

The Labor Market for Female Corporate Directors: Changes in Board of Director Composition from 1998 to 2000

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Abstract

Women recently have made dramatic progress in representation on corporate Boards of Directors. This paper analyzes why this increase has occurred. Using a sample of 499 large American companies from 1998 and 2000, I test whether the rise in female director employment is due to increasing female human capital levels or whether gender is a relevant criterion for selection to boards. The results suggest that gender is a significant factor in the director selection process and that larger companies with more male directors are the most likely to add female directors.

Women recently have made dramatic progress in representation on corporate boards of directors. In a little more than ten years, the number of corporate director seats held by women doubled, from 5 percent in 1987 to 11 percent in the late 1990s (Catalyst 2000), and this shift in board composition has not slowed in recent years. From 1998 to 2000, the female director ratio in my sample of 499 boards of directors rose by 14 percent. Demographic changes of this magnitude (imagine a 14 percent increase in the number of women working in construction or engineering in only two years) demands explanation for these high-level, high-profile corporate director positions.

This director-level labor market has special importance for the roles of women in broader managerial and executive labor markets. Director positions are an important development opportunity for future CEOs, and outside directors often shape the characteristics of future outside CEOs (Boeker and Goodstein 1993; Borokhovich et al. 1996). With more women serving as directors, there are consequently more women qualified for CEO positions and

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more women with power in the CEO-selection process. These female directors also may be role models for female managers and may pay special attention to the selection, training, and promotion of woman executives. In any case, the sudden and dramatic increase in female director participation raises a number of questions. Why has this occurred? Which firms are adding female directors?

Using a sample of 499 large American companies from 1998 and 2000, I test whether the rise in female director participation is due to increasing female human capital levels or whether gender is a relevant criterion for selection to boards. The results suggest that gender is a significant factor in the director selection process and that larger companies with many male directors are the most likely to add female directors.

Theoretical Framework

One explanation for the increasing female representation on boards is that director positions require twenty or more years of corporate experience and, consequently, high levels of human capital that women are only now beginning to have. The human capital explanation is that the number of females with director-level human capital has been increasing each year as a lagged effect of increased female labor market participation in the 1970s and 1980s. Women are added to boards only when they have the same human capital or qualifications as male directors. This model generally assumes no discrimination in director hiring, although it allows for discrimination that prevents women from gaining sufficient human capital.

The human capital explanation has a number of implications for how female directors are added to boards. First, there should be no relationship between the number of female directors in any given year and changes in the female director ratio across future years. Companies should be indifferent between hiring a male or female director because, by definition, they have the same levels of human capital. Second, female directors should be most common on the boards with low demands on director human capital, as those female directors are just beginning to exceed the threshold human capital levels to serve on boards. Large firms are more complex, which places greater demands on directors, so the smallest companies should be more likely to add female directors. Finally, in boards that reduce the total number of directors, females should be just as likely to be displaced as male directors, because they have equivalent human capital and there is no particular reason to retain one or another.

The second explanation is that female participation depends on institutional pressures that are not necessarily related to human capital. In this model, gender is an important criteria for selection to boards. Seventy-two percent

of surveyed CEOs in 1995 indicated that recruiting a female director was a top priority, whereas only 14 percent indicated that gender was not a relevant criterion and 86 percent of CEOs identified that increasing female representation on boards is an important general principle (Mattis 2000). This survey suggests that gender, independent of work experience or other qualifications, shapes new director selection and that demand for female directors is higher than it would be in the absence of gender criteria. One possibility is that firms hire female directors to satisfy stakeholders (the public, government agencies, interest groups) who seek increased female representation for reasons such as fairness, justice, or power. Firms may want to appear supportive of diversity and “forward thinking” by hiring one or more female directors. Alternatively, women may have been discriminated against in the past, and firms that prevented qualified women from serving are only now remedying and eliminating those discriminatory practices. This theory implies that female directors have equal or less human capital than male directors and that gender itself is an important criterion for selection to boards.

The institutional explanation also has a number of implications for how female directors are added to boards. First, there should be a negative relationship between the number of female directors in any given year and changes in the female director ratio across future years. Companies that have already added a large number of female directors to the board will be less likely to add more females to the board, because they have already “satisfied” institutional pressures. Second, female directors should be most prevalent on the boards facing the strongest institutional pressures, as those companies would have the most public relations (or other) benefits from adding female directors. If large firms have the most institutional pressures, because of their high levels of visibility among investors, social groups, and journalists, the largest firms should be more likely to add female directors. Finally, in boards that reduce the total number of directors, females should be much less likely to be displaced than male directors, because firms want to keep valuable female directors added in previous periods.

Data

I collected data on the boards of directors from annual reports and proxy statements published in 1999 and 2001. The sample is based on the 1998 *Forbes* survey that lists the 500 largest American companies by market value, revenue, profits, and assets. There were 815 firms on one or more list, and I collected a complete set of information on board composition (the total number of directors, the number of outside and female directors) for 636 companies. ExecuComp listed information for 612 of the original 636 companies, a 95 percent matching rate. I collected data on the following areas: firm assets,

sales, profitability (various measures, including net income), market value, and shareholder return; the number of employees; and two-digit SIC industry code. I then attempted to collect data on all 612 companies for 2000 (most recent year with complete board information) and matched 499 companies to the original data. Most companies listed in 1998 and not listed in 2000 were acquired by other firms.

Empirical Design

This research design analyzes patterns in *changes* in female participation across two periods, which has a number of desirable properties. Because the data are for a single company in two periods, it is possible to use a difference-in-difference method, which allows the elimination of firm fixed effects that may bias results in a cross-sectional analysis, assuming that the fixed effect is not correlated with changes in female director ratios. Also, the motivation for this paper is the rise in female directors over time, which is an inherently dynamic research question best addressed with data capturing changes in board composition. Finally, examining firms across two periods allows one to examine how company size, board size, and other factors in the initial period affect the likelihood of increasing the female director ratio. In the next section, I first describe the simple cross-tabulation of changes in board size and changes in the number of female directors. I then analyze the descriptive statistics and the multiple regressions that control for key explanatory variables. Because of space limitations, I have included only the tables showing the multiple regression results. I am happy to provide the other tables on request.

Cross-Tabulation

In the two years between 1998 and 2000, there is remarkable variation in board composition. Only 25 percent of companies maintained a constant number of directors over this period, whereas 26 percent increased their board size and 49 percent decreased it. The number of female directors, however, was relatively stable: 71 percent of companies employed identical numbers of female directors in both years (including boards with no women in both periods). Conditional on changing the number of female directors, companies were 50 percent more likely to make an increase than a decrease.

A surprising figure, in light of the rise in female director participation over time, is that 58 companies actually reduced the number of women on the board. Of those companies, 41 (70.7 percent) simultaneously eliminated female directors and reduced the total number of directors. These 41 firms on average cut three directors seats, one held by a woman. Female directors held 15 percent of board seats in these companies in 1998, so they appear to have been disproportionately dropped. The remaining 17 (29.3 percent) compa-

nies reduced the number of female directors while they increased or maintained a constant board size. In each of these 17 companies, only a single female director was dropped from each board. It is possible that this is just a statistical artifact caused by random fluctuations in female director participation on boards (i.e., some female directors will retire or otherwise exit firms each year), which dramatically affects boards with only a single female director and with some lag time before a new female director can be nominated.

The data suggest that increasing board size is positively associated with increasing numbers of female directors. Conditional on changing the number of female directors, companies were six times more likely to add a female director as to drop a female director when board size increased. When companies increased both board size and the number of female directors, women represented 35.6 percent of those new director seats in that subset of 44 companies. In the 33 companies with moderate changes in board size (no more than three additional directors), women represented 63.8 percent of new director seats. In the 17 companies that added a single director, a woman was that additional director in every case.

The data also suggest that female directors tend to keep their seats on boards, despite an overall trend toward reducing board size. The 499 companies on average reduced board size by .49 directors over this period (the range is from adding 14 directors for a newly merged company to eliminating 13 directors after a merger). Eliminating those extreme cases to look at the 440 (88.2 percent) companies that added or eliminated three or fewer positions, the average reduction in board size is $-.425$, which is not statistically different from $-.49$. Boards, on average, cut almost half of a director position, whereas they added almost one-tenth of a female director. In 27 companies, female directors actually gained seats on the board, despite an overall reduction in board size.

Descriptive Statistics

Although the cross-tabulation controls for changes in board size, there may be other differences between firms that add female directors and firms that do not. The first analysis in this section compares descriptive statistics for varying changes in the number of female directors. The second analysis compares firms that increased, decreased, or held constant the female director ratio, which includes both changes in the number of female directors and in board size.

Changes in the number of female directors ranges from plus three in a single company to minus two in two companies. Most companies (353, or 70.7 percent) had a constant number of female directors. Only 56 (11.2 percent) companies dropped one female director, while 77 (15.4 percent) added one

and 11 (2.2 percent) added two. This suggests that most firms have no changes in female directors and, among those making a change, the de facto range of change is from plus one to minus one.

Firms that dropped female directors tended to have large boards with more female directors (15 percent women) in 1998 compared to boards with flat or increasing numbers of female directors (9.4 percent and 8.5 percent women, respectively). Boards that cut one female also cut .9 male directors, on average, so female directors were disproportionately dropped from these boards. Boards that added one female director slightly reduced the number of male directors, and boards that added two female directors added one additional male director as well.

There is no clear relationship between firm size or financial measures and the decision to add female directors. Companies adding two female directors were the largest by any measure, but those results may be overstated by the inclusion of General Electric in that group. Using median, rather than mean, firm size reduces the difference to near zero. Firms adding female directors tended to have a higher dividend yield, better shareholder returns, and a higher Tobin's q than companies that dropped female directors, but companies that made no change had the highest average Tobin's q and shareholder returns. Companies adding exactly one female director tended to have the best market value-to-assets ratio, but only the second-best shareholder returns in the previous one, three, and five years. Of course, these variables are correlated with firm size and may be correlated with board characteristics, so it is not obvious how one should interpret the results. These interpretation issues are corrected in the later regression analysis.

An alternative way to describe the data is to examine three subsets of companies: those with no change, an increase, and a decrease in the female director ratio. This is a slightly different measure than changes in the number of female directors, because it includes board size as a denominator. A company could increase its female director ratio by increasing the number of female directors, reducing the total number of directors, or some combination of those two effects. Using this measure, 163 (32.7 percent) companies had no change in the female director ratio, 230 (46.1 percent) had an increase, and 106 (21.2 percent) had a decrease.

The first descriptive analysis is a t test comparing boards with increasing female director ratios to those with declining ratios. There are very few differences between these companies. Companies that increased the female director ratio averaged a 10.4 percent female director ratio, whereas companies that decreased it averaged a 14.9 percent ratio. By 2000, the ratios had nearly flipped to a mirror image of 1998: companies increasing the female director ratio averaged 15.6 percent women on boards, and companies decreasing it

averaged 10 percent women. These changes could reflect just random fluctuations in board composition, as adding a single woman to a normal-sized board would tend to increase the female director ratio by a few percentage points and the reverse would be true for companies dropping a single female director. The only other significant differences between these two subsets of companies is that companies increasing the female director ratio tended to have a larger reduction in board size compared to those decreasing the ratio. Of course, the number of female directors is relatively stable and the total number of directors is generally declining, which would cause the female director ratio to rise.

Comparing the increase/decrease subsets to the companies with no change in the female director ratio, there are a large number of significant differences. The no-change group tends to have smaller boards, fewer female directors in both periods, fewer outside directors in both periods, a smaller reduction in board size, a smaller size (measured as revenue, income, assets, market value, or number of employees), and higher revenue and income growth.

These findings as a whole suggest two empirical results. First, there are large and significant differences between companies with no change and any change in the female director ratio. The decision to change board composition, then, may be more important as a construct than the direction of the change. Large, relatively slow-growth companies with large and “modern” boards (approximately 10–15 percent female directors and 12–13 directors) make changes in board composition, whereas small, high-growth companies with small boards and few female directors tended to keep board composition constant over this period. Second, there is no evidence of any systematic differences between companies increasing and decreasing the female director ratio, except that increasers tended to have a large reduction in board size and tended to employ more female directors in the first place.

Multiple Regression

The descriptive statistics have some limitations, in that board and company characteristics are correlated with the decision to increase or decrease the number of female directors, which makes simple *t* tests difficult to interpret. The next step is a form of multiple regression to control for confounding variables. An ordinary least squares (OLS) regression is not appropriate in this case, because the dependent variable has only six discrete values, from +3 female directors to -2. Because the variable is not continuous, the OLS error terms are not normally distributed, violating a key assumption. I will use a logit regression with three binary dependent variables: one for whether the company increases the number of female directors from 1998 to 2000, one for maintaining a constant number of female directors, and one for decreasing the

number of female directors. I use a logit analysis to test the odds that a single company increases, maintains, or decreases its number of female directors, respectively. The set of independent variables includes the total number of directors (board size) in 1998, the number of male and outside directors in 1998, changes in the number of directors between 1998 and 2000, changes in the outside director ratio between 1998 and 2000, log revenue, and the market value-to-assets ratio. The analysis excludes industry controls.¹ The results are shown in Table 1.

The “increase case” computes the odds that a company increased its number of female directors from 1998 to 2000. The strongest predictors are log revenue and the change in board size, both positive and significant at the .001 level. Larger firms were significantly more likely to add female directors, as were boards that added a large number of new directors. Also, the findings suggest that boards with more male directors in 1998 were much more likely to add female directors, controlling for board size.

The “maintain case” computes the odds that a company did not change its number of female directors from 1998 to 2000. Board size in 1998 has a negative coefficient, significant at the .003 level, suggesting that larger boards were much more likely to change than smaller boards. In addition, boards with more male directors were significantly more likely to remain constant than boards with fewer male directors, significant at the .015 level. Companies changing board size were likely to also change the number of female directors, again suggesting that change—independent of its direction—is an important construct. Finally, large companies were much less likely to remain constant, but companies with a high market value-to-assets ratio were much more likely to remain constant, perhaps because they have no financial reason to change.

The “decrease case” computes the odds that a company reduced its number of female directors. Large boards with many female directors in 1998 were most likely to reduce the number of female directors (both variables with significant levels at .0001). Companies that reduced the number of female directors also tended to reduce board size, but there is no relationship between firm size measured as log revenue and the odds of being in this category.

Conclusion

The human capital and institutional explanations for increasing female participation in the corporate director labor market presented opposing hypotheses about the relationships between key variables. Although the descriptive statistics have no clear interpretation, the results of the logit regressions are certainly not consistent with the pure human capital hypotheses. Boards with more female directors in 1998 tended to reduce the number of female

TABLE 1
Logit Regressions

Dependent variable	Logit Coefficients			Odds Ratios		
	Increase	No change	Decrease	Increase	No change	Decrease
Number of directors in 1998	-0.34 (0.076)	-0.43 (0.003)	1.21 (0.000)	0.71	0.65	3.35
Number of male directors in 1998	0.48 (0.008)	0.31 (0.015)	-1.14 (0.000)	1.61	1.36	0.32
Number of outside directors in 1998	-0.02 (0.818)	0.09 (0.290)	-0.21 (0.069)	0.98	1.09	0.81
Change in number of directors	0.42 (0.000)	-0.16 (0.000)	-0.28 (0.000)	1.52	0.85	0.75
Log revenue	0.42 (0.000)	-0.22 (0.021)	-0.07 (0.607)	1.53	0.81	0.93
Market value-to-assets ratio	-0.10 (0.168)	0.15 (0.019)	-0.21 (0.078)	0.90	1.16	0.81
Sample Size	499	499	499			
R-squared	0.20	0.12	0.27			

Notes: P-values are in parentheses under the coefficients; bold odds ratios are significant at .05 level

directors, and boards with fewer female directors in 1998 tended to add women to the board. Larger firms were significantly more likely to add women to their boards than smaller firms. Also, among 243 firms reducing board size, women held 10.7 percent of director seats but represented only 2 percent of the eliminated director positions. Gender appears to be a relevant criterion for selection to corporate boards.

Notes

1. I also computed each analysis including two-digit SIC controls. In each case, industry collectively improved the explanatory power of the model, although the actual contribution to the pseudo-r-square was very modest. Adding industry did not significantly change the coefficient or significance levels in any material way. For example, the coefficient on log revenue in the “increase case” fell from .422 to .355 when industry controls were added and the p value rose from .001 to .019. In no case did the sign of any coefficient change after including industry controls. In only once case did the p -value change significantly. For the log sales variable in the “maintain case,” the p value on the coefficient fell from .133 to .021 after including industry controls.

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