The Value of Skill Signals for Women's Careers

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Abstract

We show that observable skill signals are more important for women's career advancement than for men's. Signals of higher education and professional experience increase male directors' probability to enter a leadership position by 5.9%, and their compensation by 6.8% ($291,000). Female directors with these signals are 12.9% more likely to enter a leadership position, and their compensation is 21.1% ($856,500) higher. These results are in line with models of screening discrimination, in which women need to provide more observable skill signals to make up for the fact that employers find it more difficult to judge their unobservable qualification for a leadership position. Supporting this channel, we find that our results are stronger if information asymmetries between (mostly) male employers and female candidates are larger: successions after the sudden death of a CEO, successions in firms with all-male nomination committees, and outside hires.

Keywords: Skills, Signals, Promotion, Gender

JEL Classifications: A14, G34, G35, J16, J31

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1 Introduction

Women are still under-represented in leadership positions. According to the U.S. Department of Labor, women made up 47.1% of the labor force in 2021. However, they only held 25.2% of board seats at firms of the Russell 3000 universe, and made up only 5.6% of all CEOs in the Russell 3000 in the second quarter of 2021.[1] Women, on average, also earn less than men. In the US, the gender pay gap amounted to 18% in 2021.[2] It is particularly pronounced in leadership positions, which has been explained by convex pay structures in higher-paying jobs that disproportionately reward individuals who work long hours and do not mind inflexible schedules (Goldin, 2014; Bertrand, 2018).

What is the reason for these persisting gender differences? The literature has provided several explanations: They range from differences in preferences for competition and negotiation (Niederle and Vesterlund, 2007; Bowles et al., 2007; Leibbrand and List, 2015), differences in educational and occupational choices (Blau and Kahn, 2017; Goldin, 2014; Bertrand, 2018) to fertility related choices and motherhood (Bertrand, 2020; Kleven et al., 2019). On top of these differences, labor market discrimination has also been shown to contribute to the gender gap in leadership positions (Goldin and Rouse, 2000), suggesting that equally qualified women face a systematic disadvantage in hiring and compensation decisions.

As pointed out in a model of screening discrimination by Cornell and Welch (1996), discrimination against female candidates may occur even if it is common knowledge that their underlying group characteristics do not differ from men's. If male employers can estimate job applicants' unobservable qualifications more precisely when candidates belong to their own gender, they may find it more difficult to judge whether a female applicant is suitable for a certain position and whether she adds enough value to the firm to warrant a certain level of compensation. This uncertainty should be particularly relevant for jobs that require a broad set of unobservable qualifications, as is the case for leadership positions. Providing more observable skill signals may thus be particularly important for women aiming to reach a leadership position.

[1] See https://www.equilar.com/reports/84-q2-2021-equilar-gender-diversity-index.

[2] See https://www.payscale.com/research-and-insights/gender-pay-gap/

In this paper, we show that observable skill signals are indeed more important for women's career advancement than for men's. Specifically, signals of higher education and professional experience increase male directors' probability to enter a leadership (CEO) position by 5.9% (6.7%) on average, but they increase female directors' probability to enter a leadership (CEO) position by 12.9% (33.6%). We find a similar effect for executive compensation. While male directors experience a 6.8% increase in compensation for additional skill signals on average, the effect is again significantly stronger for female directors, who experience a 21.1% increase in total compensation.

Our analysis is based on biographic information for a large sample of 103,461 directors included in the BoardEx database between 2000 and 2019. Of these directors, 15,757 (15.2%) are female. We investigate two categories of skill signals that have been shown to increase the probability to enter a leadership position and to receive higher compensation: signals of higher education (Useem and Karabel, 1986; Graham et al., 2012), and signals of professional experience (Murphy and Zabojnik, 2004; Custódio et al., 2013).

Our proxies for signals of higher education are an education score, which increases in degree levels as in Graham et al. (2012), and a variable reflecting whether a director graduated from a Top 50 US college (Useem and Karabel, 1986; Falato et al., 2015). As a proxy for professional experience, we follow Custódio et al. (2013) and compute a Generalist Index Score for each director in our sample. This index reflects general management skills from past work experience. According to Denis et al. (2015), directors' industry experience is a key selection criterion during the formation of new boards. Therefore, we also look at having same industry experience as an alternative proxy for directors' professional experience.

We then run fixed effect regressions where the dependent variable is a dummy variable reflecting whether a director is in a leadership position in a given year. Our main independent variables are the skill signals and their interaction with a female dummy variable. The regressions include standard firm-level and manager-level control variables as well as year and firm fixed effects, or year$\times$firm fixed effects as well as all control variables interacting with the female dummy variable.

Our results show that all skill signals increase female directors' likelihood to enter a leadership position more strongly than those of male directors. We find that signals of higher educational degrees increase the probability to enter a leadership position by 3.4% for male directors and by

8.3% for female directors relative to the respective baseline probabilities. Having graduated from a Top 50 US college increases male directors' likelihood to enter a leadership position by 0.4%, but female directors' likelihood to enter a leadership position by 6.8%, relative to the baseline probabilities. With respect to signals of professional experience, we find that general management skills increase male directors' likelihood to reach a leadership position by 12.2%, and female directors' likelihood to reach a leadership position by 19.4%. Having experience in the same industry is even more important. It increases the likelihood to enter a leadership position by 7.7% for male directors, and by 17.0% for female directors relative to the respective baseline probabilities.

It is important to note that in all regressions, the baseline probability of a female director to enter a leadership position remains significantly negative. Thus, the provision of observable skill signals mitigates, but does not eliminate, the gender gap in leadership positions.

The empirical challenge in our analysis is to identify the correct pool of potential candidates for a leadership position. Our main results are based on the full BoardEx sample. BoardEx includes all directors working for publicly listed companies with a market cap of at least 10 million USD (Engelberg et al., 2013). Thus, we do not expect gender driven selection when using the full BoardEx sample. In addition, we find that female and male directors in our sample do not differ with respect to their skill signals. This is in line with Kaplan and Sorensen (2021) who also find no significant differences between female and male CEO candidates. However, including the full BoardEx sample may raise concerns that directors in our sample are not sufficiently comparable (for example, they may differ in their preferences to compete and negotiate for leadership positions), and thus may not belong to the pool of potential candidates for a given leadership position. To mitigate these concerns, we repeat our analysis in a highly selective sample that is restricted to the ExecuComp database and only consists of the top five managers at a given firm. These directors are already in a leadership position and should be very comparable in their preferences and willingness to lead. We then examine their likelihood to become the CEO.

We find that signals of higher education increase male executives' likelihood to become CEO by 5.8% and female executives' likelihood to become CEO by 16.8% relative to the respective baseline probabilities. Our second education proxy, i.e., having graduated from a Top 50 US college, is even more important for executives' likelihood to become CEO. It increases the probability to become

CEO by 11.3% for male executives and by 49.9% for female executives. Signals of professional experience are also more important for female executives than for male executives. For example, general managerial skills increase male executives' probability to become CEO by 6.7%, but female executives' probability to become CEO by 36.4%.

We conduct further tests to differentiate between a demand side and a supply side explanation of our results. Following the theory of Cornell and Welch (1996), a higher uncertainty of male employers in judging female applicants' unobservable qualifications for leadership positions may explain why the provision of observable skill signals is more beneficial for female directors than for male directors. This demand side explanation is in line with our finding that female and male directors in our overall sample are equally qualified, but female directors are held to higher standards when it comes to filling a leadership position. Alternatively, one may argue that our results are driven by gender differences in self-promotion (Exley and Kessler, 2022; Cortes et al., 2022) on the supply side. If female directors have lower self-esteem and only apply for a leadership position if they can provide outstanding qualification signals, we would also observe a difference in female and male CEOs' overall skill signals.[3]

To differentiate between a demand side and a supply side explanation, we exploit an exogenous shock to the demand side, CEO death cases. If a CEO passes away unexpectedly, there is a sudden demand for a new CEO and little time for the firm to engage in extensive background research on potential candidates. In this situation, observable and easily verifiable skill signals may be particularly beneficial for female candidates, as they help to reduce information asymmetries with respect to their unobservable qualifications for a leadership position. At the same time, CEO death cases should not affect the supply side, i.e., gender differences in self promotion or differences in female candidates' willingness to enter a leadership position conditional on their skill sets. Using a triple interaction between the gender of a director, her skill signals, and a dummy variable capturing sudden CEO death, we find that our results are indeed stronger for CEO successions after the incumbent CEO has passed away.

To further establish the demand side channel, we conduct heterogeneity analysis to examine whether our results are stronger for firms with higher information asymmetries. We first examine

[3] Note, that recent work by Salwender and Stahlberg (2023) does not find any gender differences in the propensity to apply for a job conditional on self-perceived qualification for the job.

whether our main results are stronger for firms with all male nomination committees, i.e., firms in which only men are in charge of senior-level hiring. We repeat our baseline regressions and include a triple interaction to distinguish between nomination committees with all male members and those that have at least one female member. We find that our main results are indeed stronger for firms with all-male nomination committees. This result speaks to a demand side explanation of skill signals offsetting higher information asymmetries between female candidates and male employers.[4]

In a similar vein, we examine whether skill signals are more valuable for female directors who are hired for a leadership position from outside the company. As information asymmetries should be larger for outside hires, we expect our main result to be stronger for this subset of female directors and find significant results for some, but not all of our skill proxies.

Our results also tend to be stronger for firms located in gender conservative states, where the "Think manager - Think male" paradigm is presumably stronger. In these states, uncertainty regarding unobservable qualifications of female candidates for leadership positions should be higher because traditional gender norms stand in stark contrast to promoting women to top management roles (Koenig et al., 2011).

In the final step, we turn towards executive compensation and examine whether skill signals are also important for higher levels of pay and, particularly, if female directors' compensation benefits more from these signals than male directors' compensation. While one could still argue that, even among the top five executives of a firm, highly qualified women may still be more reluctant to enter the driving seat as CEO, it is implausible to assume that they are more reluctant to receive higher compensation than their male counterparts. However, according to the model of screening discrimination by Cornell and Welch (1996), male employers' difficulty to accurately judge the quality of female directors' unobservable skill set may also translate into higher uncertainty regarding the value that a female director adds to the firm. As a result, female directors may receive lower compensation than male directors. Female directors can try to counterbalance this disadvantage by providing more observable skill signals.

[4]Note that these results also rule out another alternative story, according to which the same skill signal may be more informative if it is obtained by a female director than by a male director. For example, employers may put more weight on a degree from a Top 50 college obtained by a woman if it was more difficult for women to enter these schools. This, however, would be hard to reconcile with the fact that our results are stronger for all-male nomination committees.

We find that educational skill signals increase female directors' compensation more strongly than male directors' compensation. Having graduated from a Top 50 ranked college has the strongest effect on female directors' compensation. It increases male directors' total compensation by 5.2%, or $223,900. If a female director graduated from a top 50 ranked college, she receives 26.7% higher compensation, which amounts to an additional $1,081,900 in absolute terms. Among the experience-based skill signals, having worked in the same industry before the current employment is the most important skill signal for raising female directors' total compensation. It increases male directors' total compensation by 8.6%, or $370,300, and female directors' compensation by 31.5%, or $1,276,400. Again, the baseline gender difference in compensation is negative in all regressions. Thus, observable skill signals mitigate, but do not reverse, the gender pay gap.

The main contribution of our paper is to show that female directors' careers benefit more from the provision of objective skill signals than careers of male directors. In both dimensions – higher education and professional experience – the likelihood of entering a leadership position, the likelihood of becoming CEO, and the level of compensation increase more strongly if a female director provides a given skill signal than if a male director provides the same signal. These results, together with our cross-sectional evidence, for example, on the gender composition of nomination committees, provide empirical support for the theoretical model on screening discrimination by Cornell and Welch (1996). Results in our paper also show that the overall probability of entering a leadership position is still lower for female directors than for male directors, even if female directors possess additional skill signals. Similarly, female directors with a larger skill set still earn less than their male counterparts. Thus, being a woman is still detrimental to reaching a leadership position, and receiving higher compensation.

Four papers on different settings augment the results of our analysis. Benson et al. (2021) investigate promotion decisions in a large retail chain and find that men's promotions are more strongly based on future potential, while women's promotion depends more on their past performance. In an academic context, Sherman and Tookes (2022) and Heckman and Moktan (2020) examine the likelihood of finance and economics assistant professors getting tenure. For 2016 and 2017, Sherman and Tookes (2022) show that the marginal impact of sole-authored top publications on the likelihood to get tenure is significantly higher for female finance professors than for male finance professors. Similarly, Heckman and Moktan (2020) show that female faculty in economics receive lower and more uncertain rewards than their male counterparts for the same number of top five publications. To achieve the same rate to tenure, they need to provide more top five publications. They also show that there are no gender differences in the quality of these articles. Finally, Lang and Manove (2011) show that educational attainment conditional on participating in the Armed Forces Qualification Test is higher for African Americans than for Caucasian candidates. They explain this with African Americans' higher needs of signaling due to statistical discrimination in the labor market. Even though these papers focus on other settings, their results point in the same direction as ours: Members of minority groups benefit more from the provision of observable skill signals.

Our results also contribute to the literature on gender gaps in leadership positions. For example, Bertrand (2018) shows that women are highly underrepresented in leadership positions in US companies. Although the gap in leadership positions is getting smaller, von Meyerinck et al. (2021) present evidence that, based on the current trend, it would take another 40 years to close the gender gap in US boards. Additionally, Fortin (2005), Bursztyn et al. (2017) and Charles et al. (2018) argue that gender norms impair women's career advancement. Our paper provides an additional explanation for the remaining gender gaps that we observe. Women have to provide more skill signals to reach a leadership position than men.

In addition, our paper contributes to the vast literature on the gender pay gap. Blau and Kahn (2017) show that although the gender pay gap has decreased since 1980, there is still a substantial difference in wages between men and women. Furthermore, the gender pay gap is even more pronounced at the very top of the wage distribution (Goldin, 2014). Several explanations for the gender pay gap are discussed in the literature. A large body of research argues that gender differences in labor market outcomes are due to psychological attributes of men and women (Bertrand, 2018). For example, compared to men, women are more risk-averse (Bertrand, 2011; Dohmen et al., 2011), less willing to compete (Niederle and Vesterlund, 2007; Flory et al., 2015), and less likely to negotiate their compensation (Babcock and Laschever, 2009; Leibbrand and List, 2015). We show that, in addition, compensation is determined by the provision of observable skill signals, and women need to collect more of these signals than men to reach the same level of pay.

2 Data and summary statistics

2.1 Sample Construction

Our main sample comprises variables from BoardEx Northamerica provided by Management Diagnostic Limited and from Compustat's ExecuComp database. In the first step, we compute proxies for directors' skill signals from their biographic information in the BoardEx database. The data cover active and inactive US publicly traded companies with a market capitalization that is greater than or equal to ten million dollars. BoardEx data allow us to identify the educational background and professional experience of each director. Additionally, we obtain detailed information about directors' current job, e.g., the company they work for and their position in the company. Our analysis is based on a sample running from 2000 to 2019, as BoardEx data reliability decreases considerably before 2000 (Engelberg et al., 2013).

In the second step, we merge company information from CRSP/Compustat to companies from the BoardEx sample. We include the following firm characteristics in our analysis: total assets, book to market ratio, annual stock return and idiosyncratic volatility. They are defined in detail in Variable Appendix A1. To merge the data, we proceed in two steps. First, BoardEx provides ISINs for most active companies. We use a firm's ISIN to construct the CUSIP number and merge firms with CRSP/Compustat data by CUSIPs. If the first step does not result in a match or if BoardEx does not provide an ISIN, we apply the Levenshtein algorithm on the company names in the two databases and manually check the matches. This results in 9,399 unique companies in our combined BoardEx/Compustat sample. We winsorize all company control variables at the 1% and 99% level.

In the third step, we follow Bertrand and Hallock (2001) and sort directors into different occupations based on their role name in BoardEx. We classify directors as CEO, Chair, Vice Chair, President, CFO, COO, Other Chief Officers, Executive VP, Senior VP, Group VP and VP. We drop all observations of directors in management positions below those classified by Bertrand and Hallock (2001), as the information provided by BoardEx is less accurate and comprehensive for people working in those positions. We then define a dummy variable, Leadership position, which is equal to one if a director is CEO, Chair, Vice Chair, President, CFO, COO, or Other Chief Officer of the company, and zero if a director's position belongs to one of the other categories. Alternatively, we define a dummy variable, CEO, which is equal to one if a director is CEO in a given year, and zero otherwise.

The sample consists of 15,757 unique female directors and 87,704 unique male directors working for 6,932 companies. We observe at least one female director in 5,216 companies, while 1,716 companies have no female director. Figure 1 shows that 13.1% of all directors in a leadership position are female. In 2000, there are only 809 (6.7%) female directors in leadership positions in the sample, and 11,307 male directors. This fraction increases to 16.6% (2,626) of female directors in leadership positions in 2019.

Finally, we merge compensation data from ExecuComp to CRSP/Compustat company information based on the common company identifier (gvkey). As there is no common unique identifier for directors in ExecuComp and BoardEx, we manually verify that compensation is correctly matched to each director based on directors' names. Overall, we match 84% of the director-year observations in ExecuComp with the combined BoardEx and CRSP/Compustat data set.[5] We use this smaller sample of 7,613 unique directors (375 female and 7,238 male) to address the trade-off between comparability of directors and inclusion of all potential candidates for leadership positions.

2.2 Variable Construction

We use directors' biographical information from BoardEx to compute proxies for skill signals based on education and professional experience. These variables have been shown to predict career advancement and compensation (Spilerman and Lunde, 1991; Custódio et al., 2013; Kaplan and Sorensen, 2021).

Education.

We calculate two different proxies for education based skills. First, we follow Graham et al. (2012) and define an Education Score for each director in our sample. A director's Education Score is equal to one if her highest degree is a Bachelor's degree, equal to two if her highest degree is a Master's, advanced law degree and/or MBA, equal to three if her highest degree is a PhD, and

[5] We use compensation data from ExecuComp instead of compensation data from BoardEx for two reasons. First, ExecuComp provides compensation data for a larger fraction of directors. For our final sample, only 30% of the director-company-year observations have compensation data in BoardEx. Second, as most US studies use ExecuComp data, using ExecuComp data allows us to compare our results to the existing literature on CEO pay in the US (Fernandes et al., 2013).

zero otherwise. Second, we measure the prestige of the university/college a director graduated from and define a dummy variable, Top 50 ranked college, which is equal to one if a director obtained a Bachelor's degree, Master's degree, law degree or a PhD degree from a Top 50 ranked college, and zero otherwise. A Top 50 ranked college is defined according to Forbes America's Top Colleges List.[6]

Professional experience.

We proxy for signals of professional experience based on directors' employment history provided by BoardEx. All professional skill measures are based on job experience a director gained before her current employment. First, we follow Custódio et al. (2013), and estimate a Generalist Index calculated as:

$$\begin{aligned} \text{(1)} \quad Generalist\ Index = {} & 0.268 * \ Number\ of\ Positions + 0.312 * \ Number\ of\ Firms \\ & + 0.309 * \ Number\ of\ Industries + 0.281 * \ CEO\ Experience \\ & + 0.153 * \ Conglomerate\ Experience \end{aligned}$$

where *Number of Positions* (*Firms* / *Industries*) is defined as the number of different positions (firms/industries) the director worked in before the current employment, *CEO Experience* is a dummy variable that is equal to one if the director was CEO at a listed firm before, and zero otherwise. *Conglomerate Experience* is an indicator that equals one if the director worked at a listed firm with more than one segment before her current employment, and zero otherwise.

Second, directors' industry experience has been shown to be a key selection criterion during the formation of new boards (Denis et al., 2015). Therefore, we define a variable capturing job experience within the same industry as an indicator equal to one, if a director has already worked in the same industry before her current employment, and zero otherwise.

2.3 Summary statistics

Panel A of Table 1 shows summary statistics of director characteristics. In our sample, and directors are on average 50 years old and 15% are women. 45% of directors hold a leadership position, and 10% of directors are CEO. Directors in our sample earn on average $4.29 million per year. While the

[6] See Appendix Table OA1 for a list of all schools includes in the Top 50 rank.

bottom 1% of directors in our sample have a total compensation of less than $200,000 per year, the top 1% of directors earn more than $20 million per year, i.e., the distribution of total compensation across directors in our sample is right-skewed. Hence, we use the inverse hyperbolic sine of total compensation in our regression analysis (Aihounton and Henningsen, 2021). It is also reported in Panel A to allow for the calculation of effect sizes.

Panel B of Table 1 presents summary statistics of firm characteristics. Total assets range from $12 million to $159.10 billion. Thus, the total assets variable is also right-skewed, and we again use the inverse hyperbolic sine of total assets in our regression analysis. The median company in our sample has a stock return of 7.8% over the last year and a market to book ratio of 2.15.

In Panel C, we show summary statistics for the full BoardEx sample by director gender.[7] Female directors are on average 2.63 years younger than male directors. 32% (47%) of female (male) directors held a company leadership position at some point during the sample period. 2% of female directors and 11% of male directors are CEO. Normalized mean differences are all above 0.25 for these variables, indicating that the gender differences in age and the likelihood of being in a leadership position are also statistically significant. In contrast, we do not find any significant gender differences in the skill variables, i.e., female and male directors in our sample have similar educational and professional backgrounds. This supports results in Kaplan and Sorensen (2021) who also find no significant difference between female and male CEO candidates and supports the view that there are no systematic differences between female and male directors in our sample, at least with respect to educational and professional backgrounds.

Results look different if we restrict the sample to ExecuComp and investigate gender differences between female and male executive directors (Panel D), i.e., directors who are already in a leadership position. Here, we find that female executive directors have a stronger educational and professional background. The difference is particularly pronounced for the generalist index, with a normalized difference of 0.29. This result suggests that women in leadership positions obtained more skill signals than their male counterparts. Similar results have been found for African Americans. Lang and Manove (2011) show that educational attainment conditional on participating in the Armed

[7]We report normalized differences calculated as in Imbens and Woolridge (2009), because they do not depend on the sample size and are more appropriate in our case than t-statistics. Imbens and Wooldridge suggest a threshold of 0.25 to determine whether there are systematic differences between subsamples.

Forces Qualification Test is higher for African Americans than for Caucasian candidates which they explain with African Americans' higher needs of signaling due to statistical discrimination in the labor market.

Table 2 provides further details regarding the fraction of female and male directors in a leadership position graduating from a Top 50 ranked college. The absolute number of female directors graduating from the same university is highest for Harvard, Stanford and the University of Pennsylvania. However, the ratio of female to male directors in a leadership position graduating from the same university is higher for smaller universities like Boston University and Georgetown University.

3 Skill signals and the likelihood to enter a leadership position

In this section, we examine whether and to what extent skill signals are more important for female directors to enter a leadership position than for male directors. The empirical challenge is to correctly define the pool of potential candidates considered for a given leadership position. In our baseline analysis, we focus on all directors in the BoardEx database. BoardEx collects the full list of directors working for all publicly listed companies in the US with a market capitalization of at least 10 million USD (Engelberg et al., 2013). It then adds all available information about those directors, i.e., employment history and educational background. When formally examining whether female or male directors might be selected for the BoardEx sample based on different criteria, we find no gender differences between female and male directors (see Table 1). However, one could argue that including all BoardEx directors as potential candidates for a leadership position creates a pool that is too large and includes too many individuals that would not be eligible for a given leadership position. In addition, this large pool includes a very heterogeneous group of individuals who may, for example, differ in preferences for competition and negotiation that are relevant for obtaining a leadership position. Therefore, we repeat our analysis for a smaller sample based on the ExecuComp database. This database only includes the top five executives at a given firm, and we investigate the likelihood of these executives becoming CEO. This narrow set of individuals is very likely to belong to the set of potential candidates for the CEO position and should be more homogeneous with respect to preferences and leadership aspirations. However, by definition, the analysis based on ExecuComp data leaves out potential candidates from outside the firm, and thus the ExecuComp pool may be too small. We believe that showing results for both the largest and smallest pool of potential candidates is the best way to deal with potential selection concerns.

We start our analysis with the following regression for the full BoardEx sample at the director-year level:

(2)

$$
\begin{aligned}
LeadershipPosition_{\mathrm{d,t}} = & \beta_1 Skill\ Signal_{\mathrm{d,t\text{-}1}} + \beta_2 Skill\ Signal_{\mathrm{d,t\text{-}1}}\ x\ Female\ dummy_{\mathrm{d}} \\
& + \beta_3 Female\ dummy_{\mathrm{d}} + \beta_4\ Director\ Age_{\mathrm{d,t}} + \beta_5\ Director\ Age\ Squared_{\mathrm{d,t}} \\
& + \beta_6\ Total\ Assets_{\mathrm{c,t\text{-}1}} + \beta_7\ Return_{\mathrm{c,t\text{-}1}} + \beta_8\ Volatility_{\mathrm{c,t\text{-}1}} \\
& + \beta_9\ Market\ to\ Book_{\mathrm{c,t\text{-}1}} + \alpha_c + \alpha_t + \varepsilon_{\mathrm{d,t}}
\end{aligned}
$$

The dependent variable, *Leadership Position*$_{d,t}$, is a dummy variable equal to one if director d is in a leadership position at company c in year t, and zero otherwise.

The main independent variables are our proxies for skill signals, $Skill\ Signal_{\mathrm{d,t\text{-}1}}$: directors' education and professional experience. Skill signals are measured over directors' lifespan, excluding experience from their current employment.

We interact each skill signal variable with a female dummy, $Female\ dummy_{\mathrm{d}}$, which is equal to one for female directors, and zero otherwise. The impact of each skill signal on male directors' probability to enter a leadership position is captured by coefficient β_1. The marginal impact of each skill signal for female relative to male directors is captured by the coefficient on the interaction term, β_2. Finally, the baseline gender difference with respect to the likelihood to become CEO is captured by the coefficient on the female dummy, β_3.

Next, we focus on the ExecuComp sample and examine the probability that one of the non-CEO top executives becomes CEO in a given year, conditional on the provision of observable skill signals. We focus on the CEO position, because it represents the top of the corporate hierarchy (Baker et al., 2009) and can be considered as the ultimate prize in a tournament for promotion (Kale et al., 2009). We then re-estimate the same regression as in Equation 2, but replace the dependent variable with a dummy variable *CEO*$_{d,t}$, which is equal to one if an executive is CEO in a given year, and zero otherwise.

Following the previous literature, we include the following control variables. $Director\ Age_{\mathrm{d,t}}$ ($Director\ Age\ Squared_{\mathrm{d,t}}$) controls for the non-linear relationship between director age and the likelihood of becoming a CEO. Weisbach (1988), Murphy and Zimmerman (1993) and Bushman et al. (2010) show that there is a positive link between director age and the likelihood to become CEO up to an age of around 60 years. Being older than 60 has a negative impact on the likelihood to become CEO, as the average retirement age is between 60 and 65. We also control for standard firm characteristics that might have an influence on the likelihood that a certain type of CEO is selected by different types of firms. Specifically, we include a firm's total assets, $Total\ Assets_{\mathrm{c,t\text{-}1}}$, as a proxy for size, and the market to book ratio, $Market\,to\,Book_{\mathrm{c,t\text{-}1}}$, as a proxy for firms' growth opportunities. Previous research shows that large firms and firms with high growth potential select different types of CEOs compared to small and low growth potential firms (Schoar and Zuo, 2017). Firm performance has an impact on CEO turnover and selection (Jenter and Lewellen, 2021). Therefore, the stock return over the past year, $Return_{\mathrm{c,t\text{-}1}}$, is added as control variable. We also include a stock's idiosyncratic volatility, $Volatility_{\mathrm{c,t\text{-}1}}$, as Bushman et al. (2010) show that there is a relationship between CEO turnover (new CEO appointments) and idiosyncratic risk.

Finally, we include firm and year fixed effects (α_c and α_t) or firm×year fixed effects ($\alpha_{c,t}$). In our main specification, we estimate linear probability models and cluster standard errors by firm-year to account for dependencies due to multiple directors working at the same firm in a given year.[8]

3.1 Education signals and (female) directors' likelihood to enter a leadership position

Higher education in general and degrees from top-ranked colleges in particular have been shown to be crucial for reaching a managerial position (Useem and Karabel, 1986). If screening discrimination takes place in recruiting for leadership positions, these objective and observable skill signals may be even more important for female directors. We run fixed effects regressions as described in equation 2 and subsequently include our proxies for education signals, interacted with a female dummy variable, as main independent variables.

[8]Alternatively, we estimate logit regressions with industry and year fixed effects, cluster standard errors by firm only, and add interactions of our control variables and the female dummy, to account for the possibility that our results are driven by different company characteristics of firms in which male and female directors work. These specifications do not affect our results (see Appendix Tables OA2 - OA4).

Results are reported in Table 3. We include firm and year fixed effects in columns (1) and (2) and firm×year fixed effects in columns (3) and (4).

Panel A shows the impact of education signals on (female) directors' likelihood to enter a leadership position. Results are based on the full BoardEx sample. First, we include Education Score as a proxy for education-based skill signals in columns (1) and (3). This variable is measured as the highest degree (Bachelor, Master, PhD) a director obtained, and ranges between zero and three. We find that increasing the Education Score by one point (i.e., having a Master's instead of a Bachelor's degree) corresponds to a 1.6pp (columns (1) and (3)), or 3.4% relative to the baseline probability, increase in the likelihood of a male director entering a leadership position. The Education Score is even more important for female directors. A one point increase of the Education Score increases the likelihood of a female director entering a leadership position by 2.7pp (columns (1) and (3)), or 8.3% in relative terms. Independent of the specification, all results are statistically significant at the 1% level.

Second, we analyze whether graduating from a Top 50 ranked college increases female and male directors' likelihood to enter a leadership position. This variable is equal to one if a director graduated from a Top 50 ranked college in the US, and zero otherwise.[9] Columns (2) and (4) show that having graduated from a Top 50 ranked college is not statistically significant for male directors. However, having graduated from a Top 50 ranked college is a valuable skill signal for female directors. The interaction between Top 50 ranked college and the female dummy is positive and statistically significant at the 1% level. It increases female directors' likelihood entering a leadership position by 2.2pp (column (2)) to 2.3pp (column 4)) or 6.8% to 7.1% in relative terms.

Panel B presents results from the ExecuComp sample and analyzes the impact of education signals on (female) executives' likelihood to become CEO. Columns (1) and (3) present results for the Education Score. They show that a one point increase of the Education Score corresponds to a 3.5pp (column (1)) to 3.7pp (column (3)) increase in the likelihood that a male executive becomes CEO. As indicated by the statistically significant interaction term between Education Score and the female executive variable, a one point increase in the Education Score (for example, having a Master's degree instead of a Bachelor's degree) increases the likelihood that a female executive

[9]See Appendix Table OA1 for a list of all schools included in the Top 50 rank.

becomes CEO by 7.7pp (column (1)) to 9.1pp (column (3)). In relative terms, this corresponds to a 5.8% to 6.2% increase for male executives, and a 16.8% to 19.8% increase for female executives. In columns (2) and (4) we examine whether graduating from a Top 50 ranked college increases female and male executives' probability of becoming CEO. We find that graduating from a Top 50 ranked college increases male executives' likelihood of becoming CEO by 6.8pp (column (2)) to 9.6pp (column (4)). We again find that educational skill signals are even more valuable for female executives. Graduating from a Top 50 ranked college increases female executives' likelihood of becoming CEO by 22.9pp (column (2)) to 32.2pp (column (4)). Relative to the baseline probability to become CEO, this corresponds to a 11.3% to 16.0% increase for male executives, and a 49.9% to 70.2% increase for female executives.

Overall, results in Table 3 show that signals of higher education are valuable for directors as they are associated with a higher likelihood of entering a leadership position and becoming CEO of the company. The effect is particularly strong for female directors who benefit more from each skill signal, reflected by a larger increase in the likelihood of entering a leadership position and becoming CEO.[10]

Results for control variables are broadly in line with the previous literature ((Weisbach, 1988; Murphy and Zimmerman, 1993; Bushman et al., 2010)). Most importantly, we find that female directors are significantly less likely than male directors to enter a leadership position and to become CEO, supporting the vast literature on gender differences in leadership positions (Blau and DeVaro, 2007; Bertrand, 2018; Kaplan and Sorensen, 2021). The likelihood of entering a leadership position or to becoming CEO is also still smaller for female directors with a large number of observable skill signals. Thus, skill signals mitigate, but do not close, the gender gap in leadership positions.

[10]For robustness, we strictly analyze promotions in leadership positions and drop subsequent years in which a director is still in the same position from the sample. That is, we define a leadership promotion dummy variable that is only equal to one if a director enters a leadership position in year t, and that is equal to zero for the previous year in which the director was not already in this leadership position. Results are weaker for education based skills and robust for skills based on professional experience (see Appendix Table OA5).

3.2 Professional experience and (female) directors' likelihood to enter a leadership position

According to Murphy and Zabojnik (2004), general managerial skills have become more important for leadership positions than firm specific skills. In addition, Denis et al. (2015) show that directors' industry experience is a key selection criterion during the formation of new boards. Therefore, we now analyze whether and to what extent general managerial skills and same industry experience gained before working at the current firm are more important for female relative to male directors with respect to the likelihood to enter a leadership position and to become CEO. Results are reported in Table 4.

Panel A examines the impact of professional experience and (female) directors' likelihood of entering a leadership position. First, we use the Generalist Index score, computed as in Custódio et al. (2013), as a proxy for professional experience in columns (1) and (3). Increasing the Generalist Index score by one standard deviation (i.e., higher general managerial skills) increases male directors' probability to enter a leadership position by 5.7pp (column (1)) to 5.9pp (column (3)). This corresponds to 12.2% to 12.6% relative to the baseline probability. The interaction term between the Generalist Index and the female dummy is positive and statistically significant at the 1% level in column (1) and at the 10% level in column (3). A one standard deviation increase of the Generalist Index increases female directors' likelihood to enter a leadership position by 6.3pp or 19.4% in relative terms.[11] Second, we use same industry experience as a proxy for professional experience and define a dummy variable equal to one if a director has worked in the same industry before, and zero otherwise. Columns (2) and (4) show that having same industry experience increases male directors' probability to enter a leadership position by 3.6pp (column (2)) to 3.8pp (columns (2)). Having same industry experience is even more important for female directors. It increases their likelihood of entering a leadership position by 5.4pp (column (4)) to 5.5pp (columns (2)). Relative to the baseline probability, this corresponds to a 7.7% to 8.1% increase for male directors and a 16.7% to 17.0% increase for female directors.

[11] In a further analysis, we split the index into its components to test whether its overall impact on the likelihood to enter a leadership position is driven by one individual component. Panel A of Appendix Table OA6 shows that each of the index components except for number of industries and conglomerate experience are more valuable for female directors than for male directors to enter a leadership position.

Panel B analyzes the impact of professional experience and (female) executives' likelihood of becoming CEO. In columns (1) and (3), we show that a higher Generalist Index score increases the probability of female and male executives becoming CEO. A one standard deviation increase of the Generalist Index score corresponds to a 4.7pp (columns (1)) to 7.4pp (column (3)) increase in male executives' likelihood of becoming CEO. Relative to the baseline probability, this corresponds to a 7.8% to 12.4% increase. The coefficient of the interaction term between the Generalist Index score and the female executive variable is also positive as well as economically and statistically significant at the 1% level. Specifically, a one standard deviation increase in the Generalist Index score (i.e., higher general managerial skills) increases female executives' probability of becoming CEO by 14.4pp (column (1)) to 16.9pp (column (3)), or 31.3% to 36.9%.[12]

In columns (2) and (4), we analyze whether having same industry experience increases the likelihood of becoming CEO. We find that having industry experience is not statistically significant at the 10% level for male executives' likelihood of becoming CEO. However, having industry experience is an valuable skill signal for female executives. The interaction between industry experience and the female dummy is statistically significant at the 1% level. Having industry experience increases their likelihood of becoming CEO by 16.7pp (column (2)) to 21.2pp (column (4)) or 36.4% to 46.2%.

Results for control variables are broadly in line with the previous literature and the results in Table 3.

We also examine the second level of corporate hierarchy and check whether our results are similar for the likelihood of becoming Executive Vice President. Specifically, we repeat the regression outlined in equation 2 but replace the dependent variable with a dummy equal to one if a director is Executive Vice President in a given year, and zero otherwise. To determine the pool of potential candidates for Executive Vice President positions correctly, we restrict the sample to Executive VP, Senior VP, Group VP and VP, i.e., the second level of corporate hierarchy, and drop all directors in a leadership position, i.e. the first level of corporate hierarchy. Results are reported in Appendix Table OA7. They show that all skill signals are associated with a higher likelihood of becoming Executive Vice President. The impact is again more pronounced for female directors who benefit

[12]We also split the Generalist Index into its individual components to test whether they have a differential impact on the likelihood to become CEO. Panel B of Appendix Table OA6 shows that the interaction between all components and the Female dummy variable are positive and statistically significant.

more from each skill signal, reflected by a larger increase in the likelihood to become Executive Vice President. Thus, our results also hold for the second level of corporate hierarchy.

4 Does screening discrimination explain our results?

So far, our results can be explained by either a demand side or a supply side channel. According to a demand side explanation, female directors aspiring to attain a leadership position need to provide more qualification signals, because male employers find it more difficult to judge their (unobservable) skill set, even if they are as equally qualified as their male counterparts. As a result, only women with a higher number of easily verifiable skill signals overcome the hurdle of hiring discrimination at the demand side. However, one may also argue that our results are driven by the supply side, i.e., women are less self-confident and only apply for a leadership position if they can provide clearly outstanding qualification signals, while men are (overly) optimistic and thus more likely to apply. These gender gaps in self-promotion and job search (Exley and Kessler, 2022; Cortes et al., 2022) would be consistent with our results, even though they do not seem to result in gender differences in the propensity to apply for a job (Salwender and Stahlberg, 2023).

To differentiate between a supply side and a demand side explanation, it is important to note that women and men in our sample are already in a top ranked job position and therefore included in the BoardEx database. In our baseline sample, they do not differ with respect to their educational or professional backgrounds (see Table 1). Particularly for our results based on ExecuComp, which are derived from the top five executive directors at a given firm only, a supply side explanation according to which female executive directors have lower self-esteem and thus are less likely to apply for the CEO position seems unlikely. In line with this view, Kaplan and Sorensen (2021) show that female and male candidates for a CEO position are not appreciably different from each other. Based on proprietary data on executive assessments, they do not find significant differences between female and male CEO candidates with respect to risk-taking, career path, personality, and being good at sales.

Furthermore, the hiring process for CEO appointments is quite different from more general job hirings and is usually overseen by a nomination committee, which identifies suitable candidates and prepares the corresponding director election. There is usually no formal application process in which potential CEO candidates submit their CVs and job package. Rather, they are approached by members of the nomination committee and/or external head hunters. In our view, this also speaks to a demand side explanation, which we explore more formally in this section.

4.1 CEO death cases as a natural experiment

In the following, we examine CEO death cases as an unexpected shock to the demand side to establish causality. According to a survey of board members, roughly half of the firms in the U.S. do not have a CEO succession plan and many of them have not even identified an interim CEO in case a CEO leaves abruptly.[13] Thus, if a CEO suddenly passes away, her firm will have to find a replacement CEO under time pressure with little time left for extensive background research on each candidate. In this situation, observable skill signals may be particularly valuable for female candidates. At the same time, CEO death cases should not have an impact on the supply side, i.e., gender differences in self-promotion or differences in female candidates' willingness to lead the firm conditional on their skill sets.

To identify CEO death cases, we use the database of CEO turnover and dismissals at S&P 1500 firms provided by Gentry et al. (2021). The database reports the reasons for CEO departures in ExecuComp based on SEC filings and news articles. As a result, we can identify all CEOs who passed away unexpectedly while still in office (CEO departure code (1) in Gentry et al., 2021). We then define an indicator variable equal to one if in our ExecuComp sample the previous CEO died while in office, and zero otherwise. Overall, there are 41 CEO death cases in our sample (38 male CEOs and 3 female CEOs). We do not have variation in same industry experience of subsequent female CEOs. Therefore, we estimate triple interactions for Education Score, Top 50 ranked college, and the Generalist Index, only.

Results in Table 5 show that observable skill signals are indeed more beneficial for female candidates if a CEO succession follows the sudden death of the incumbent CEO. Coefficient estimates are quite large which may be due to the small number of CEO death cases in our sample. We also find that female candidates are less likely to become CEO after a sudden CEO death, which provides further support for the view that information asymmetries between male employers and

[13] See https://hbr.org/2020/05/your-ceo-succession-plan-cant-wait and https://edition.cnn.com/2019/09/06/success/ceo-succession/index.html

female candidates are more pronounced if the new CEO needs to be hired under time pressure. This makes objective and easily verifiable skill signals even more valuable for female candidates.

4.2 Heterogeneity analysis: Information asymmetries

To further differentiate between a supply side and a demand side explanation of our results, we try to identify cases in which information asymmetries between the firm and female candidates should be larger and examine cross-sectional heterogeneity along these dimensions. Specifically, we split the sample according to the gender composition of the nomination committee, inside versus outside hires, and firms located in gender-conservative versus gender-liberal states.

Composition of the nomination committee.

CEO successions are usually managed by members of the nomination committee.[14] Committee members, often supported by professional executive search firms, identify potential candidates for the CEO position and eventually propose the most suitable candidate to the firms' shareholders at the annual meeting. Even though women are over-represented among human resources managers, who are usually involved in hiring decisions, they are clearly a minority when it comes to nomination committees.[15] Thus, potential female candidates for the CEO job may benefit more from the provision of observable skill signals than their male counterparts, if the (mostly) male members of the nomination committee find it more difficult to judge their unobservable leadership qualifications. If this is the case, we should find weaker effects for firms with nomination committees that have a female chair, as information asymmetries between the committee and female candidates should be smaller. At the same time, given that the prospective job of a CEO is the same, independent of the nomination committee's gender composition, a supply side explanation of our results becomes less likely.

In Table 6, we include triple interactions between director gender, skill signal, and a female nomination dummy variable (*FemNom*) which is equal to one if the chair of the nomination committee

[14] While nomination committees are responsible for CEO appointments, the CEO usually decides on the composition of the top management team (CFO, COO, etc.) Thus, the following analysis is focused on CEO appointments only.

[15] According to data from Statista, in 2021, 80 percent of human resources managers in the United States were women (see `https://www.statista.com/statistics/1088059/share-human-resources-managers-united-states-gender/`. The under-representation of women in nomination committees is documented in the following report: `https://www2.deloitte.com/content/dam/Deloitte/global/Documents/gx-women-in-the-boardroom-seventh-edition.pdf`).

is female, and zero otherwise.[16] The dependent variable is equal to one if a female executive director becomes CEO, and zero otherwise. The regressions include the same set of control variables as in Table 3 and firm and year fixed effects, or firm×year fixed effects, respectively.

Results in Table 6 show that the triple interactions between director gender, skill signal, and a female nomination committee dummy variable are negative and statistically significant for all skill signals. For example, the coefficient of the triple interaction between director gender, Top 50 ranked college, and a female nomination committee dummy is -0.236 (Panel A column (2)). Thus, having graduated from a Top 50 ranked college is 23.6pp less important for female directors' likelihood of becoming CEO when the firm has a female nomination committee chair compared to firms with a male nomination committee chair. These results provide support for a demand side explanation, according to which female directors need to possess more objective qualifications to make up for higher information asymmetries regarding their unobservable skills, particularly if the nomination committee is only composed of male members.

Outside hires. Information asymmetries should also be larger for outside hires, i.e., it should be easier for a firm to evaluate female candidates from inside the company, because these directors already have an employment history at the firm. Thus, the provision of observable skill signals should be more important for female directors who enter a leadership position from outside the company. At the same time, there should be no differences in gender gaps in self-promotion conditional on whether a female director is hired from inside or outside the firm.

In Table 7, we include a triple interaction between director gender, skill signal, and an outside dummy variable equal to one if a director has not worked for the company before entering the leadership position, and zero otherwise. We find suggestive evidence that skill signals are even more important for female directors from outside compared to inside the firm. For Education Score and Generalist Index, the triple interaction is positive and statistically significant at the 1% level, i.e., increasing the Education Score by 1 point (i.e., having a Master's instead of a Bachelor's degree) is 1.4pp more important for female directors from outside compared to inside the firm regarding

[16]Before 2004, we only have information on firms' nomination committees for 57% of observations. Afterwards, the SEC adopted new rules requiring firms to disclose whether they had a separate nominating committee (https://www.sec.gov/news/press/2003-160.htm). For the subsequent time period, we have information on nomination committees for 94% of observations. To avoid potential differences in firms selecting into disclosing whether or not they have a nomination committee, we restrict the sample to 2004-2019 for the analysis in Table 6. Our results (not reported) remain robust if we include years before 2004.

their probability of entering a leadership position. We do not observe a positive and statistically significant triple interactions for Top 50 ranked college degrees and same industry experience.

Gender norms. Finally, we examine whether our results are stronger for firms located in states with conservative gender norms, where the "Think manager - Think male" paradigm (Koenig et al., 2011), according to which men are better suited for leadership positions, should be more common. This may amplify hiring disadvantages for female directors stemming from screening discrimination. As Republican states have more conservative gender norms than Democratic states (May and McGarvey, 2017), we expect that it is more challenging for female directors to enter a leadership position in Republican states compared to Democratic states. If this is the case, our skill signals should be even more important for female directors' likelihood to enter a leadership position in Republican states compared to Democratic states.

In Table 8, we include a triple interaction between director gender, skill signal, and a conservative dummy variable which is equal to one if a firm's headquarter state has voted for Republicans in at least 4 out of the 5 presidential elections between 2000 and 2019, and zero if the state of the headquarter of the company has voted for Democrats in at least 4 out of the 5 presidential elections between 2000 and 2019. We find that all triple interactions between director gender, skill signal, and the conservative state dummy are positive. However, only Top 50 ranked college and same industry experience are statistically significant at the 5% level. For example, having graduated from a Top 50 ranked college is 3.3pp more important for female directors entering a leadership position in a company headquartered in a more conservative state.

To conclude, Tables 6 to 8 provide support for screening discrimination being a main driver of our results. In addition, they rule out several alternative explanations based on selection effects or gender differences in preferences among female and male directors, as these would be hard to reconcile with cross-sectional differences conditional on, for example, the gender composition of the nomination committee.

5 Skill signals and executive compensation

Screening discrimination may also result in lower compensation of female vs. male executives. If male employers can judge male job applicants' unknown qualities better than those of female applicants, they may also find it more difficult to determine the market value of a female executive when setting the compensation contract.

Previous research shows that signals of higher education (Useem and Karabel, 1986; Graham et al., 2012) and signals of professional experience (Murphy and Zabojnik, 2004; Custódio et al., 2013) have a positive impact on executive compensation. Therefore, we conjecture that observable skill signals are also more important for female executives' when it comes to determining their compensation.

To test this conjecture, we run the same set of fixed effect regressions as in Equation 2, but use the inverse hyperbolic sine of total compensation, $Compensation_{\mathrm{d,t}}$, as the dependent variable. We include the same set of control variables, because the previous literature shows that they are also relevant for executive compensation (Gibbons and Murphy, 1992; Kuhnen and Niessen, 2012; Gabaix and Landier, 2008; Tervio, 2008; Graham et al., 2012; Core et al., 1999). As in our previous regressions, we also include firm and year fixed effects or firm×year firm effects.[17]

5.1 Education signals and (female) executives' compensation

Advanced degrees are not only crucial for directors to reach leadership positions (Useem and Karabel, 1986), but are also associated with higher compensation (Graham et al., 2012). Graham et al. (2012) provide evidence that executives with higher education, which is often used as a proxy for managerial talent, receive higher pay. Therefore, we now test whether the impact of observable signals such as higher education are a more important determinant for female executives' compensation contracts compared to male executives' compensation contracts.[18]

Panel A of Table 9 shows the results for our two education signals. Results in columns (1) and (3) show that a one point increase of the Education Score corresponds to a 4.1% (column (3)) to 4.6% (column (1)) increase in total compensation for male executives. In absolute terms, this corresponds to $176,600 to $198,100 higher compensation for the average male executive in our sample. The interaction between Education Score and the female dummy variable is positive and

[17] Alternatively, we cluster standard errors by firm only and we add interactions of our control variables and the female dummy, to account for the possibility that our results are driven by different company characteristics of firms in which male and female directors work which does not affect our results (see Appendix Tables OA3 - OA4).

[18] The following results are based on the ExecuComp sample, because BoardEx lacks compensation data for more than 70% of the observations in our sample.

statistically significant at the 5% level in column (3). In economic terms, a one point increase in the Education Score (i.e., having a Master's degree instead of a Bachelor's degree) increases total compensation of female executives between 8.3%, or $336,300 in column (1) and 10.6% or $429,500 in column (3).

In columns (2) and (4) we analyze whether executives who graduated from a Top 50 ranked US college receive higher compensation. We show that graduating from a Top 50 ranked college increases male executives' total compensation by 5.2% in column (2) and by 5.5% in column (4). We again find that educational skill signals are even more valuable for female executives. Graduating from a Top 50 ranked college increases female executives' total compensation between 26.7% (column (1)) and 37.0% (column (3)). This corresponds to an increase of $223,900 to $236,800 for male executives, and $1,081,900 to $1,499,300 for female executives in absolute terms.

Overall, results in Table 9 show that signals of higher education are valuable for executives as they are associated with higher total compensation. The effect is particularly strong for female executives who benefit more from each education-based skill signal in terms of higher total compensation than their male counterparts.[19]

Again, the female dummy is negative in all specifications, indicating that female executives earn about 25% less than male executives (columns (1)-(2)). This finding supports the vast literature on the gender pay gap (Blau and Kahn, 2017) and compares well to findings in Bell (2005) who report a gender pay gap in the gross compensation of 25%. Our result also supports findings of Bertrand and Hallock (2001), according to which the gender pay gap is more pronounced among women and men in leadership positions. We find that signals of higher education mitigate, but do not close, the gender pay gap in leadership positions.

Director age is positively related to total compensation up to 59 years. Being older than 59 has a negative impact on directors' compensation, which is in line with previous research (Gibbons and Murphy, 1992; Kuhnen and Niessen, 2012). Total assets have a positive and statistically significant impact on compensation, supporting the previous literature on the link between firm size and executive pay (Baker et al., 1988; Murphy, 1999; Gabaix and Landier, 2008). We also find that

[19] Our results are not mainly driven by the CEOs in our sample and are robust to excluding CEOs (see Panel A of Table OA8). Results also hold if we restrict the sample to promotions to CEO positions and drop subsequent years in which an executive is still CEO (see Panel B of Table OA8).

better performing managers receive higher total compensation. The coefficient of last year's return is positive and statistically significant at the 1% level. A one standard deviation increase in last year's return increases directors' compensation by 0.06%. Thus, the economic significance is very small, which is inline with previous research (e.g. Core et al., 1999; Graham et al., 2012). Also as expected from the previous literature (Core et al., 1999), our results show that directors in firms with higher market-to-book ratios (i.e., more growth opportunities) receive higher compensation.

5.2 Professional experience signals and (female) executives' compensation

Custódio et al. (2013) show that executives with higher general managerial skills receive higher compensation. We now test whether female executives benefit more from general managerial skill signals than male executives. Panel B of Table 9 shows the results.

In columns (1) and (3), we use the Generalist Index as a proxy for professional experience. This variable proxies for general managerial ability gained during past work experience (see Equation 1). We find that a one standard deviation increase of the Generalist Index corresponds to an 8.6% (column (1)) to 10.5% (column (3)) increase in total compensation for male executives. In absolute terms, this corresponds to \$371,900 to \$453,400 higher compensation. Firms, on average, pay higher compensation for executives with more general management skills according to the Generalist Index (and each of its components as shown in Appendix Table OA9). This result compares well with findings in Custódio et al. (2013). In their analysis, a one standard deviation increase of the Generalist Index leads to a pay increase of up to 12% (\$500,000).

More importantly, the interaction term between the Generalist Index and the female dummy variable is positive and statistically significant at the 1% and 5% level. In economic terms, a one standard deviation increase of the Generalist Index increases total compensation of female executives by 18.0% (column (1)) to 21.7% (column (3)) or \$731,200 to \$880,100.

We also find that same industry experience is positively associated with total compensation (columns (2) and (4)). Having worked in the same industry before the current employment increases male executives' total compensation by 7.9% (column (4)) to 8.6% (columns (2)) or \$340,200 to \$370,300, and female executives' total compensation by 31.5% (column (2)) to 39.7% (column (4)), or \$1,276,400 to \$1,608,700.

We conclude that signals of professional experience are not only more important for female directors' likelihood of entering a leadership position and becoming CEO, but also increase their total compensation more strongly than that of male directors.

6 Discussion and Conclusion

This paper shows that female directors' careers benefit more from signals of higher education and professional experience than careers of male directors. We observe substantial increases in the likelihood to enter a leadership position, to become CEO and in the level of compensation for female directors with more objective and observable skill signals.

A natural question that arises from our findings is to what extent gender gaps in leadership positions are reduced between female and male directors with a larger number of skill signals. In Table 10, we sort female and male directors into terciles conditional on whether and how much of a given skill signal they gathered. For each tercile, we then compute the gender gap in the likelihood to reach a leadership position and a CEO position respectively.

Results show that gender gaps are more pronounced among female and male directors with fewer skill signals, while they decrease and are significantly smaller among female and male directors with more skill signals. Thus, a larger number of observable skill signals seems to be particularly important for women aspiring to reach a leadership position. These positions are characterized by less precise job descriptions and require a complex skill set along many dimensions, ranging from human resource management, to financial and strategic planning. This results in higher uncertainty regarding a potential match between the job's requirements and the applicant's skill set compared to standardized jobs characterized by mainly routine tasks.

Further calculations show that a one point increase in the Education Score increases female directors' likelihood of entering a leadership position by 2.7pp, while graduating from a Top 50 ranked colleges adds another 2.2pp, and having industry experience adds another 5.5pp. This reduces the gender gap in entering a leadership position from 14% to 3.6%. If the Generalist Index increases by one standard deviation, which leads to a 6.3pp increase and is the largest impact factor among our skill signals, the gender gap in entering a leadership position can be closed completely.

We believe that screening discrimination is the main driver of our results. In line with this view, we show that observable skill signals are more important for female directors if the hiring decision is made by men only, and after sudden CEO death cases, where search committees need to find a new CEO under time pressure. Our results are also stronger for female directors entering a leadership position from outside the company, and for firms headquartered in states with conservative gender norms.

Do our results suggest that equally qualified women are burdened with collecting more skill signals to be considered for leadership positions, receive higher pay, and eventually close gender gaps in leadership positions and earnings? As long as there are different baseline probabilities for men and women to reach a leadership position (which is the case in our sample), and if women are not equally represented among recruiters and nominating committees, the answer is yes.

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Figure 1: Fraction of Female Directors

This figure shows the fraction of female directors in our sample. The time period is from 2000 to 2019. The fraction of female directors is defined as the number of unique female directors in each year divided by the total number of unique directors in each year. The fraction of female leaders is defined as the number of unique female directors in a leadership position (CEO, Chairwoman, Vice Chair, President, CFO, COO and Other Chief Officers) divided by the total number of unique directors in a leadership position (CEO, Chairwoman, Vice Chair, President, CFO, COO and Other Chief Officers). The fraction of female CEOs is defined as the number of unique female CEOs each year divided by the total number of unique CEOs in each year. All numbers are based on the BoardEx sample.

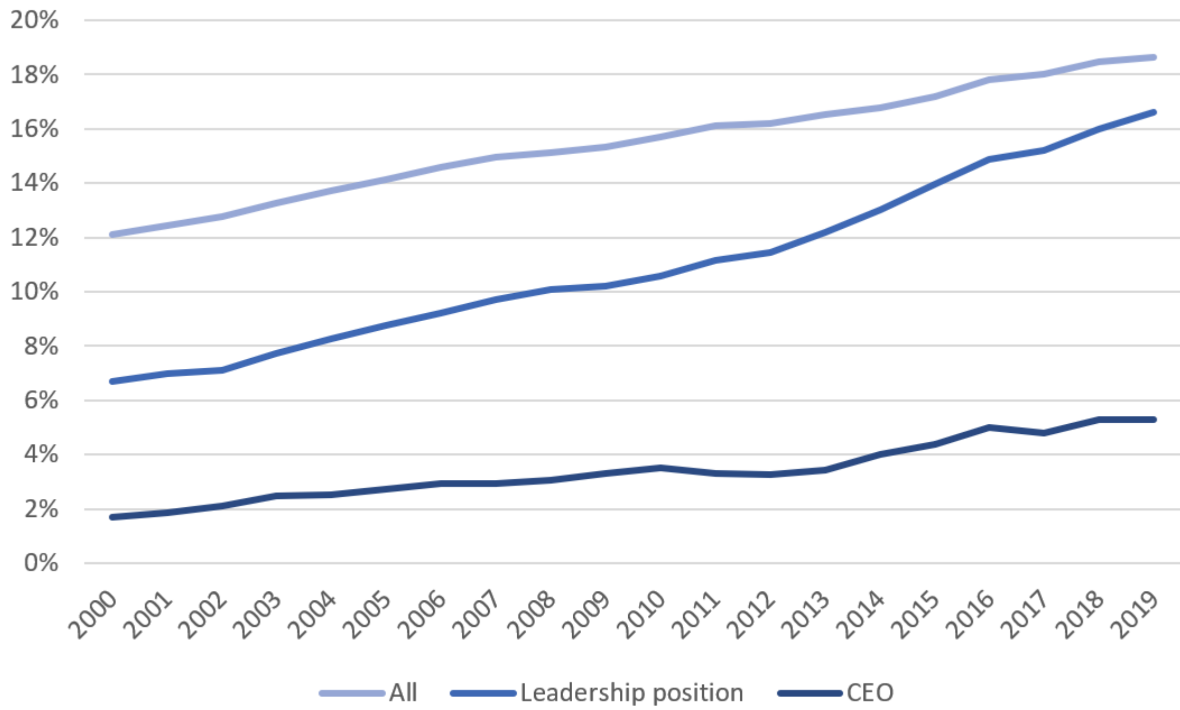

Table 1: Summary Statistics

This table presents summary statistics on all variables used in the paper. Data are obtained from BoardEx, Compustat, CRSP and ExecuComp. The sample runs from 2000 to 2019. Panel A presents director characteristics. Leadership Position is a dummy variable equal to one if director is in a leadership position (CEO, Chairwoman, Vice Chair, President, CFO, COO and Other Chief Officers), and zero otherwise. Total compensation is in thousands. Asinh(Total Compensation) is the inverse hyperbolic sine of total compensation. Female is a dummy variable equal to one for female directors, and zero otherwise. Age is the age of the director in years. CEO is an indicator variable that takes the value of one if the director is CEO, and zero otherwise. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if the director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as the Generalist Ability Index from Custódio et al. (2013). Same Industry Experience is an indicator that is equal to one if the director worked in the same industry before, and zero otherwise. Panel B presents firm characteristics. Assets are from Compustat. Last year return is the annual stock return from CRSP. Idiosyncratic Volatility is defined as the squared residual estimated in a five-year rolling window CAPM regression of monthly returns. Market to book is the ratio of the market value of equity at the fiscal year end divided by the book equity for the fiscal year. Panel C presents gender differences for the full BoardEx sample, Panel D presents gender differences for the ExecuComp sample. Columns (1) and (2) report mean values of different director characteristics for female and male directors separately. Column (3) reports the difference between female and male directors. In column (4), we report normalized mean differences as in Imbens and Woolridge (2009). All variables are winsorized at the 1st and 99th percentile, and described in detail in Variable Appendix A1.

Panel A: Director characteristics

	Mean (1)	Median (2)	SD (3)	1^{th} (4)	99^{th} (5)	Obs. (6)
Female	0.15	0.00	0.36	0.00	1.00	728,143
Age	50.18	50.00	9.15	31.00	75.00	728,143
Leadership position	0.45	0.00	0.50	0.00	1.00	728,143
CEO	0.10	0.00	0.30	0.00	1.00	728,143
Total Compensation	4,294.63	2,645.237	4,577.34	189.17	19,797.45	49,117
Asinh(Total Compensation)	8.54	8.57	1.07	5.94	10.60	49,117
Education Score	1.09	1.00	0.91	0.00	3.00	728,143
Top 50 ranked college	0.18	0.00	0.39	0.00	1.00	728,143
Generalist Index	0.74	0.00	1.06	0.00	4.29	728,143
Same Industry Experience	0.26	0.00	0.44	0.00	1.00	728,143

Panel B: Firm characteristics

	Mean (1)	Median (2)	SD (3)	1^{th} (4)	99^{th} (5)	Obs. (6)
Assets	14,566.95	1,817.43	32,236.32	12.35	159,103.00	728,143
Asinh(Assets)	8.23	8.20	2.28	3.21	12.67	728,143
Last year return in %	15.14	7.84	61.31	-79.41	251.86	728,143
Idiosyncratic Volatility in %	1.33	0.25	4.07	0.00	17.56	728,143
Market to Book	3.21	2.15	5.21	-10.37	23.97	728,143

Table 1: cont'd

Panel C: Gender differences (BoardEx sample)

	Female	Male	Difference	Normalized diff. (< 0.25)
	(1)	(2)	(3)	(4)
Age	47.92	50.59	-2.63	-0.29
Leadership position	0.32	0.47	-0.14	-0.29
CEO position	0.02	0.11	-0.09	-0.31
Number of Board Seats	0.23	0.45	-0.22	-0.19
Education Score	1.059	1.091	-0.032	-0.04
Top 50 ranked college	0.180	0.183	-0.003	-0.01
Generalist Index	0.736	0.735	0.001	0.00
Same Industry Experience	0.248	0.257	-0.009	-0.02

Panel D: Gender differences (ExecuComp sample)

	Female	Male	Difference	Normalized diff. (< 0.25)
	(1)	(2)	(3)	(4)
Age	53.18	55.54	-2.36	-0.29
CEO position	0.46	0.60	-0.14	-0.29
Number of Board Seats	1.77	1.70	0.07	0.04
Education Score	1.190	1.193	-0.003	-0.02
Top 50 ranked college	0.294	0.219	0.075	0.18
Generalist Index	1.582	1.180	0.402	0.29
Same Industry Experience	0.335	0.275	0.060	0.13

Table 2: Where did female directors in a leadership position graduate?

This table shows the number of female and male directors in a leadership position that graduated from a given university. We only include universities where at least 50 female directors in a leadership position graduated. Percentage is the number of female directors in a leadership position divided by the total number of directors in a leadership position who graduated from the same university.

Rank	Percentage	# All	# Male	# Female	University
1	19.6%	363	292	71	Boston University
2	16.1%	627	526	101	Indiana University
3	15.9%	490	412	78	Georgetown University
4	14.9%	370	315	55	University of Washington
5	14.6%	1139	973	166	University of California Berkeley
6	14.5%	759	649	110	Cornell University
7	14.3%	460	394	66	University of Minnesota
9	14.2%	386	331	55	Boston College
10	13.8%	465	401	64	University of North Carolina Chapel Hill
11	13.6%	1145	989	156	Northwestern University
12	13.5%	2469	2135	334	Harvard University
13	13.4%	448	388	60	Michigan State University
14	13.2%	589	511	78	Duke University
15	13.2%	881	765	116	Columbia University
16	13.0%	747	650	97	New York University
17	12.8%	452	394	58	Ohio State University
18	12.8%	924	806	118	University of Chicago
19	12.4%	1603	1405	198	Stanford University
20	12.3%	745	653	92	University of Illinois
21	12.3%	471	413	58	University of California Los Angeles
22	12.2%	572	502	70	University of Wisconsin
23	11.9%	1024	902	122	University of Michigan
24	11.9%	860	758	102	University of Texas at Austin
25	11.5%	1589	1407	182	University of Pennsylvania
26	11.0%	499	444	55	Purdue University
27	11.0%	518	461	57	Pennsylvania State University
28	11.0%	529	471	58	California State University
29	10.6%	555	496	59	State University of New York of Brockport
30	10.6%	671	600	71	University of Virginia
31	9.9%	515	464	51	Yale University
32	9.5%	567	513	54	University of Southern California
33	9.3%	803	728	75	Massachusetts Institute of Technology

Table 3: Are signals of higher education more beneficial for female directors?

This table presents results on the impact of female directors' educational background on their likelihood to enter a leadership position in Panel A and to become CEO in Panel B. Results in Panel A are based on the full BoardEx sample, results in Panel B are based on the ExecuComp sample. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. Age (squared) is the age (squared) of a director. Assets is the inverse hyperbolic sine transformation of firm's book value of total assets. Market to Book is the ratio of the market value of equity divided by the book value of equity. Last year return is the raw annual stock return ending on the fiscal year-end date. Idiosyncratic volatility is the squared residual estimated from a CAPM regression of monthly returns. The regression includes firm and year fixed effects in columns (1) and (2), and firm×year fixed effects in columns (3) and (4). *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.016***		0.016***	
	(21.76)		(21.39)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.011***		0.011***	
	(6.48)		(6.58)	
Top 50 ranked college$_{d,t}$		0.002		0.001
		(1.14)		(0.59)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.022***		0.023***
		(5.66)		(5.81)
Female dummy$_{d,t}$	-0.130***	-0.124***	-0.131***	-0.124***
	(54.47)	(69.93)	(54.15)	(69.34)
Age$_{d,t}$	0.043***	0.043***	0.043***	0.043***
	(84.75)	(84.98)	(82.91)	(83.17)
Age squared$_{d,t}$	-0.000***	-0.000***	-0.000***	-0.000***
	(69.53)	(69.83)	(67.63)	(67.94)
Assets$_{c,t-1}$	-0.025***	-0.024***		
	(23.22)	(22.95)		
Last year return in %$_{c,t-1}$	-0.000*	-0.000*		
	(1.67)	(1.65)		
Idiosyncratic Volatility in %$_{c,t-1}$	0.000	0.000		
	(1.17)	(1.23)		
Market to Book$_{c,t-1}$	-0.000	-0.000*		
	(1.63)	(1.65)		
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm x Year FE	No	No	Yes	Yes
Adjusted R^2	0.152	0.151	0.112	0.111
Observations	728143	728143	727552	727552

Table 3: cont'd

Panel B: Likelihood to become CEO	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.035***		0.037***	
	(8.51)		(6.44)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.042***		0.054***	
	(2.66)		(2.60)	
Top 50 ranked college$_{d,t}$		0.068***		0.096***
		(8.31)		(7.98)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.161***		0.226***
		(4.90)		(5.10)
Female dummy$_{d}$	-0.246***	-0.241***	-0.321***	-0.328***
	(11.06)	(15.14)	(11.46)	(15.43)
Age$_{d,t}$	0.105***	0.107***	0.120***	0.123***
	(35.01)	(35.66)	(28.95)	(29.62)
Age squared$_{d,t}$	-0.001***	-0.001***	-0.001***	-0.001***
	(32.29)	(32.92)	(25.92)	(26.57)
Total Assets$_{c,t-1}$	-0.032***	-0.032***		
	(9.14)	(9.24)		
Last year return in %$_{c,t-1}$	0.000***	0.000***		
	(3.91)	(3.95)		
Idiosyncratic Volatility in %$_{c,t-1}$	0.001*	0.001*		
	(1.65)	(1.82)		
Market to Book$_{c,t-1}$	-0.000	-0.000		
	(0.75)	(0.79)		
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.186	0.186	-0.530	-0.525
Observations	49674	49674	32608	32608

Table 4: Do signals of professional experience increase female directors' probability to enter a leadership position?

This table presents results on the impact of professional experience signals on female directors' likelihood to enter a leadership position in Panel A and on female directors' likelihood to become CEO in Panel B. Results in Panel A are based on the full BoardEx sample, results in Panel B are based on the ExecuComp sample. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. All variables are defined in detail in Appendix Table A1. The regression includes firm and year fixed effects in columns (1) and (2), and firm×year fixed effects in columns (3) and (4). *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.054***		0.056***	
	(82.14)		(82.31)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.005***		0.003*	
	(3.46)		(1.79)	
Same Industry Experience$_{d,t}$		0.036***		0.038***
		(22.82)		(23.52)
Same Industry Experience$_{d,t}$x Female dummy$_{d}$		0.019***		0.016***
		(5.42)		(4.40)
Female dummy$_{d}$	-0.123***	-0.124***	-0.122***	-0.124***
	(64.61)	(67.76)	(63.07)	(66.65)
Age$_{d,t}$	0.040***	0.042***	0.040***	0.042***
	(78.75)	(83.22)	(77.12)	(81.37)
Age squared$_{d,t}$	-0.000***	-0.000***	-0.000***	-0.000***
	(65.63)	(68.25)	(64.04)	(66.35)
Assets$_{c,t-1}$	-0.025***	-0.025***		
	(23.95)	(23.16)		
Last year return in %$_{c,t-1}$	-0.000	-0.000		
	(1.31)	(1.60)		
Idiosyncratic Volatility in %$_{c,t-1}$	0.000	0.000		
	(1.18)	(1.24)		
Market to Book$_{c,t-1}$	-0.000	-0.000		
	(1.26)	(1.58)		
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.161	0.152	0.123	0.112
Observations	728143	728143	727552	727552

Table 4: cont'd

Panel B: Likelihood to become CEO	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.040***		0.063***	
	(15.64)		(14.60)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.051***		0.043***	
	(6.70)		(3.76)	
Same Industry Experience$_{d,t}$		0.011		-0.004
		(1.37)		(0.31)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$		0.167***		0.212***
		(5.55)		(4.64)
Female dummy$_{d}$	-0.287***	-0.253***	-0.329***	-0.319***
	(17.24)	(15.13)	(15.98)	(15.22)
Age$_{d,t}$	0.099***	0.105***	0.112***	0.121***
	(33.14)	(35.07)	(26.82)	(29.11)
Age squared$_{d,t}$	-0.001***	-0.001***	-0.001***	-0.001***
	(30.80)	(32.34)	(24.23)	(26.07)
Assets$_{c,t-1}$	-0.031***	-0.032***		
	(8.92)	(9.12)		
Last year return in %$_{c,t-1}$	0.000***	0.000***		
	(4.22)	(3.92)		
Idiosyncratic Volatility in %$_{c,t-1}$	0.001	0.001*		
	(1.28)	(1.69)		
Market to Book$_{c,t-1}$	-0.000	-0.000		
	(0.46)	(0.66)		
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.192	0.184	-0.510	-0.532
Observations	49674	49674	32608	32608

Table 5: The impact of sudden CEO deaths on (female) directors' likelihood to become CEO

This table investigates whether a sudden death of a CEO matters for female executives' likelihood to become CEO. Results are based on the ExecuComp sample. Education Score is defined as in Graham et al. (2012). Top 50 ranked college is an indicator equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. CEO Death is an indicator variable that takes the value of one if the previous CEO of the firm died while in office, and zero otherwise. Controls are the same as in Tables 3 - 4. The regression includes firm and year fixed effects in columns (1) to (3), and firm×year fixed effects in columns (4) to (6). *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Education Score$_{d,t}$	0.038***			0.041***		
	(9.15)			(7.09)		
Education Score$_{d,t}$ x Female dummy$_d$	0.031*			0.034		
	(1.93)			(1.58)		
Education Score$_{d,t}$ x CEO Death$_{c,t}$	-0.175***			-0.202***		
	(6.61)			(6.05)		
Education Score$_{d,t}$ x CEO Death$_{c,t}$	0.416***			0.513***		
x Female dummy$_d$	(6.50)			(6.68)		
Top 50 ranked college$_{d,t}$		0.073***			0.103***	
		(8.80)			(8.47)	
Top 50 ranked college$_{d,t}$ x Female dummy$_d$		0.140***			0.185***	
		(4.18)			(4.00)	
Top 50 ranked college$_{d,t}$ x CEO death$_{c,t}$		-0.291***			-0.375***	
		(4.87)			(5.26)	
Top 50 ranked college$_{d,t}$ x CEO death$_{c,t}$		0.872***			1.089***	
x Female dummy$_d$		(6.43)			(7.03)	
Generalist Index$_{d,t}$			0.040***			0.064***
			(15.60)			(14.69)
Generalist Index$_{d,t}$x Female dummy$_d$			0.048***			0.039***
			(6.37)			(3.38)
Generalist Index$_{d,t}$x CEO Death$_{c,t}$			-0.010			-0.062*
			(0.45)			(1.93)
Generalist Index$_{d,t}$x CEO Death$_{c,t}$			0.130			0.258*
x Female dummy$_d$			(1.34)			(1.95)
CEO Death$_{c,t}$ x Female dummy$_d$	-0.688***	-0.567***	-0.205**	-0.723***	-0.586***	-0.221**
	(7.73)	(6.95)	(2.55)	(6.84)	(6.55)	(2.46)
CEO death$_{c,t}$	0.037	-0.126***	-0.170***			
	(0.93)	(5.00)	(5.37)			
Female dummy$_d$	-0.225***	-0.227***	-0.279***	-0.291***	-0.306***	-0.321***
	(9.89)	(14.13)	(16.54)	(10.00)	(14.09)	(15.22)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	No	No	No
Year FE	Yes	Yes	Yes	No	No	No
Firm×Year FE	No	No	No	Yes	Yes	Yes
Adjusted R^2	0.187	0.187	0.193	-0.527	-0.524	-0.509
Observations	49674	49674	49674	32608	32608	32608

Table 6: Does female representation in the nomination committee matter?

This table investigates whether female representation in the nomination committee matters for female executives' likelihood to become CEO. Results are based on the ExecuComp sample. Panel A presents results for signals of higher education. Education Score is defined as in Graham et al. (2012). Top 50 ranked college is an indicator equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Panel B presents results for signals of professional experience. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. FemNom is an indicator variable that takes the value of one if the chair of the nomination committee of a company is female, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. Controls are the same as in Tables 3 - 4. The regression includes firm and year fixed effects in columns (1) and (2), and firm×year fixed effects in columns (3) and (4). *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Signals of higher education	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.038***		0.035***	
	(7.25)		(4.85)	
Education Score$_{d,t}$ x Female dummy$_d$	0.057***		0.088***	
	(2.76)		(3.36)	
Education Score$_{d,t}$ x FemNom$_{c,t}$	0.002		0.033*	
	(0.22)		(1.83)	
Education Score$_{d,t}$ x FemNom$_{c,t}$ x Female dummy$_d$	-0.084**		-0.184***	
	(2.24)		(3.05)	
Top50 ranked college$_{d,t}$		0.067***		0.083***
		(6.47)		(5.65)
Top50 ranked college$_{d,t}$ x Female dummy$_d$		0.231***		0.320***
		(5.51)		(5.95)
Top50 ranked college$_{d,t}$ x FemNom$_{c,t}$		-0.003		0.011
		(0.15)		(0.27)
Top50 ranked college$_{d,t}$ x FemNom$_{c,t}$ x Female dummy$_d$		-0.236***		-0.429***
		(3.15)		(3.34)
FemNom$_{c,t}$ x Female dummy$_d$	0.102**	0.062*	0.076	0.000
	(1.97)	(1.72)	(0.94)	(0.00)
FemNom$_{c,t}$	-0.023*	-0.009		
	(1.69)	(1.15)		
Female dummy$_d$	-0.264***	-0.291***	-0.315***	-0.315***
	(9.40)	(14.42)	(8.73)	(11.86)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.195	0.196	-0.525	-0.521
Observations	38326	38326	25509	25509

Table 6: cont'd

Panel B: Signals of professional experience	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.036***		0.053***	
	(10.99)		(10.52)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.058***		0.065***	
	(6.42)		(5.13)	
Generalist Index$_{d,t}$x FemNom$_{c,t}$	-0.006		0.002	
	(0.96)		(0.18)	
Generalist Index$_{d,t}$x FemNom$_{c,t}$ x Female dummy$_{d}$	-0.051***		-0.112***	
	(2.89)		(3.49)	
Same Industry Experience$_{d,t}$		0.006		-0.012
		(0.61)		(0.79)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$		0.202***		0.297***
		(5.22)		(5.42)
Same Industry Experience$_{d,t}$ x FemNom$_{c,t}$		-0.018		0.025
		(0.96)		(0.63)
Same Industry Experience$_{d,t}$ x FemNom$_{c,t}$		-0.208***		-0.430***
x Female dummy$_{d}$		(3.24)		(3.82)
FemNom$_{c,t}$ x Female dummy$_{d}$	0.100**	0.099**	0.038	0.011
	(2.26)	(2.48)	(0.57)	(0.17)
FemNom$_{c,t}$	-0.001	-0.007		
	(0.09)	(0.86)		
Female dummy$_{d}$	-0.337***	-0.303***	-0.315***	-0.301***
	(16.02)	(13.80)	(12.28)	(11.22)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.200	0.193	-0.509	-0.528
Observations	38326	38326	25509	25509

Table 7: Inside vs. outside hires

This table investigates whether our main results are stronger for outside hires. Results are based on the full BoardEx sample. Education Score is defined as in Graham et al. (2012). Top 50 ranked college is an indicator equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Outside is an indicator variable that takes the value of one if a director has not worked for the company before the current employment, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. Controls are the same as in Tables 3 - 4. The regression includes firm×year fixed effects. *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.027***			
	(26.70)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.004*			
	(1.73)			
Education Score$_{d,t}$ x Outside$_{d,t}$	-0.020***			
	(14.43)			
Education Score$_{d,t}$ x Outside$_{d,t}$ x Female dummy$_{d}$	0.014***			
	(4.10)			
Top 50 ranked college$_{d,t}$		0.017***		
		(7.31)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.024***		
		(4.14)		
Top 50 ranked college$_{d,t}$ x Outside$_{d,t}$		-0.033***		
		(10.40)		
Top 50 ranked college$_{d,t}$ x Outside$_{d,t}$ x Female dummy$_{d}$		-0.003		
		(0.38)		
Generalist Index$_{d,t}$			0.085***	
			(89.39)	
Generalist Index$_{d,t}$ x Female dummy$_{d}$			-0.005**	
			(2.17)	
Generalist Index$_{d,t}$ x Outside$_{d,t}$			-0.034***	
			(27.77)	
Generalist Index$_{d,t}$ x Outside$_{d,t}$ x Female dummy$_{d}$			0.013***	
			(4.46)	
Same Industry Experience$_{d,t}$				0.060***
				(25.44)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$				0.017***
				(2.96)
Same Industry Experience$_{d,t}$ x Outside$_{d,t}$				-0.001
				(0.33)
Same Industry Experience$_{d,t}$ x Outside$_{d,t}$ x Female dummy$_{d}$				-0.014*
				(1.85)
Outside$_{d,t}$ x Female dummy$_{d}$	0.022***	0.039***	0.024***	0.040***
	(4.81)	(11.44)	(6.63)	(11.47)
Outside$_{d,t}$	-0.101***	-0.116***	-0.117***	-0.129***
	(48.22)	(74.92)	(69.74)	(78.65)
Female dummy$_{d}$	-0.143***	-0.144***	-0.134***	-0.142***
	(42.19)	(57.69)	(52.21)	(57.51)
Controls	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.126	0.125	0.142	0.127
Observations	760815	760815	760815	760815

Table 8: The impact of conservative gender norms on (female) directors' likelihood to enter a leadership position

This table shows the impact of conservative gender norms in a firm's headquarter state on our main results. Results are based on the full BoardEx sample. Education Score is defined as in Graham et al. (2012). Top 50 ranked college is an indicator equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Cons is an indicator variable that takes the value of one if a firm's headquarter state voted for republicans in at least 4 out of the 5 president elections between 2000 and 2019, and zero if a firm's headquarter state voted for democrats in at least 4 out of the 5 president elections between 2000 and 2019 otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. Controls are the same as in Tables 3 - 4. The regressions include firm×year fixed effects. *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.010***			
	(8.16)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.004			
	(1.58)			
Education Score$_{d,t}$ x Cons$_{c}$	0.002			
	(1.12)			
Education Score$_{d,t}$ x Cons$_{c}$ x Female dummy$_{d}$	0.002			
	(0.35)			
Top 50 ranked college$_{d,t}$		-0.017***		
		(6.56)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.010*		
		(1.82)		
Top 50 ranked college$_{d,t}$ x Cons$_{c}$		0.012**		
		(2.53)		
Top 50 ranked college$_{d,t}$ x Cons$_{c}$ x Female dummy$_{d}$		0.033***		
		(3.06)		
Generalist Index$_{d,t}$			0.049***	
			(47.55)	
Generalist Index$_{d,t}$ x Female dummy$_{d}$			0.001	
			(0.33)	
Generalist Index$_{d,t}$ x Cons$_{c}$			0.018***	
			(10.02)	
Generalist Index$_{d,t}$ x Cons$_{c}$ x Female dummy$_{d}$			0.001	
			(0.21)	
Same Industry Experience$_{d,t}$				0.025***
				(10.13)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$				0.008
				(1.61)
Same Industry Experience$_{d,t}$ x Cons$_{c}$				0.041***
				(9.03)
Same Industry Experience$_{d,t}$ x Cons$_{c}$ x Female dummy$_{d}$				0.026**
				(2.53)
Cons$_{c}$ x Female dummy$_{d}$	-0.013**	-0.016***	-0.009*	-0.015***
	(2.03)	(3.38)	(1.66)	(3.06)
Female dummy$_{d}$	-0.099***	-0.098***	-0.098***	-0.098***
	(26.13)	(36.13)	(33.77)	(35.36)
Controls	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.094	0.094	0.106	0.095
Observations	431248	431248	431248	431248

Table 9: The impact of skill signals on (female) executives' compensation

This table presents results on the impact of skill signals on female directors' compensation. Results are based on the ExecuComp sample. Compensation is measured as the inverse hyperbolic sine of ExecuComp's total compensation variable. Panel A presents results for signals of higher education. Education Score is defined as in Graham et al. (2012). Top 50 ranked college is an indicator equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Panel B presents results for signals of professional experience. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. All variables are defined in detail in Appendix Table A1. The regression includes firm and year fixed effects in columns (1) and (2), and firm×year fixed effects in columns (3) and (4). t-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Signals of higher education	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.046***		0.041***	
	(8.22)		(6.19)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.037		0.065**	
	(1.63)		(2.38)	
Top 50 ranked college$_{d,t}$		0.052***		0.055***
		(4.64)		(4.03)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.213***		0.315***
		(4.54)		(5.65)
Female dummy$_{d}$	-0.238***	-0.252***	-0.322***	-0.338***
	(7.08)	(10.73)	(8.23)	(11.66)
Age$_{d,t}$	0.097***	0.099***	0.090***	0.092***
	(18.91)	(19.25)	(15.75)	(16.08)
Age squared$_{d,t}$	-0.001***	-0.001***	-0.001***	-0.001***
	(18.69)	(18.99)	(14.95)	(15.25)
Total Assets$_{c,t-1}$	0.236***	0.236***		
	(23.67)	(23.64)		
Last year return in %$_{c,t-1}$	0.001***	0.001***		
	(15.32)	(15.32)		
Idiosyncratic Volatility in %$_{c,t-1}$	-0.001	-0.001		
	(0.90)	(0.86)		
Market to Book$_{c,t-1}$	0.007***	0.006***		
	(6.46)	(6.46)		
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Ad Adjusted R^2	0.603	0.603	0.600	0.601
Observations	49117	49117	31892	31892

Table 9: cont'd

Panel B: Signals of professional experience	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.073***		0.089***	
	(18.44)		(16.60)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.040***		0.047**	
	(3.01)		(2.42)	
Same Industry Experience$_{d,t}$		0.086***		0.079***
		(7.23)		(4.98)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$		0.229***		0.318***
		(5.21)		(5.26)
Female dummy$_{d,t}$	-0.280***	-0.277***	-0.329***	-0.342***
	(11.02)	(11.53)	(11.07)	(12.50)
Age$_{d,t}$	0.088***	0.096***	0.078***	0.089***
	(17.00)	(18.63)	(13.57)	(15.61)
Age squared$_{d,t}$	-0.001***	-0.001***	-0.001***	-0.001***
	(17.08)	(18.38)	(13.13)	(14.79)
Assets$_{c,t-1}$	0.237***	0.238***		
	(23.78)	(23.80)		
Last year return in %$_{c,t-1}$	0.001***	0.001***		
	(15.45)	(15.32)		
Idiosyncratic Volatility in %$_{c,t-1}$	-0.002	-0.001		
	(1.06)	(0.92)		
Market to Book$_{c,t-1}$	0.007***	0.007***		
	(6.68)	(6.53)		
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.608	0.604	0.609	0.601
Observations	49117	49117	31892	31892

Table 10: Gender gaps across skill signals terciles

This table presents gender gaps conditional on female and male directors belonging to the same tercile of a given skill signal. We group all directors with the lowest number of a given skill signal into Tercile 1, and directors with the highest number of skill signals into Tercile 3. For skill signals based on binary variables, we only group directors into two groups, correspondingly. In the next step, for each tercile, we calculate the difference between female and male directors' likelihood to be in a leadership position in Panel A, to be CEO in Panel B, and the difference between female and male directors' compensation in Panel C. Results in Panel A are based on the full BoardEx sample, results in Panel B and Panel C are based on the ExecuComp sample. Compensation is measured as the inverse hyperbolic sine of ExecuComp's total compensation variable. Average differences between female and male directors for each tercile are reported in columns (1) to (3). The difference in gender gaps between the lowest (Tercile 1) and highest (Tercile 3) tercile are reported in column (4). *t*-statistics based on robust standard errors are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Gender gaps in the likelihood to be in a leadership position

	Tercile 1 (low) (1)	Tercile 2 (2)	Tercile 3 (high) (3)	Difference T1 - T3 (4)
Education Score$_{d,t}$	-0.154***	-0.131***	-0.112***	-0.042***
	(-79.31)	(-49.94)	(-13.52)	(-5.00)
Top 50 ranked college$_{d,t}$	-0.148***		-0.129***	-0.019***
	(-87.09)		(-35.79)	(-4.64)
Generalist Index$_{d,t}$	-0.152***	-0.146***	-0.124***	-0.028***
	(-77.18)	(-41.37)	(-37.78)	(-7.26)
Industry Experience$_{d,t}$	-0.150***		-0.125***	-0.025***
	(-85.80)		(-39.52)	(-7.05)

Panel B: Gender gaps in the likelihood to be CEO

	Tercile 1 (low) (1)	Tercile 2 (2)	Tercile 3 (high) (3)	Difference T1 - T3 (4)
Education Score$_{d,t}$	-0.143***	-0.140***	-0.106	-0.037
	(-10.38)	(-7.98)	(-1.44)	(-0.50)
Top 50 ranked college$_{d,t}$	-0.180***		-0.066***	-0.114***
	(-14.29)		(-3.36)	(-4.84)
Generalist Index$_{d,t}$	-0.280***	-0.119***	-0.060***	-0.220***
	(-19.40)	(-4.55)	(-3.83)	(-10.37)
Industry Experience$_{d,t}$	-0.187***		-0.070***	-0.117***
	(-14.47)		(-3.81)	(-5.20)

Panel C: Gender gaps in compensation

	Tercile 1 (low) (1)	Tercile 2 (2)	Tercile 3 (high) (3)	Difference T1 - T3 (4)
Education Score$_{d,t}$	-0.099***	-0.046	0.404**	-0.503***
	(-3.40)	(-1.23)	(2.38)	(-2.93)
Top 50 ranked college$_{d,t}$	-0.164***		0.108**	-0.336***
	(-6.16)		(2.55)	(-7.50)
Generalist Index$_{d,t}$	-0.306***	-0.115**	0.030	-0.336***
	(-9.36)	(-2.02)	(0.97)	(-7.50)
Industry Experience$_{d,t}$	-0.219***		0.174***	-0.393***
	(-7.88)		(4.79)	(-8.60)

Appendix: Data Sources and Variable Definitions

Table A1: Data sources and variable definitions

(i) BoardEx: Information about directors including employment and professional experience,

(ii) Compustat: Firm characteristics based on annual reports,

(iii) CRSP: Share price information from the Center for Research in Security Prices,

(iv) ExecuComp: Compensation data for the S&P 1500 companies derived from company's annual reports,

(v) KFL: Kenneth French's data library,

(vi) Gentry et al. (2021): Database reporting the reasons for CEO turnover and dismissal in S&P 1500 firm.

Table A1: cont'd

Variable name	Description	Source
$\mathrm{Age}_{\mathrm{d,t}}$	Age of a director d in years in year t.	BoardEx, ExecuComp
$\mathrm{CEO}_{\mathrm{d,t}}$	Indicator equal to one if a director d is the CEO of the firm in year t, and zero otherwise.	BoardEx, ExecuComp
CEO $\mathrm{Death}_{\mathrm{c,t}}$	Indicator equal to one if the previous CEO of the firm c in year t died while in office, and zero otherwise.	ExecuComp, Gentry et al. (2021)
CEO $\mathrm{Experience}_{\mathrm{d,t}}$	Indicator equal to one if a director d was CEO in a listed firm before the current employment in year t, and zero otherwise.	BoardEx
Conglomerate $\mathrm{Experience}_{\mathrm{d,t}}$	Indicator equal to one if a director d worked at a listed firm with more than one segment before the current employment in year t, and zero otherwise.	BoardEx
$\mathrm{Cons}_{\mathrm{c}}$	Indicator equal to one if a firm's c headquarter state has voted for republicans in at least 4 out of the 5 presidential elections between 2000 and 2019, and zero if a firm's headquarter state has voted for democrats in at least 4 out of the 5 presidential elections between 2000 and 2019.	BoardEx, Compustat
Education $\mathrm{Score}_{\mathrm{d,t}}$	A variable equal to one if in year the highest degree of director d is a Bachelor's degree, 2 if the highest degree is a Master's degree, 3 if the highest degree is a PhD, and 0 otherwise (Graham et al., 2012). Education Score of director d in year t is based on the Education Score of director d before the current employment in year t	BoardEx
Female $\mathrm{dummy}_{\mathrm{d}}$	Indicator equal to one if a director d is female, and zero otherwise.	BoardEx
$\mathrm{FemNom}_{\mathrm{c,t}}$	Indicator equal to one if the chair of the nomination committee of a company c in year t is female, and zero otherwise.	BoardEx

Table A1: cont'd

Generalist Index$_{d,t}$	Generalist Index is defined as in Custódio et al. (2013), estimated as 0.268 x Number of Positions + 0.312 x Number of Firms + 0.309 x Number of Industries + 0.281 x CEO Experience + 0.153 x Conglomerate Experience. Generalist Index of director *d* in year *t* is based on the professional experience of director *d* before the current employment in year *t*.	BoardEx
Idiosyncratic Volatility$_{c,t}$	Idiosyncratic volatility of firm *c* in year *t*, computed as the squared residual estimated from a five-year rolling window CAPM regression of monthly returns.	CRSP, KFL
Industry$_{c,t}$	Industry of of firm *c* in year *t*, classified according to the 2-digit SIC classification.	BoardEx, Compustat
Last year return (in%)$_{c,t}$	Annual stock return of firm *c* in year *t*.	CRSP
Leadership position$_{d,t}$	A dummy variable equal to one if a director *d* in year *t* is CEO, Chairman/-woman, Vice Chair, President, CFO, COO, or Other Chief Officer, and zero otherwise.	BoardEx
Leadership promotion$_{d,t}$	Indicator that is equal to one if a director *d* enters a leadership position in year *t*, and equal to zero for the previous year in which the director was not already in this leadership position.	BoardEx
Market to Book$_{c,t}$	Market to book of firm *c* in year *t*, computes as the ratio of the market value of equity at the fiscal year end divided by the book value of equity for the fiscal year. The book value of equity is calculated as shareholder equity, plus deferred taxes and credits, minus the book value of preferred stock. The market value of equity is the product of price and number of shares outstanding.	Compustat, CRSP
Nom$_{c,t}$	Indicator equal to one if there is at least one female director in the nomination committee of a firm *c* in year *t*, and zero otherwise.	BoardEx
Number of Board Seats$_{d,t}$	Number of Board Seats of a director *d* in year *t*.	BoardEx

Table A1: cont'd

Number of $\text{Industries}_{d,t}$	Number of different four-digit SIC code industries a director *d* worked in before the current employment in year *t*.	BoardEx
Number of $\text{Firms}_{d,t}$	Number of different firms a director *d* worked in before the current employment in year *t*.	BoardEx
Number of $\text{Positions}_{d,t}$	Number of different positions a director *d* worked in before the current employment in year *t*.	BoardEx
$\text{Outside}_{d,t}$	Indicator that is equal to one if a director *d* has not worked for the company before the current employment in year *t*, and zero otherwise.	BoardEx
Same Industry $\text{Experience}_{d,t}$	Indicator that is equal to one if a director *d* worked in the same industry before the current employment in year *t*, and zero otherwise.	BoardEx
Top 50 ranked $\text{college}_{d,t}$	Indicator that is equal to one if the director *d* graduated from a Top 50 ranked college, and zero otherwise. Top 50 ranked college is defined according to Forbes America's Top Colleges List. Top 50 ranked college of director *d* in year *t* is based on the Top 50 rank college of of director *d* before the current employment in year *t*	BoardEx, Forbes
Total $\text{Assets}_{c,t}$	Total assets of firm *c* in year *t*, computed as firm's book value of total assets. We use the inverse hyperbolic sine transformation of total assets in our regressions.	Compustat
Total $\text{Compensation}_{d,t}$	Total compensation of a director *d* in year *t* (tdc1). We use the inverse hyperbolic sine of total compensation in our regressions.	ExecuComp

Appendix (For Online Publication)

This Online Appendix contains additional empirical results for the paper "The Value of Skill Signals for Women's Careers".

Additional Results

Table OA1: List of Top 50 ranked colleges

This table shows the Top 50 colleges in the US according to the Forbes top colleges ranking taken from https://www.forbes.com/top-colleges/.

1	University of California, Berkeley	26	Brown University
2	Yale University	27	University of Washington, Seattle
3	Princeton University	28	University of North Carolina, Chapel Hill
4	Stanford University	29	United States Military Academy
5	Columbia University	30	University of Virginia
6	Massachusetts Institute of Technology	31	University of Illinois, Urbana-Champaign
7	Harvard University	32	Wellesley College
8	University of California, Los Angeles	33	Washington University in St. Louis
9	University of Pennsylvania	34	Georgia Institute of Technology
10	Northwestern University	35	Emory University
11	Dartmouth College	36	Bowdoin College
12	Duke University	37	Johns Hopkins University
13	Cornell University	38	Tufts University
14	Vanderbilt University	39	University of California, Santa Barbara
15	University of California, San Diego	40	California Institute of Technology
16	Amherst College	41	University of Notre Dame
17	University of Southern California	42	University of Maryland, College Park
18	Williams College	43	Swarthmore College
19	Pomona College	44	Middlebury College
20	University of California, Davis	45	University of Texas, Austin
21	Georgetown University	46	Claremont McKenna College
22	University of Michigan, Ann Arbor	47	University of California, Irvine
23	University of Chicago	48	Colgate University
24	Rice University	49	Carnegie Mellon University
25	University of Florida	50	Texas A&M University, College Station

Table OA2: Do skill signals increase female directors' probability to enter a leadership position? - Logit regressions

This table presents average marginal effects for the likelihood of a director to enter a leadership position in Panel A and to become CEO in Panel B using logit regressions. Results in Panel A are based on the full BoardEx sample, results in Panel B are based on the ExecuComp sample. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Controls are the same as in Tables 3 - 4 and interacted with the female indicator variable. Since we are estimating logit regressions, this table only includes industry fixed effects (based on 2-digit industry classification) and year fixed effects. *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.020***			
	(55.29)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.016***			
	(9.86)			
Top 50 ranked college$_{d,t}$		0.036***		
		(41.07)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.044***		
		(10.78)		
		(10.83)		
Generalist Index$_{d,t}$			0.030***	
			(104.56)	
Generalist Index$_{d,t}$x Female dummy$_{d}$			0.016***	
			(14.58)	
Same Industry Experience$_{d,t}$				0.017***
				(22.28)
Same Industry Experience$_{d,t}$x Female dummy$_{d}$				0.027***
				(7.19)
Female dummy$_{d}$	-0.387***	-0.382***	-0.187***	-0.341***
	(6.34)	(6.24)	(3.30)	(5.75)
Controls	Yes	Yes	Yes	Yes
Controls×Female dummy	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	728149	728149	728149	728149

Table OA2: cont'd

Panel B: Likelihood to become CEO	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.042***			
	(16.35)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.053***			
	(4.07)			
Top 50 ranked college$_{d,t}$		0.065***		
		(12.42)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.145***		
		(5.97)		
Generalist Index$_{d,t}$			0.050***	
			(27.83)	
Generalist Index$_{d,t}$x Female dummy$_{d}$			0.047***	
			(5.65)	
Same Industry Experience$_{d,t}$				0.057***
				(11.63)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$				0.096***
				(4.29)
Female dummy$_{d}$	-2.739***	-2.724***	-1.625**	-2.202***
	(3.74)	(3.53)	(2.44)	(3.14)
Controls	Yes	Yes	Yes	Yes
Controls×Female	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	49712	49712	49712	49712

Table OA3: Do skill signals increase female directors' probability to enter a leadership position? - Controls interacted with the female indicator variable

This table shows the robustness of our main results on female directors' likelihood to enter a leadership position (Panel A), to become CEO (Panel B) and to receive higher compensation (Panel C) interacting the control variables with the female indicator variable. Results in Panel A are based on the full BoardEx sample, results in Panel B and Panel C are based on the ExecuComp sample. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if the director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. We include the same control variables as in Tables 3 - 9. Regressions include firm×year fixed effects. *t*-statistics based on standard errors clustered by firm-year are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.016***			
	(21.89)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.007***			
	(3.97)			
Top 50 ranked college$_{d,t}$		0.002		
		(1.07)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.016***		
		(3.93)		
Generalist Index$_{d,t}$			0.055***	
			(81.48)	
Generalist Index$_{d,t}$x Female dummy$_{d}$			0.005***	
			(3.63)	
Same Industry Experience$_{d,t}$				0.036***
				(22.19)
Same Industry Experience$_{d,t}$x Female dummy$_{d}$				0.026***
				(7.26)
Female dummy$_{d}$	-0.172***	-0.181***	-0.126***	-0.161***
	(5.55)	(5.81)	(4.02)	(5.18)
Controls	Yes	Yes	Yes	Yes
Controls×Female dummy	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.114	0.113	0.124	0.114
Observations	727472	727472	727472	727472

Table OA3: cont'd

Panel B: Likelihood to become CEO				
	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.037***			
	(6.49)			
Education Score$_{d,t}$ x Female dummy$_d$	0.055***			
	(2.58)			
Top 50 ranked college$_{d,t}$		0.096***		
		(7.94)		
Top 50 ranked college$_{d,t}$ x Female dummy$_d$		0.241***		
		(5.17)		
Generalist Index$_{d,t}$			0.062***	
			(14.55)	
Generalist Index$_{d,t}$x Female dummy$_d$			0.047***	
			(3.96)	
Same Industry Experience$_{d,t}$				-0.003
				(0.26)
Same Industry Experience$_{d,t}$ x Female dummy$_d$				0.206***
				(4.40)
Female dummy$_d$	-1.329***	-1.240***	-0.340	-0.859**
	(3.17)	(2.96)	(0.85)	(2.13)
Controls	Yes	Yes	Yes	Yes
Controls×Female dummy	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	-0.529	-0.525	-0.510	-0.532
Observations	32606	32606	32606	32606

Table OA3: cont'd

Panel C: Gender gaps in compensation	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.041***			
	(6.21)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.073***			
	(2.61)			
Top 50 ranked college$_{d,t}$		0.055***		
		(4.05)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.331***		
		(5.68)		
Generalist Index$_{d,t}$			0.088***	
			(16.55)	
Generalist Index$_{d,t}$x Female dummy$_{d}$			0.054***	
			(2.66)	
Same Industry Experience$_{d,t}$				0.079***
				(4.93)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$				0.324***
				(5.24)
Female dummy$_{d}$	-0.805	-0.674	0.448	-0.151
	(1.25)	(1.05)	(0.72)	(0.24)
Controls	Yes	Yes	Yes	Yes
Controls×Female dummy	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.600	0.601	0.609	0.601
Observations	31890	31890	31890	31890

Table OA4: Do skill signals increase female directors' probability to enter a leadership position? - One-way clustered standard errors

This table shows the robustness of our main results on female directors' likelihood to enter a leadership position (Panel A), to become CEO (Panel B) and to receive higher compensation (Panel C) using one-way clustered standard errors. Results in Panel A are based on the full BoardEx sample, results in Panel B and Panel C are based on the ExecuComp sample. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if the director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. We include the same control variables as in Tables 3 - 9. The regression includes firm and year fixed effects in columns (1) and (2), and firm×year fixed effects in columns (3) and (4). t-statistics based on standard errors clustered by firm are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Likelihood to enter a leadership position	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.016***		0.016***	
	(7.69)		(7.55)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.011***		0.011***	
	(2.58)		(2.62)	
Top 50 ranked college$_{d,t}$		0.002		0.001
		(0.41)		(0.21)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.022**		0.023**
		(2.29)		(2.35)
Female dummy$_{d}$	-0.130***	-0.124***	-0.131***	-0.124***
	(19.91)	(25.11)	(19.89)	(24.91)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.152	0.151	0.112	0.111
Observations	728143	728143	727552	727552
	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.054***		0.056***	
	(30.51)		(30.73)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.005		0.003	
	(1.44)		(0.75)	
Same Industry Experience$_{d,t}$		0.036***		0.038***
		(8.85)		(9.16)
Same Industry Experience$_{d,t}$x Female dummy$_{d}$		0.019**		0.016*
		(2.30)		(1.87)
Female dummy$_{d}$	-0.123***	-0.124***	-0.122***	-0.124***
	(23.00)	(23.82)	(22.45)	(23.40)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.161	0.152	0.123	0.112
Observations	728143	728143	727552	727552

Table OA4: cont'd

Panel B: Likelihood to become CEO	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.035***		0.037***	
	(3.69)		(2.78)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.042		0.054	
	(1.40)		(1.34)	
Top 50 ranked college$_{d,t}$		0.068***		0.096***
		(3.69)		(3.48)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.161***		0.226***
		(2.58)		(2.70)
Female dummy$_{d}$	-0.246***	-0.241***	-0.321***	-0.328***
	(5.65)	(7.61)	(5.71)	(7.66)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.186	0.186	-0.530	-0.525
Observations	49674	49674	32608	32608
	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.040***		0.063***	
	(8.23)		(7.66)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.051***		0.043**	
	(4.36)		(2.35)	
Same Industry Experience$_{d,t}$		0.011		-0.004
		(0.65)		(0.14)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$		0.167***		0.212**
		(2.95)		(2.50)
Female dummy$_{d}$	-0.287***	-0.253***	-0.329***	-0.319***
	(8.60)	(7.19)	(7.73)	(7.07)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.192	0.184	-0.510	-0.532
Observations	49674	49674	32608	32608

Table OA4: cont'd

Panel C: Gender gaps in compensation	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.046***		0.041***	
	(4.14)		(3.00)	
Education Score$_{d,t}$ x Female dummy$_d$	0.037		0.065	
	(0.93)		(1.34)	
Top 50 ranked college$_{d,t}$		0.052**		0.055**
		(2.37)		(2.01)
Top 50 ranked college$_{d,t}$ x Female dummy$_d$		0.213**		0.315***
		(2.55)		(3.21)
Female dummy$_d$	-0.238***	-0.252***	-0.322***	-0.338***
	(3.86)	(5.73)	(4.38)	(5.96)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm x Year FE	No	No	Yes	Yes
Adjusted R^2	0.603	0.603	0.600	0.601
Observations	49117	49117	31892	31892
	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.073***		0.089***	
	(10.79)		(9.83)	
Generalist Index$_{d,t}$x Female dummy$_d$	0.040**		0.047*	
	(2.06)		(1.66)	
Same Industry Experience$_{d,t}$		0.086***		0.079***
		(3.97)		(2.65)
Same Industry Experience$_{d,t}$ x Female dummy$_d$		0.229***		0.318***
		(3.02)		(3.01)
Female dummy$_d$	-0.280***	-0.277***	-0.329***	-0.342***
	(5.69)	(5.92)	(5.93)	(6.23)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.608	0.604	0.609	0.601
Observations	49117	49117	31892	31892

Table OA5: Promotion to a leadership position

This table presents results on the impact of female directors' skill signals on their likelihood to be promoted to a leadership position. Results are based on the full BoardEx sample. Promotion to leadership position is defined as an indicator variable that is only equal to one if a director enters a leadership position for the first time, and that is equal to zero for the previous year in which the director was not yet in this leadership position. All other firm-director years are dropped from the sample. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. We include the same control variables as in Tables 3 - 4. The regression includes firm and year fixed effects in columns (1) and (2), and firm×year fixed effects in columns (3) and (4). t-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.001***		0.001**	
	(3.18)		(2.38)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.001		0.001*	
	(1.15)		(1.80)	
Top 50 ranked college$_{d,t}$		-0.001		-0.001
		(1.29)		(1.55)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.002		0.002
		(1.00)		(0.93)
Female dummy$_{d}$	-0.008***	-0.008***	-0.008***	-0.007***
	(6.94)	(8.73)	(7.03)	(8.11)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.024	0.024	0.065	0.065
Observations	412115	412115	403969	403969

	(1)	(2)	(3)	(4)
Generalist Index$_{d,t}$	0.005***		0.005***	
	(12.20)		(13.63)	
Generalist Index$_{d,t}$x Female dummy$_{d}$	0.003***		0.002**	
	(3.32)		(2.74)	
Same Industry Experience$_{d,t}$		0.007***		0.007***
		(8.16)		(7.57)
Same Industry Experience$_{d,t}$x Female dummy$_{d}$		0.005***		0.004*
		(2.68)		(1.74)
Female dummy$_{d}$	-0.009***	-0.008***	-0.008***	-0.007***
	(10.32)	(9.75)	(7.63)	(6.15)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Firm×Year FE	No	No	Yes	Yes
Adjusted R^2	0.025	0.025	0.066	0.065
Observations	412115	412115	403969	403969

Table OA6: Which components of the Generalist index increase (female) directors' likelihood to enter a leadership position?

This table presents results on the impact of general management skills on (female) directors' likelihood to enter a leadership position in Panel A and to become CEO in Panel B. Results in Panel A are based on the full BoardEx sample, results in Panel B are based on the ExecuComp sample. Number of Positions (Firms/Industries) is defined as the number of different positions (firms/industries) the director worked in before the current employment in year t. CEO Experience is a dummy variable that is equal to one if a director was CEO in another firm before the current employment in year t, and zero otherwise. Conglomerate Experience is an indicator that is equal to one if a director worked at a firm with more than one segment before the current employment in year t, and zero otherwise. We include the same control variables as in Table 4. All variables are defined in detail in Appendix Table A1. The regressions include firm×year fixed effects. *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Likelihood to enter a leadership position

	(1)	(2)	(3)	(4)	(5)
Number of Positions$_{d,t}$	0.037***				
	(77.58)				
Number of Positions$_{d,t}$ x Female dummy$_{d}$	0.002**				
	(2.07)				
Number of Firms$_{d,t}$		0.048***			
		(51.59)			
Number of Firms$_{d,t}$ x Female dummy$_{d}$		0.006***			
		(3.74)			
Number of Industries$_{d,t}$			0.053***		
			(74.81)		
Number of Industries$_{d,t}$ x Female dummy$_{d}$			0.002		
			(1.44)		
CEO Experience$_{d,t}$				0.247***	
				(56.41)	
CEO Experience$_{d,t}$ x Female dummy$_{d}$				0.042*	
				(1.93)	
Conglomerate$_{d,t}$					0.079***
					(54.17)
Conglomerate$_{d,t}$ x Female dummy$_{d}$					0.001
					(0.24)
Female dummy$_{d}$	-0.122***	-0.124***	-0.123***	-0.118***	-0.1205***
	(65.09)	(64.13)	(64.22)	(71.67)	(59.65)
Controls	Yes	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.122	0.121	0.121	0.115	0.116
Observations	727552	727552	727552	727552	727552

Table OA6: cont'd

Panel B: Likelihood to become CEO	(1)	(2)	(3)	(4)	(5)
Number of Positions$_{d,t}$	0.037***				
	(12.30)				
Number of Positions$_{d,t}$ x Female dummy$_{d}$	0.029***				
	(3.11)				
Number of Firms$_{d,t}$		0.052***			
		(12.33)			
Number of Firms$_{d,t}$ x Female dummy$_{d}$		0.035***			
		(3.21)			
Number of Industries$_{d,t}$			0.058***		
			(13.16)		
Number of Industries$_{d,t}$ x Female dummy$_{d}$			0.048***		
			(4.04)		
CEO Experience$_{d,t}$				0.190***	
				(9.20)	
CEO Experience$_{d,t}$ x Female dummy$_{d}$				0.233**	
				(2.33)	
Conglomerate Experience$_{d,t}$					0.176***
					(16.97)
Conglomerate Experience$_{d,t}$ x Female dummy$_{d}$					0.193***
					(5.03)
Female dummy$_{d}$	-0.312***	-0.319***	-0.335***	-0.266***	-0.353***
	(14.98)	(15.51)	(16.20)	(13.77)	(16.30)
Controls	Yes	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	-0.517	-0.514	-0.512	-0.525	-0.506
Observations	32608	32608	32608	32608	32608

Table OA7: Do skill signals increase (female) directors' likelihood to become Executive Vice President?

This table presents results on the impact of female directors' skill signals on their likelihood to become Executive Vice President. Results are based on the full BoardEx sample. We exclude all directors in a leadership position. Panel A presents results for signals of higher education. Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Panel B presents results for signals of professional experience. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. Female dummy is an indicator variable that takes the value of one if a director is female, and zero otherwise. We include the same control variables as in Tables 3 - 4. In columns (3) - (6), the control variables are interacted with the female indicator variable. The regression includes firm and year fixed effects in columns (1) - (4) and firm×year fixed effects in columns (5) and (6). *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Signals of higher education	(1)	(2)	(3)	(4)	(5)	(6)
Education Score$_{d,t}$	0.008***		0.008***		0.008***	
	(12.72)		(12.88)		(12.88)	
Education Score$_{d,t}$ x Female dummy$_{d}$	0.012***		0.011***		0.011***	
	(9.20)		(8.81)		(8.06)	
Top 50 ranked college$_{d,t}$		0.024***		0.024***		0.024***
		(16.35)		(16.60)		(16.54)
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.006**		0.004		0.006*
		(2.01)		(1.45)		(1.83)
Female dummy$_{d}$	-0.048***	-0.037***	0.124***	0.126***	0.126***	0.127***
	(25.96)	(27.53)	(6.12)	(6.24)	(5.89)	(5.92)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls×Female dummy	No	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes	No	No
Firm×Year FE	No	No	No	No	Yes	Yes
Adjusted R^2	0.303	0.303	0.304	0.304	0.287	0.287
Observations	403240	403240	403240	403240	394783	394783

Table OA7: cont'd

Panel B: Signals of professional experience	(1)	(2)	(3)	(4)	(5)	(6)
Generalist Index$_{d,t}$	0.002***		0.002***		0.002***	
	(2.99)		(2.63)		(2.90)	
Generalist Index$_{d,t}$x Female dummy$_d$	0.015***		0.016***		0.016***	
	(10.63)		(11.74)		(10.86)	
Same Industry Experience$_{d,t}$		0.003**		0.003*		0.002*
		(2.32)		(1.88)		(1.66)
Same Industry Experience$_{d,t}$ x Female dummy$_d$		0.022***		0.025***		0.022***
		(7.80)		(8.78)		(7.49)
Female dummy$_d$	-0.045***	-0.041***	0.147***	0.132***	0.148***	0.131***
	(31.67)	(29.79)	(7.32)	(6.52)	(6.92)	(6.14)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls×Female dummy	No	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes	No	No
Firm×Year FE	No	No	No	No	Yes	Yes
Adjusted R^2	0.303	0.303	0.303	0.303	0.286	0.286
Observations	403240	403240	403240	403240	394783	394783

Table OA8: The impact of skill signals on (female) executives' compensation - The impact of CEOs

This table presents results on the impact of professional experience on (female) executives' compensation. Results are based on the ExecuComp sample. In Panel A, we exclude all CEOs from our sample and in Panel B, we include all non-CEO observation and only the CEO observations if a director becomes CEO for the first time in our sample. Compensation is measured as the inverse hyperbolic sine of ExecuComp's total compensation variable (tdc1). Education Score is defined according to Graham et al. (2012). Top 50 ranked college is an indicator that is equal to one if a director graduated from a Top 50 ranked college, and zero otherwise. Generalist Index is defined as in Custódio et al. (2013). It is based on the professional experience of a director before the current employment in year t. Same Industry Experience is an indicator equal to one if a director worked in the same industry before the current employment in year t, and zero otherwise. We include the same control variables as in Table 9. All variables are defined in detail in Appendix Table A1. The regression includes firm and year fixed effects. *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: CEOs excluded	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.021**			
	(2.16)			
Education Score$_{d,t}$ x Female dummy$_d$	0.033			
	(1.05)			
Top 50 ranked college$_{d,t}$		0.033		
		(1.64)		
Top 50 ranked college$_{d,t}$ x Female dummy$_d$		0.104		
		(1.54)		
Generalist Index$_{d,t}$			0.039***	
			(5.26)	
Generalist Index$_{d,t}$x Female dummy$_d$			0.039*	
			(1.80)	
Same Industry Experience$_{d,t}$				0.087***
				(4.07)
Same Industry Experience$_{d,t}$ x Female dummy$_d$				0.184***
				(2.87)
Female dummy$_d$	-0.153***	-0.144***	-0.170***	-0.172***
	(3.34)	(4.45)	(4.81)	(5.25)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.619	0.619	0.620	0.620
Observations	19389	19389	19389	19389

Table OA8: cont'd

Panel B: Promotion to CEO	(1)	(2)	(3)	(4)
Education Score$_{d,t}$	0.035***			
	(4.23)			
Education Score$_{d,t}$ x Female dummy$_{d}$	0.014			
	(0.49)			
Top 50 ranked college$_{d,t}$		0.044**		
		(2.54)		
Top 50 ranked college$_{d,t}$ x Female dummy$_{d}$		0.096		
		(1.50)		
Generalist Index$_{d,t}$			0.061***	
			(9.60)	
Generalist Index$_{d,t}$x Female dummy$_{d}$			0.025	
			(1.19)	
Same Industry Experience$_{d,t}$				0.134***
				(7.51)
Same Industry Experience$_{d,t}$ x Female dummy$_{d}$				0.145**
				(2.43)
Female dummy$_{d}$	-0.145***	-0.155***	-0.177***	-0.180***
	(3.37)	(5.11)	(5.28)	(5.90)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.585	0.585	0.588	0.586
Observations	24073	24073	24073	24073

Table OA9: Which components of the Generalist Index matter for (female) executives' compensation?

This table presents results on the impact of the components of the Generalist Index on (female) executives' compensation. Results are based on the ExecuComp sample. Compensation is measured as the inverse hyperbolic sine of ExecuComp's total compensation (tdc1). Number of Positions (Firms/Industries) is defined as the number of different positions (firms/industries) a director worked in before the current employment in year t. CEO Experience is a dummy variable that is equal to one if a director was CEO in another firm before the current employment in year t, and zero otherwise. Conglomerate Experience is an indicator that is equal to one if a director worked at firm with more than one segment before the current employment in year t, and zero otherwise. We include the same control variables as in Table 9. All variables are defined in detail in Appendix Table A1. The regressions include firm×year fixed effects. *t*-statistics based on standard errors clustered by firm-year level are shown in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Number of Positions$_{d,t}$	0.054***				
	(14.38)				
Number of Positions$_{d,t}$ x Female dummy$_d$	0.031**				
	(2.13)				
Number of Firms$_{d,t}$		0.072***			
		(12.95)			
Number of Firms$_{d,t}$ x Female dummy$_d$		0.041**			
		(2.26)			
Number of Industries$_{d,t}$			0.083***		
			(15.40)		
Number of Industries$_{d,t}$ x Female dummy$_d$			0.047**		
			(2.52)		
CEO Experience$_{d,t}$				0.207***	
				(7.32)	
CEO Experience$_{d,t}$ x Female dummy$_d$				0.593***	
				(3.88)	
Conglomerate Experience$_{d,t}$					0.222***
					(18.54)
Conglomerate Experience$_{d,t}$ x Female dummy$_d$					0.212***
					(4.16)
Female dummy$_d$	-0.306***	-0.321***	-0.329***	-0.272***	-0.3515***
	(10.63)	(11.17)	(11.59)	(10.93)	(11.59)
Controls	Yes	Yes	Yes	Yes	Yes
Firm×Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.606	0.607	0.608	0.602	0.608
Observations	31892	31892	31892	31892	31892

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