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THE GENDER GAP IN TOP CORPORATE JOBS

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ABSTRACT

This paper studies the gender compensation gap among high-level executives in US corporations. We use the ExecuComp data set that contains information on total compensation for the top five highest paid executives of a large group of US firms over the period 1992-1997. About 2.5% of the executives in the sample are women. These women earn about 45% less than their male counterparts. As much as 75% of this gap can be accounted for by the fact that women manage smaller companies and are less likely to be CEO, Chair, or President of their company. The unexplained gender gap can be reduced to less than 5% when one further accounts for the fact that female executives are younger and have less seniority than male executives. Over the period under study, women have nearly tripled their participation in the top executive ranks and have also strongly improved their relative compensation, mostly by gaining representation into the larger corporations. While the absence of a significant gender gap (once we control for measurable characteristics) implies that women and men who hold similar jobs in firms of similar size received fairly equal treatment in terms of compensation, it does not rule out the possibility of discrimination in terms of gender segregation or promotion.

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1 Introduction

This paper analyses gender differences among top executives in a large set of US public corporations. Our motivation for undertaking this study is twofold. First and foremost is the obvious curiosity that this topic raises, both in the media and in policy circles.[1] Despite this wide public interest, we know of no systematic study to date of how well women are really doing in top corporate jobs. We provide the first detailed description of the relative position of female top executives in the 1990s. Our second motivation is more academic. Problems of unobserved characteristics of both workers and jobs that have plagued many studies of the gender pay gap in the past are likely to be less present in this specific occupational group. Most of the previous work has indeed identified an unexplained gender gap that cannot be attributed to observable differences between men and women.[2] While this unexplained (by observable characteristics) gap could be due to labor market discrimination, it could also be attributed to some unobservable (at least to the econometrician) differences between men and women, such as a relative lack of long-term career commitment for women.[3] It is reasonable to assume that such unobservable differences are minimized in the group of top executives we propose to study. Men and women in this sample are likely to be similar in that both share a high level of job motivation and high career ambitions. Hence, our study provides an interesting experiment to study true gender differences in earnings.

Several authors have previously examined gender pay differences among the highly paid. Ex-

[1] See, for example, Catalyst (1999), Morris (1998), Jones (1999), and Meyer (1999).

[2] An exception is Groshen (1991). Groshen shows that most of the gender gap can be attributed to sex segregation rather than wage differences by sex within occupation, industries and establishments. Using a larger sample but a similar empirical methodology, Bayard, Hellerstein, Neumark, and Troske (1999) however find that a large part of the sex gap remains unexplained after accounting for sex segregation.

[3] Of course, it is also possible that lower pay leads to lower career commitment. In addition, it could be the case that some compensating differential exists whereby women on average select lower paying jobs and, at the same time, enjoy amenities on these jobs that the higher paying jobs don't have. We cannot explore this issue empirically in this paper.

amples include Wood, Corcoran, and Courant (1993), and Biddle and Hamermesh (1998) who investigate lawyers, Barbezat (1987), Barbezat and Hughes (1990), Ferber and Greene (1982), Gander (1997), Hoffman (1976), Johnson and Stafford (1974), Katz (1973), and Ransom and Megdal (1993) for university faculty, Morgan (1998) for engineers, Baker (1995) for physicians, and Gregg and Machin (1993) for firm managers in the U.K.[4] No one before, however, has focused on gender compensation differentials among top executives. There have been two substantial barriers to conducting an investigation such as ours to date. First, the required data simply did not exist before. Second, it has been widely believed that too few women were in these top positions to carry out a formal analysis of their relative pay.

We use Standard and Poor's ExecuComp data. The data contain information on total compensation for the top five executives for all firms in the S&P 500, S&P Midcap 400, and S&P SmallCap 600. These data, which cover the period 1992-1997, include information on base salary, bonus and the value of granted stock options in the current year.[5] The data set has three main advantages for our purpose. First, it is very large. The sample we use in most of our analysis includes more than 42000 executive-year observations. All publicly traded firms are required to disclose the names and compensation of the "top five" highest paid employees annually. This large sample size is especially important for us because we want to estimate gender differences with sufficient statistical precision in an economic sector where female representation is small. A second advantage of the data set is that it covers a variety of occupational categories among the top managerial jobs and not only Chief Executive Officers (CEOs). We are thus able to investigate the importance of occupational

[4]Gregg and Machin (1993) explore pay gaps for a much more general class of managers than the class we focus on. Another study that focuses on such lower-level managers for the US is Jacobs (1992).

[5]Most studies of CEO pay do not include the value of stock options granted in a given year. Hall and Liebman (1998) however document the growing importance of granted options in the compensation of CEOs since the early 1980s. ExecuComp reports this information and we have included it in our total compensation measure.

differences at the top. Finally, because the data set covers a wide cross-section of firms, the role of firm size and industrial specialization in the gender compensation gap can be assessed.

The rest of the paper is organized as follows. Section 2 describes the unconditional (not controlling for any measurable characteristics) gender compensation gap between female and male executives. Section 3 assesses the role played by various characteristics of managers and firms. Firm size is explored in Section 3.1, sex segregation by industry in Section 3.2, and sex segregation by occupation in Section 3.3. Section 3.4 performs a simple Oaxaca (1973) decomposition. Individual demographics are explored in Section 3.5. Section 4 describes trends in relative female participation and compensation. Conclusions are offered in Section 5.

2 The Gender Gap

As we mentioned earlier, the ExecuComp data set is unique for many reasons including its wide variety of measures of compensation, details concerning firm characteristics, and large sample size. We can also arrange the data as a panel since we have multiple observations on a set of firms over time. Most crucial for our work, however, is the identification of the gender of each manager. Given the substantial discussion of a dearth of women in managerial positions in the US (see, for example, Catalyst (1999)), we were concerned that convincingly examining the question of a compensation gap would be difficult. However, due to ExecuComp's substantial size, we were able to identify more than 1134 female executive-year observations (449 unique individuals) on the basis of the gender variable included in the data. This is roughly 2.4% of all observations in the sample.

Panel A of Table 1 summarizes mean compensation by gender for the basic ExecuComp sample. The table displays total compensation but also decomposes total compensation in its major ele-

ments: salary, bonus, other annual compensation, and the value of options granted in the current year. Pooling all the ExecuComp years together, total compensation is on average 33% lower for women.[6] On average, women earn a little less than 900 thousand 1997 dollars in total compensation. The average male executive earns more than 1.3 million 1997 dollars.

How does the gender gap among top level managers compare to the gender gap among lower level managers? Panel B addresses this question. We use the Merged Outgoing Rotation Groups of the Current Population Survey (CPS) over the same period, 1992 to 1997. Given that the ExecuComp data are so specialized, we define a manager as anyone reporting that they work in an "executive, administrative and managerial occupation," excluding "management related occupations."[7] We focus on full-time workers only, i.e. individuals who work at least 35 hours per week. Annual salaries are constructed based on average weekly earnings. One can see that the gender gap between middle level managers is very similar to the gender gap among top managers: about 46%.

We now consider gender differences in the composition of the compensation package. Several features are worth noticing. First, women seem to receive a larger share of their compensation in the form of stock options. This fact is, however, likely largely driven by the fact that the sample of women is larger in the later years, where the use of stock options is more common.[8] Also, women receive less compensation in the form of bonuses and more in the form of salary.

[6] When we later control for year effects, the gender gap in total compensation reaches about 45%, the number reported in the introduction. Controlling for year effects is crucial because as we will see in Section 4, the number of women is larger in the later years of the sample when compensation levels are on average higher.

[7] This corresponds to categories 3 to 22 in the 1980 Census of Population Occupation Classification. Obviously, this definition formally also includes higher level managers. But because this group is small, most of the individuals in the CPS sample are lower level managers.

[8] See Section 4.

3 Decomposing the Gender Gap

In this section, we investigate how various characteristics of female top executive employment might account for the gender gap. We explore issues such as firm size, industrial segregation, occupational segregation, and individual demographic characteristics.

3.1 The Role of Firm Size

Women in top managerial positions tend to work for much smaller corporations than men. Panel A of Table 2 clearly illustrates this fact. Female executives' firms are 35 to 45% smaller, whether size is measured as the value of shareholder wealth, sales, total assets or number of employees.[9] In an analysis not reported here, we found that companies of extreme size are mostly driving the relationship between firm size and gender. We computed the fraction of women by deciles of firm market value. Women constitute about 3.5% of top management employment in the bottom two deciles and only 1% in the top decile. In all the other deciles, the fraction of women fluctuates between roughly 2 and 3% and the decline is not monotonic in size.

It is a well-known fact in the executive compensation literature that CEOs of larger firms get paid more (see Murphy (1985), Kostiuk (1990) and Rosen (1992)). If this pay-size correlation also holds for other top executives, one may ask how much of the gender gap can be attributed to the under-representation of women in large firms. The first columns of Table 3 answer this question. The dependent variable for all regressions in Table 3 is the logarithm of real total compensation. All regressions in the paper (Tables 3, 5, 7, and 8) include yearly time indicators and standard errors are White-corrected standard errors. One can see in column (1) that the gender gap is larger, 44%,

[9]Shareholder wealth is the total number of shares times the year-end share price. The correlation between ln(shareholder wealth) and ln(assets) is 0.8, between ln(shareholder wealth) and ln(number of employees) is 0.7, and between ln(assets) and ln(employees) is 0.7.

when one controls for year effects than the gap implied by Table 1, which does not control for any covariates. This can be explained by the fact that there are more observations for women in the later sample years. Column (2) shows that the gender gap is, as we had expected, substantially reduced when we control for the value of shareholder wealth. The elasticity of managerial compensation to the value of shareholder wealth is about 0.4.[10] About a third of the gender compensation differential, or 15 percentage points, can be accounted by the lower participation of women in large firms.

3.2 The Role of Industrial Segregation

Female executives are not uniformly represented in all industrial sectors. This can be seen in Appendix Table A1. Women are more likely to be managing companies that specialize in health and social services and in trade. These are also sectors where a disproportionate share of lower level managers are women, as we can see from the CPS results in column 6. On the other hand, very few women hold top-level positions in agriculture, construction, mining and in "heavy" manufacturing industries. The banking sector is an interesting case. While it has the largest share of females in lower level management among all sectors, women are relatively less present at the top.[11] Does the apparent industrial segregation of female executives account for some of the gender gap in compensation? Looking at Appendix Table A1, there is in fact no obvious pattern of a concentration of women in low wage industries. While managers in health and social services as well as in trade are paid slightly less than the average manager in the sample, it is also true that managers in the industries where women are very scarce are paid below average as well.

[10] This elasticity is slightly higher than that documented in Rosen (1992) for CEOs only.

[11] Bird (1990) previously documented substantial growth of female employment in bank management since the 1970s, partly as a result of pressures by the Equal Employment Opportunities Commission (EEOC). She further noticed that these women tend to be mostly employed in retail banking and especially branch management, where chances of advancement are very low.

Columns (3) to (5) in Table 3 confirm this observation in a more rigorous statistical way. Columns (3) and (4) show that the female dummy variable stays unchanged whether we add 8 broad industry dummies or 115 finer dummies. Moreover, none of gender gap remaining after controlling for firm size (column (2)) can be accounted for by the differential representation of women in different industries (column (5)). In summary, there is no evidence of a systematic allocation of women in low-paying industries.

3.3 The Role of Occupational Segregation

Table 4 presents the share of women in various occupations. We constructed occupational categories based on the "title" variable in ExecuComp. There are more than 5100 unique occupation titles in ExecuComp. Some of these titles clearly represent similar occupations. For example, "ex. vp" and "exec. vp" are just different ways of representing executive vice president. But many are more complicated and cannot naturally be merged together. We broke the occupation categories into 31 unique groupings, including Chair and CEO, Vice-Chair, President, Chief Financial Officer (CFO), Chief Operating Officer (COO), etc. Because some of the executives in the sample reported more than one occupation in their job title, we constructed two different occupational categories for the first and second occupation reported for each manager in ExecuComp.

The occupational breakdown reported in Table 4 is a further consolidation of our 31 categories into only 11 based on the first occupation reported, except for the Chair and CEO category. Indeed, as most of the CEOs in the sample are also Chairs of their companies and sometimes reported their title as "CEO and Chairman" and sometimes as "Chairman and CEO", we put in the "CEO/Chairman/Chairwoman" category anyone that reports at least one of these occupations in their title. Finally, we ranked these occupations based on our intuitive assessment of their relative

prestige. Column (3) of Table 4 reports the mean compensation for each occupation relative to the overall mean compensation in the sample. This confirms that our intuition was roughly correct except with respect to CFOs whose relatively low compensation on average in our sample came as a surprise to us.

The most important fact in Table 4 is the under-representation of women in the top three occupational categories and top four occupations (Chair, CEO, Vice-Chair, and President).[12] Women who have made it into the top managerial level (i.e. they are in the ExecuComp sample) are less likely to be at the very top than men.[13] The fraction of women among CEOs, Chairs and Vice-Chairs is much less than 1%. There are also fewer female presidents than there would be if female top executives were randomly allocated across occupations.[14] Once we look beyond these 4 top occupations, there is also an apparent negative correlation between the fraction of female executives in an occupation and relative compensation in that occupation but the correlation is far from strong. For example, women are over-represented among CFOs whose compensation is relatively lower than we initially expected, but CFOs are still paid more than most of the categories of Vice Presidents.

In Table 5, we turn to a regression analysis in order to more precisely quantify the impact of sex segregation by occupation on the gender earnings gap. The sample of executives for which we can construct occupation is about 9% smaller than the original sample. The unconditional gender

[12]This is an example of what is known as vertical segregation (see Blau, Ferber, and Winkler, 1998). Also see Ferber and Loeb (1997) for a related example in higher education.

[13]Note, however, that in column 4 we report the ratio of the average pay of women to the average pay of men within occupations. For the CEO/Chair category, this ratio is positive and marginally significant (p-value 0.08). It appears that although very few women make it to this top spot, once they get there, their average compensation (without considering control variables) is quite high.

[14]This finding is consistent with a vast prior literature that has shown that a substantial part of the difference in pay between men and women is attributable to the fact that women are less likely to hold the higher-paying jobs. See, among others, Goldin (1990) and Blau and Ferber (1987). While sex segregation by occupation can be reconciled with some form of taste discrimination by employers, employees, or customers (Becker, 1957, Arrow, 1973), many authors have preferred to rely on human capital models to explain this fact. See Lazear and Rosen (1990) for one such model. Another interpretation is offered by Reskin and Ross (1990) and Strober (1984).

gap in this sample is 47% (column (1) in Table 5) and is not statistically different from the 44% gap found in Table 3 (which covers the entire sample). The scarcity of female CEOs and Chairs only explain as much as 13% of the compensation differentials (column (2)). Nearly half of the 47% gap can be explained by the relative absence of women in the top four occupations of Chair, CEO, Vice Chair, and President (column (4)). If one further controls for firm size (column (5)), the gender compensation differential falls to 12%. Interestingly, adding further occupational controls only very weakly reduces the remaining gender compensation gap (columns (6) to (8) relative to column (4)). Adding more than 60 detailed controls for both first and second occupations in the job title (column (9)) reduces the gender gap by another 7% points compared to column (4). Finally, columns 10 and 11 of Table 5 examine the combined effect of occupational segregation, industrial segregation and firm size. As noted earlier, industry indicators do not reduce the coefficient on the female indicator at all (compare column (8) to column (10)). Controlling for firm size after controlling for occupational categories (column (11)) still has a large effect on the female dummy. The magnitude of the effect is however smaller than in Table 3. This very likely indicates that women are even less likely to hold the top jobs when they work for larger corporations.

By constructing occupational categories based on the job title variable, we were also able to extract information on broad field of activity for a subsample of the observations (See Appendix Table A2). Women's representation was highest in fields such as human resources, utility services and retail banking. Controlling for field in addition to occupation did not affect the coefficient on the female indicator variable. We do not report these results in the tables.

In column (12) of table 5, we allow for firm-specific effects in pay and add individual firm fixed effects to the regression.[15] The chi-squared value of the Hausman test of fixed-effects versus random

[15] In this case, we cannot also control for industry since industry does not vary within firms (for the most part).

effects is highly significant (p-value less than 0.001) and indicates that inferences based on the firm fixed effects specification in column (12) of Table 5 is most appropriate. In any event, the coefficient estimate on female when controlling for individual firm fixed-effects (-0.13), is nearly identical to that in the previous specification with industry fixed effects (-0.11 in column (11)).[16]

3.4 Oaxaca Decomposition

Another way to consider wage gaps between groups is described in Oaxaca (1973). This method decomposes the overall gap into a portion that is due to differences in observable skills between groups and a part that is still unexplained. This is easily done by running separate regressions for men and women and then rewriting the overall wage gap in various ways as described below. First, define α_f and β_f (a vector) as coefficient estimates from a regression of log compensation on a constant and a set of covariates for women only and $\overline{X}_f$ (a vector) as the mean characteristics of women. α_m, β_m and $\overline{X}_m$ are similarly defined for men. The overall gap between men and women is

$$\Delta w = \alpha_m + \beta_m \overline{X}_m - \alpha_f - \beta_f \overline{X}_f \tag{1}$$

There are two popular ways to re-write this equation. The first is based on adding and subtracting $\beta_m \overline{X}_f$ which yields

$$\Delta w = (\alpha_m - \alpha_f) + (\beta_m - \beta_f)\overline{X}_f + \beta_m(\overline{X}_m - \overline{X}_f). \tag{2}$$

In this case we are assuming that the returns to male characteristics, β_m, are the baseline. The second common decomposition is found by adding and subtracting $\beta_f \overline{X}_m$ to equation (1) which

[16] We also re-computed this specification with an individual person random effect model. In this case, the coefficient on female is nearly identical, -0.12.

yields

$$\Delta w = (\alpha_m - \alpha_f) + (\beta_m - \beta_f)\overline{X}_m + \beta_f(\overline{X}_m - \overline{X}_f). \quad (3)$$

In this case we are assuming that the returns to female characteristics, β_f, are the baseline.[17] In both equations (2) and (3), the first two terms are the part of the total gap left unexplained and the third term is the part of the gap due to explained differences in skills.

We present results for a simple Oaxaca (1973) decomposition in Table 6. In this case, we use the covariates used in column 5 of Table 5: year indicators, indicators for the top three occupations, log stock market value, and stock return in the previous year. We chose this parsimonious specification since, as indicated by Table 5, these covariates alone account for nearly all of the explained variation in compensation. As stated above, we decompose the total gap assuming that the male wage structure is the true wage structure (as in equation (2)) and assuming that the female wage structure is the true wage structure (as in equation (3)).

The results in Table 6 confirm our previous findings. Most of the total gap in compensation by gender for these top managers (between $71\% = 0.30/0.42$ and $88\% = 0.37/0.42$) is due to observable differences between men and women.[18]

3.5 The Role of Age and Tenure

A major drawback of the ExecuComp data set is that it does not report age and tenure consistently for all observations. These two variables are available for only a sub-set of the observations in the sample.[19]

[17] Of course, these are just extreme cases and any combination of β_m and β_f could also be a possibility (See Ransom and Oaxaca (1994)).

[18] Further details of the decomposition including the separate regressions by gender, are available from the authors upon request.

[19] We are not aware of any reason why age and tenure are only reported for a sub-set of the data. We investigated how individual and firm characteristics differ between the sample where age and tenure are available and our basic

Focusing on that subsample of the data, Panel B of Table 2 shows that women are significantly different from their male counterparts with respect to age and seniority in their corporations. Women in the subsample for which age and tenure are available are about 5 years younger on average (47.5 vs. 52.6 years old) and have 5.6 fewer years of seniority in their company (7.7 vs. 13.3 years). It is interesting to note that the gaps in age and tenure are about the same. As we alluded to in the introduction, women in these top managerial jobs indeed appear very similar to men with respect to their labor force attachment and career commitment. Because returns to age and experience are large in the market for executives, we expect that the relative youth and low seniority of the female executives is another important determinant of the gender gap. This is formally shown in Table 7.

Because the sample used in this section is much smaller, we reestimate the unconditional gender compensation gap for this group. As seen in column (1) of Table 7, the point estimate on the female indicator, -0.61, is substantially larger than in the previous larger samples. Yet, standard errors are large. Once we control for firm size (as in column (2)), the remaining gender gap is again much smaller. If we further add the three top occupation dummies (column (3)), the gap falls to 8%. However, standard errors are again large and we cannot reject the possibility that the coefficient on the female indicator variable is either 0 or the same as the female dummy in the larger sample for the same set of controls (column (5) of Table 5). If we control for occupation effects (column (4)) or for both occupation and industry effects (column (5)), the point estimate for the female dummy drops to -0.05 and -0.09 respectively. Again, because standard errors are large, we cannot reject the possibility that the coefficients on the female dummies are the same as the corresponding ones in Table 5.

sample. We found that individuals in the sub-sample were slightly more likely to be female (2.4% of the overall sample is female and 2.6% of the sub-sample is female) and worked for smaller firms.

The relative youth of women cannot in itself fully explain the gender gap. Column (6) of Table 7 shows that a 33% difference in compensation still exists between men and women after we account for age and seniority. However, this is not precisely estimated. There is also a clear but imperfect correlation between executives' age and the size of the companies they manage. When age and tenure are included (last five columns of Table 7), the addition of a firm size control does not improve the R^2 as much nor does it decrease (in absolute value) the coefficient on the female dummy as much either (column (7) versus column (2)). Whether or not we control for age and seniority, adding the three top occupation dummies (column (8)) leads to about the same improvement in R^2 as in column (3) where we do not control for age and tenure at all. The female dummy decreases (in absolute value), from -0.14 to -0.04. These findings, while imprecise, indicate that the gender compensation gap could be less than 5% after controlling for all observables.[20]

4 Trends in Participation and Earnings: Is the Glass Ceiling Cracking?

One of the major facts about US labor markets in the last two decades has been the convergence in outcomes between men and women. Focusing on differences in earnings, Blau and Kahn (1997) show that women's relative position considerably improved, especially during the 1980s when men experienced a real decline in earnings while female real wages grew very rapidly. They show that part of this shrinking gender pay gap can be explained by an improvement in female human capital, especially in the form of labor market experience, and by a smaller "unexplained" gender

[20]If we examine relatively new entrants to the top managerial jobs – that is men and women with only five or fewer years of labor market experience, we find that the conditional wage gap is also insignificant and the point estimate is not much different from our estimate on the complete set of data. If we estimate a specification like that in Table 5, column (11), for the 5113 executives with 5 years of experience or less, the coefficient on the female indicator is -0.093 with a standard error of 0.134.

gap, that could reflect either a reduction in labor market discrimination or an improvement in women's unmeasured characteristics. Yet, another important factor in explaining the decline in the gender gap has been an important shift in occupational categories for women. More specifically, the representation of women in managerial and professional jobs has been growing while the share of women in low-paying clerical and related jobs has not. In this section, we address the question of whether these trends also exist among top executives. In other words, we ask whether there is any evidence that the glass ceiling is cracking little by little in US corporations. We ask whether the relative participation of women in these top managerial jobs has increased over time, and also study trends in relative compensation. It is important to note that because our data set only covers the period 1992-1997, we are unable to investigate relative gains in the 1980s, the period during which most of the catch-up by women has occurred, at least in the other segments of the labor market.

Table 8 reports trends over time in the fraction of women in top level management. While the fraction of women in lower level management has only gone from 40 to 43% over the sample period (column 9), the fraction of women in top level management has nearly tripled over the sample period, going from 1.29% in 1992 to 3.39% (column 1) in 1997.[21] The fraction of firms with at least one woman in the top executive ranks (one of the top 5 most highly paid) has grown from 5.4% in 1992 to 15.03% in 1997. Although the fraction of firms with strictly more than one woman in these top positions is much smaller, it also grew a great deal over the period from 0.17% in 1992 to 1.95% in 1997. Also note in column 4 that the fraction of firms with no women in one year and at least one woman in the next year has grown steadily over time from 2.19% in 1993 to 3.85% in 1997.

[21] See Catalyst (1999) for descriptive evidence that is consistent with this.

Female top executives also seem to have improved their relative earnings quite substantially. While the ratio of average female to average male compensation in 1992 is a puzzle to us, it appears that female relative compensation has gone up extremely fast between 1993 (52%) and 1997 (73%).[22] During these same years, we find that the ratio of average female to average male annual earnings in our CPS sample went from 67% to 72%. In addition, in column (6) we have reported coefficients on the female indicator from our specification in column (11) of Table 5 by running separate regressions by year. The substantial and significant estimate of -0.221 from 1992 has declined through the sample period to an insignificant -0.013 in 1997.

Note, however, that the regressions adjusted gap for managers in the CPS has changed much less over time (column (11)). What has caused such a rapid decline in the gender gap for female managers at the top? In the previous section, we have isolated two main factors that have strongly hampered women's relative earnings: under-representation in large firms and under-representation in the top four occupations. Are female top executives in 1997 doing better on any of these two fronts? Column (7) of Table 8, which displays the ratio of average female manager's company size to average male manager's company size, clearly indicates that female executives are steadily gaining access to larger US corporations.[23] On the other hand, column (8) shows that there is little evidence that women's representation in the top occupational group (CEOs, Chairs, Vice Chairs and Presidents) has improved over time. If anything, women's representation in this group has declined, though not steadily.

[22]Because we were concerned by possible changes in the set of companies covered by ExecuComp over time, we investigated the robustness of these findings to limiting the sample to the companies that were present in 1992. The findings were unaffected.

[23]This could be due to a lessening of employers' or customers' tastes for discrimination or to changing tastes on the part of the female executives themselves.

5 Summary and Concluding Remarks

This paper showed that, contrary to what some commentators may have claimed, the "glass ceiling" is somewhat porous and some women, even if only a limited number, are involved in the top-level management of US corporations. In fact, over all years in the sample, about 2.4% of the executives are women.[24] We went on to show, that although this number is small, it has increased substantially in recent years. Our results further indicate that the gender gap in compensation among top executives is at least 45%. An important fact is that female managers are under-represented in large corporations. Because the returns to firm size are very high among top executives, this explains up to 15 percentage points of the gender gap. Interestingly, while female managers do not seem to be allocated randomly across industries, there is no evidence that sex segregation by industry explains any of the gender gap. On the other hand, we found that sex segregation by occupation is important. The scarcity of female CEOs, Chairs, Vice-Chairs and Presidents accounts for as much as half of the unconditional gender compensation gap. Once we look beyond these four top occupations however, there is no significant evidence of a concentration of women in the lower compensation occupations. A last crucial factor is that women in the sample are much newer in this top stratum of managerial jobs. Women in the sample are much younger and have much less seniority in their company than men. Part of the effect of age and seniority on the gender gap seems to be reflected in the size of companies women manage. All in all, we find that the unexplained gender compensation gap for top executives is less than 5% after one accounts for all observable differences between men and women.

Finally, we asked whether there is any evidence of a growing crack in the glass ceiling over

[24] This is still a small fraction relative to other forms of organization. For example, Hallock (1998) finds that about 20% of public charities are headed by women.

the period under study. We found that the participation of women in the top corporate jobs has been dramatically growing in the 1990s, from 1.3% in 1992 to 3.4% in 1997. Also, the gender compensation gap has declined, very much like in the other segments of the labor market. Most of the decline appears correlated with a decline in sex segregation by firm size. Female top executives are heading larger and larger corporations.

Because top executives probably constitute a fairly homogeneous group with respect to job motivation, career commitments and human capital, finding an unexplained gender compensation gap in this sample could have reasonably been interpreted as evidence for taste discrimination against women. In fact, we find that the conditional gender gap in this sample is very small. This obviously does not imply the absence of discrimination. Low general participation, sex segregation by firm size and by occupation could indeed all reflect some form of taste discrimination. The absence of a significant conditional gender gap simply means that women and men who hold similar functions in firms of similar size receive fairly equal treatment in terms of compensation.

Additional caveats should be stated here. First, the latter results should not be generalized to a claim that *all* female executives in the US are paid like their male counterparts in the same occupation category and in firms of the same size. Investigating that issue would require a different data set that, to our knowledge, does not exist. Second, one might argue that the very few women who made it into our sample are truly exceptional and should not in fact be compared to the average man in the sample but rather to the highest ability men in the sample.[25] Under that view, one might have expected that these women should have been paid more than the average male executives. The data clearly reject a positive female-male gender gap in earnings.

Future work might involve a more formal analysis of why some companies decide to promote

[25] Our analysis has assumed that men and women in our sample form an homogeneous group and that the distribution of unobservables is similar across genders.

women to top jobs while others do not. For example, one might inquire whether various characteristics of the board of directors, such as the sex and age distribution of directors, are correlated with the selection of women into top executive positions. More fundamentally, one might try to understand what factors make small companies more likely to attract female top executives and why women are virtually absent from the "very top" of the U.S. corporate world.

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TABLE 1. Summary Statistics on Compensation, 1992-1997

	(1) All Managers	(2) Males	(3) Females	(4) p-value[f]
Panel A:				
High Level Managers[a]				
Total Current Pay[b]	1323.0	1333.7	894.1	0.000
	(13.8)	(14.1)	(58.1)	
Salary	336.3	338.6	246.9	0.000
	(1.0)	(1.0)	(6.1)	
Bonus	257.6	260.7	136.1	0.000
	(3.8)	(3.8)	(8.4)	
Other Annual Pay[c]	20.6	20.8	12.7	0.006
	(0.7)	(0.7)	(2.8)	
Value Granted Options[d]	489.7	492.6	370.8	0.003
	(10.5)	(10.7)	(39.5)	
N	46708	45574	1134	
Panel B:				
Managers From CPS[e]				
Annual Labor Earnings	45.6	52.4	36.0	0.000
	(0.09)	(0.13)	(0.11)	
N	73411	43011	30400	

Source: The data on high level managers in panel A are from Standard and Poor's ExecuComp database, 1992-1997. The data on managers from the CPS are from the 1992 to 1997 Merged Outgoing Rotation Groups of the Current Population Survey.

Notes: All data are reported in real 1997 thousands of dollars adjusted using the consumer price index. Standard errors are in parentheses.

(a) High level managers include the top five highest paid executives in each firm in the Execucomp database.

(b) Total current pay is the sum of salary, bonus, other annual pay, and the value of stock options granted in the current year.

(c) Other annual pay includes dollar value of annual compensation not categorized as salary or bonus.

(d) Value of granted options is the value of stock options granted in the current period. This is not the value of options chased in a given year.

(e) The managers from the CPS are the set of full-time workers that report an occupation category between 3 and 22 in the 1980 Census of Population Occupation Classification. Annual income are constructed from average weekly earnings.

(f) This is the p-value for the difference in sample means between males and females within each row.

TABLE 2. Firm and Manager Characteristics

	(1) All Managers	(2) Males	(3) Females	(4) p-value[(e)]
Panel A: Firm Characteristics				
Market Value (millions)	3768.7	3799.3	2538.3	0.000
	(45.7)	(46.4)	(245.4)	
Sales[(a)] (millions)	3423.6	3470.9	1893.5	0.000
	(42.1)	(43.0)	(117.9)	
Assets[(b)] (millions)	7473.0	7525	5379.6	0.000
	(117.2)	(119.1)	(644.6)	
Employees[(c)] (thousands)	16.9	17.1	9.2	0.001
	(0.2)	(0.2)	(0.5)	
N[(d)]	46708	45574	1134	
Panel B: Manager Characteristics				
Age	52.6	52.6	47.5	0.000
	(0.5)	(0.06)	(0.5)	
N	17236	16960	276	
Seniority	13.2	13.3	7.7	0.000
	(0.1)	(0.1)	(0.5)	
N	14189	13845	344	

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.

Notes: Standard errors are reported in parentheses.

(a) Sample sizes for sales are 46665, 45533, and 1132.
(b) Sample sizes for assets are 46703, 45569, and 1134.
(c) Sample sizes for employees are 45581, 44482, and 1099.
(d) Sample size for Market Value. This size variable is used in most of the analysis below.
(e) P-value for difference in sample means by gender for each variable.

TABLE 3. Gender Pay Gap for High-Level Executives

Dependent variable: Log of total compensation

	(1)	(2)	(3)	(4)	(5)
Female	-0.44***	-0.28***	-0.44**	-0.43***	-0.27***
	(0.05)	(0.04)	(0.05)	(0.04)	(0.03)
market value		0.37***			0.39***
		(0.004)			(0.005)
stock return/1000		0.04			0.02
		(0.03)			(0.03)
8 industries	no	no	yes	no	no
115 industries	no	no	no	yes	yes
Constant	6.48***	3.86***	6.48***	6.48***	3.89***
	(0.01)	(0.03)	(0.01)	(0.01)	(0.02)
R^2	0.030	0.345	0.056	0.177	0.410
N	46670	46670	46670	46670	46670

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.

Notes: All regressions control for time indicator variables. White-corrected standard errors are reported. *** indicates significant at 0.01, ** significant at 0.05, and * significant at 0.10.

TABLE 4. Relative Pay, Percent Female, and Female / Male Compensation Gaps by Broad Occupation Groups

	(1) Number in Occupation	(2) % Female in Occupation	(3) Occupation Wage / Market Wage	(4) Female/Male Wage Gap in Occupation
CEO / Chairman / Woman	8987	0.52	1.93	1.75*
Vice Chair	2000	0.85	1.53	0.50***
President	5840	1.71	1.30	0.58***
CFO	326	6.44	0.61	0.67
COO	164	1.83	1.16	0.61
Other "Chief" Officer	2155	1.58	1.48	0.47***
Exec. VP	8581	2.66	0.83	1.10
Senior VP	8006	3.45	0.56	0.88**
Group VP	493	0.81	0.44	0.91
VP	7468	4.27	0.37	0.79***
Other Occupations	695	2.88	0.55	0.40***

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.

Notes: *** indicates means for men and women are significantly different at 0.01, ** significant at 0.05, and * significant at 0.10.

TABLE 5. Gender Pay Gap for High-Level Executives when Considering Detailed Manager Occupation
Dependent variable: Log of total compensation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
female	-0.47***	-0.34***	-0.31***	-0.25***	-0.12***	-0.26***	-0.22***	-0.22***	-0.18***	-0.19***	-0.11***	-0.13***
	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.03)	(0.02)
ceo / chair		0.82***	0.87***	0.99***	0.89***	0.99***	1.24***					
		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.06)					
vice chair			0.77***	0.89***	0.51***	0.50***	0.50***					
			(0.04)	(0.04)	(0.03)	(0.12)	(0.12)					
president				0.64***	0.66***	0.65***	0.89***					
				(0.02)	(0.02)	(0.02)	(0.06)					
cfo						-0.07	0.17					
						(0.09)	(0.11)					
coo						0.48***	0.73***					
						(0.12)	(0.13)					
co						0.39***	0.63***					
						(0.11)	(0.13)					
evp							0.57***					
							(0.06)					
svp							0.26***					
							(0.06)					
gvp							0.21***					
							(0.07)					
vp							-0.12**					
							(0.06)					
31 occs	no	no	no	no	no	no	no	yes	no	yes	yes	yes
31 +35 occs	no	no	no	no	no	no	no	no	yes	no	no	no
115 inds	no	no	no	no	no	no	no	no	no	yes	yes	no
firm effects	no	no	no	no	no	no	no	no	no	no	no	yes
log value					0.36***						0.35***	0.27***
					(0.004)						(0.004)	(0.009)
return/1K					0.06**						0.01	-0.04
					(0.02)						(0.03)	(0.03)
Constant	6.50***	6.29***	6.22***	6.09***	3.63***	6.09***	5.83***	6.64***	6.90***	6.63***	4.33***	4.95***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.06)	(0.09)	(0.10)	(0.09)	(0.08)	(0.07)
R^2	0.029	0.143	0.170	0.217	0.494	0.219	0.266	0.273	0.281	0.382	0.575	0.710
N	42677	42677	42677	42677	42677	42677	42677	42677	42677	42677	42677	42677

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.
Notes: All regressions control for time indicator variables. White-corrected standard errors are reported. The omitted occupation category in the final columns is all other occupations.

TABLE 6. Basic Oaxaca Decomposition

	Total Gap	Unexplained Gap	Gap Due to Skill Differences
Oaxaca Decomposition #1 (returns to male are baseline)	0.42	0.12	0.30
Oaxaca Decomposition #2 (returns to female are baseline)	0.42	0.05	0.37

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.
Notes: Separate regressions are run for men and women (see text). All regressions control for time indicator variables, status as CEO, Chair, Vice Chair, President, log(market value), and shareholder return.

TABLE 7. Gender Pay Gap for High-Level Managerial Pay when Considering Age and Tenure of Manager
Dependent variable: Log of total compensation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Not Controlling for Age and Tenure					Controlling for Age and Tenure				
female	-0.61***	-0.25***	-0.08	-0.05	-0.09	-0.33	-0.14	-0.04	-0.006	-0.05
	(0.20)	(0.17)	(0.15)	(0.14)	(0.13)	(0.20)	(0.17)	(0.14)	(0.14)	(0.13)
age						0.20***	0.08***	0.06***	0.06***	0.08***
						(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
age^2						-0.002***	-0.006***	-0.001***	-0.001***	-0.0007***
						(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
tenure						0.017**	-0.005	-0.02***	-0.019***	-0.022***
						(0.007)	(0.005)	(0.005)	(0.005)	(0.004)
tenure^2						-0.0001	0.0000	0.0002*	0.0002*	0.0003***
						(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log value		0.45***	0.39***	0.38***	0.38***		0.424***	0.40***	0.389***	0.390***
		(0.01)	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.011)	(0.013)
return/1000		-0.02	0.03	0.04	-0.05		-0.01	0.02	0.02	-0.06
		(0.04)	(0.03)	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)	(0.03)
ceo / chair			0.90***					0.92***		
			(0.04)					(0.04)		
vice chair			0.43***					0.44***		
			(0.08)					(0.08)		
president			0.66***					0.66***		
			(0.04)					(0.04)		
31 occs	no	no	no	yes	yes	no	no	no	yes	yes
115 inds	no	no	no	no	yes	no	no	no	no	yes
Constant	6.92***	3.69***	3.49***	4.26***	4.25***	0.75	1.26***	1.86***	2.70***	2.18***
	(0.04)	(0.08)	(0.07)	(0.12)	(0.13)	(0.68)	(0.48)	(0.44)	(0.45)	(0.42)
R^2	0.016	0.427	0.533	0.544	0.609	0.136	0.449	0.544	0.556	0.612
N	7379	7379	7379	7379	7379	7379	7379	7379	7379	7379

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.
Notes: All regressions control for time indicator variables. White-corrected standard errors are reported. *** indicates significant at 0.01, ** significant at 0.05, and * significant at 0.10.

TABLE 8. Information Over Time (1992-1997) for Two Sets of Managers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	High Level Managers from ExecuComp (columns 1-8)								CPS Sample (columns 9-11)		
	Fraction Female	Frac. Firms with >= 1 woman	Frac. Firms with > 1 woman	Frac Firms with no women in one year and then >= 1 in next	F/M Comp Gap[(a)]	Regression Adjusted Differential[(b)]	F/M Firm Size Gap	F/M Share Jobs in "Top" Group[(c)]	Fraction Female	F/M Comp Gap[(d)]	Regression Adjusted Differential[(e)]
1992	1.29	5.44	0.17	--	0.67*	-0.221**	0.42***	0.64***	40.41	0.67***	-0.271***
						(0.091)					(0.009)
1993	1.52	7.25	0.39	2.19	0.52***	-0.137***	0.52***	0.48***	40.25	0.69***	-0.254***
						(0.053)					(0.009)
1994	2.22	10.25	1.13	3.44	0.56***	-0.163***	0.52***	0.36***	41.79	0.68***	-0.247***
						(0.053)					(0.009)
1995	2.60	11.76	1.58	3.66	0.57***	-0.144***	0.56***	0.32***	41.20	0.68***	-0.260***
						(0.043)					(0.009)
1996	3.01	13.42	1.72	3.92	0.61***	-0.085**	0.61***	0.40***	42.07	0.70***	-0.249***
						(0.043)					(0.009)
1997	3.39	15.03	1.95	3.84	0.73***	-0.013	0.77***	0.37***	42.86	0.72***	-0.225***
						(0.049)					(0.009)

Source: The data are from Standard and Poor's ExecuComp database, 1992-1997.

Note: Standard errors are in parentheses.

(a) *** indicates that the difference in average female / average male compensation by year is significant at 0.01, ** significant at 0.05, and * significant at 0.10.

(b) This is the coefficient on the female indicator from an annual regression of ln (pay) on an indicator for female, plus the other covariates included in Table 5, column (11). White-corrected standard errors are reported.

(c) By "top group" we mean those jobs classified as CEO/chair, vice chair or president.

(d) Adjusting for hours. *** indicates that the difference in average female / average male compensation by year is significant at 0.01, ** significant at 0.05, and * significant at 0.10.

(e) This is the coefficient on the female indicator from an annual regression on ln (pay) on an indicator for female, experience, experience-squared, a linear term for education, and indicator for black, and one digit industry indicators.

APPENDIX TABLE A1. Relative Pay, Percent Female, and Female / Male Wage Gaps by Broad Industry Categories

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High-Level Managers				Managers From the CPS			
	Number in Industry	% Female in Industry	Industry Wage / Market Wage	Female/Male Wage Gap in Industry	Number in Industry	% Female in Industry	Industry Wage / Market Wage	Female/Male Wage Gap in Industry
Agriculture	222	0.00	0.60	--	312	42.63	0.77	.75***
Mining, Oil, Construction	3197	1.38	0.93	0.47***	4338	18.21	1.01	.72***
Food, Tobacco, Textile	6361	2.63	0.99	0.81	3953	31.77	1.08	.76***
Chemical, Concrete, Autos	10252	1.11	0.93	0.49***	10486	22.20	1.23	.76***
Transport, Communication	6112	2.45	0.77	0.49***	6495	31.25	1.10	.82***
Wholesale / Retail Goods	5484	3.61	0.81	0.65***	10671	40.72	0.76	.71***
Banking	5593	2.34	1.49	0.61***	8975	50.14	1.05	.69***
Personal & Business Serv.	5378	3.18	1.20	0.89	9296	39.46	0.88	.77***
Health and Social Services	4109	3.87	0.95	0.62***	18958	60.07	0.99	.74***

Source: The data on high level managers are from Standard and Poor's Execucomp database, 1992-1997. The data on managers from the CPS are from the 1992 to 1997 Merged Outgoing Rotation Groups of the Current Population Survey.

Notes: *** indicates significance at 0.001 or better.

APPENDIX TABLE A2. Relative Pay, Percent Female, and Female / Male Wage Gaps by Broad "Field" Groups

	(1)	(2)	(3)	(4)
		High-Level Managers Only		
	Number in Field	% Female in Field	Field Wage / Market Wage	Female/Male Wage Gap in Field
Human Resources	343	14.86	0.89	0.60***
Finance / Accounting	1682	2.02	1.01	1.41
Legal / Regulatory Affairs	258	10.85	1.28	0.51***
Sales	683	2.05	0.99	0.77
Marketing/Merchandising, Advertising	721	6.52	1.00	0.89
Product Development: R&D , engin, design	702	3.99	1.02	1.52
U.S. Operations	1132	0.88	0.90	1.48
International Operations	332	1.20	1.25	1.81
Corporate Affairs	907	4.96	1.05	1.63
Customer Service	120	12.5	0.89	1.36
Product Management / Manufacturing	268	4.10	0.96	0.78
Real Estate / Construction	66	4.55	0.81	0.62
Utility Services	26	30.77	0.34	1.33
Retail Banking, Credit	84	16.67	0.74	0.98
Sourcing, Procurement	21	9.52	1.03	1.23
Administration	299	5.69	0.88	0.46***
Communication, Information	89	6.74	0.70	0.78
Healthcare	59	1.69	1.36	0.53&
Mergers & Acquisitions	50	0.00	0.91	NA&
Computers	38	2.63	1.40	0.93&
Developed Markets	7	42.86	2.84	1.78
Investment	35	2.86	1.99	0.13&
Distribution	30	3.33	0.70	0.48&
Missing	38756	2.04	2.27	0.67***

& Only one woman (or zero in the case of mergers) in these cases – no t test for differences in means.