

BOARD INDEPENDENCE AND THE GENDER PAY GAP FOR TOP EXECUTIVES*

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Abstract

Since the early 1990s, a 25%-45% gender pay gap has persisted for the top five executives in U.S. publicly traded companies. I present an empirical approach to determine the relative importance of two possible explanations for the gender pay gap that originate with employers: gender taste-based discrimination, and downward-biased beliefs about women's performance. I use the 2003 SEC regulation event that required boards to become more independent and disallowed insiders to serve on the compensation committee to distinguish between the two possible causes of discrimination. Independent board members do not work alongside executives and so would be less inclined than insiders to indulge in taste-based discrimination. Independent board members, on the other hand, have less information about executives' performance and are thus more likely to rely on their prior, potentially biased beliefs about women's performance when they set pay. I find that the gender pay gap became *19% larger* in firms that were required to convert to more independent boards compared to firms that were not, which is not consistent with taste-based discrimination. An increase in the pay gap is consistent with downward-biased beliefs about women's performance, but also with reverse taste-based discrimination. I distinguish between these two hypotheses by examining whether the increase in the pay gap is persistent and uniform across positions. I find the increase in the pay gap reverted as independent board members had time to learn about individual performance. And, the gap did not widen in occupations where accreditation provided an easy-to-interpret signal of ability. These results are consistent with board members having downward-biased beliefs about women's performance.

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I. INTRODUCTION

The gender gap has been a persistent feature of executive compensation, ranging between 25% and 45%¹ since the early 1990s for the top five executives in U.S. publicly traded companies. The cause of the gap has been difficult to pinpoint. Studies have identified observable differences in the characteristics of executives that can proximately explain some of the gender pay gap, such as the rare occurrence of women CEOs (Bertrand and Hallock, 2001; Bell, 2005; Yurtoglu and Zulehner, 2007). Still, observable characteristics of executives do not go very far to explain the underlying causes of the gender pay gap.

I use an original empirical approach to investigate the underlying causes of the gender pay gap. I focus on the characteristics of compensation setters - members of the board of directors - to test the relative importance of two explanations of the pay gap on the employer side: (1) gender taste-based discrimination, which is a preference for working in all-male groups, and (2) biased beliefs about women's performance, which are systematic mistakes in estimating women's performance in the face of incomplete information. Boards of directors have two types of compensation setters: independent board members, who are neither employed by nor have business ties with the company, and insiders, who are typically executives who sit on the board. Independents should be less willing than insiders to allow a preference to work in all-male groups to influence their compensation decisions because they do not work alongside the executives whose pay they set, and so they would be less likely to let their tastes interfere with their obligation to obtain a competitive

¹ Based on Total Compensation (TDC1 from the Execucomp database) of the top five executives in Standard and Poor's (S&P) LargeCap 500, MidCap 400 and SmallCap 600 companies, or the S&P 1500, 1992-2005. The S&P 1500 cover about 85% of the U.S. equities market.

return for shareholders. Thus increased board independence would reduce a pay gap stemming from taste-based discrimination. However, independent board members do not have as much information available to them as insiders do and so may rely on their potentially biased beliefs about women's performance to set pay. Thus increased board independence would increase a pay gap stemming from downward-biased beliefs about women's performance.

To distinguish empirically between these two types of discrimination, I exploit a regulation event, the 2003 SEC rules, which required corporate boards to become more independent and disallowed insiders to serve on the compensation committee.

I find the gender pay gap became 19% larger in firms that converted to more independent boards compared to firms that did not. This finding is not consistent with independent boards driving out gender taste-based discrimination. It is consistent with either downward-biased beliefs about women's performance or reverse taste-based discrimination, a preference for working with women executives.

I develop a simple dynamic model with empirical predictions to distinguish between mistake-based discrimination (biased beliefs) and preference-based discrimination (taste-based or reverse taste-based discrimination). The model has features of employer learning to capture the relationship between biased beliefs about women's performance and the gender pay gap (Altonji and Pierret, 2001; Ichino and Moretti, 2006). A Becker-type wedge (1971) between performance and pay captures the effect of taste-based discrimination. The model predicts that if a newly independent board corrects for taste-based or reverse discrimination, the gender pay gap will show a constant decrease or increase over time and a uniform decrease or increase across occupations. In contrast, if

newly independent boards have downward-biased beliefs about women's performance, the gender pay gap will initially become larger and then revert to previous levels as newly independent boards learn more about individual performance. Also, when executives possess additional signals of ability, for instance accreditation, newly independent boards will rely less on potentially biased beliefs about women's performance and the initial increase in the pay gap will be less pronounced than for non-accredited executives.

I build a panel of annual data merged from the Execucomp database and the RiskMetrics database over the sample range 1998 to 2005. The Execucomp data consist of the universe of firms in the S&P 1500 and their top five (most highly paid) executives. The RiskMetrics database contains the information about members of the boards of directors that I use to construct a measure of board independence consistent with the policy event.

I test the effect of board independence on the gender gap in executive compensation by using the introduction of the 2003 NYSE/NASD Corporate Governance Listing Standards as the event that changes board independence.² This regulation required boards to have a majority of independent directors, and entirely independent nominating, compensation and audit committees. The control group consists of firms that had already complied with the regulation in 2002, and the treatment group consists of firms that did not comply with the required degree of board independence in 2002 but subsequently complied in 2003 or 2004. The event window spans 2002, before the event, and 2004, after the event, when most firms were required to comply. Using a difference-in-difference-in-

²Wintoki, 2007 and Chhaochharia and Grinstein, 2008 used this event to test its impact on CEO pay and firm performance.

differences research design, I compare the pay of men and women executives in the treatment and control firms, before and after the event.

This research methodology has some caveats. The firms in the control and treatment groups are not assigned randomly, which may result in systematic differences between the groups and confound the interpretation of the results. I confirm that the characteristics of the firms, executives and boards in the comparison groups are not significantly different across a wide array of observable characteristics (for instance, market value, number of female top executives in firms, and gender composition of the board). Also, the difference-in-difference-in-differences specification isolates the change in the pay gap between control and treatment firms so any systematic differences between comparison firms is a concern only if it affects men's and women's compensation differently.

I consider two explanations for the 19% increase in the gender pay gap in firms that converted to more independent boards, compared to firms that did not: (1) the widening gap is consistent with downward-biased beliefs about women's performance in the face of incomplete information, and (2) the widening gap is consistent with the new boards correcting for reverse taste-based discrimination. I test these hypotheses by estimating whether the increase in the gender pay gap reverts over time, and whether the increase in the pay gap is less pronounced in occupations that require credentials. I find the increase in the gender pay gap does revert in the years following the event and the pay gap does not widen at the time of the event in the Chief Financial Officer and Legal Counsel occupations, both of which require accreditation. These results comport with a model of employer learning with biased prior beliefs.

The results complement psychological and economic research showing that when assessing the ability of female senior executives, boards are informed by a smaller and shorter sample for women than for men, a pronounced and recent change in skills and labor force attachment for women, more heterogeneous and ambiguous performance measures for women than men, and the tendency to attribute inferior performance more to women than men in downturns.³ Thus, if boards look to gender as a signal of ability, their prior beliefs, which are evolving in the face of changing and uncertain information, might lead them initially to pay women less than their performance would merit.

The next section lays out a model and empirical predictions. Section III discusses the data and stylized facts and Section IV explains the event. Sections V and VI present and discuss the results. Section VII offers some conclusions.

II. MODEL AND EMPIRICAL PREDICTIONS

To distinguish the two potential channels for discrimination, mistake-based and preference-based, I present a simple dynamic model where employers can learn about the performance of their employees over time (Farber and Gibbons, 1996; Altonji and Pierret, 2001; Ichino and Moretti, 2006), and also may have persistent preferences for working in all-male groups.⁴

³ Nieva and Gutek, 1980; Bertrand and Hallock, 2001; Goldin, 2002; Khurana, 2002; Blau and Kahn, 2003; Goldin, 2004; Bell, 2005; Hewlett and Luce, 2005; Bertrand, Chugh, and Mullainathan, 2005; Bigelow and Parks, 2005; Lee and Hayes, 2007; Brescoll, 2007; Goldin and Katz, 2008; Bertrand, Goldin and Katz, 2009; Selody, 2010

⁴ Typically an incentive pay model, where boards set contracts to reward performance and executives choose their effort level, depicts the pay setting process for executives. Because the focus of this paper is a change in employers that is independent of executive characteristics and executive effort, a model that describes the relationship between employer learning and employee pay is more appropriate.

An employer learning model of the gender pay gap

Boards act as employers on behalf of shareholders to set compensation f_i for a top executive. The boards never really know how much an individual executive contributes to a company's performance. They can rely on their beliefs \tilde{g}_i about the relationship between firm performance and easy-to-observe characteristics g_i such as education, credentials, gender, or race, and their experience accumulated over time a_{pt} of estimates of an executive's contribution to the firm's performance, p_{it} .

$$f_{it} = a_{gt} \tilde{g}_i + \sum_t a_{pt} p_{it} \quad (1)$$

When boards are not familiar with an executive's performance, they estimate performance by relying more heavily on what they believe to be the distribution of f given their beliefs of \tilde{g} . For executives who are in the minority, such as women, boards might make their initial assessment based on their beliefs about the performance of women as a group (\tilde{g}_w) – in other words, discriminate statistically. If boards believe that women executives as a group perform worse than men ($\tilde{g}_w < \tilde{g}_m$) and boards statistically discriminate, then, all else equal, there will be a gender pay gap ($f_w < f_m$).

Allow for the possibility of a bias h in the board's beliefs about women executives' performance.

$$\tilde{g}_i = g_i + h \quad (2)$$

If $h < 0$, then boards' beliefs mistakenly underestimate an individual woman's productivity.

Boards refine their estimates as they receive new information. Over time, repeated observations of individual's performance would increase the weight on the individual performance measure p insofar as p added new information about the individual's productivity (Farber and Gibbons, 1996). When the indicators of productivity g are positively correlated with the individual's performance measure p , then as employers learn more about the productivity of their employees, they begin to rely increasingly on the productivity estimate p and rely less on g .

The experience path depends on the correlation θ between g and p (Altonji and Pierret, 2001).

$$\frac{\delta a_{gt}}{\delta t} = -\theta \times \frac{\delta \sum_t a_{pt}}{\delta t}, \quad (3)$$

where $\theta > 0$ if g is positively correlated with p .

The estimate f changes with experience as employers learn that they have erred in their initial judgment. If there is a bias in the beliefs about an individual's performance, then experience will diminish the importance of this bias.

The employer learning model re-expressed in terms of employer characteristics

One difficulty in identifying the source of gender pay gaps is that unobserved (by the economist) differences between men and women employees, such as ambition and competitive drive, can be confounded with other sources of the pay gap. To control for unobserved differences in men and women executives, the employer learning model is re-expressed in terms of the response of the pay gap to a discrete change in employer characteristics – in this case, how much the board has learned about its executives' performance.

The tenure of independent board members characterizes the amount of information that the board has about executives' performance indicators. Assume that when a board D becomes independent, either it does not have access to the full performance history of executives that the insider board members had or, if it does, it does not trust the insiders' reporting of the history. In this instance, a newly independent board knows less about the performance of executives than the insider board. Thus switching to a newly independent board is analogous to going back in learning time from $t=j$ to $t=k$.

Assign independent board members a value of one ($d=1$) and insider board members a value of zero ($d=0$) and assume that when independent board members take charge, the board has unlearned $j - k$ years of performance information. Thus the pay equation for the *insider board* translates to

$$f_{ij} = a_{gj} \tilde{g}_i + \sum_{t=1}^j a_{pj} p_{it} = b_{ij} |_{d=0}. \quad (4)$$

The pay equation for the *independent board* translates to

$$f_{ik} = a_{gk} \tilde{g}_i + \sum_{t=1}^k a_{pk} p_{it} = b_{ik} |_{d=1}. \quad (5)$$

If $\tilde{g}_w < g_w$, the gap will widen with a change to a more independent board because the weight on the \tilde{g} term has increased.

$$\Delta(f_{wt} - f_{mt})_{jk,d0d1} = (b_{wk} - b_{mk})|_{d=1} - (b_{wj} - b_{mj})|_{d=0} < 0 \quad (6)$$

Empirical prediction 1: *Employer learning with biased beliefs hypothesis predicts the pay gap will widen if a newly independent board is put in place.*

When employers can base their initial estimates of performance on characteristics in addition to gender, a bias related to gender will take on relatively less importance. Other performance characteristics might include credentials such as professional degrees or professional certification: a law degree held by the firm's Legal Counsel, or a Chartered Public Accountant certificate held by the firm's Chief Financial Officer, for example.

Empirical prediction 2: *Employer learning with biased beliefs hypothesis predicts that when an independent board is put in place, the increase in the gender pay gap will be less pronounced in occupations that require accreditation.*

If newly independent boards use gender and initially underestimate women's productivity ($h < 0$), then as they learn more about a woman's performance and accord relatively more weight to p , the estimate of productivity will increase and the pay gap between men and women will narrow.

Empirical prediction 3: *Employer learning with biased beliefs hypothesis predicts the gap that widened initially with the introduction of a new board will revert to previous levels over time.*

Nesting the taste-based discrimination model in the employer learning model

Now consider the hypothesis that executives discriminate on the basis of taste. Executives have preferences for skimming perquisites φ , which are awards given in excess of performance. Taste-based discrimination can be rendered in the model as a constant wedge between pay and performance (Becker, 1971) in the form of a perquisite paid to male executives who dislike working with women executives. Executives who are insiders on the board can try to influence the board to pay favored executives a premium and/or impose on disfavored executives a penalty.

If $\varphi > 0$, insider board members prefer to work with men executives (taste-based discrimination).

If $\varphi < 0$, insider board members prefer to work with women executives (reverse taste-based discrimination).

The gap in compensation can be re-expressed as

$$f'_{wt} - f'_{mt} = (b_{wt} - b_{mt})|_{d=0} - \varphi . \quad (7)$$

Assume that independent board members do not indulge in taste-based or reverse discrimination since they do not work directly with women executives. Thus the executives who had practiced taste-based or reverse discrimination before the arrival of a more independent board would be constrained from the practice after the arrival. Boards would correct for the presence of taste-based or reverse discrimination on the part of insider board members by adjusting the pay gap.

The change in the pay gap after the change from an insider board to an independent board would be:

$$\Delta(f'_{wt} - f'_{mt})_{jk,d0d1} = (b_{wk} - b_{mk})|_{d=1} - (b_{wj} - b_{mj})|_{d=0} + \varphi. \quad (8)$$

Empirical prediction 1: *Taste-based (reverse) discrimination hypothesis predicts the pay gap will narrow (widen) if a newly independent board is put in place.*

Empirical prediction 2: *Taste-based (reverse) discrimination hypothesis predicts that if a newly independent board is put in place, the narrowing (widening) will be the same for all occupations, regardless of accreditation.*

Empirical prediction 3: *Taste-based (reverse) discrimination hypothesis predicts that the change in the pay gap will be constant (constant) in the years following the event.*

III. DATA AND STYLIZED FACTS

Data

The data form a panel that merges by CUSIP identifier the annual Execucomp database provided by Standard and Poor's, and the annual RiskMetrics provided by the RiskMetrics Group. The merged data set extends from 1998 to 2005. I drop the firms whose CUSIP identifiers differ in Execucomp and RiskMetrics because of inconsistent updating practices (Table A.1 in the Appendix). I limit my sample to firms that are present from 2000 to 2005 inclusively. The degree of board independence in my sample tracks closely the entire RiskMetrics sample.

Execucomp data include total compensation (TDC1) and its components, which consist of salary, bonus, other annual compensation, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total compensation. Firm size and performance variables consist of market value, assets, and sales in thousands of \$2004, and the number of employees.

The director's data from RiskMetrics provide the names of directors who sit on the board of each firm, whether a director is independent, linked (affiliated), or an employee⁵ of the firm, and the

⁵ As defined by RiskMetrics, an independent director "has no significant connection with the firm." An affiliated director "provide(s) (or whose employer provides) professional services to the company or is a major customer. [Affiliated directors] also include directors who were former employees; recipients of charitable funds; interlocks; and family members of a director or executive." Directors who are employees of the firm are those who are currently employed (such as the current CEO). (RiskMetrics Director's Data Manual)

committees where he or she presides (i.e. the nominating, compensation, or audit committees). I construct measures of compliance to the SEC rules with the data.

To clean the data, I drop all observations with missing data for total compensation of the executive (9,289 observations), and all observations with zero values for total compensation (26 observations) or salary (45 observations). I drop all executives who were ranked 6 or lower (20,649 observations).

My sample has 899 firms and their top five or fewer executives ranked by compensation, which totals an average of 4,405 observations per year, 20,751 observations all told. Women comprise 5.7% of the executives, or 1,172 observations.

Stylized facts

In 1992, when Execucomp began to report the executives in the S&P 1500 by gender, women made up 1.3% of the top five (Bertrand and Hallock, 2001). Their representation increased to 3.4% in 1997 and then to 6.0% by 2005. As more women gradually entered the executive ranks, the gender gap in executive compensation slowly narrowed from 44% on average between 1992 and 1997 (Bertrand and Hallock, 2001) to 33% on average between 1998 and 2005 (Table I).

In the first systematic study of the gender pay gap using Execucomp data, Bertrand and Hallock (2001) find that the gender pay gap between 1992 and 1997 can be explained proximately by the lower likelihood of women holding top-paying occupations such as CEO and the lower likelihood of women working in larger firms. I re-estimate the gender gap for top five executives between 1998 and 2005, and find that firm size no longer has an important effect on the pay gap as women's

presence in larger firms increases.⁶ Occupational segregation continues to account for a large portion of the gender gap.

IV. THE EVENT: THE SEC CORPORATE GOVERNANCE LISTING STANDARDS

The event

It is a convention that in large public companies, the Boards of Directors have the authority to decide compensation for the CEO and other senior executives.⁷ State corporate law allows the boards virtual *carte blanche* in setting compensation; only rarely will directors' approved compensation packages be overturned (Bebchuk and Hamdani, 2005).⁸ Most boards delegate the responsibility for setting compensation to a committee, usually comprising three or four directors. The committee typically adopts a multi-year compensation plan for an executive that lays out the parameters for salary, bonus, and stock grants. Each year the board has the discretion to adjust the pay components within the terms of reference of the multi-year plans. Arguably independent directors can act as objective monitors of performance and avoid potential conflicts between duty and self-interest that insider board members face (Meckling and Jensen, 1976; Fama, 1980; Fama and Jensen, 1983). But independent board members may not have access to the details of firms' operations and instead may rely on "heuristic forms of thought tied to readily observable data" (Langevoort, in *Harvard Law Review*, 2006) when they set pay. Thus greater board independence may

⁶ Consistent with Yurtoglu and Zulehner's estimates (2006)

⁷ Bebchuk, Fried and Walker (2002), explain in detail the process of setting executive compensation and the typical issues that boards face.

⁸ In most jurisdictions in the U.S., the legal duties of directors are expressed only in general terms: the duty of loyalty to the company's shareholders and the duty of care, that is, due diligence in making decisions. If a director can demonstrate that he has acted within these duties, the state courts will not challenge his business judgment regarding compensation.

control managers' abilities to extract rents, but may also allow the biases of independent directors to influence pay decisions.

In the spirit of the Sarbanes-Oxley reforms, the SEC chairman announced in February 2002 that he had tasked the New York Stock Exchange (NYSE) and the National Association of Securities Dealers (NASD) to review corporate governance listing standards with the intent to mandate to boards greater independence to act as objective monitors of management's performance (U.S. Securities and Exchange Commission, 2003). The exchanges filed a series of proposals during 2003 with the SEC for public review and the SEC approved the amended proposals for both of the exchanges on November 2003. Listed companies in both exchanges had to comply with the new standards by their first annual meeting by January 15, 2004 or October 31, 2004, whichever was earlier. The rules required that all companies listing common equity shares on their respective exchanges⁹ have a majority of independent directors, and entirely independent nominating, compensation, and audit committees. Those who failed to comply faced suspension or delisting.¹⁰

Empirical analysis of the event

Compliance is defined as having all of: a majority of independent directors, an entirely independent nominating committee and an entirely independent compensation committee. Noncompliance is defined as not satisfying these conditions of compliance.

⁹ Classified boards had until December 31, 2005 to comply. Exceptions were made for controlled companies (those who had individuals or entities holding more than 50% voting power), limited partnerships and companies in bankruptcy, management investment companies, trusts and derivatives are exempt from most of the rules except for the auditing provisions.

¹⁰ The new NYSE rules relating to board independence are broadly similar to the Nasdaq rules except that the Nasdaq rules tend to be slightly more lenient.

I omit the independent audit committee condition from the definition of compliance because (a) required changes to the auditing procedures of firms were set in motion earlier than the other requirements through Sarbanes-Oxley and (b) an independent audit committee has a tenuous link to compensation decisions. To ensure the results are robust, I vary the compliance condition when estimating the impact of the event.

The control group consists of the firms that had complied by 2002. The treatment group consists of the firms that had not complied in 2002 but subsequently complied in 2003 or 2004. A structural break in compliance occurs between 2002 and 2003 when the percent of compliers jumped from 45% to 57%, making 2002 a reasonable “before” date (Figure I). Although the formal date for compliance was not until 2004, the SEC widely circulated drafts of the new rules in 2003, which explains the significant increase in compliance. Given that the window for compliance is large, I test the robustness of the results by staggering the compliance dates.

In 2002 control firms had an average of two insiders and treatment firms an average of four insiders. Between 2002 and 2004, the number of insiders in the treatment firms fell to an average of between two and three, while the average number of insiders in control firms remained the same. The average number of board members in control firms is 9.5 and in treatment firms is 9.9, statistically indistinguishable. The proportion of women on the board does not differ significantly between comparison groups before or after the event.

One caveat related to the methodology of this study is that the control and treatment groups are not assigned randomly. If the comparison groups are systematically different then events not related to the treatment could affect comparison groups differently and confound the interpretation of the

results. This caveat is mitigated because I employ a difference-in-difference-in-differences design and look at the difference between men's and women's compensation as well as between control and treatment firms, so any systematic differences between control and treatment firms is a concern only if it affects men's and women's compensation differently. To examine this possibility I compare the observable characteristics of the control and treatment groups. The non-complying firms have slightly lower market value, sales, employees, and total compensation, and slightly higher assets than the complying firms in 2002. I cannot reject the null hypothesis of equality of means (Table A.2 in the Appendix). The distribution of industries in the control and treatment firms is also similar. I correct for time-unvarying unobserved differences in control and treatment firms by introducing firm fixed effects in estimation.

The executives in the control and treatment firms are also comparable. The percentage of women in the control and treatment firms is the same -- 5.2%. The percentage of women CEOs in control firms is 1.1%, a statistically insignificant difference from 1.9% in treatment firms. And, the percentage of women CFOs and Legal Counsel in control firms (8.9%) is insignificantly different from the percentage (7.2%) in treatment firms. The gender pay gaps in the control and treatment groups track within two percent of each other in the two years before the event (Figure II).

During the time that the SEC regulations for board independence took effect, other regulatory reforms were taking place that might also have had an effect on executive compensation, most notably, Sarbanes-Oxley (SOX). SOX required that CEOs and CFOs attest to the company's financial reports and that Legal Counsels report violations in securities regulations. This increased emphasis on proper accounting and legal practices might have increased the demand for qualified

CFOs and Legal Counsels, and thus their compensation. However, there is no evidence of a shift in the total number or proportion of CFOs and Legal Counsels in the control or treatment groups before or after the event.¹¹

V. RESULTS

Empirical specification

Recall that Equation 8 expresses the change in the gender pay gap as the difference in the gap before and after a board becomes more independent. This relationship can be estimated as the cross-term in a difference-in-difference-in-differences equation specification (Meyer, 1995) that compares compensation for executives in treatment firms (that did not comply in 2002) and control firms (that had already complied in 2002), before and after the regulation event:

$$\ln(TDC1) = \alpha_i + \beta_1(Post-reg_{sit} * Treatment_i) + \beta_2(Female_i * Treatment_i) + \beta_3(Female_i * Post-reg_{sit} * Treatment_i) + year\ dummies\ \Gamma_Y + (Female_i * year\ dummies)\Gamma_{FY} + (Female_i * X_{it})\Gamma_{FX} + X_{it}\Gamma_X + firm\ f.e.$$

where $\ln(TDC1)$ is the natural log of total compensation in \$2004 for each executive.

The expression $Post-reg_{sit} * Treatment_i = 1$ after 2003 for firms that did not comply in 2002, but complied after the announcement of the change in regulation in 2003 or 2004. X is a vector of lagged control variables that account for firm performance, such as the natural log of: market value (in 2004\$), assets (in 2004\$), sales (in 2004\$) and the number of employees. $Female * Treatment = 1$ for

¹¹ SOX also required that option grants be reported within two days, which might reduce the incidence of backdating. However, the rule was weak; under SOX the SEC had no explicit sanctions for backdating and the practice continued to be widespread. Another accounting change made to the Financial Accounting Standards 123R requires that companies must record stock option grants as an expense, which would likely change the incentives for granting options by making the reporting more transparent. However, this rule did not come into effect until the first accounting period after June 15, 2005.

women in firms in the treatment group. Men's and women's compensation might not be equally sensitive to the market value, assets, sales, or number of employees of the firm, so for that reason, I interact gender with these firm performance variables. The regression includes year dummies and firm fixed effects, and the standard errors are clustered by firm. The year dummies control for trends in compensation over time. Men's and women's compensation may be following a different time trend, so for that reason, I include the interaction between gender and year dummies. Firm fixed effects account for whether firms are complying or not complying in 2002, so *Treatment* does not need to be included in the regression separately. Similarly, since there are year fixed effects the *Post-reg* term need not be included separately. The coefficients of interest are β_1 , the effect on pay for all executives of complying with board independence regulations, and β_2 , the effect on the gender gap in pay of complying with board independence regulations. Equations are estimated for the years 2000-2005.

The effect of greater board independence on the gender pay gap

The results are presented in Table II. Column (1) shows the effect of firm size and performance variables as well as gender on compensation without taking the event into account. The average gender gap in executive compensation is 30.6%. Predictably, the market value of the firm significantly influences the compensation of the firm's executives. In columns (2) – (5) *Female* is interacted with year dummies to allow for different trends in compensation for men and women, so gender is not included in the regression separately.

Column (2) estimates the effect of adopting a more independent board in compliance with the NYSE/NASD regulations on all executives' compensation. The effect is essentially zero, which is

consistent with newly independent boards not correcting for “skimming.”¹² The lack of evidence of a correction for skimming does not support the hypothesis that managers are skimming to indulge in taste-based or reverse discrimination. If insiders had the managerial power to skim firm value to create discriminatory pay gaps, why wouldn’t they skim purely for their own benefit too?

There is an impact on the pay-setting process unrelated to skimming however. I test whether newly independent boards tied pay to performance differently after compliance than before by estimating the sensitivity of executives’ pay to changes in market value. Using a difference-in-differences specification and controlling for firm size and firm fixed effects, I find that the response of executive compensation to changes in market value is significantly stronger after compliance than before in treatment firms compared with control firms. Thus, compliance with the SEC regulations does affect the way boards in treatment firms set compensation.

Column (3) estimates the effect of compliance on all executives, as well as on women executives in relation to all executives. The coefficient *Female*Treatment* is not economically or statistically significant, suggesting that women’s pay in the treatment and control groups are insignificantly different before the event. The coefficient on *Female*Post-reg*Treatment* is significant at the 95% level and negative, indicating that women executives in firms that comply have lower pay after compliance than those in the control group. The effect is also economically significant – women in the treatment group do 19.2% worse than women in the control group and so the pay gap widens. This result contradicts the hypothesis of taste-based discrimination by male executives who were

¹² Estimates on the impact of director independence on executive compensation vary, from negative (Chhaochharia and Grinstein, 2006), to conditional on other board features (Bertrand and Mullainathan, 2001; Bebchuk and Grinstein, 2005) to positive (Hall and Murphy, 2003; Hermalin, 2005).

entrenched on the board before the regulation. It is consistent with either reverse discrimination among executives and employer learning with downward-biased beliefs about women's performance (*Empirical predictions 1 and 1*).

There is a more negative and more significant coefficient on *Female*Post-reg*Treatment* for salary plus bonus than for total compensation (-20.9%, significant at the 99% level), indicating women in treatment firms experience a hit to their core component of pay (Table II; column (4)). This is also the component that boards have considerable discretion over changing in the short term.

To determine how much of the decline in compensation came from women leaving and entering, I restrict the sample to include only executives who were present from 2002 to 2005 (Table II; column (5)). The sample size drops from 20,751 to 12,297. The gender pay gap for salary plus bonus widens, but by slightly less than in the entire sample (-18.3%), and is statistically significant at the 95% level. Thus the widening gap does not appear to be the result of turnover.

What if male executives were practicing taste-based discrimination by not hiring women in the first place? If taste-based discrimination manifested before compliance as a constraint on hiring or promoting women to senior executive positions, then after compliance the number of women would likely increase. Poisson regression estimates show that the number of women executives increases overall with time but there is no significant increase (or decrease) in the number of women working in firms that did not comply in 2002 and then complied by 2004 (Table III). Thus the evidence does not suggest that insider boards were engaging in taste-based discrimination through restrictive hiring practices or reverse discrimination through over-hiring.

The effect of compliance on the gender gap differs between executives depending on their occupation (Table IV). Notably, the response of the pay gap for executives who are not CFOs or Legal Counsels is significantly negative for all firms (column (2)) as well as for firms with executives present from 2002 to 2005 (column (3)), while response of the pay gap for the executives who are CFOs and Legal Counsels is not significant (columns (5) and (6)). CFOs and Legal Counsels have jobs that have specific credentials and more easily observable measures of performance. This result is consistent with employer learning with downward-biased beliefs (*Empirical prediction 2*) but is not consistent with reverse-discrimination (*Empirical Prediction 2*). If reverse discrimination were occurring, there is no reason to expect the response in pay after the event would differ by occupation.

The model of employer learning with biased beliefs predicts that the gap will widen after the event and subsequently narrow as independent directors gain more experience with executives' performance (*Empirical prediction 3*), whereas the reverse discrimination model predicts no moderation (*Empirical Prediction 3*). To test whether the increase in the gender gap in compensation persisted after the event, I alter the specification to estimate the effect of *Female*Post-reg*Treatment* in 2004 and in 2005 separately (Table V). The gap increases in 2004 in firms that previously did not comply, but by 2005 the gap has reverted towards the control (column (1)). This pattern is the same for executives who are not CFOs and Legal Counsels (column (2)) and for the salary and bonus component of pay for all executives (column (3)).

Robustness tests

To ensure the results are invariant to the sample selection, I limit the sample to firms that had at least one woman in the top five positions – about 20% of all firms. The impact on total compensation for all executives is not significantly different than zero, and the impact on the pay gap is negative (-15.0%) and significant at the 90% level.

I test the robustness of the timing of the event by staggering the event into those who complied in 2003 and those who complied in 2004. I find that in the group of companies that complied in 2003, the decline in pay occurred in 2003, reached its trough in 2004, and moderated the next year. In the group of companies that complied in 2004, the decline in pay reached its trough in 2004 and moderated in 2005. Thus in each instance the gap reverted after the newly independent board members gained experience.

Since women are under-represented in the top ranks and over-represented in the bottom ranks, I break the sample into pay ranks to make sure that the decline in pay is not skewed towards the lower ranks and thus the result of a compositional effect. I find the gender gap increases significantly for both high ranks where women are under-represented and in low ranks where women are over-represented. The gap does not increase in middle ranks, due in large part to the presence of CFOs and Legal Counsels in these ranks. Thus, the concentration of women in the lower ranks does not appear to explain the fall in women's compensation after compliance.

The findings are robust to a definition of compliance that includes independent audit committees as well as the other three requirements. Adding the independent audit committee requirement had very little effect on the number of non-complying firms in 2002, probably because most firms had already

complied by 2002 with the introduction of SOX. Results are also robust to a definition of compliance that includes only an entirely independent compensation committee.

Additional evidence

If boards have downward biased prior beliefs about women's performance, then in other situations where boards have less information about executives, the gender pay gap should be wider. To test this prediction, I track the gender pay gap for new executives as their tenure increases. Between 1999 and 2002, 2,969 men and 346 women executives were new either to the company or to the top five ranks. I calculate the mean total compensation for the executives' first, second and third years of tenure. As executives' tenure in the top jobs increases, the gender pay gap narrows (Figure III). The gender pay gap for new executives exceeded 30% in the first year of tenure. The pay gap for those same executives narrowed considerably in the second year of tenure, and continued to narrow in the third year.¹³ This is consistent with boards having an initial bias that compelled them to pay unknown women less than unknown men.¹⁴

VI. DISCUSSION

The results of this study are consistent with the view that boards have biased beliefs about women's performance and make systematic mistakes when they set executive compensation. Boards' reliance

¹³ A narrowing pay gap for top executives is not inconsistent with evidence of a widening pay gap for young workers in the corporate and financial sectors as their tenure increases found by Bertrand, Goldin and Katz (2009). In this instance, the widening pay gap can be traced mainly to the financial penalty that women face when they interrupt work or reduce their hours when they have children. Women who have reached the top five executive spots would, for the most part, have their childbearing years behind them.

¹⁴ The narrowing of the gap with increased tenure might stem in part from the slightly higher leaving rates of women than men. If the lowest performing women are more likely to leave the firm, then the pay of new men and women would tend to converge. This effect does not occur in the board independence test because leaving rates are stable over the event window.

on pre-existing norms can lead to the prolonged underestimation of women's performance and a persistent pay gap (Goldin, 2002). Historical studies show that the information that boards use to ascertain the abilities of women executives as a group rests on a very small sample and a very brief history. Three decades ago, information about top women executives was hard to come by because there were almost no top women executives (Bertrand and Hallock, 2001; Cappelli and Hamori, 2004). Then, in the span of thirty years, women's skills and labor force attachment changed utterly (Blau and Kahn, 2003). The ratio of women-to-men college graduates and post-graduates climbed rapidly in the 1970s and now exceeds unity. The most prestigious private universities lifted the longstanding quotas and prohibitions on women applicants¹⁵ and women made an about turn from "female intensive" concentrations such as Education to male intensive concentrations such as Business and Management and Law (Goldin, 2004). Currently, the top women executives in the S&P 1500 are slightly more likely than men to have graduated from a private college or a top university and slightly less likely to have earned only a terminal undergraduate degree (Bell, 2005). And, having made the long climb to the top, these women of high ability tend not to self-select into less challenging jobs (Bertrand and Hallock, 2001). Even so, this recent history appends to a long and stable history of weaker skills and labor force attachment for women.

Boards might also underestimate women executives' performance because they have a harder time interpreting ability from the resumés of women than from those of men. Family responsibilities have induced women executives to seek more flexibility in the way they organize when and where they work and what path they take to the top (Hewlett and Luce, 2005), which makes their

¹⁵ Yale adopted an equal access policy in 1972; Harvard in 1975. Princeton did not admit any women until 1972.

performance history unlike the traditional history of male executives. Bertrand, Goldin, and Katz (2009) find that the penalties from modest career interruptions for women who chose to have children were enormous, particularly for MBAs (Goldin and Katz, 2008). Boards often measure “leadership” ability, a requirement for senior executives, by ambiguous qualities such as “charisma,” “stature,” “confidence,” and “vision,” (Khurana, 2002) which can invite subjective comparisons that boards might not even be aware they are making (Bertrand, Chugh, and Mullainathan, 2005). Both the heterogeneity and the ambiguity of the performance measures can introduce an unintended bias in beliefs about women’s abilities.

Evidence suggests that even when men and women present the same performance indicators, boards might attribute lower competence and lower pay to a woman than a man, but that the biases are mitigated as more information on individual performance becomes available. For example, business finance students presented with identical prospectuses and CEO biographies for an imaginary initial public offering – identical except in one case the CEO was named Robert and in the other case Roberta – were willing to invest three times more in the “male” companies and rank the “women” CEOs as having less leadership experience, less ability to deal with a crisis and more likelihood to engender conflict in the management team than “men” CEOs (Bigelow and Parks, 2005). However, if boards have access to information on individual performance, gender becomes less salient and the effect of gender stereotypes on performance evaluations is mitigated (Nieva and Gutek, 1980).

Market participants tend to perceive the ability of women CEOs as lower than men. Stock markets react more negatively to the announcement of women CEOs than men, especially if the women are

appointed from outside the firm (Lee and Hayes, 2007). Moreover, analysts', particularly male analysts', earnings forecast errors are systematically larger for firms led by women (Wolfers, 2007). If beliefs about women's ability were downward biased, this would suggest excess stock market returns in firms led by women. Systematically excess returns have not been found for women-led firms, which may simply reflect the weakness of statistical tests given the small sample of women CEOs rather than an inference about the presence or lack of biased beliefs (Wolfers, 2007).

In another study, (Selody, 2010), I determine whether boards of directors in the S&P 1500 assign credit and blame differently to men and women executives for their firm's performance. I find that negative shielding – pay that increases proportionately more in times of increasing market value that it decreases in times of decreasing market value – presents for executives overall, but women's pay is significantly more sensitive than men's to downswings in firms' value. This pattern does not appear to stem from inherent gender differences in risk preferences, ability, or skimming by top (male) executives. It is suggestive of mistake-based discrimination on the part of boards when they compare the performance of women relative to men.

VII. CONCLUSION

The gender gap has been a persistent feature of executive compensation and its cause has been difficult to pinpoint: an executive's marginal product is usually unobserved and the observable characteristics of executives do not represent the underlying cause of the discrepancy in pay. In this paper I look at the characteristics of the compensation setters – the board of directors – which are easily observable and can be used to make predictions about how compensation might deviate from executives' productivity. I use a unique policy change that required boards to become more

independent to test the effect of board independence on the gender gap in executive compensation. Independent board members have stronger incentives to set executive compensation efficiently and so might curb taste-based or reverse discrimination practiced by insider board members. Also, more independent boards would not have the information available to them that previous insider boards had to assess executives' performance and so might rely on biased prior beliefs about women's performance to set pay. Because the event involves a change in employer characteristics, differences in productivity between men and women do not confound the results. Nor do differences in self-selection into the top paying jobs.

I compare the gender pay gap before and after the introduction of the 2003 Corporate Governance Listing Standards, which required that corporate boards become more independent. I find that the gap widens after the event. One explanation is that boards have biased beliefs about women executives' performance given their credentials. The widening is also consistent with the view that insider boards engaged in reverse discrimination toward women. However, a subsequent moderation of the effect and a smaller effect for jobs with higher information content are not consistent with the hypothesis of reverse discrimination.

These findings help inform the choice among policies aimed at mitigating the gender gap in executive pay. Policies that encourage more distance between the boards and the executives whose pay they set, such as requiring more independent boards, do not seem to help narrow the gap, and in fact might exacerbate it. Although independent board members may be less affected by personal preferences for one gender over another, they share the same potential biases about women's ability as society as a whole. Biases coupled with less information about individual executives' performance

would make independent boards initially more likely than insider boards to pay women executives less than men. More effective policies, then, might encourage boards to attach less import to the pre-existing norms that could lead them to underestimate women's ability (Goldin, 2002). Boards might be encouraged to require more information from CEOs about the executives whose pay they set, to mandate more time spent reviewing executives' history and appraisals, and to monitor executives more closely. By uncovering a more complete history of performance of executives, boards could attend to the individual characteristics of the executive rather than potentially biased group characteristics.

Another way to potentially diminish the gender pay gap might be to increase the rigor and transparency of the performance measures themselves. Implicit discrimination is more likely when performance measures are ambiguous (Bertrand, Chugh, and Mullainathan, 2005). If boards were required to set out clear and quantifiable performance measures on which executives could be judged before evaluating individual executives, unconscious biases of the boards would have less opportunity to assert themselves.

Finally, any discussion about the gender pay gap for top executives cannot ignore the sheer scarcity of women executives. The same policies that improve the parity of women to men in top corporate jobs could also help diminish the pay gap. Increasing the number of women top executives would increase the exposure of boards to women's performance and thus diminish biases that boards may hold about women's ability as a group.

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APPENDIX: MERGED EXECUCOMP AND RISKMETRICS DATABASE

TABLE A.1
The Number of Firms in Execucomp, RiskMetrics and the Merged Sample

Year	Number of firms in Execucomp	Number of firms in RiskMetrics	Number of firms in merged sample
1998	1,265	1,756	839
1999	1,270	1,789	894
2000	1,268	1,736	942
2001	1,272	1,769	989
2002	1,400	1,426	1,073
2003	1,409	1,455	1,143
2004	1,412	1,461	1,168
2005	1,414	1,439	1,212

TABLE A.2
Comparison of the Complying and Non-complying Firms in the Merged Sample

Firm Variable	Mean for complying firm, 2002	Mean for non-complying firm, 2002	P-value
Market Value	8,170.11 (1,150.37)	7,321.89 (918.99)	0.56
Assets	15,346.59 (2,678.60)	17,977.78 (3,414.41)	0.54
Sales	6213.16 (862.38)	5670.21 (552.76)	0.60
Employees	25.34 (4.03)	21.78 (1.76)	0.42
Mean total compensation of top five executives	2,946.29 (104.85)	2,800.19 (95.61)	0.30
Number of firms	434	634	F=1.08

Notes: Market value, assets, sales in logs in \$2004 thousands. Employees in thousands. Standard errors in parentheses. P test assesses equality of pair-wise means of firm variables for complying and non-complying firms. ANOVA F-test assesses equality of means over all five firm variables for complying and non-complying firms.

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TABLE I
Executive Compensation for Men and Women
Summary Statistics, 1998-2005

Variable (\$ Thousands)	Men executives						Women executives					
	Obs.	Mean	Median	SD	Min	Max	Obs.	Mean	Median	SD	Min	Max
Total compensation	38,433	3,142	1,439	7,659	0	658,581	2,112	2,111	1,142	4,074	119	115,235
Salary	38,433	463	384	288	0	7216	2,112	380	324	203	3	1,483
Bonus	38,433	547	240	1,507	0	129,348	2,112	343	187	642	0	10,414
Options granted	38,433	346	0	1,609	0	76,738	2,112	270	0	1,785	0	73,336
Restricted stocks granted	38,433	1,481	387	6,416	0	658,581	2,112	923	304	2,572	0	63,864
Long-term incentive plan	38,433	142	0	842	-2,736	37,436	2,112	75	0	346	-566	5,066
Other annual	38,433	36	0	193	0	8,697	2,112	21	0	104	0	3,062
All other	38,433	127	17	888	-189	74,656	2,122	99	12	1128		43,549
CEO total compensation	7,967	6,135	3,195	13,234	0	658,581	108	4,883	2,809	6,453	292	115,235
CFO and Legal Counsel total compensation	7,954	1,828	1,104	3,453	119	129,759	678	1,560	963	2,009	169	23,655
Total compensation by industry												
Energy	1,868	3,340	1,522	6,542	62	97,863	53	1,413	1,094	936	323	4,139
Materials	2,988	1,854	1,130	2,668	205	49,228	92	943	763	638	305	3,464
Industrials	5,952	2,573	1,189	7,154	61	268,784	228	1,184	856	998	195	7,541
Consumer staples	6,955	3,078	1,492	6,653	0	231,871	583	1,967	1,266	2,651	119	43,769
Health care	2,168	3,385	1,827	4,982	154	80,460	144	3,127	2,306	3,040	333	21,637
Financials	3,892	3,328	1,766	5,724	128	184,591	252	2,020	1,359	2,075	138	14,151
Information Technology	4,975	4,159	1,810	8,000	24	252,347	236	2,466	1,018	3,517	145	21,642
Telecom	6,554	3,655	1,484	12,108	0	658,581	337	3,196	1,103	8,387	127	115,235
Services	343	7,458	4,369	10,218	161	79,051	32	2,858	2,424	2,806	189	12,268
Utilities	2,738	1,738	956	2,652	144	54,543	155	1,109	673	1,508	175	15,997

Notes: Compensation variables are in \$2004 thousands. Total compensation includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total (TDC1 in Execucomp). Other annual consists of perquisites, other personal benefits, above market earnings on restricted stock, tax reimbursements. All other annual includes severance payments, debt forgiveness, imputed interest, payments for unused vacation, signing bonuses, 401K contributions and life insurance premiums.

TABLE II
The Effect of More Independent Boards on the Gender Pay Gap:
Difference-in-difference-in-difference Regressions

	(1)	(2)	(3)	(4)	(5) Executives in the sample 2002-2005
Dependent variable:	Total log compensation	Total log compensation	Total log compensation	Salary + bonus in logs	Salary + bonus in logs
Female	-0.306 (0.04)***				
Post-reg*Treatment		-0.002 (0.03)	0.009 (0.03)	-0.018 (0.02)	-0.035 (0.02)
Female*Treatment			-0.040 (0.07)	-0.023 (0.05)	0.066 (0.10)
Female*Post-reg*Treatment			-0.192 (0.08)**	-0.209 (0.07)***	-0.183 (0.09)**
Market Value	0.350 (0.03)***	0.349 (0.03)***	0.348 (0.03)***	0.068 (0.02)***	0.060 (0.02)***
Firm fixed effects	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Female*Year dummies	no	yes	yes	yes	yes
Female*(Firm variables)	no	yes	yes	yes	yes
Constant	5.065 (0.35)***	5.050 (0.35)***	5.049 (0.35)***	5.898 (0.25)***	5.926 (0.32)***
Observations	20,751	20,751	20,751	20,751	12,297
R-squared	0.61	0.61	0.61	0.55	0.60

Notes: Dependent variable in natural logs \$2004 thousands, 2000-2005. Total compensation includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total (TDC1 in Execucomp). All regressions include firm market value, assets, number of employees and sale, lagged and in natural logs. Robust standard errors are clustered at the firm level in parentheses.

*significant at 10%; **significant at 5%; ***significant at 1%

TABLE III
The Effect of More Independent Boards
on the Number of Women Executives, 2000-2005

Dependent variable: Total number of women executives per firm

Post-reg*Treatment	0.019 (0.08)
Market Value	0.091 (0.03)***
Assets	-0.147 (0.03)***
Number of Employees	0.069 (0.02)***
2001	0.123 (0.10)
2002	0.143 (0.10)
2003	0.277 (0.10)***
2004	0.312 (0.10)***
2005	0.349 (0.10)***
Firm Fixed Effects	yes
Constant	-1.199 (0.17)***
Observations	6,024
R-squared	0.091

Notes: Poisson regression. 2000-2005. Market value, assets and number of employees are lagged and in natural logs. Robust standard errors in parentheses.

*significant at 10%; **significant at 5%; ***significant at 1%

TABLE IV
The Effect of More Independent Boards on the Gender Pay Gap, by Occupation:
Difference-in-difference-in-differences Regressions

Dependent variable: Total log compensation

	Top five executives except CFOs and Legal Counsels			Top five executives who are CFOs or Legal Counsels		
	(1)	(2)	(3) Executives in the sample 2002-2005	(4)	(5)	(6) Executives in the sample 2002-2005
Female	-0.335 (0.05)***			-0.093 (0.05)*		
Post-reg*Treatment		0.025 (0.03)	0.037 (0.03)		-0.006 (0.04)	0.027 (0.04)
Female*Treatment		-0.098 (0.09)	-0.113 (0.19)		-0.223 (0.11)**	-0.252 (0.14)*
Female*Post-reg*Treatment		-0.346 (0.10)***	-0.283 (0.14)**		0.160 (0.10)	0.133 (0.13)
Market Value	0.353 (0.03)***	0.352 (0.03)***	0.376 (0.03)***	0.363 (0.04)***	0.357 (0.04)***	0.343 (0.05)***
Firm fixed effects	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes
Female*(Year dummies)	no	yes	yes	no	yes	yes
Female*(Firm variables)	no	yes	yes	no	yes	yes
Constant	5.057 (0.36)***	5.042 (0.36)***	5.291 (0.43)***	5.146 (0.56)***	5.191 (0.56)***	5.859 (0.58)***
Observations	16,380	16,380	9,675	4,376	4,376	2,623
R-squared	0.62	0.62	0.68	0.79	0.79	0.82

Notes: Dependent variable in natural logs, \$2004 thousands, 2000-2005. Total compensation includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total. All regressions include firm market value, assets, number of employees and sales are lagged and in natural logs. Robust standard errors are clustered at the firm level in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%

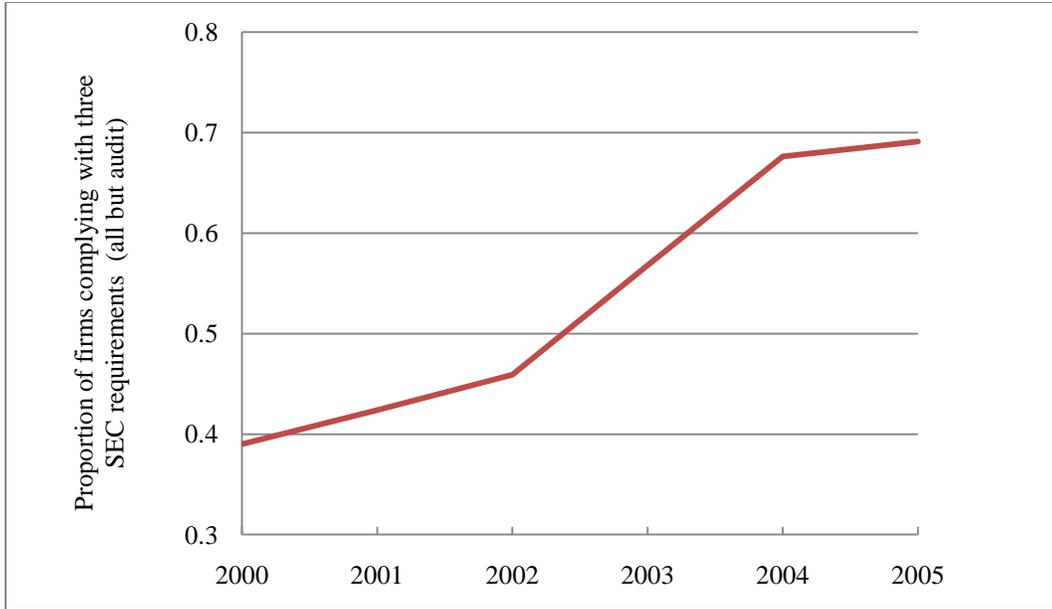
TABLE V
The Effect of More Independent Boards on the Gender Pay Gap
in the First and Second Years After Compliance:
Difference-in-difference-in-differences Regressions

	(1) All executives	(2) Executives who are not CFO or Legal Counsel	(3) All executives
Dependent variable:	Total log compensation	Total log compensation	Salary+bonus in logs
Post-reg*Treatment	0.009 (0.03)	0.045 (0.03)	-0.01 (0.02)
Female*Treatment	0.007 (0.06)	0.012 (0.08)	0.021 (0.05)
Female*Treatment*2004	-0.179 (0.09)**	-0.375 (0.13)***	-0.17 (0.07)**
Female*Treatment*2005	-0.108 (0.07)	-0.141 (0.13)	-0.129 (0.07)
Market Value	0.336 (0.03)***	0.338 (0.03)***	0.057 (0.02)***
Firm fixed effects	yes	yes	yes
Year dummies	yes	yes	yes
Female*(Year dummies)	yes	yes	yes
Female*(Firm variables)	yes	yes	yes
Constant	5.193 (0.37)***	5.675 (0.39)***	5.849 (0.27)***
Observations	22,105	17,715	22,105
R-squared	0.62	0.63	0.57

Notes: The dependent variables are in natural logs in \$2004 thousands, 1999-2005. Total compensation includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total. All regressions include market value, assets, number of employees and sales, lagged and in natural logs. Robust standard errors are clustered at the firm level in parentheses.

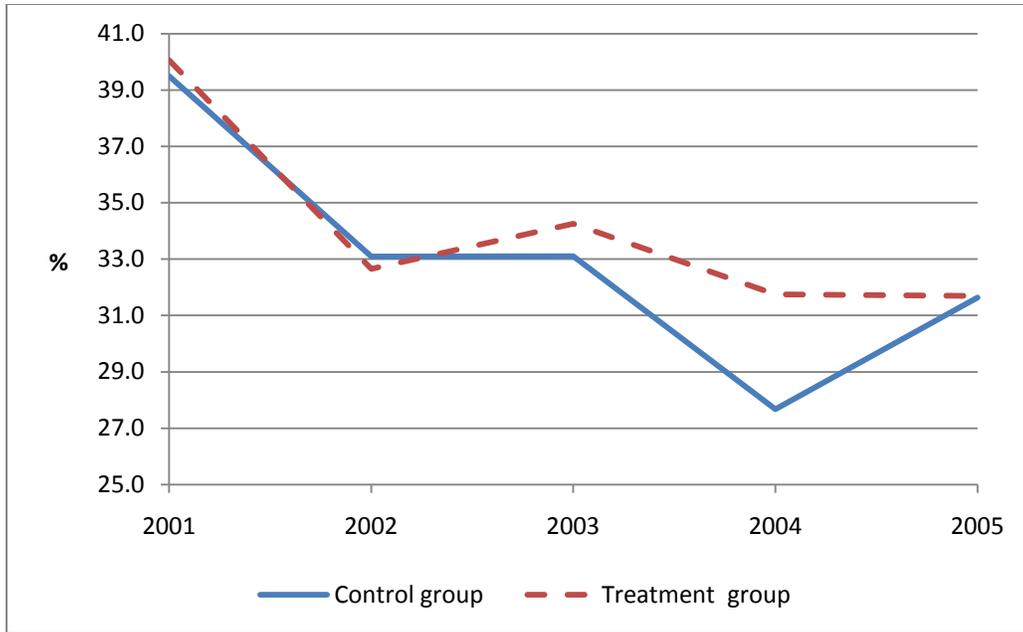
*significant at 10%; **significant at 5%; ***significant at 1%

FIGURE I
The Proportion of Firms in the Merged Sample that Complied with SEC Requirements
2000-2005



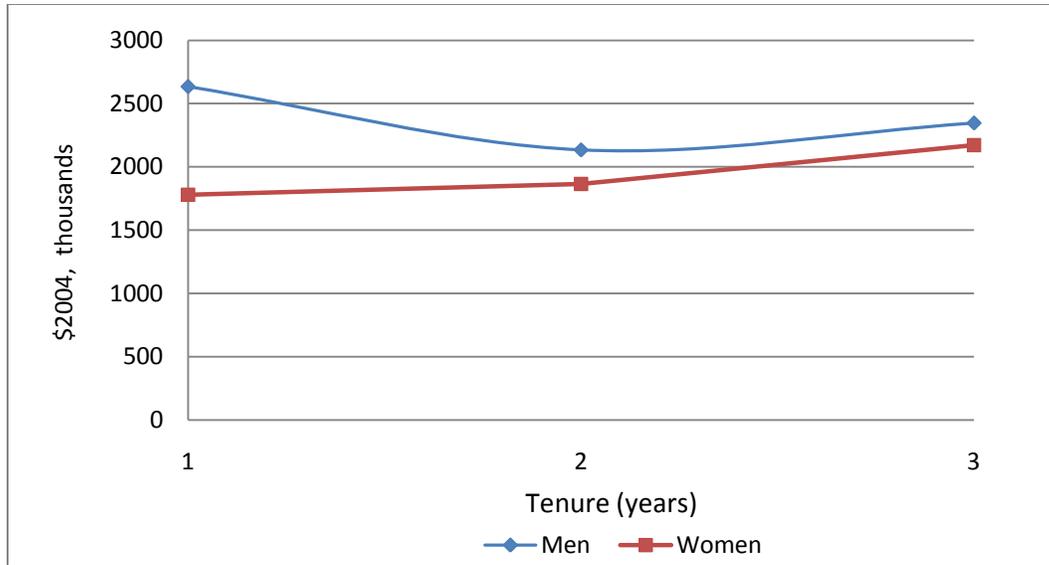
Source: Merged Execucomp and RiskMetrics databases

FIGURE II
Gender Pay Gap for Total Compensation, Control and Treatment Groups
2001-2005



Note: Total compensation scaled by market value
Source: Merged Execucomp and RiskMetrics databases

FIGURE III
Mean Total Compensation of New Executives by Year of Tenure
1999-2004



Source: Execucomp