.62 (385.95)
Test of Difference		-4.01[a] (-2.79[a])	0.01 (2.00[b])	0.50 (-1.72[c])	2.27[b] (2.04[b])
Women Directors	23	549.63 (418.50)	1920.28 (1424.50)	60.02 (24.10)	317.31 (98.23)
Men Directors	1590	933.33 (698.46)	3166.03 (1474.36)	112.84 (33.99)	997.07 (152.73)
Test of Difference		-4.77[a] (-3.11[a])	-2.40[b] (-1.18)	-2.22[b] (-0.67)	-2.78[a] (-0.90)
Women Executives	692	588.39 (400.00)	2494.29 (1150.01)	51.16 (11.66)	174.71 (28.90)
Men Executives	10967	642.56 (456.80)	2876.26 (1129.43)	61.61 (13.92)	295.61 (42.22)
Test of Difference		-1.99[b] (-4.39[a])	2.25[b] (1.78[c])	3.01[a] (-3.23[a])	-1.60 -1.20

Table 6
Female CEOs/Directors/Executives in M&As (by Year)

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. Female CEOs are the number of acquirers with female CEOs. Female director is the number of acquirers with at least female director on board. Female executive is the number of acquirers with at least one female top executive.

Year	*Sample size*	*Female CEO*	*Female Director*	*Female Executive*	*Total*	*Percentage*
1993	63	0	2	11	13	20.63%
1994	147	0	3	25	28	19.05%
1995	212	0	3	34	37	17.45%
1996	228	1	5	34	40	17.54%
1997	238	0	5	47	52	21.85%
1998	293	1	2	81	84	28.67%
1999	311	11	0	80	91	29.26%
2000	314	4	0	78	82	26.11%
2001	223	1	0	52	53	23.77%
2002	172	3	0	55	58	33.72%
2003	184	0	1	52	53	28.80%
2004	142	4	0	29	33	23.24%
Total	2527	25	21	578	624	24.69%

Table 7

Female CEOs/Directors/Executives in M&As (by Industry)

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. Female CEOs are the number of acquirers with female CEOs. Female director is the number of acquirers with at least female director on board. Female executive is the number of acquirers with at least one female top executive. The industry classification is based on Fama French 48 industry classification.

No.	*Industry*	*Observations*	*Female CEO*	*Female Director*	*Female Executive*	*Total*
1	Agriculture	2	0	0	0	0
2	Food Products	39	0	0	9	9
3	Candy & Soda	6	0	0	4	4
4	Beer & Liquor	2	0	0	0	0
5	Tobacco Products	0	0	0	0	0
6	**Recreation**	**19**	**2**	**2**	**1**	**5**
7	Entertainment	33	0	0	7	7
8	**Printing and Publishing**	**32**	**1**	**0**	**7**	**8**
9	Consumer Goods	26	0	1	7	8
10	Apparel	23	0	0	9	9
11	Healthcare	48	0	1	15	16
12	Medical Equipment	101	0	0	12	12
13	Pharmaceutical Products	85	0	1	27	28
14	Chemicals	48	0	0	10	10
15	Rubber and Plastic Products	3	0	0	0	0
16	Textiles	13	0	2	0	2
17	Construction Materials	48	0	0	9	9
18	Construction	19	0	0	3	3
19	Steel Works Etc	42	0	0	5	5
20	Fabricated Products	3	0	0	0	0
21	Machinery	85	0	0	9	9
22	Electrical Equipment	12	0	0	2	2
23	**Automobiles and Trucks**	**29**	**3**	**1**	**2**	**6**
24	Aircraft	11	0	0	2	2
25	Shipbuilding, Railroad Equipment	1	0	0	0	0
26	Defence	9	0	0	0	0
27	Precious Metals	2	0	0	0	0
28	Non-Metallic and Industrial Metal Mining	7	0	0	3	3
29	Coal	0	0	0	0	0
30	Petroleum and Natural Gas	70	0	0	9	9
31	**Utilities**	**63**	**1**	**0**	**21**	**22**
32	Communication	69	0	0	25	25
33	Personal Services	12	0	0	7	7
34	**Business Services**	**387**	**15**	**0**	**118**	**133**
35	**Computers**	**178**	**1**	**0**	**23**	**24**
36	Electronic Equipment	202	0	0	35	35
37	Measuring and Control Equipment	41	0	0	4	4
38	Business Supplies	31	0	0	11	11
39	Shipping Containers	2	0	0	0	0
40	Transportation	28	0	0	7	7
41	Wholesale	60	0	2	7	9
42	**Retail**	**77**	**1**	**8**	**25**	**34**
43	Restaurants, Hotels, Motels	22	0	2	5	7
44	Banking	378	0	0	101	101
45	Insurance	90	0	1	13	14
46	Real Estate	8	0	0	1	1
47	Trading	46	0	0	19	19
48	**Others**	**15**	**1**	**0**	**4**	**5**
Total		2527	25	21	578	624

Table 8
Summary Statistics of the Variables

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. The definitions of the variables are listed in Table 2. The statistics below, apart from CAR, relate only to the subsample for the 1 year post-acquisition performance analysis.

Panel A: Continuous variable

Variable	*Observations*	*Mean*	*t*	*Median*	*z*	*Standard Deviation*
CAR	2527	-0.51	-3.49[a]	-0.36	-97.5[a]	7.36
1Yr BHAR (%)	1205	0.35	0.25	-2.60	-53.5[a]	50.66
3Yr BHAR (%)	736	-1.09	-0.31	-11.5	-72[a]	95.30
1Yrr Δ RISK (%)	1205	0.02	0.82	-0.02	-17.5	0.01
3Yrr Δ RISK (%)	736	0.08	2.11[b]	0.01	11	1.02
CEOVEGA ($ 000s)	1205	160.40	15.36[a]	56.93	532.5[a]	362.50
CEODELTA ($ 000s)	1205	3204.65	3.11[a]	313.40	600.5[a]	35787.55
EXECVEGA ($000s)	1205	220.90	15.24[a]	83.77	557[a]	503.15
EXECDELTA ($000s)	1205	1877.28	3.83[a]	343.28	600.5[a]	17023.11
CCOMP ($ 000s)	1205	1346.98	33.49[a]	980.79	601[a]	1396.11
OWNERSHIP (%)	1205	2.37	14.36[a]	0.29	590[a]	5.72
BM	1187	0.41	41.98[a]	0.34	593.5[a]	0.34
PSTPF	1103	0.32	11.42[a]	0.16	194.5[a]	0.94
SIZE ($M)	1205	10788.91	11.17[a]	2312.61	602.5[a]	33536.81
RELSIZE	1205	0.19	19.86[a]	0.07	602.5[a]	0.33

Panel B: Dummy variable

Variable	*Observations*	*Proportion (%)*
WOMENEXEC	1205	21
WOMENCEO	1205	1
SERIALACQ	1205	5
STKPM	1205	35
MIXEDPM	1205	30
TENDER	1205	16
PUBLIC	1182	56
HOSTILITY	1182	5
RELATEDNESS	1182	64

[a], [b], and [c] indicate significance at 1 percent, 5 percent, and 10 percent levels, respectively.

Table 9
Female CEOs/Directors/Executives in M&A—Univariate Analyses

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. t(z)-statistics are reported for the parametric tests of the group mean (median) difference.

Attributes	*Acquirers* **WITH** *female executives*		*Acquirers* **WITHOUT** *female executives*		*Test of Difference*
	Observations	*Value*	*Observations*	*Value*	
CAR (%)	624	-0.88 (-0.31)	1903	-0.51 (-0.40)	-0.85 (0.34)
1Yr BHAR (%)	265	-1.05 (-5.68)	940	1.28 (-2.55)	0.70 (-0.68)
1Yr ΔRISK (%)	265	-0.01 (0.03)	940	0.03 (-0.03)	0.61 (0.09)
3Yr BHAR (%)	144	-5.11 (-11.40)	592	-0.50 (-12.16)	-0.57 (0.01)
3Yr ΔRISK (%)	144	0.00 (0.02)	592	0.09 (0.02)	-0.84 (0.32)
EXECDELTA ($000s)	624	340.80 (124.26)	1903	263.27 (89.83)	3.02[a] (4.41[a])
EXECVEGA ($000s)	624	1286.06 (455.94)	1903	2340.81 (372.66)	2.80[a] (2.24[b])
CEODELTA ($000s)	624	2219.44 (494.47)	1903	3234.95 (349.44)	-1.39 (4.35[a])
CEOVEGA ($000s)	624	270.08 (100.89)	1903	222.16 (62.63)	2.37[b] (4.60[a])
CCOMP ($000s)	624	1561.64 (986.57)	1903	1495.25 (1022.88)	0.77 (-0.35)
OWNERSHIP (%)	624	2.62 (0.29)	1903	2.43 (0.28)	0.72 (0.65)
SIZE ($M)	624	15397.17 (2745.17)	1903	17588.89 (3040.19)	1.25 (0.44)
RELSIZE	624	0.16 (0.05)	1903	0.16 (0.05)	0.42 (0.39)
BM	624	0.36 (0.29)	1903	0.38 (0.32)	1.50 (-2.53[b])
PSTPF	624	0.49 (0.20)	1903	0.36 (0.19)	2.03[b] (0.11)
SERIALACQ	624	0.09 (0.00)	1903	0.15 (0.00)	-4.42[a] (N/A)
STKPM	624	0.34 (0.00)	1903	0.37 (0.00)	-1.31 (N/A)
MIXEDPM	624	0.38 (0.00)	1903	0.37 (0.00)	0.31 (N/A)
TENDER	624	0.10 (0.00)	1903	0.12 (0.00)	-0.90 (N/A)
HOSTILITY	624	0.19 (0.00)	1903	0.18 (0.00)	0.65 (N/A)
PUBLIC	624	0.44 (0.00)	1903	0.49 (0.00)	-2.31[b] (N/A)
RELATEDNESS	624	0.64 (1.00)	1903	0.60 (1.00)	1.67[c] (N/A)

[a], [b], and [c] indicate significance at 1 percent, 5 percent, and 10 percent levels, respectively.

Table 10
Female CEOs in M&A—Univariate Analyses

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. t(z)-statistics are reported for the parametric tests of the group mean (median) difference.

Attributes	*Acquirers* WITH *Female CEOs*		*Acquirers* WITH *Male CEOs*		*Test of Difference*
	Observations	*Value*	*Observations*	*Value*	
CAR (%)	25	-0.39 (-0.18)	2502	-0.51 (-0.36)	0.08 (0.35)
1Yr BHAR (%)	13	-23.71 (-14.17)	1192	0.61 (-2.50)	-1.76[c] (-1.56)
1Yr ΔRISK (%)	13	-0.70 (-0.44)	1192	0.03 (-0.02)	-1.73[c] (-1.95[c])
3Yr BHAR (%)	8	-33.05 (-0.24)	728	-0.74 (-0.12)	-0.95 (-0.81)
3Yr ΔRISK (%)	8	-0.60 (-0.16)	728	0.09 (0.01)	-0.92 (-1.01)
EXECDELTA ($000s)	13	372.07 (79.31)	1192	219.25 (84.14)	0.64 (-0.03)
EXECVEGA ($000s)	13	12890.08 (132.57)	1192	1757.17 (346.72)	0.91 (-1.06)
CEODELTA ($000s)	13	2246.50 (166.56)	1192	3215.10 (313.58)	-0.56 (-0.83)
CEOVEGA ($000s)	13	267.87 (46.02)	1192	159.23 (57.26)	0.58 (-0.09)
CCOMP ($000s)	13	914.62 (730.09)	1192	1351.70 (982.26)	-3.02[a] (-1.11)
OWNERSHIP (%)	13	2.09 (0.48)	1192	2.37 (0.29)	-0.18 (0.87)
SIZE ($M)	13	3996.59 (720.93)	1192	10862.98 (2338.97)	-0.21 (-1.65[c])
RELSIZE	13	0.18 (0.09)	1192	0.19 (0.07)	0.1 (0.84)
BM	13	0.43 (0.26)	1174	0.41 (0.34)	0.13 (-0.25)
PSTPF	11	0.76 (0.10)	1092	0.32 (0.17)	-0.59 (-0.97)
SERIALACQ	13	0.00 (0.00)	1192	0.05 (0.00)	-8.22[a] (N/A)
STKPM	13	0.31 (0.00)	1192	0.35 (0.00)	0.34 (N/A)
MIXEDPM	13	0.23 (0.00)	1192	0.30 (0.00)	0.53 (N/A)
TENDER	13	0.15 (0.00)	1192	0.16 (0.00)	0.04 (N/A)
HOSTILITY	13	0.00 (0.00)	1169	0.05 (0.00)	7.95[a] (N/A)
PUBLIC	13	0.46 (0.00)	1169	0.56 (1.00)	0.69 (-0.69)
RELATEDNESS	13	0.54 (1.00)	1169	0.64 (1.00)	0.74 (N/A)

[a], [b], and [c] indicate significance at 1 percent, 5 percent, and 10 percent levels, respectively.

Table 11
Regression of Acquisition-related Risk Change on Gender Diversity

The 1-year sample consists of 1205 completed acquisitions during the period January 1, 1993, to December 31, 2003. The 3-year sample consists of 736 completed acquisitions during the period January 1, 1993, to December 31, 2001. The dependent variable is 100 × Δ Risk. The t-statistics for the significance of the coefficients are White's (1980) heteroskedasticity consistent t-statistic. The basic empirical model used in table 11 is Equation 1. The VIF factor is generally less than 10 which is an indicator of weak multicollinearity. The standard errors are in the parentheses. We control for year and industry effect by using year and industry dummy variables in the regressions (We only control for year effect in the restricted sample and business services industry sample regressions). In the unreported results, some of the coefficients of year and industry dummies are significant. The definitions of the variables are listed in Table 2. Restricted sample comprises of all the deals in an industry where there is at least one deal conducted by female CEOs. Business services industry sample comprises of only the deals from Business Services industry.

	Panel A: 1-Year			***Panel B: 3-Year***		
Coefficients	***Whole Sample***	***Restricted Sample***	***Business Services Industry Sample***	***Whole Sample***	***Restricted Sample***	***Business Services Industry Sample***[22]
INTERCEPT	-0.05	-0.23	-0.35	-0.64	-1.03	-1.84[b]
WOMENEXEC	0.34	0.22	0.58	-0.15	-0.45	0.72
WOMENCEO	0.31	0.27	-0.68	**2.39[b]**	**2.13[c]**	**-4.01[a]**
EXECVEGA	0.04	0.06	0.13[b]	0.04	0.08	0.31[b]
EXECDELTA	-0.02	-0.13[b]	-0.10	-0.04	-0.16[c]	-0.29[b]
CEOVEGA	0.02	-0.03	-0.13[c]	-0.02	-0.09	-0.27[b]
CEODELTA	0.02	0.15[b]	0.22[b]	0.03	0.19[b]	0.30[b]
WOMENEXEC*EXECVEGA	-0.05	-0.06	-0.03	-0.07	**-0.17[c]**	-0.10
WOMENEXEC*EXECDELTA	-0.02	0.01	-0.07	0.08	0.20	
WOMENCEO*CEOVEGA	**0.63[a]**	**0.55[a]**	**0.64[a]**	**0.48[a]**	**0.40[b]**	**0.81[b]**
WOMENCEO*CEODELTA	**-0.60[a]**	**-0.57[a]**	**-0.45[a]**	**-0.87[a]**	**-0.80[a]**	
Control Variables						
CCOMP	-0.01	-0.02	0.16	-0.01	0.08	0.21[c]
OWNERSHIP	0.04	-0.11	-0.21	0.02	-0.16	-0.35[b]
TENURE	-0.01[c]	-0.01[c]	-0.01	0.00	-0.01	0.01
BM	-0.30[c]	-0.04	-0.38	-0.02	-0.04	-0.53
PSTPF	0.24[a]	0.17	0.29	0.13	0.16	0.47[b]
SIZE	-0.03	0.02	-0.19	-0.01	0.00	-0.11
SERIALACQ	0.01	0.21	0.09	0.16	0.36	0.98[b]
STKPM	0.05	0.18	0.16	0.08	0.36[b]	0.04
MIXEDPM	0.06	0.33[c]	0.46	0.19[b]	0.40[c]	0.36
TENDER	0.04	0.07	-0.24	0.05	-0.04	-0.85[b]
HOSTILITY	-0.09	0.01	0.18	0.06	-0.25	0.18
PUBLIC	-0.16[a]	-0.17	-0.07	-0.14[c]	-0.11	0.15
RELSIZE	0.05	-0.07	0.07	0.14	0.04	0.33
RELATEDNESS	0.00	0.00	0.25	-0.08	0.02	0.35
Adjusted R^2	0.21	0.22	0.38	0.28	0.20	0.41
F-statistics	4.69	3.81	4.01	4.23	2.56	3.14
P-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Observations	1052	339	168	634	203	93

[a], [b], and [c] indicate significance at 1 percent, 5 percent, and 10 percent levels, respectively.

[22] The VIF of the interaction terms WOMENEXEC*EXECDELTA and WOMENCEO*CEOVEGA are abnormally high (more than 100). We therefore drop these two interaction variables and rerun the model.

Table 12
Regression of Short Term Shareholder Gains on Gender Diversity

The sample consists of 2527 completed acquisitions during the period January 1, 1993, to December 31, 2004. The dependent variable is 100 × CAR. The t-statistics for the significance of the coefficients are White's (1980) heteroskedasticity consistent t-statistic. The basic empirical model used in table 13 is Equation 2. The VIF factor is generally less than 10 which is an indicator of weak multicollinearity. The standard errors are in the parentheses. We control for year and industry effect by using year and industry dummy variables in the regressions. In the unreported results, some of the coefficients of year and industry dummies are significant. The definitions of the variables are listed in Table 2. Restricted sample comprises of all the deals in an industry where there is at least one deal conducted by female CEOs. Business services industry sample comprises of only the deals from Business Services industry.

Coefficients	***Whole Sample***	***Restricted Sample***	***Business Services Industry Sample***
INTERCEPT	-0.22	-1.58	-3.96
WOMENEXEC	0.48	2.91	6.20
WOMENCEO	**15.83[a]**	**14.64[a]**	16.98
EXECVEGA	-0.05	-0.42	-0.31
EXECDELTA	-0.34	-0.30	-0.68
CEOVEGA	0.16	0.28	0.56
CEODELTA	0.10	0.75[c]	1.51[b]
WOMENEXEC*EXECVEGA	0.08	-0.49	**-1.63[b]**
WOMENEXEC*EXECDELTA	-0.10	-0.14	0.06
WOMENCEO*CEOVEGA	**-1.41[c]**	-1.04	-0.50
WOMENCEO*CEODELTA	**-1.50[b]**	**-1.58[b]**	**-2.08[c]**
Control Variables			
CCOMP	0.18	0.03	-0.10
OWNERSHIP	-0.25	-0.85	-0.92
TENURE	0.00	0.04	-0.03
BM	3.58[b]	6.68[b]	14.77[a]
PSTPF	2.78[a]	3.98[a]	6.47[a]
SIZE	-0.13	-0.40	-0.46
SERIALACQ	0.57	0.27	0.97
STKPM	-0.94[b]	-0.70	-0.15
MIXEDPM	-0.25	-0.20	-0.52
TENDER	1.76[a]	3.34[a]	3.01
HOSTILITY	0.36	-1.22	-2.48
PUBLIC	-2.47[a]	-2.57[a]	-1.84
RELSIZE	-2.85[a]	-4.07[b]	0.49
RELATEDNESS	0.31	0.14	-1.79
Adjusted R^2	0.09	0.09	0.12
F-statistics	3.46	2.65	2.16
P-value	<.0001	<.0001	0.0004
Observations	1849	593	287

[a], [b], and [c] indicate significance at 1 percent, 5 percent, and 10 percent levels, respectively.

Table 13
Regression of Long Term Shareholder Gains on Gender Diversity

The 1-year sample consists of 1205 completed acquisitions during the period January 1, 1993, to December 31, 2003. The 3-year sample consists of 736 completed acquisitions during the period January 1, 1993, to December 31, 2001.The dependent variable is 100 × BHAR. The t-statistics for the significance of the coefficients are White's (1980) heteroskedasticity consistent t-statistic. The basic empirical model used in table 14 is Equation 2. The VIF factor is generally less than 10 which is an indicator of weak multicollinearity. We control for year and industry effect by using year and industry dummy variables in the regressions. In the unreported results, some of the coefficients of year and industry dummies are significant. The definitions of the variables are listed in Table 2. Restricted sample comprises of all the deals in an industry where there is at least one deal conducted by female CEOs. Business services industry sample comprises of only the deals from Business Services industry.

	Panel A: 1-Year			***Panel B: 3-Year***		
Coefficients	***Whole Sample***	***Restricted Sample***	***Business Services Industry Sample[23]***	***Whole Sample***	***Restricted Sample***	***Business Services Industry Sample***
INTERCEPT	-35.21	-39.73	-68.73	3.72	44.60	9.29
ΔRISKDUM	-12.81[a]	-19.33[b]	-22.84[c]	-25.29[a]	-40.33[b]	-31.87
WOMENEXEC	6.48	7.26	13.67	-27.37	-56.00	-43.59
WOMENCEO	-6.85	6.21	**-83.62[b]**	**-130.57[c]**	-64.47	**-242.96[a]**
EXECVEGA	-1.92	-1.59	-2.25	-8.70[b]	-11.33	-14.09
EXECDELTA	4.72[b]	5.16	7.78	10.02[b]	21.71[b]	30.28[a]
CEOVEGA	2.31	0.66	0.70	9.31[b]	11.89	-2.27
CEODELTA	-5.47[b]	-1.90	-5.25	-6.56	-13.63	-6.48
WOMENEXEC*EXECVEGA	4.24	6.77	-0.67	6.32	12.38	13.91
WOMENEXEC*EXECDELTA	-3.86	-5.93		-0.11	-0.99	
WOMENCEO*CEOVEGA	**9.24[b]**	7.91	**16.70[c]**	**36.71[a]**	**33.21[a]**	**60.22[a]**
WOMENCEO*CEODELTA	-5.34	-6.67		1.05	-12.49	
ΔRISKDUM*WOMENEXEC	-8.55	-6.85	-23.40	-4.06	3.07	-29.41
ΔRISKDUM*WOMENCEO	**-44.13[c]**	**-48.48[b]**	-46.27	**-96.37[b]**	-59.12	**-87.55[c]**
Control Variables						
CCOMP	3.92	6.71	11.69[c]	-1.75	-1.27	12.04
OWNERSHIP	3.94	2.29	1.44	-11.56	-4.89	-15.51
TENURE	0.37	0.47	-0.29	0.47	0.65	-1.52
BM	17.03[b]	26.12[c]	66.29[a]	37.12[c]	92.35[b]	201.30[b]
PSTPF	-1.24	0.43	-10.12	-3.84	12.02	-12.26
SIZE	1.03	-3.52	-2.69	-2.77	-9.78	-26.06[b]
SERIALACQ	-0.23	-13.55	-6.73	-28.98[c]	-86.60[b]	-15.55
STKPM	-0.59	-3.52	-0.22	-5.95	-9.18	30.70[c]
MIXEDPM	-10.97[a]	-16.74[b]	-14.99	-11.64[c]	-20.70	-19.65
TENDER	-2.67	-21.27[b]	-9.04	-2.87	-1.87	24.82
HOSTILITY	2.87	18.48[c]	24.62	-2.18	28.63[c]	48.99
PUBLIC	3.71	9.18	4.67	8.04	0.57	4.47
RELSIZE	-7.67	-9.02	-49.32[a]	-13.18	-2.58	-85.53[a]
RELATEDNESS	5.14[c]	-1.37	-3.55	2.14	11.02	30.83[c]
Adjusted R^2	0.05	0.06	0.03	0.10	0.11	0.25
F-statistics	1.73	1.57	1.17	1.9	1.75	1.93
P-value	0.0001	0.02	0.26	<.0001	0.01	0.01
Observations	1052	339	168	634	203	93

[a], [b], and [c] indicate significance at 1 percent, 5 percent, and 10 percent levels, respectively.

[23] The VIF of the interaction terms WOMENEXEC*EXECDELTA and WOMENCEO*CEOVEGA are abnormally high (more than 100). We therefore drop these two interaction variables and rerun the model. This also applies to the 3-year business services industry sample in panel B.