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Gender and Corporate Finance

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Abstract

Using a difference-in-differences approach around executive transitions, we examine whether men and women differ in corporate financial decisions. We find that companies with female CFOs make fewer acquisitions, and acquisitions made by female CFO firms have announcement returns approximately 2% higher than those made by male CFO firms. This evidence suggests greater scrutiny in deal-making by women and greater overconfidence for men. Female CFOs also issue debt less frequently. The lower debt issuance is consistent with women being relatively more risk averse, but we find mixed evidence on the impact of female CFO financial policy on shareholder value.

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I. INTRODUCTION

Men and women behave differently in a variety of settings. Barber and Odean (2001) evaluate stock trading behavior in approximately 38,000 household portfolios and find that trading is more frequent in accounts opened by men than those opened by women. This higher level of trading leads to lower net returns, and the authors attribute the higher trading in men's accounts to overconfidence as documented in previous psychological studies.[1] Other studies indicate that women are more risk averse. Previous research indicates that women invest in less risky assets in their investment portfolios (e.g., Sunden and Surette (1998) and Bernasek and Shwiff (2001)), and similar behavior is shown in simulated gambles (Levin, Snyder and Chapman (1988)) and is reported in surveys on risk preferences (Barsky, Juster, Kimball, and Shapiro (1997) and Prince (1993)).

We examine differences in behavior by gender in a new setting: corporate financial decision making. The number of female top executives in the U.S. has increased significantly. Among major U.S. corporations in 2005, 8.0% of CFOs and 2.0% of CEOs were women, versus 2.8% and 0.5% in 1994, respectively. Despite this increase in female representation, little research has examined whether gender plays a role in corporate decisions. We evaluate whether firms with female CFOs make different financing or acquisition decisions compared to firms with male CFOs. We then examine whether any differences in decisions identified for women are better or worse for shareholder value. Our analysis provides an evaluation of gender differences in a new setting as well an examination of the potential impact of discrimination in executive hiring (since CFOs are hired by boards/CEOs who may discriminate based on gender). Our study also differs from most

[1] See Lundeburg, Fox and Puncochar (1994), Prince (1993), and Deaux and Farris (1977), among others.

other studies of gender differences since our sample of female executives differs from women overall; female executives are on average more educated than the general population and have made it through rigorous competition to achieve their positions.[2]

Our empirical tests identify several differences in behavior for female CFOs relative to male CFOs. We find that firms with female CFOs grow more slowly and are less likely to make acquisitions. Investors seem to appreciate that female executives undertake greater scrutiny in making acquisitions, as we find that acquisitions made by female CFOs experience higher announcement returns compared to those made by firms with male CFOs. Female CFOs are also less likely to issue debt, less likely to make significant changes to capital structure in general and reduce leverage more than male CFOs, although some of these findings are less reliably significant. Male capital structure decisions are as likely to move a firm toward its target leverage as those made by female CFOs, yet announcement returns for equity offerings are more favorable for women.

We consider several explanations for the differences in executive behavior by gender. Becker (1957) argues that employers with a taste for discrimination will hire desired employees despite higher costs associated with hiring these employees. Employers who discriminate against women will therefore employ fewer than the profit-maximizing number of women. This implies that women who are hired will on average be of higher quality, since they were able to overcome discriminatory preferences, so decisions made by female CFOs will be better for shareholder value creation.

[2] Our study examines CFOs instead of CEOs since the sample of female CEOs is too small for meaningful analysis (12 observations in our sample). Frank and Goyal (2007) find that CFOs are at least as important as CEOs for corporate financing decisions.

Contrary to Becker's arguments, other models argue that female executives could be lower quality on average. Coate and Loury (1993) argue that affirmative action in hiring decisions can lead to lower quality female employees on average, even in cases in which the average quality is the same across gender ex ante. Models of statistical discrimination argue that differences in the treatment of men and women arise from average differences between the two groups in the expected value of productivity or in the reliability with which productivity may be predicted which leads employers to discriminate on that basis (Phelps (1972), Arrow (1973), and Aigner and Cain (1977)). Gneezy, Niederle, and Rustichini (2003) find in a laboratory experiment that women are less effective than men in competitive environments.

Our evidence on the lower frequency of acquisitions and higher announcement returns for female CFO firms is consistent with discrimination leading to lower average quality male CFOs. Lower quality managers may be overly optimistic or overconfident in evaluating deal synergies or fail to account properly for winner's curse (as in Roll (1986)). Lower quality managers may also be overconfident in financing decisions which would lead to excessive transactions costs (similar to arguments in Barber and Odean (2001) regarding excessive trading). Consistent with this, we find that men make financing decisions more frequently (although the magnitude of this difference is small), and announcement returns are higher for seasoned equity offerings made by female CFOs. However, we also find that capital structure decisions made by men generally move a firm toward its target capital structure, indicating male CFO financial decisions are consistent with shareholder value creation.

Our evidence on lower debt issuance by women on the other hand may be consistent with female CFOs being lower quality on average. Women have been shown to be more risk averse than men in

other settings. Risk averse managers may maintain lower than the shareholder maximizing level of leverage to preserve their own undiversified human capital (Fama (1980) and Berger, Ofek and Yermack (1997)). However, we do not find that female CFOs make decisions that are consistently risk averse, since the evidence on leverage overall is not reliably statistically significant. Furthermore, announcement returns are positive for equity offerings by firms with a female CFOs, inconsistent with the notion that women make financial decisions that do not maximize shareholder value. Overall, we conclude that the weight of the evidence suggests that on average, female CFOs make better decisions for shareholders than male CFOs.

Female executives are not randomly assigned to firms, so our empirical framework must consider potential endogeneity issues. If firms do not discriminate by gender when hiring executives, the gender of an executive could be considered as random as the color of the CFO's hair or whether a CFO's first name begins with the letter 'J' or 'M'. On the other hand, if firms discriminate based on gender, the same characteristics that are associated with discriminatory behavior may be associated with the outcomes found in this paper. Female representation is also not uniform across all kinds of firms. Discriminatory exclusion of women from "male" jobs can result in an excess supply of labor in "female" occupations, as in Bergmann's (1974) overcrowding hypothesis. For example, female executives are more highly represented at consumer products firms. If consumer products firms also grow more slowly, for example, a spurious conclusion could be made. Female executives may also seek out firms that are different. Perhaps, for example, women choose to work at firms that make better acquisitions.

To mitigate these issues, we use a difference-in-differences framework for our empirical tests, comparing activity before and after transitions from a male to a female CFO with a control sample

of male-to-male transition firms.[3] We use male-to-male transition firms as our control group thereby conditioning all tests on the occurrence of a CFO transition of any kind, and since we compare behavior and outcomes after a transition to a female CFO with those before the transition, we remove any time invariant unobservable firm effects. Therefore, any other characteristics of a firm must have changed at the same time of the transition, and be independent of a transition, for alternate explanations to be supported. However, we can't completely rule out the argument that some unobserved change in discriminatory orientation of the firm that coincides with the decision to hire a woman could explain our findings. Firms may also seek out women if they know that men and women differ in corporate financial policy. For example, if a firm knows that it would like to reduce its acquisitions, perhaps it deliberately hires a female. This particular interpretation is generally consistent with our overall interpretation, although it suggests a feedback channel that may intensify the results we find.

To our knowledge, ours is among the first papers to study gender differences in the corporate setting. Existing literature examines gender differences in personal finance decisions (Barber and Odean (2001)), the mutual fund industry (Atkinson, Baird and Frye (2003)) and at start-up firms (Verhuel and Thurik (2001)). Two contemporaneous working papers examine firm gender behavior differences in the corporate setting, but for different decisions and with different empirical approaches. Levi, Li and Zhang (2008) focus solely on deal premiums in acquisitions in which the target firm is headed by a female CEO. By focusing on CEOs, their female sample ranges from only four to eleven for their main tests. Peng and Wei (2008) examine the investment/cash flow sensitivity for firms with female top executives (CEOs, presidents, or chairpersons). In addition to examining different aspects of executive behavior, neither of these contemporaneous papers

[3] Through hand collection we identify all CFO transitions (from male to female or male to male) for all firms larger than $500 million from 1994-2005.

conducts difference-in-differences tests, nor do they hand collect executive gender data to obtain a more comprehensive sample (they cover only firms in the S&P1500).

The rest of the paper is organized as follows. In Section II, we describe previous literature on gender differences and relate those findings to potential implications for gender differences in corporate decisions. In Section III, we provide our main empirical tests which examine gender differences in capital structure and acquisitions. In Section IV, we evaluate the impact of gender differences in firm policy on firm value. In Section V, we conclude.

II. GENDER DIFFERENCES AND EXECUTIVE DECISIONS

Although this paper is the first to examine whether differences in gender lead to different corporate financial decision making, significant literature examines gender behavior differences in other settings. In this section, we describe some of the existing evidence on differences in gender, the literature on gender discrimination, and we also summarize literature that examines non-gender executive characteristics. In doing so, we note how these studies provide insights into the interpretation of any potential relationships we identify in our empirical work.

II. A. Overconfidence

Overconfidence is pervasive, as shown in studies such as Svenson (1981), in which 80% of drivers surveyed felt that they were in the top 30% of driving ability. Camerer and Lovallo (1999) conduct an experiment designed to mimic business entry and find that people are overconfident in their ability to succeed in a new business, perhaps explaining the seemingly high level of business

failures. Malmendier and Tate (2005) find that CEOs who are overconfident (measured by their decisions whether to exercise stock options) have a greater sensitivity of investment to cash flow.

With respect to gender, Lundeburg, Fox and Puncochar (1994) examine test results of students in psychology courses. In these tests, the students were also asked to assess their degree of confidence in the answers they provided. Most students exhibited a degree of overconfidence, often thinking they were correct when they were not, and this overconfidence was significantly greater for men compared to women. Prince (1993) finds that men generally report greater confidence in money matters. Barber and Odean (2001) find that men trade more frequently in their financial accounts, and that increased trading leads to lower returns net of estimated transaction costs.

In the context of corporate financial decision making, overconfidence may manifest into more frequent changes in capital structure and a greater willingness to make a significant acquisition. However, to show that increased activity reflects overconfidence, we must also determine whether any increased activity is beneficial or detrimental to firm value. Therefore we examine the relative announcement returns for decisions made by women compared to men. For capital structure activity, we also examine whether the capital market activity of men moves a firm nearer to its target capital structure compared to women, using a partial adjustment model of capital structure activity (as in Flannery and Rangan (2006)).

II. B. Risk Aversion

Previous research indicates that women are more risk averse than men. Sunden and Surette (1998) evaluate investment decisions made in defined contribution plans for approximately 4,000

households. In such accounts, women are less likely to hold their assets "mostly" in stock than men, particularly among single women. Similarly, Bernasek and Shwiff (2001) find that gender is a significant determinant of asset allocation in retirement accounts at five universities in Colorado. Women have also been shown to be more risk averse in a computer-simulated task of moving a tank across a mine field (Hudgens and Fatkin (1985)), in simulated gambles (Levin, Snyder and Chapman (1988)), and in surveys on risk preferences (Barsky, Juster, Kimball, and Shapiro (1997) and Prince (1993)). Other studies however question some of the findings that indicate differences in gender risk aversion (for example, Schuber, Brown, Gysler and Brachinger (1999) and Atkinson, Baird and Frye (2003)).

In the context of corporate financial decision making, risk aversion may translate into decisions that lower a firm's leverage. If women are more risk averse, they may issue debt less frequently, hold more cash, and achieve lower overall levels of debt. Regarding acquisitions, risk aversion could lead to a reduced propensity to make an acquisition, since acquisitions in general may be perceived as a risky endeavor. On the other hand, acquisitions make the firm larger and, especially for those that are diversifying, reduce the overall risk of bankruptcy for the firm. Therefore risk aversion could plausibly lead to a greater propensity to make acquisitions.

II. C. Discrimination

If decisions made by female executives are systematically better or worse for shareholder value, firms should hire more or fewer female executives, ceteris paribus. However, the level of female representation in executive positions may not be the firm value maximizing level due to

discrimination, affirmative action, or statistical discrimination, as suggested in previous literature. In this section, we briefly review the main arguments from the gender discrimination literature.

Becker (1979) argues that companies with a preference for a certain gender will higher greater than the profit maximizing number of that gender as employees in the firm. With perfect competition, over time these firms will be driven out of business by other firms who do not discriminate based on gender. Other forces, such as monopoly power for the firm for instance, would allow for persistent discrimination to occur. Thus women CFOs could plausibly make decisions that were systematically better than male CFOs.

Affirmative action might lead to lower quality female CFOs on average. If equally qualified female executives are not available for a certain CFO position, an explicit or implicit desire for diversity could lead to lower average quality. Even if quality were the same ex ante, placing preferences for a certain group, such as women, can lead to lower average quality ex post (as in Coate and Loury (1993)). Models of statistical discrimination argue that if differences in the quality of employees exist on average by gender (perhaps due to unequal educational opportunities), employers may use gender as a surrogate for the unobservable characteristics if the cost of obtaining more detailed information about candidates is high (see Phelps (1972) and Arrow (1973), for example).

Other related literature examines differences in pay for female top executives. Bertrand and Hallock (2001) find that top executive women earn approximately 45% less than men, although much of this difference is explained by the size of the firm and age/seniority of the woman. Black and Strahan (2001) find that prior to bank deregulation, firms were able to discriminate against women by providing a disproportionate share of rents to male workers.

II. D. The Significance of CEOs and CFOs

Our paper also extends previous literature which examines the effects of other non-gender executive characteristics on financial decision making. For example, Bertrand and Schoar (2003) find that manager fixed effects are significant for a wide variety of corporate decisions. They link these effects to managerial characteristics such as when the executive was born or if the executive has an MBA. Frank and Goyal (2007) examine the effect of CEOs and CFOs on corporate leverage. They find that leverage is affected by the particular manager, and CFOs explain more of the variation in leverage than CEOs. Kaplan, Klebanov and Sorensen (2008) examine which types of CEO characteristics increase the likelihood for being hired and their ultimate performance in LBO and venture capital deals. Liu and Yermack (2008) find that information about a CEO's home purchase decisions is related to subsequent company performance. Our study enhances the understanding of the influence of CFO characteristics on significant firm decisions.

III. EMPIRICAL RESULTS

III. A. Data and Summary Statistics

Our primary empirical framework is a difference-in-differences approach around executive transitions for which we require that a female executive be in power for at least four years (the year she is hired and three years following). We compare firm activity after the transition to a new female CFO to activity before the transition when a male CFO was in power. We further compare this against a sample of firms with a male-to-male CFO transition. We use this approach first to control for any unobserved time invariant effects of firms which hire female CFOs. A panel data

with fixed effects would also achieve this objective, but the difference-in-differences approach requires the executive to be in power for a significant time period, negates any unique effects of an executive transition, and reduces noise from dated observations. To illustrate these issues, consider a panel data regression that includes 20 years of data for a particular firm, with 19 years of a male CFO and only the last year with a female CFO. In this case, the beginning years are unlikely to provide an effective control for the last year that the female was in power. Furthermore, if the female executive was in power for only one year, she may not have a significant impact on policy that quickly. Finally, since the female was in power for a year, decisions which are unique to an executive transition would compromise the results (e.g., perhaps all executives make fewer acquisitions in their first year in office). Our approach eliminates these issues.

We focus on CFOs since the sample of CEOs is too small for meaningful analysis (applying the same filters for CEOs yields a data set of only 12 female firms). Focusing on CFOs provides a larger sample (73 female CFO firms for the majority of tests) while still examining an executive who can have a meaningful impact on firm financing and acquisition activity. Frank and Goyal (2007) indicate that CFOs are at least as significant as CEOs for major financial decisions, and anecdotal evidence indicates that CFOs can significantly affect acquisition decisions.[4]

We compile our data set for female CFOs using executive information on the ExecuComp database (which only includes the largest firms) and we supplement this with hand collected data for all firms with book assets greater than $500 million. We also require that the firm be a NYSE, AMEX or NASDAQ listed firm in COMPUSTAT. The ExecuComp database is available from 1992 and

[4] Indra Nooyi, then CFO of PepsiCo, was the "lead negotiator on a $13.8 billion acquisition of Quaker Oats" (Wall Street Journal, 2006). Responsibilities for Carol Tome, CFO of Home Depot, include "oversight of acquisitions, strategy…" (CFO magazine, 2007), and more generally, the Business Trend Quarterly states that "during a merger or acquisition, the CFO and the finance department are routinely called upon to evaluate and execute transactions."

electronic filings through SEC Edgar system became effective in 1993, so our sample covers from 1993 to 2005. We collect the name, gender, and rank of the CFO for all firms. If ExecuComp reports two executives with "CFO" or "Chief Finance Officer" in their titles for a firm in the same year, we choose the one with a higher rank. This matching identifies CFOs for 6,743 firm years. For the remaining firm/year observations, we manually collect the name and gender of the incumbent CFO of a firm/year by searching the 10K filing of the firm through the SEC Edgar system.[5] If the company filing does not report the gender of the executive or refer to the executive using third person pronouns, we search through Factiva, the company's website, and business websites, such as Forbes.com and ZoomInfo.com, to identify the gender of the executive. We end up with 12,457 firm year observations for which the name and gender of the CFO is available.

We construct our CFO transition sample from the firm/year list using the following filters: (1) We require that a CFO appears on the company's 10K reports for at least 4 consecutive years as a CFO. (2) The transition year is between 1994 and 2002, and the book assets of the firm in the transition year is greater than $500 million; (3) The predecessor is a male CFO, which means that the transition should be either a male-to-male or a male-to-female transition. (4) We exclude financial firms (SIC code between 6000 and 6999) and foreign firms (ADR, GDR, and Canadian firms). Our final sample includes 3812 firm/year observations with 584 cases of male-to-male transitions and 73 cases of male-to-female transitions. The transition year (year *t*) is defined as the first year that a new CFO appears in a firm's 10K file. For most of our analyses, we focus on the financial and investment decisions during the post transition three-year period (year *t* + 1, +2, and +3). Appendix A provides a list of the female CFOs for our sample.

[5] We also double check the accuracy of executive information reported by ExecuComp. In about 5% of the firm years that ExecuComp provides a CFO record, the executive information is inconsistent with that by the company filing. We correct the discrepancy using the information in the firm's 10K reports.

Summary statistics for the sample of CFO transitions are shown in Tables 1 and 2. Table 1 indicates that more women have been hired as CFOs recently, with 37.0% of women in our transition sample hired in the last two years versus 30.8% of male CFOs. Women are also more highly represented in consumer industries whereas men are more represented in manufacturing and other industries. The states with the highest percentage of female CFOs are Illinois and Ohio and the two with the lowest percentages are Pennsylvania and Texas.

Panel A of Table 2 shows that women are hired at firms that are significantly larger than firms which hirer males CFOs. The average size of a firm that hires a female is approximately 60% greater than that of male firms the year before the transition. Since larger firms are more visible, the Board and CEOs of those firms may have to be more careful not to discriminate in hiring and promotion decisions. Negligible differences exist between female and male firms with respect to leverage and return-on-assets. Table 2 also shows that although both female and male firms increase in size after a transition, the percentage increase is much smaller for female CFOs. The assets of a male-to-male transition firm increase approximately 28% three years after the transition compared to only 4% for female transition firms. Table 2 also indicates that female CFOs reduce leverage after a transition, although the difference appears small in this univariate analysis.

Panel B of Table 2 indicates that women are more likely to be hired by a firm with a higher percentage of outside directors, although this is not statistically significant. Outside directors may be more objective and willing to hire someone entirely based on merit. Female CFOs are also on average younger (by an average of about 2 ½ years). Female CFOs are also significantly more likely to be hired from within, whereas male CFOs are more likely to be hired externally. To the extent discrimination exists in the hiring of female CFOs, internal executives may be able to more

effectively demonstrate their quality. A higher percentage of female CFOs have an MBA, but this difference is not statistically significant. For some of this demographical data, the sample is smaller since we are unable to identify the characteristic for all firms in our sample. For this reason, our main empirical results are reported for the larger sample, but our results are robust to tests on smaller samples using these variables as controls (for example, internal versus external hiring).

Table 3 shows results of multivariate tests predicting which types of firms are more likely to hire a female CFO. Women are more likely to be hired in firms that are more profitable. Women are also more likely to be hired at retail firms or telecommunication firms. Governance measures as well as the size of the firm are not significant predictors of hiring a woman in this multivariate setting.

III.B. Main Empirical Tests

We begin our primary empirical investigation by conducting difference-in-differences tests to evaluate whether components of the left and right hand side of the balance sheet are significantly affected by the firm having a female CFO. The sample for these tests is firm years three years before and three years after a CFO transition, and the year of the transition. We limit the observations to only three years after the transition both to increase our sample size for female transitions and to mitigate serial correlation bias from difference-in-differences approaches (Betrand, Duflo and Mullainathan (2004)). Our regressions are as follows:

$$Y_{i,t+1} = \mu + \nu_i + \tau_t + \beta_1 \text{Post}_{i,t+1} + \beta_2 \text{Female}_i * \text{Post}_{i,t+1} + \beta_3 X_{i,t} + \varepsilon_{i,t} \quad (1)$$

$Y_{i,t+1}$ is the balance sheet related variable of interest (e.g., total assets) measured at the end of year t+1, ν_i are firm fixed effects, τ_t are year fixed effects, Female_i is an indicator variable for whether

firm i is a male-to-female transition firm, $Post_{i,t+1}$ is an indicator variable for whether year t+1 is after the CFO transition, and $X_{i,t}$ is a set of control variables for firm i measured at the end of year t (profitability, size, market-to-book ratio, and PPE). We also include a dummy variable for the year of the transition to separate this year from our main inference. Logarithms of the dependent variable are taken so the coefficient can be interpreted as a percentage change. Appendix B provides the definitions of the variables for our tests.

Results from these regressions are reported in Table 4. The first column shows tests with assets as the dependent variable. The negative and significant (at 1%) coefficient on Post*Female indicates that women executives increase the size of the firm at a significantly lower rate than men. The coefficient can be interpreted to roughly indicate that the percentage growth in assets for a firm for the three years after a transition to a female CFO is 6.6% lower than it is for a firm that transitions to another male CFO. Since year dummies are included, the overall trend is taken out, so the coefficient on the post variable indicates an increase generally in the rate of growth after a transition of any kind. This rate of growth however is lower for new female CFOs, consistent with the idea that men are more aggressive in building up the size of the firm. Subsequent tests evaluate whether this gender difference is due to a greater propensity for men to make acquisitions and whether this difference reflects overconfidence in men relative to women.

The next two columns indicate that the slower growth rate in assets for women is a function of both lower levels of debt and lower levels of equity. With Total Debt and Total Equity as dependent variables, the coefficients on the Post*Female variable are negative and statistically significant (at 1% or 5%). These results show that the reduction in assets is not caused by only one component of the balance sheet, suggesting that perhaps overall leverage has not changed (we test this directly in

the next set of tests). Examining cash flow variables measuring issuances and reductions of debt and equity (columns 4-7) indicates that women are significantly less likely to issue debt, but not significantly more likely to reduce equity (the samples however for these tests are smaller given missing observations for these fields). The lower likelihood for a debt issuance is consistent with women being risk averse.

Table 5 reports results from tests that further decompose firm activity for female versus male CFOs. The dependent variables are either levels (e.g., leverage) or a flow variable (e.g., debt issuance). If the dependent variable is a level, the dependent variable is measured three years after the year the new CFO is hired and we control for the level of that variable at the end of the year of transition. If the variable is a flow, we aggregate the dependent variable for the three years following the year of transition and we control for the level of that variable aggregated for the three years prior to the transition (we exclude the year of transition from the analysis). This approach is similar to a traditional difference-in-differences approach, yet by aggregating the flow variables we reduce potential serial correlation issues as suggested by Betrand, Duflo and Mullainathan (2004) (we could also aggregate the level variables, but in this setting the end of period levels convey more information than the average). Year dummies are included in this specification for the year of the transition.

Table 5 shows that in this alternate econometric approach female CFOs still are more likely to reduce long-term debt compared to male CFOs (column (4)). The coefficient on the female dummy variable is negative and significant (at 5%) when the dependent variable measures cumulative debt issuance for the three years after a CFO is hired. For the sample as a whole, firms issue a cumulative 38.6% average debt as a percentage of assets for the three years after a new CFO

is hired, but that amount is 12.6% lower for female CFOs, an economically meaningful difference. Female CFOs are also less likely to reduce equity levels, but this result is only marginally significant (at 10%). The net effect of these two differences is that leverage is not significantly different for male versus female CFOs, although the coefficient on the female dummy variable is negative (but not significant) when the dependent variable measures leverage three years after the transition. We conclude that this evidence provides moderate support that women are more risk averse. Furthermore, since men are more likely to make capital structure changes of any kind, this may reflect overconfidence.

Table 5 also shows that the percentage change in assets is again significantly lower for female CFOs. The three-year growth in assets is 16.6% lower for new female CFOs compared to male CFOs. Table 5 further indicates that women are less likely to make acquisitions. Both of these results are significant at the 5% level. These two results, together with the results of Table 4, provide consistent evidence that men are more aggressive in their acquisition and growth policy. To show that this reflects overconfidence, subsequent tests evaluate whether this aggressiveness is positively or negatively received by the market.

III. C. Propensity-Score Matching

We also evaluate financial decision making by female CFOs compared to male CFOs using a propensity score matching approach. These tests serve as robustness test for our main results and provide further insights into the differences in policy for female CFOs. Our matching procedure is based on a nearest neighbor matching of propensity scores, and we restrict the sample only to firms with an executive transition. The matching begins with a Probit regression of a female dummy

variable on firm characteristics. Specifically, we include profitability, size, and industry dummies, all of which are measured at the end of the transition year. We then use the predicted probabilities, or propensity scores, from this Probit estimation and perform a nearest neighbor match with replacement. This procedure ensures that a male-to-female transition firm is paired with a male-to-male transition firm with statistically the same transition-year profitability, size, and industry membership.

Table 6 reports results using this propensity-score matching approach. We still use a regression on this sample to include the lagged levels of the dependent variables. Column (2) indicates that women reduce leverage significantly more than the matched CEO sample. Leverage is approximately 5% lower for female CFOs compared to male CFOs, and this result is significant at 5%. This test supports the hypothesis that women are more risk averse in their capital structure policy. Women are less likely to reduce or issue debt, although the coefficient on female in the issuance tests is only significant at 10%. We also confirm that women are less likely to make acquisitions than their matched male CFOs, although this result too is only significant at 10%. Finally, we confirm in column (10) that even when female firms are matched to male firms with size as one of the matching variables, we find that women grow the firm much more slowly than men overall.

In summary, Tables 4-6 represent three different econometric settings in which we evaluate female executive decision making. The most robust results are that women grow the firm more slowly than men, women are less likely to make acquisitions, and women are less likely to issue debt. These results indicate that men are more aggressive in acquisition and capital structure policy, and women are more risk averse with respect to debt policy. The remaining tests of the paper evaluate whether

the decisions made by male CFOs relative to female CFOs are firm value increasing or decreasing. If, for example, we find that the increased likelihood for acquisitions made by male CFOs are value decreasing, we can then conclude that this increased activity represents overconfidence. Alternatively, if we find that these decisions increase firm value, the increased activity would not represent overconfidence but instead would represent added value to the firm.

IV. EVALUATION OF DIFFERENCES IN BEHAVIOR BY GENDER

In Section III we identify differences by gender in executive decision making. In this section we examine whether these differences affect firm value maximization.

IV. A. Acquisition Announcement Returns

To evaluate the impact of the increased likelihood for acquisition activity by firms with male CFOs, we examine the announcement returns associated with those acquisitions. One issue with this approach is that not every firm in our sample makes an acquisition, so the already small sample is further reduced. To correct for this, we define the sample a few ways, reporting the results in each instance. We either require the new CFO to have been in power for one, two or three years. The longer the CFO is in power, the more likely she will have made an acquisition, but the longer we require a CFO to be in power, the fewer CFOs we have in our sample. The sample that generates the largest number of female acquisitions is when we require the CFO to be in power for two years, but we present the main results for each of the three specifications. Table 7 presents univariate tests for the sample when we require the CFO to be in power for two years.

Table 7 presents a univariate quasi difference-in-difference test. This test differs from a standard difference-in-difference test since the sample is unbalanced. A balanced sample requires each firm in the sample to make an acquisition before the transition and after the transition. Since acquisitions are infrequent, this criterion significantly reduces the sample. Instead we use the sample which includes all firms with at least one acquisition in the two years prior to or post the transition. In all other respects, this test mirrors difference-in-difference tests from previous studies (see Card and Krueger (1994) for a similar approach).

This test indicates that firms with female CFOs experience higher announcement returns than those with male CFOs. The first row of Panel A shows that the average announcement return is 2.34% for the two years after a female CFO takes over, compared to 0.38% for the two years prior to the female CFO taking over. This difference is both economically meaningful and statistically significant. No such difference is found for male CFOs after a transition, indicating that it is not simply a result of a new CFO getting more favorable returns generally. When the difference-in-difference is taken, we find that female CFOs experience announcement returns which are 2.27% greater than male CFO firms, and this result is significant at 1%. Subsequent tests are conducted to determine if this result is robust when various controls are included.

Table 7 also indicates that women are more likely to use cash instead of stock as the mode of payment in an acquisition. Since previous studies have found a relationship between the mode of payment and announcement returns, subsequent multivariate tests control for this choice. However, men are also less likely to use cash after the transition, and thus when the difference-in-difference is taken, no significant difference between men and women emerge. We also test whether women are more or less likely to make a diversifying acquisition in Panel C. Although women are somewhat

less likely to make a diversifying acquisition than men, the difference is small and not statistically significant.

Table 8 presents results from a multivariate analysis. We require that a female CFO be in power for one, two or three years after the transition year and perform the following test:

$$CAR_{i,t} = \mu + \tau_t + \beta_0 \text{Female}_i + \beta_1 \text{Post}_{i,t} + \beta_2 \text{Female}_i * \text{Post}_{i,t} + \beta_3 X_{i,t} + \varepsilon_{i,t} \quad (2)$$

$CAR_{i,t}$ is the announcement return for an acquisition measured either as a raw return or market-adjusted return, τ_t are year fixed effects, Female_i is an indicator variable for whether firm i is a male-to-female transition firm, $\text{Post}_{i,t}$ is an indicator variable for whether year t+1 is after the CFO transition, and $X_{i,t}$ is a set of control variables for firm i measured at the end of year t (size, market-to-book ratio, a dummy for if the deal was hostile, and a dummy for a stock deal). We also exclude the year of the transition to separate this year from our main inference. This approach is identical to equation (1) except for a different set of control variables and the use of a Female-to-Male fixed effect instead of individual firm fixed effects. Using firm fixed effects would require all variation to occur within the same firm, which as mentioned previously, significantly reduces the relevant sample since only a small percentage of firms have acquisitions both before and after the transition. The broader Female-to-Male fixed eliminates any time invariant effect within male-to-female transition firms. We also provide results based on the sample that includes only firm years in the transition period as an additional robustness test.

For each of the specifications, the coefficient on the female dummy variable is positive and economically meaningful. The tests indicate that female CFOs have announcement returns that range from 0.8% to 4.4% higher than male CFOs. The coefficient is significant at 5% in over half

of the specifications. For the sample that has the most acquisitions, the 2-year sample, women have approximately 2% higher announcement returns compared to male CFOs, and the result is reliably statistically significant at 5%. These results indicate that the market views acquisitions made by firms with female CFOs to be more value increasing on average than those made by male CFOs. Since in the previous section we found that men are more likely to make acquisitions in general, these two results combined indicate that men are overconfident relative to women in their ability to make value-enhancing acquisitions.

IV. B. Seasoned Equity Offerings Announcement Returns

We also examine announcement returns around seasoned equity offerings. Univariate difference-in-differences results are presented in Table 9. These tests indicates that equity offerings are also more well received if the firm has a female CFO than if it has a male CFO. The difference-in-differences for these tests indicate that seasoned offering made by women have a 3.4% higher announcement return than those for men. This result however is significant only at the 10% level, but the economic magnitude is large. Table 10 presents multivariate analysis for announcement returns on seasoned equity offerings. In these tests, the economic magnitudes of the differences remain large (over 2% in most tests), but the coefficients are no longer statistically significant.

IV. C. Capital Structure Decisions in a Partial Adjustment Model

To evaluate further the impact of differences in capital structure behavior by firms with male versus female CFOs, we rely on a partial adjustment model of capital structure behavior as in Flannery and Rangan (2006) "FR". FR examines whether firms target leverage levels considering that firms may

only partially adjust to a target leverage level over time due to adjustment costs. They begin their analysis by proposing that a firm's target market debt ratio (MDR) can be determined as a linear combination of various capital structure factors:

$$MDR^{*}_{i,t+1} = \beta X_{i,t} \quad (3)$$

MDR is defined as short-term debt plus long-term debt, divided by total debt plus the market value of equity. The variables in X include measures of profitability, depreciation, market-to-book, size, fixed assets, and research and development. If firms target leverage levels, then absent adjustment costs, a firm will adjust back to its target debt ratio if the firm's leverage is not at its target. FR construct a model that incorporates the possibility that firms might only partially adjust toward the target due to adjustment costs as follows:

$$MDR_{i,t+1} - MDR_{i,t} = \lambda(MDR^{*}_{i,t+1} - MDR_{i,t}) + \varepsilon_{i,t+1} \quad (4)$$

In this equation, MDR* is the firms target leverage and λ is the speed of adjustment (for example, if λ is 1, then firms adjust immediately). FR test this model by inserting equation (3) into equation (4), yielding:

$$MDR_{i,t+1} - MDR_{i,t} = \lambda\beta X_{i,t} - \lambda MDR_{i,t} + \varepsilon_{i,t+1} \quad (5)$$

Using this framework, we examine whether the capital structure decisions made by male CFOs are more or less likely to move a firm toward its target leverage than those made by a female CFO. In Section III we find that men are more likely to issue debt than women and men also appear to make

more capital structure decisions in general. If these decisions lead a firm to move toward its target leverage, the increased activity would not represent overconfidence and instead would potentially represent added value for the firm. On the other hand, if this activity does not move a firm towards its target, we can conclude that men are more overconfident since minimally they will cause the firm to incur greater transactions costs with no tangible benefit. The model we test to examine this is:

$$MDR_{i,t+1} = \beta_1 MDR_{i,t} + \beta_2 FEMALE*MDR_{i,t} + \gamma_1 X_{i,t} + \gamma_2 FEMALE*X_{i,t} + \xi_{i,t+1} \quad (6)$$

Results from this test are shown in Table 11. The coefficient on MDR is 0.348, indicating a speed of adjustment of (1-0.348) = 0.652. This value is significantly larger than that found in FR (approximately 35%). Our sample includes only firms with a newly hired CFO, so this result indicates that newly hired CFOs move a firm toward its target leverage faster than firms in general. This result is similar to other studies which indicate that managers are able to make more dramatic decisions in their initial years of service.

The coefficient on the interaction variable with the female dummy variable and MDR is not significantly different from zero. Women are not more or less likely to move a firm toward its target leverage than men. This finding is depicted graphically in Figure 2, which shows that both men and women make capital structure decisions to move back toward target levels. In the previous section we found that men are more likely to issue debt and more likely in general to make capital structure decisions. That result combined with the results reported in Table 11 indicates that men make more capital structure decisions but those decisions are not necessarily better or worse for the firm.

V. CONCLUSIONS

Women make different corporate finance decisions than men. Women are less likely to make acquisitions, and the acquisitions they make appear to be better for shareholders. Women are less likely to issue debt, but their capital structure decisions are as likely as men to move a firm toward a target leverage level. These results are consistent with previous literature which finds that men are overconfident and women are more risk averse.

If some boards and/or CEOs of corporations discriminate based on gender in hiring of female CFOs, those women that are ultimately hired should be higher quality on average (to have cleared the additional hurdle of discrimination (as in Becker (1971)). The evidence of this paper suggests that female CFOs on average do in fact make decisions which are better for overall shareholder value, consistent with this discrimination argument. The market reacts favorably to major corporate decisions made by women relative to men, both for acquisitions and equity offerings.

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Appendix A: A List of Female CFOs Succeeding Male Predecessors

Company Name	Executive Name	Start	Tenure	Predecessor Name	Industry Classification (FF48)
Albertson's Inc	Felicia D. Thornton	2001	5	A. Craig Olson	Retail
American Electric Power	Susan Tomasky	2001	5	Henry W. Fayne	Utilities
Applied Materials Inc	Nancy H. Handel	2002	4	Joseph R. Bronson	Machinery
Atlantic Richfield Company	Marie L. Knowles	1996	5	Ronald J. Arnault	Petroleum and Natural Gas
Automatic Data Processing	Karen E. Dykstra	2001	5	Richard J. Haviland	Business Services
Autonation Inc	Patricia A. McKay	1998	5	Michael S. Karsner	Retail
Belo Corp	Dunia A. Shive	1998	4	Michael D. Perry	Printing and Publishing
Benchmark Electronics Inc	Gayla J. Delly	2001	5	Cary T. Fu	Electronic Equipment
Bio-Rad Laboratories Inc	Christine A. Tsingos	2002	4	Norman Schwartz	Measuring and Control Equipment
Brown-Forman Corp	Phoebe A. Wood	2000	6	Steven B. Ratoff	Beer & Liquor
Brunswick Corp	Victoria J. Reich	1999	4	Peter B. Hamilton	Shipbuilding, Railroad Equipment
Carlisle Companies Inc	Carol P. Lowe	2002	4	Kirk F. Vincent	
Central Vermont Public Service	Jean H. Gibson	2002	4	Francis J. Boyle	Utilities
Champion Enterprises Inc	Phyllis A. Knight	2002	4	Anthony S. Cleberg	Construction Materials
Cleco Corp	Dilek Samil	2001	4	Thomas J. Howlin	Utilities
Cleveland-Cliffs Inc	Cynthia B. Bezik	1997	7	John S. Brinzo	Non-Metallic and Industrial Metal Mining
Clorox Co	Karen M. Rose	1998	6	William F. Ausfahl	Consumer Goods
Coherent Inc	Helene Simonet	2002	4	Robert J. Quillinan	Measuring and Control Equipment
Compuware Corp	Laura L. Fournier	1997	9	Ralph A. Caponigro	Business Services
Consolidated Edison Inc	Joan S. Freilich	1997	8	Raymond J. McCann	Utilities
Constellation Energy Group Inc	E. Follin Smith	2001	5	David A. Brune	Utilities
Cummins Inc	Jean S. Blackwell	2001	5	Kiran Patel	Machinery
Cymer Inc	Nancy J. Baker	2002	4	William A. Angus, III	Machinery
Darden Restaurants Inc	Linda J. Dimopoulos	2002	4	Clarence Otis	Restaurants, Hotels, Motels
DirecTV Group Inc	Roxanne S. Austin	1997	4	Charles Noski	Communication
Donnelley (R R) & Sons Co	Cheryl A. Francis	1996	4	Frank R. Jarc	Business Services
DPL Inc	Elizabeth M. McCarthy	2000	4	James P. Torgerson	Utilities
Federal Signal Corp	Stephanie K. Kushner	2002	4	Henry L. Dykema	Automobiles and Trucks
Federated Dept Stores	Karen M. Hoguet	1995	11	Ronald W. Tysoe	Retail
First Data Corp	Kimberly S. Patmore	1999	7	Lee Adrean	Business Services
Flowserve Corp	Renee J. Hornbaker	1998	7	Bruce E. Hines	Machinery
Gannett Co	Gracia C. Martore	2002	4	Larry F. Miller	Printing and Publishing
GenCorp Inc	Yasmin R. Seyal	2001	5	Terry L. Hall	Defense
General Electric Co	Keith S. Sherin	1998	8	Dennis D. Dammerman	
Getty Images Inc	Elizabeth J. Huebner	2000	6	Christopher J. Roling	Business Services
Graybar Electric Co Inc	Juanita H. Hinshaw	2000	5	Carl L. Hall	Wholesale
Great Plains Energy Inc	Andrea F. Bielsker	1996	10	John DeStefano	Utilities
Home Depot Inc	Carol B. Tomé	2001	5	Dennis J. Carey	Retail
Houghton Mifflin Company	Gail Deegan	1995	6	Stephen O. Jaeger	Printing and Publishing
IMS Health Inc	Nancy E. Cooper	2001	5	James C. Malone	Business Services
Ingles Markets Inc	Brenda S. Tudor	1998	7	Jack R. Ferguson	Retail
International Game Technology	Maureen T. Mullarkey	1998	8	Thomas Baker	
International Paper Co	Marianne M. Parrs	1995	6	Robert C. Butler	Business Supplies
ITT Industries Inc	Heidi Kunz	1995	4	Robert A. Bowman	Electronic Equipment
Lam Research Corp	Mercedes Johnson	1996	8	Henk J. Evenhuis	Machinery
Limited Brands Inc	V. Ann Hailey	1997	9	Kenneth B. Gilman	Retail
MasTec Inc	Carmen M. Sabater	1998	4	Edwin D. Johnson	Construction
Miller (Herman) Inc	Elizabeth A. Nickels	1999	6	Brian C. Walker	Business Supplies
Millipore Corp	Kathleen B. Allen	1999	7	Francis J. Lunger	Measuring and Control Equipment
Nicor Inc	Kathleen L. Halloran	1999	4	David L. Cyranoski	Utilities
Oakwood Homes Corp	Suzanne H. Wood	1999	4	Robert A. Smith	Construction Materials
OMI Corp	Kathleen C. Haines	2000	6	Vincent J. de Sostoa	Transportation
PepsiCo Inc	Indra K. Nooyi	2002	4	Matthew M. McKenna	Beer & Liquor
Pharmaceutical Prod Dev Inc	Linda Baddour	2002	4	Philippe M. Maitre	Business Services
Range Resources Corp	Eddie M. LeBlanc III	1999	4	Thomas W. Stoelk	Petroleum and Natural Gas
Reliance Steel & Aluminum Co	Karla R. McDowell	1999	7	Steven S. Weis	Wholesale
Reynolds American Inc	Dianne M. Neal	2001	5	Kenneth J. Lapiejko	Tobacco Products
Ruby Tuesday Inc	Marguerite N. Duffy	2001	4	J. Russell Mothershed	Restaurants, Hotels, Motels
Sara Lee Corp	Judith A. Sprieser	1995	6	Michael E. Murphy	Food Products

Smith International Inc	Margaret K. Dorman	1999	7	John J. Kennedy	Chemicals
STERIS Corp	Laurie Brlas	1999	7	Mark L. Fagerholm	Medical Equipment
Supervalu Inc	Pamela K. Knous	1997	9	Jeffrey C. Girard	Retail
Telephone & Data Systems Inc	Sandra L. Helton	1998	7	Murray L. Swanson	Communication
Tellabs Inc	Joan E. Ryan	1999	4	Peter A. Guglielmi	Electronic Equipment
United States Steel Corp	Gretchen R. Haggerty	2002	4	John P. Surma	Steel Works Etc
United Stationers Inc	Kathleen S. Dvorak	2000	6	Daniel H. Bushell	Wholesale
Varian Medical Systems Inc	Elisha W. Finney	1999	7	Robert A. Lemos	Medical Equipment
Verizon Communications Inc	Doreen A. Toben	2002	4	Frederic V. Salerno	Communication
Weatherford International Ltd	Lisa W. Rodriguez	2001	5	Curtis W. Huff	Machinery
Wendy's International Inc	Kerrii B. Anderson	2000	6	Frederick R. Reed	Restaurants, Hotels, Motels
Williams-Sonoma Inc	Sharon L. McCollam	2000	6	John W. Tate	Retail
Yahoo! Inc	Susan L. Decker	2000	6	Gary Valenzuela	Business Services
Zale Corp	Sue E. Gove	1998	5	Louis J. Grabowsky	Retail

Appendix B: Variable Definitions

Book leverage: long term debt (item 9) plus debt in current liabilities (item 34) over long term debt plus debt in current liabilities plus the book value of common equity (item 60) plus preferred stock liquidating value (item 10) minus deferred taxes and investment tax credits (item 35).

Market leverage: long term debt plus debt in current liabilities over long term debt plus debt in current liabilities market capitalization at the end of the fiscal year (item 199 * item 25) plus preferred stock liquidating value (item 10) minus deferred taxes and investment tax credits (item 35).

Net long-term debt issuance: long-term debt issuance (item 111) minus long-term debt reduction (item 114) divided by lagged total assets (item 6).

Net short-term debt issuance: change in current debt issuance (item 301) divided by lagged total assets.

Total debt: long-term debt (item 9) plus debt in current liabilities (item 34).

Net equity issuance: sale of common and preferred stock (item 108) minus purchase of common and preferred stock (item 115) divided by lagged total assets.

Total equity: shareholders' equity (item 216).

Cash holdings: cash and short-term investments (item 1) over assets at the beginning of the fiscal year.

Dividend payout: the ratio of the sum of common dividends (item 21) and preferred dividends (item 19) over earnings before depreciation, interest and tax (item 13).

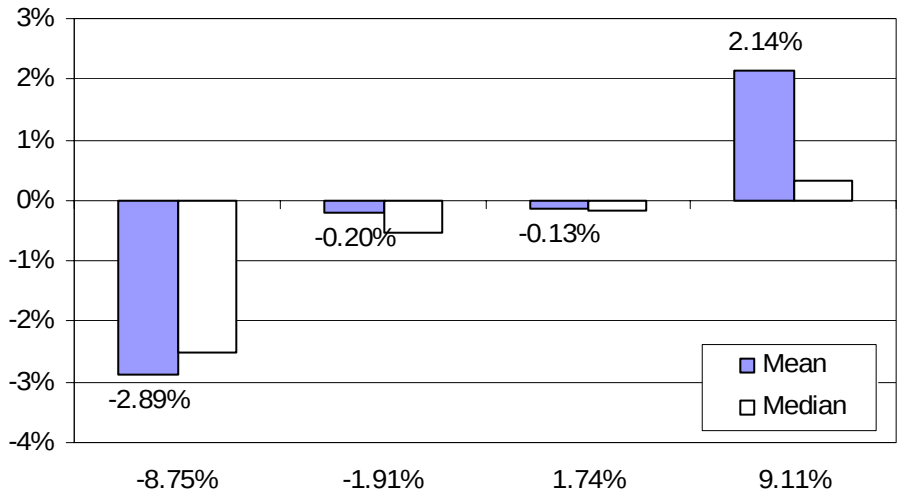
Acquisition: acquisitions (item 129) divided by transition-year total assets (item 6).

Size: the sum of market capitalization (item 199 * item 25) and book value of total debt (item 9 + item 34).

Profitability: earnings before interest, taxes, and depreciation (item 13) divided by lagged total assets.

Market-to-book: the ratio of market value of assets (item 9 + item 34 + item199 * item 25 + item 10 - item 35) to book value of assets (item 6).

PPE: net plant, property, and equipment (item 8) standardized by lagged total assets.



Horizontal axis: Mean Distance from Target (MDR*–MDR) in year t–1
Vertical axis: Change in Book Debt Ratio

Figure 2a. Subsequent year's change in book debt ratio: Male CFOs.

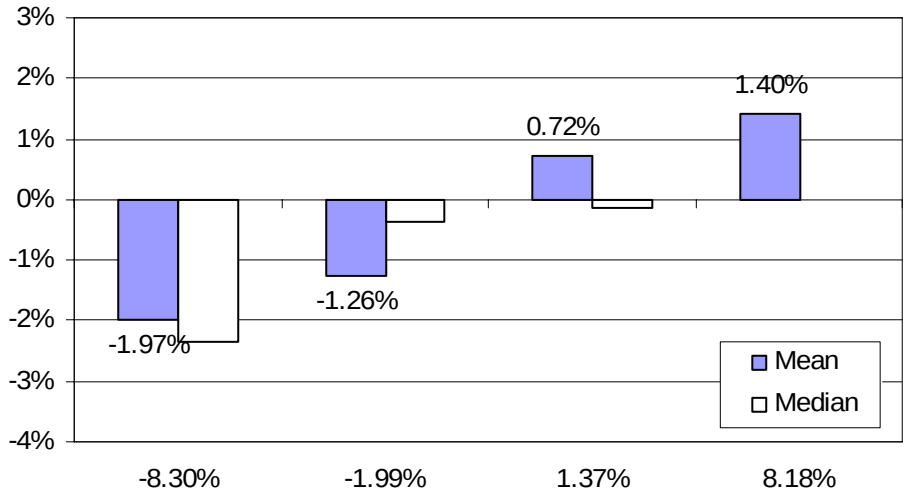


Figure 2b. Subsequent year's change in book debt ratio: Female CFOs.

Table 1: Summary Statistics

The table presents the distribution of CFOs by gender and other characteristics, including tenure, transition year, industry association, and geography. Tenure is the number of years that the executive shows up on a firm's 10K reports as a CFO. We require that the executive has to be in office consecutively for at least 4 years. The year of transition is the first year that the executive shows up on the annual report. The industry definition follows Fama-French classification which is available on Kenneth French's website.

Panel A: Distribution of CFOs by Gender and Tenure

Tenure	4	5	6	7	8	9	10	11	12	Total
Male	169	142	104	64	44	29	18	12	2	584
	28.9%	24.3%	17.8%	10.9%	7.5%	5.0%	3.1%	2.1%	0.3%	
Female	27	15	12	10	4	3	1	1	0	73
	37.0%	20.6%	16.4%	13.7%	5.5%	4.1%	1.4%	1.4%	0.0%	

Panel B: Distribution of CFOs by Gender and Transition Year

Transition Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Male	9	43	53	49	64	86	100	97	83	584
	1.5%	7.4%	9.1%	8.4%	11.0%	14.7%	17.1%	16.6%	14.2%	
Female	0	5	4	6	10	12	9	13	14	73
	0.0%	6.9%	5.5%	8.2%	13.7%	16.4%	12.3%	17.8%	19.2%	

Panel C: Distribution of CFOs by Gender and Fama-French 5-Industry Definitions

Industry	Consumer	Manufacture	Health	High-Tech	Other	Total
Male	144	215	34	110	81	584
	24.7%	36.8%	5.8%	18.8%	13.9%	
Female	24	25	2	13	9	73
	32.9%	34.3%	2.7%	17.8%	12.3%	

Panel D: States Ranked by Proportion of Female CFOs (Total # of CFOs > 30)

	Proportion of Female CFOs	# of Female CFOs
1 Illinois	25.00%	8
2 Ohio	19.44%	7
3 California	16.25%	13
4 New York	12.50%	6
5 Texas	8.11%	6
6 Pennsylvania	2.78%	1

Table 2: Firm Leverage, Profitability, and Size around CFO Transitions

Panel A of the table presents the mean statistics of leverage, profitability, and size of the sample firms around the year of transition (Year *t*). Panel B reports firm age and board characteristics of male and female CFO firms, and CFO characteristics, such as education, age, and whether the executive is hired from within.

Panel A: Firm Leverage, Profitability, and Size around CFO Transitions

	Book Leverage		Market Leverage		Profitability (ROA)		Size	
	Male-to-Male	Male-to-Female	Male-to-Male	Male-to-Female	Male-to-Male	Male-to-Female	Male-to-Male	Male-to-Female
$t-1$	42.82%	42.86%	28.63%	26.42%	14.62%	14.89%	9,014	14,524
t	43.87%	43.92%	30.42%	27.97%	13.88%	14.90%	9,330	13,309
$t+1$	43.63%	43.92%	30.16%	27.02%	13.78%	14.09%	10,222	12,749
$t+2$	43.93%	43.72%	29.68%	27.02%	13.66%	13.76%	11,497	13,450
$t+3$	43.36%	42.33%	28.78%	25.36%	13.39%	13.34%	11,975	13,794
No. of Firms	584	73	584	73	584	73	584	73

Panel B: Firm Age, Board Characteristics, and Other CFO Characteristics

	Male CFO	Female CFO	Test of Difference
Firm Age (months)	346.45	349.11	-0.08
Board Independence (%)	51.32	57.13	-1.53
Board Size	8.09	8.80	-1.32
CEO/Chairman Duality	0.79	0.83	-0.89
MBAs (%)	54.59	60.00	-0.56
CFO Age (years)	46.54	44.14	2.80***
CFO Insider Dummy (%)	47.41	64.00	-2.23**

Table 3: Probit Regression of Hiring a Female CFO

The dependent variable is a binary variable which equals 1 if a transition firm hires a female CFO and 0 otherwise. In regressions with industry dummies (Columns 2 and 3), I exclude industry code 12 (Other) in Fama-French 12 industry classifications. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	(1)	(2)	(3)
$Profitability_t$	0.293	0.342	0.275
	(2.55)**	(3.91)***	(2.47)**
$Log(Size_t)$	0.009	0.008	0.000
	(0.82)	(0.71)	(0.05)
$Market\text{-}to\text{-}Book_t$	-0.009	-0.002	0.006
	(0.99)	(0.23)	(0.88)
PPE_t	-0.075	-0.113	-0.070
	(1.36)	(1.41)	(0.92)
Firm Age	0.000	0.000	0.000
	(0.13)	(0.17)	(0.14)
CEO Age			0.001
			(0.90)
Board Independence			-0.007
			(0.11)
Board Size			0.041
			(1.12)
CEO-Chairman Duality			-0.055
			(0.59)
Consumer NonDurables		-0.029	-0.045
		(2.92)***	(2.90)***
Consumer Durables		-0.045	-0.025
		(4.39)***	(1.60)
Manufacturing		-0.015	0.000
		(1.95)*	(0.01)
Energy		-0.037	-0.056
		(2.08)**	(4.86)***
Chemicals		-0.056	-0.047
		(10.44)***	(6.91)***
Business Equipment		-0.049	-0.029
		(3.39)***	(1.61)
Telecommunications		0.127	0.083
		(3.09)***	(1.71)*
Utilities		0.032	0.045
		(1.46)	(2.09)**
Shops		0.01	0.027
		(2.40)**	(4.24)***
Healthcare		-0.07	-0.058
		(8.44)***	(4.43)***
Year FE	Yes	Yes	Yes
Observations	650	650	572
Pseudo R-Squared	0.03	0.05	0.06

Table 4: Financial and Acquisition Decisions of Male versus Female CFOs: Difference-in-Differences Regression Results

The table presents results from a panel regression of the form:

$$Y_{i,t+1} = \mu + \nu_i + \tau_t + \beta_1 \text{Post}_{i,t+1} + \beta_2 \text{Female}_i * \text{Post}_{i,t+1} + \boldsymbol{\beta}_3 \mathbf{X}_{i,t} + \varepsilon_{i,t}$$

where $Y_{i,t+1}$ is financial and acquisition activities at the end of year $t+1$, ν_i is the unobservable firm effect, τ_t is the fixed year effect, Female_i is an indicator variable for whether firm i is a male-to-female transition firm, $\text{Post}_{i,t+1}$ is an indicator variable for whether year $t+1$ is after the transition, and $\mathbf{X}_{i,t}$ is a set of control variables for firm i measured at the end of year t (profitability, size, book-to-market ratio, and PPE). Numbers in parentheses are t-statistics. All standard errors are robust to heteroskedasticity. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	Log(Assets) (1)	Log(Total Debt) (2)	Log(Total Equity) (3)	Log(Debt Iss) (4)	Log(Debt Rdct) (5)	Log(Equity Iss) (6)	Log(Equity Rdct) (7)
Post*Female	-0.066	-0.155	-0.077	-0.438	0.092	0.127	0.246
	(3.06)***	(2.62)***	(2.48)**	(2.03)**	(0.58)	(0.86)	(1.32)
Post	0.004	0.015	0.029	-0.015	0.091	-0.111	-0.115
	(0.34)	(0.42)	(1.84)*	(0.14)	(1.06)	(1.35)	(1.15)
$Profitability_t$	-0.405	-1.364	0.173	0.452	-1.866	-0.110	4.942
	(3.46)***	(2.94)***	(1.03)	(0.45)	(2.27)**	(0.16)	(5.02)***
$Log(Size_t)$	0.701	0.770	0.720	0.557	0.684	0.579	1.272
	(38.90)***	(17.17)***	(32.45)***	(5.17)***	(8.75)***	(7.46)***	(8.98)***
$Market\text{-}to\text{-}Book_t$	-0.178	-0.325	-0.150	-0.168	-0.293	0.103	-0.343
	(13.96)***	(10.43)***	(9.69)***	(2.19)**	(4.92)***	(2.49)**	(5.08)***
PPE_t	0.057	0.989	0.131	0.103	-0.571	0.365	0.253
	(0.62)	(4.09)***	(1.11)	(0.16)	(1.20)	(0.66)	(0.29)
Constant	2.216	-0.056	1.031	0.835	0.428	-2.937	-8.512
	(15.20)***	(0.10)	(4.36)***	(0.88)	(0.46)	(3.05)***	(6.07)***
Year/Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3641	3486	3641	2609	3174	2987	2133
R-squared	0.98	0.90	0.95	0.57	0.69	0.68	0.73

Table 5: Financial and Acquisition Behavior of Female CFOs: Aggregated Dependent Variables

The table presents regression results of various financial and investment variables aggregated at year $t+3$ on its own aggregated lag at the year of transition (t) and other control variables using the full sample. Industry and year fixed effects are included in all regressions. Industries are defined as the 48 Fama-French industry groups. All dependent variables, except for leverage, are measured as cumulative changes from year $t + 1$ to $t + 3$. Leverage is measured at year $t + 3$. Numbers in parentheses are t-statistics. All standard errors are robust to heteroskedasticity. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	Book Leverage (1)	Market Leverage (2)	Net LT Debt Issnc (3)	LT Debt Issnc (4)	LT Debt Rdctn (5)	Net Equity Issnc (6)	Equity Issnc (7)	Equity Rdctn (8)	Acquisition (9)	% Change Assets (10)
Female	-0.002	-0.013	-0.025	-0.126	-0.070	0.007	-0.007	-0.021	-0.039	-0.166
	(0.08)	(1.06)	(1.10)	(2.08)**	(1.38)	(0.54)	(0.64)	(1.69)*	(2.14)**	(2.30)**
$Dependent_t$	0.675	0.662								
	(16.09)***	(16.22)***								
$Dependent_{t-3 \rightarrow t-1}$			0.007	0.003	0.009	-0.009	0.003	-0.020	0.032	0.002
			(0.48)	(0.45)	(0.98)	(1.31)	(0.74)	(0.61)	(2.83)***	(0.77)
$Profitability_t$	-0.015	-0.035	0.172	0.362	0.035	-0.442	-0.013	0.551	0.122	1.286
	(0.11)	(0.26)	(1.02)	(0.97)	(0.11)	(6.28)***	(0.27)	(5.05)***	(1.31)	(2.10)**
$Log(Size_t)$	0.001	0.006	-0.006	-0.061	-0.050	-0.010	-0.008	-0.000	-0.008	-0.034
	(0.14)	(0.99)	(0.58)	(1.64)	(2.63)**	(2.74)***	(2.73)***	(0.13)	(1.68)	(1.09)
$Market\text{-}to\text{-}Book_t$	-0.002	-0.003	0.014	0.006	-0.005	-0.009	0.020	0.025	0.011	0.125
	(0.18)	(0.70)	(1.25)	(0.29)	(0.35)	(1.56)	(3.12)***	(4.07)***	(1.28)	(4.03)***
PPE_t	0.041	0.047	0.104	0.273	0.164	0.090	0.031	-0.065	0.032	0.135
	(1.29)	(1.77)*	(2.80)***	(2.30)**	(1.76)*	(4.36)***	(1.16)	(3.04)***	(0.89)	(1.84)*
Constant	0.061	-0.073	0.039	0.657	0.618	0.020	0.086	0.080	0.116	0.156
	(1.27)	(1.20)	(0.50)	(2.53)**	(3.59)***	(0.39)	(3.51)***	(1.46)	(1.99)*	(0.83)
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	603	611	622	650	645	599	631	626	613	658
R-squared	0.70	0.70	0.16	0.17	0.18	0.34	0.22	0.37	0.18	0.21

Table 6: Financial and Acquisition Behavior of Female CFOs: Propensity-Score Matched Sample

The table presents regression results of various financial and investment variables at year *t*+3 on its own lag at the year of transition (*t*) and other control variables using a propensity-score matched sample. Our matching procedure is based on a nearest neighbor matching of propensity scores. The matching begins with a probit regression of a female dummy variable on some firm characteristics. Specifically, we include profitability, size, and industry dummies, which are measured at the end of the transition year. We then use the predicted probabilities, or propensity scores, from this probit estimation and perform a nearest neighbor match with replacement. That is, a male-to-female transition firm is paired with a male-to-male transition firm with statistically the same transition-year profitability, size, and industry membership. Industries are defined as the 48 Fama-French industry groups. All dependent variables, except for leverage, are measured as cumulative changes from year *t*+1 to *t*+3. Leverage is measured at year *t*+3. Numbers in parentheses are *t*-statistics. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	Book Leverage (1)	Market Leverage (2)	Net LT Debt Issnc (3)	LT Debt Issnc (4)	LT Debt Rdctn (5)	Net Equity Issnc (6)	Equity Issnc (7)	Equity Rdctn (8)	Acquisition (9)	% Change Assets (10)
Female	-0.020	-0.048	-0.028	-0.141	-0.141	0.003	0.002	-0.003	-0.048	-0.306
	(0.72)	(2.00)**	(0.89)	(1.89)*	(2.48)**	(0.14)	(0.18)	(0.19)	(1.80)*	(2.69)***
$Dependent_t$	0.767	0.750	-0.211	0.047	0.088	0.938	0.532	1.462	-0.057	0.003
	(11.07)***	(10.33)***	(1.30)	(0.51)	(1.21)	(4.26)***	(3.80)***	(6.56)***	(0.43)	(0.46)
$Market\text{-}to\text{-}Book_t$	-0.003	-0.006	-0.003	-0.021	-0.025	-0.023	0.005	0.020	0.016	0.148
	(0.30)	(0.62)	(0.27)	(0.80)	(1.25)	(3.06)***	(1.27)	(2.67)***	(1.61)	(3.52)***
PPE_t	0.066	0.083	-0.093	-0.299	-0.220	-0.004	-0.033	-0.042	-0.151	0.121
	(1.11)	(1.56)	(1.34)	(1.82)*	(1.79)*	(0.10)	(1.29)	(1.10)	(2.65)***	(1.72)*
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	143	143	130	136	138	126	137	133	131	142
R-squared	0.64	0.64	0.27	0.23	0.15	0.23	0.22	0.37	0.27	0.29

Table 7: Announcement Returns for Acquisitions Before and After CFO Transitions

The table presents cumulative abnormal announcement returns (CAR) before and after a transition to a new CFO. CAR is defined as the abnormal 3-day announcement return adjusted by the market return. The pre-transition period consists of years *t*-2 and *t*-1, and post-transition period consists of years *t*+1 and *t*+2, where year *t* is the transition year. Numbers in parentheses are *t*-statistics based on industry-clustered standard errors. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

Panel A: Abnormal Announcement Returns

	Before	After	Difference (After-Before)
Male-To-Female	0.38%	2.34%	1.96%
	(0.39)	(1.73)	(2.09)**
Male-To-Male	-0.25%	-0.56%	-0.31%
	(0.58)	(1.42)	(0.52)
Difference (Female-Male)	0.63%	2.90%	2.27%
	(0.73)	(4.02)***	(2.77)***

Panel B: Probability of Stock Deals

	Before	After	Difference (After-Before)
Male-To-Female	38.0%	17.1%	-20.9%
	(5.48)	(2.65)	(1.31)
Male-To-Male	49.0%	33.2%	-15.8%
	(20.94)	(12.34)	(4.37)***
Difference (Female-Male)	-11.0%	-16.1%	-8.8%
	(1.25)	(1.35)	(0.51)

Panel C: Probability of Diversifying Acquisitions

	Before	After	Difference (After-Before)
Male-To-Female	56.0%	51.4%	-4.6%
	(7.9)	(6.00)	(0.52)
Male-To-Male	61.7%	58.6%	-3.1%
	(27.11)	(20.83)	(0.79)
Difference (Female-Male)	-5.7%	-7.2%	-1.4%
	(0.90)	(1.02)	(0.16)

Table 8: Multivariate Analysis of Acquisition Announcement Returns

The table presents results from a panel regression of the form:

$$CAR_{i,j} = \mu + \tau_t + \beta_1 \text{Post}_{i,j} + \beta_2 \text{Female}_i + \beta_3 \text{Female}_i * \text{Post}_{i,j} + \boldsymbol{\beta}_3 \mathbf{X}_{i,j} + \varepsilon_{i,j}$$

where $CAR_{i,j}$ is cumulative abnormal announcement return for firm i acquisition j, τ_t is the fixed year effect, Female_i is an indicator variable for whether firm i is a male-to-female transition firm, $\text{Post}_{i,j}$ is an indicator variable for whether acquisition j is made after the transition, and $\mathbf{X}_{i,j}$ is a set of control variables for firm i acquisition j (size, market-to-book, and deal characteristics). Size is the log of assets at the beginning of the year. Market-to-Book is the ratio of market value of assets (item 6 + item9 * item 25 - item 60) to book value of assets at the beginning of the year (item 6). Stock deal is a dummy that equals 1 if the fraction of equity value as a payment method in the deal exceeds 50%. Hostile is a dummy that equals 1 if the acquisition is hostile. Toehold is a dummy that equals 1 if the acquirer holds a minority interest position (less than 50%) in the target's stock before the announcement. Industries are defined as the 48 Fama-French industry groups. Panel A, B, and C report the results based on 1, 2, and 3-year post transition sample, respectively. Numbers in parentheses are *t*-statistics. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

Panel A: 1 Year Sample

	Diff-in-Diff		Post Transition Years Only	
	Raw (1)	Market-Adjusted (2)	Raw (3)	Market-Adjusted (4)
Post*Female	2.639	1.801	4.447	4.059
	(2.16)**	(1.53)	(3.18)***	(2.85)***
Post	0.338	0.389		
	(0.47)	(0.59)		
Female	1.061	1.506		
	(0.90)	(1.21)		
Size	0.213	-1.101	-0.049	-0.543
	(0.08)	(0.42)	(0.02)	(0.20)
Market-to-Book	0.029	0.024	-0.338	-0.334
	(0.59)	(0.43)	(1.67)	(1.77)*
Hostile	0.181	0.212	3.026	2.883
	(0.13)	(0.16)	(1.25)	(1.37)
Toehold	0.217	0.080	2.341	2.259
	(0.11)	(0.04)	(0.91)	(0.90)
Stock Deal	-0.505	-0.413	-0.535	-0.350
	(0.56)	(0.48)	(0.32)	(0.24)
Constant	0.851	3.016	-1.363	-0.761
	(0.16)	(0.56)	(0.28)	(0.14)
Year and Industry FEs	Yes	Yes	Yes	Yes
Observations	514	514	218	218
R-squared	0.09	0.09	0.13	0.15

Panel B: 2 Year Sample

	Diff-in-Diff		Post Transition Years Only	
	Raw	Market-Adjusted	Raw	Market-Adjusted
	(1)	(2)	(3)	(4)
Post*Female	2.086	1.868	2.521	2.655
	(2.60)**	(2.32)**	(3.69)***	(4.18)***
Post	0.458	0.470		
	(0.67)	(0.78)		
Female	0.582	0.917		
	(0.88)	(1.32)		
Log(Size)	1.536	0.049	5.673	4.472
	(0.60)	(0.02)	(1.13)	(0.96)
Market-to-Book	0.059	0.056	-0.001	0.004
	(3.03)***	(2.50)**	(0.01)	(0.04)
Hostile	0.989	0.880	4.338	4.253
	(0.68)	(0.57)	(1.72)*	(1.64)
Toehold	-2.567	-3.064	-4.080	-4.937
	(0.95)	(1.16)	(0.70)	(0.93)
Stock Deal	-0.844	-0.808	-1.614	-1.769
	(1.80)*	(1.84)*	(1.12)	(1.50)
Constant	-7.099	-4.493	-10.800	-8.347
	(1.29)	(0.83)	(1.01)	(0.84)
Year and Industry FEs	Yes	Yes	Yes	Yes
Observations	820	820	333	333
R-squared	0.09	0.09	0.17	0.18

Panel C: 3 Year Sample

	Diff-in-Diff		Post Transition Years Only	
	Raw (1)	Market-Adjusted (2)	Raw (3)	Market-Adjusted (4)
Post*Female	0.943	0.816	1.871	2.053
	(0.76)	(0.70)	(1.51)	(1.87)*
Post	0.328	0.531		
	(0.40)	(0.74)		
Female	0.941	1.154		
	(1.34)	(1.53)		
Log(Size)	0.204	-0.976	-0.612	-1.006
	(0.12)	(0.51)	(0.33)	(0.47)
Market-to-Book	0.090	0.086	0.087	0.071
	(5.77)***	(6.38)***	(0.98)	(0.88)
Hostile	-1.004	-0.401	-2.530	-1.233
	(0.60)	(0.27)	(0.92)	(0.55)
Toehold	0.011	-0.372	2.735	1.800
	(0.01)	(0.22)	(1.54)	(1.34)
Stock Deal	-1.694	-1.515	-2.909	-2.771
	(3.91)***	(3.68)***	(2.83)***	(3.08)***
Constant	-3.818	-1.650	0.226	3.050
	(1.08)	(0.42)	(0.05)	(0.66)
Year and Industry FEs	Yes	Yes	Yes	Yes
Observations	733	733	362	362
R-squared	0.10	0.09	0.16	0.15

Table 9: Announcement Returns for SEOs Before and After CFO Transitions

The table presents cumulative abnormal announcement returns (CAR) before and after a transition to a new CFO. CAR is defined as the abnormal 3-day announcement return adjusted by the market return. The pre-transition period consists of year *t*-3 to *t*-1, and post-transition period consists of year *t*+1 to *t*+3, where year *t* is the transition year. Numbers in parentheses are *t*-statistics based on industry-clustered standard errors. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	Before	After	Difference (After-Before)
Male-To-Female	-0.96%	1.90%	2.86%
	(0.84)	(1.29)	(1.67)
Male-To-Male	-0.85%	-1.40%	-0.55%
	(1.90)	(3.80)	(1.02)
Difference (Female-Male)	-0.11%	3.30%	3.41%
	(0.09)	(2.25)**	(1.89)*

Table 10: Multivariate Analysis of SEO Announcement Returns

The table presents results from a panel regression of the form:

$$CAR_{i,j} = \mu + \tau_t + \beta_1 \text{Post}_{i,j} + \beta_2 \text{Female}_i + \beta_3 \text{Female}_i * \text{Post}_{i,j} + \boldsymbol{\beta}_3 \mathbf{X}_{i,j} + \varepsilon_{i,j}$$

where $CAR_{i,j}$ is cumulative abnormal announcement return for firm i acquisition j, τ_t is the fixed year effect, Female_i is an indicator variable for whether firm i is a male-to-female transition firm, $\text{Post}_{i,j}$ is an indicator variable for whether acquisition j is made after the transition, and $\mathbf{X}_{i,j}$ is a set of control variables for firm i acquisition j (size, market-to-book, and other firm characteristics). Size is the log of assets at the beginning of the year. Market-to-Book is the ratio of market value of assets (item 6 + item9 * item 25 - item 60) to book value of assets at the beginning of the year (item 6). Return volatility is the standard deviation of daily stock return during the trading period (-90, -11) prior to the announcement date (trading day 0). Share turnover is the ratio of average daily share trading volume during the trading period (-90,-11) prior to the announcement date (trading day 0) divided by pre-SEO total shares outstanding. Industries are defined as the 48 Fama-French industry groups. Numbers in parentheses are *t*-statistics. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	Diff-in-Diff		Post Transition Years Only	
	Raw	Market-Adjusted	Raw	Market-Adjusted
	(1)	(2)	(3)	(4)
Post*Female	2.612	2.596	1.904	2.326
	(1.07)	(1.07)	(0.87)	(1.01)
Post	-1.046	-0.986		
	(1.15)	(1.24)		
Female	0.001	0.275		
	(0.00)	(0.16)		
Log(Size)	0.640	2.051	-2.706	-2.011
	(0.17)	(0.59)	(0.64)	(0.53)
Market-to-Book	0.135	0.120	0.016	0.007
	(5.01)***	(5.06)***	(0.02)	(0.01)
Log(Net Proceeds)	-0.042	-0.179	0.384	0.216
	(0.07)	(0.31)	(0.66)	(0.40)
Return Volatility	0.337	-16.123	-84.303	-83.469
	(0.00)	(0.23)	(0.77)	(0.85)
Share Turnover	-0.426	-0.568	0.210	0.010
	(0.28)	(0.48)	(0.09)	(0.00)
Constant	-1.207	-3.913	4.652	3.498
	(0.21)	(0.73)	(0.70)	(0.58)
Year and Industry FEs	Yes	Yes	Yes	Yes
Observations	331	331	158	158
R-squared	0.17	0.19	0.32	0.33

Table 11: Target Leverage Behavior of Female versus Male CFOs

This table presents regression results from Flannery and Rangan (2006) model of partial adjustment toward target leverage. Specifically, we run the following regression:

$$MDR_{i,t+1} = \beta_1 MDR_{i,t} + \beta_2 FEMALE*MDR_{i,t} + \boldsymbol{\gamma}_1 \boldsymbol{X}_{i,t} + \boldsymbol{\gamma}_2 FEMALE*\boldsymbol{X}_{i,t} + \xi_{i,t+1}$$

where MDR is the market debt ratio. Female is a dummy variable which equals 1 if the executive is a female CFO and 0 otherwise. EBIT_TA is earnings before interest and taxes as a proportion of total assets. MB is the market-to-book ratio of firm assets. DEP_TA is depreciation expense as a proportion of total assets. LnTA is natural logarithm of total assets. FA_TA is fixed assets as a proportion of total assets. R&D_DUM is a dummy variable indicating that the firm did not report R&D expenses, and R&D_TA is R&D expenses as a proportion of total assets. Firm fixed effects are included in the regression. Significance on a ten percent (*), five percent (**), or one percent level (***) is indicated.

	Coefficients	t-Stats
MDR	0.348	6.83***
FEMALE*MDR	-0.006	-0.06
EBIT_TA	0.041	0.46
MB	0.002	0.39
DEP_TA	0.591	1.89*
LnTA	0.029	3.31***
FA_TA	-0.097	-1.65*
R&D_DUM	-0.029	-0.84
R&D_TA	0.036	0.18
FEMALE*EBIT_TA	0.025	0.11
FEMALE*MB	0.005	0.35
FEMALE*DEP_TA	-0.585	-0.71
FEMALE*LnTA	-0.005	-0.58
FEMALE*FA_TA	0.101	0.87
FEMALE*R&D_DUM	0.013	0.22
FEMALE*R&D_TA	0.166	0.34