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The Glass Ceiling Hypothesis: a comparative study of United States, Sweden and Australia.

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THE GLASS CEILING HYPOTHESIS
A Comparative Study of the United States, Sweden, and Australia

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The general-case glass ceiling hypothesis states that not only is it more difficult for women than for men to be promoted up levels of authority hierarchies within workplaces but also that the obstacles women face relative to men become greater as they move up the hierarchy. Gender-based discrimination in promotions is not simply present across levels of hierarchy but is more intense at higher levels. Empirically, this implies that the relative rates of women being promoted to higher levels compared to men should decline with the level of the hierarchy. This article explores this hypothesis with data from three countries: the United States, Australia, and Sweden. The basic conclusion is that while there is strong evidence for a general gender gap in authority—the odds of women having authority are less than those of men—there is no evidence for systematic glass ceiling effects in the United States and only weak evidence for such effects in the other two countries.

The "glass ceiling" is one of the most compelling metaphors for analyzing inequalities between men and women in the workplace. The expression has been used widely in the popular media as well as in official government reports and academic publications (Canberra Bulletin of Public Administration 1994; Catalyst 1990; Garland 1991; Scandura 1992; State of Wisconsin Task Force on the Glass Ceiling Initiative 1993; U.S. Department of Labor 1991). The image suggests that although it may now be the case that women are able to get through the front door of managerial hierarchies, at some point they hit an invisible barrier that blocks any further upward movement. As one of the early writers who used the metaphor commented, the glass ceiling is "a transparent barrier that kept women from rising above a

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certain level in corporations. . . . It applies to women as a group who are kept from advancing higher *because they are women*" (Morrison et al. 1987, 13).

Taken literally, the metaphor of the "glass ceiling" implies the existence of an impermeable barrier that blocks the vertical mobility of women: Below this barrier, women are able to get promoted; beyond this barrier, they are not. Such a situation can be considered the limiting case of a more general phenomenon: situations in which the disadvantages women face relative to men intensify as they move up organizational hierarchies. In the case of the literal use of the glass ceiling metaphor, this intensification takes the form of a simple step function; in the more general case, the intensification of disadvantage could occur in several steps and come in varying degrees.[1] Throughout this article, we will use the expression "glass ceiling" to cover this more general case. Our objective is to test whether glass ceilings are present in this looser definition of the term.[2]

The glass ceiling metaphor as we will use it is thus not simply a description of an outcome—that there are disproportionately few women at the top of organizations—nor is it simply a claim that discrimination against women is pervasive at all levels of managerial hierarchies. It is a specific claim that the obstacles women face to promotion relative to men systematically increase as they move up the hierarchy. Of course, obstacles to promotion may also increase for men as they move up the hierarchy, but the idea of a glass ceiling implies that barriers to promotion intensify more for women than for men. Employers and top managers may be willing to let women occupy the lower reaches of the managerial structure, but—the argument goes—they obstruct the access of women to positions of "real" power. As a result, women are largely denied promotions to the higher levels of management. Many different concrete mechanisms may be responsible for this obstruction: old-fashioned sexism, women managers' isolation from important informal networks, or more subtle sexist attitudes that place women at a disadvantage. But whatever the specific mechanism, the glass ceiling hypothesis argues that the relative disadvantages women face in getting jobs and promotions are greater in the upper levels of managerial hierarchies than at the bottom.

The metaphor of the glass ceiling seems to be confirmed by casual observation. It does not take systematic research to notice that a much higher proportion of bottom supervisors than of chief executive officers are women. Data from the comparative project in class analysis (Wright 1989, 1997) indicate that at the bottom of managerial hierarchies in most economically developed countries, around 25 to 30 percent of lower-level supervisors are women. In contrast, at most a small percentage of top executives and CEOs in large corporations are women. According to Fierman (1990), fewer than 0.5 percent of the 4,012 highest paid managers in top companies in the United States are women, while fewer than 5 percent of senior management in the *Fortune* 500 corporations are women and minorities. Reskin and Padavic (1994, 84) report that "although women held half of all federal government jobs in 1992 and made up 86 percent of the government's clerical workers, they were only a quarter of supervisors and only a tenth of senior executives." Similar patterns occur in other countries: In Denmark, women were 14.5 percent of all

managers and administrators but only between 1 and 5 percent of top managers; in Japan, women were 7.5 percent of all administrators and managers but only 0.3 percent of top management in the private sector (Reskin and Padavic 1994). The report of the State of Wisconsin Task Force on the Glass Ceiling Initiative (1993, 9) states that while 47 percent of supervisors and 42 percent of middle management in Wisconsin were women, only 34 percent of upper management and 18 percent of executives were women. A 1991 U.S. Department of Labor "Report on the Glass Ceiling Initiative" makes similar observations: In 94 randomly sampled reviews of corporate headquarters of *Fortune* 1000 sized companies between 1989 and 1991, women were found to represent 37.2 percent of all employees of these companies yet only 16.9 percent of all levels of management and 6.6 percent of managers at the executive level. Such distributions would surprise no one, and they lend considerable credibility to the claim that women indeed do face a glass ceiling.

However, things may not be what they seem. A simple arithmetic example will clarify the point. Suppose, as illustrated in Table 1, there is a managerial hierarchy with six levels. In the first example in this illustration, 50 percent of men but only 25 percent of women get promoted at each level (i.e., men have twice the probability of being promoted than women at every level of the hierarchy). Discrimination, at least as measured by relative probabilities of promotion, is thus constant across levels of the hierarchy. In this situation, if roughly 25 percent of line supervisors are women, only 1 percent of top managers will be women. In the second example, the ratio of the probabilities of men getting promoted to women getting promoted actually becomes steadily more egalitarian as you move up the hierarchy. This ratio is 2:1 for promotions into line supervisor positions but declines to only 1.16:1 for promotions to the top manager position. Yet even in this situation, the proportion of top managers who are women is strikingly less than the proportion of supervisors who are women: 6 percent compared to about 25 percent.[3]

Neither of these two examples is properly described as reflecting a "glass ceiling" as we are using the term. The glass ceiling hypothesis suggests that the barriers to managerial promotions become increasingly severe for women compared to men as they move up the hierarchy. In the two examples just reviewed, however, the disadvantages women face relative to men are either constant as they move up the hierarchy (case 1), or they actually decrease (case 2). And yet, in both cases, there are almost no women top managers. The cumulative effect of declining discrimination can still produce an increasing "gender gap in authority" as one moves to the top of organizational hierarchies. Thus, the existence of a glass ceiling cannot be inferred simply from the sheer fact that a much smaller proportion of people at the top echelons of organizations are women than at the bottom levels.

To prove the existence of a glass ceiling, it is thus necessary to demonstrate two things: (1) that the ratio of the probabilities of women compared to men being promoted into or entering a given level of management declines as they move up the managerial hierarchy and (2) that this deterioration in relative promotion probabilities is due to intensified barriers to promotion as opposed to some other mechanism. If, for example, women disproportionately self-select into occupations or organiza-

TABLE 1: Hypothetical Example Showing How There Can Be Very Few Women Top Managers and Gender Discrimination without a "Glass Ceiling"

	Number of People in Level			*Promotion Rates to Next Hierarchy Level (in percentages)*		
Managerial Level	*Men*	*Women*	*Percentage of Women*	*Men*	*Women*	*Ratio*
Constant intensity of discrimination up the hierarchy						
Top managers	100	1	1			
Manager level 4	200	4	2	50	25	2:1
Manager level 3	400	16	4	50	25	2:1
Manager level 2	800	64	7.5	50	25	2:1
Manager level 1	600	256	14	50	25	2:1
Line supervisor	3,000	1,024	24	50	25	2:1
Nonmanagement	6,400	4,096	42	50	25	2:1
Declining intensity of discrimination up the hierarchy						
Top managers	100	6	6			
Manager level 4	200	14	6.5	50	43	1.16:1
Manager level 3	400	36	8.3	50	40	1.25:1
Manager level 2	800	98	11	50	37	1.35:1
Manager level 1	600	297	15.7	50	33	1.52:1
Line supervisor	3,200	1,024	24	50	29	1.72:1
Nonmanagement	6,400	4,096	42	50	25	2.00:1

tions with limited possibilities of vertical promotion for everyone in such jobs, and if this accounts for the pattern of gender differences in promotion rates across hierarchical levels, then the process would not properly be described as involving a glass ceiling (intensification of barriers). Occupational and organizational sex segregation, even self-segregation, may reflect various forms of gender discrimination in the society at large, but the mechanisms involved are different from those identified with the glass ceiling.

The central objective of this article is to provide a preliminary exploration of the central empirical prediction of the glass ceiling hypothesis that the ratio of probabilities of women compared to men being promoted up managerial hierarchies declines with hierarchical level. Given the salience of the metaphor in public discussions of gender inequality, it might have been expected that there would be a substantial body of quantitative research systematically exploring the extent and variations in the glass ceiling. While there are numerous studies documenting the gender gap in authority (Gradolph et al. 1994; Hultin 1996; Ishida 1994 **[*1995 IN REFERENCES*]**; Jacobs 1992; Jaffee 1989; Reskin and Roos 1992; Rosenfeld,

Van Buren, and Kalleberg 1994 **[*1998 IN REFERENCES*]**; Tomaskovic-Devey 1993; Wright and Baxter 1995) and many reports and investigations that purport to study the glass ceiling (Canberra Bulletin of Public Administration 1994; State of Wisconsin Task Force on the Glass Ceiling Initiative 1993), virtually none of this research addresses the specific empirical question of how the relative probabilities of women and men being promoted into or entering a given level of management change as one moves up the hierarchy. This is a key issue since it potentially identifies the most important point of focus for those concerned with women's lack of representation in senior management. If it is the case, for example, that the gendered barriers to promotion do significantly intensify at a specific level of the hierarchy, then this highlights an important site for political action. On the other hand, if the barriers to promotion for women relative to men are equally rigid at all levels of the hierarchy, then this suggests that political efforts should perhaps concentrate more at the bottom of hierarchies since this will affect the lives and opportunities of more women than at higher levels.

The research reported in this article explores variations in the gender gap in authority by hierarchical level in three developed capitalist economies—the United States, Sweden, and Australia. The central question we ask is this: Does the probability of women being promoted into a given level of the authority hierarchy relative to men decline as one moves up the hierarchy? The comparative setting of the analysis serves two purposes: First, the three analyses can be viewed as replications of each other. The glass ceiling hypothesis is not a special hypothesis for the United States but a quite general hypothesis about the patterns of gender discrimination in organizational hierarchies. If this hypothesis is robust, it would be expected to occur in all three of these countries, although the pattern and magnitudes of the glass ceiling effects might differ. Second, earlier work (Wright and Baxter 1995) has demonstrated that on a variety of measures, the gender gap in authority was significantly greater in Sweden than in either the United States or Australia. In this article, we examine if there are also indications of stronger glass ceiling effects in Sweden as well. Such a result would not only lend credence to our earlier findings but would also have implications for understanding the impact of differing political strategies on eradicating gender inequality in workplaces.

DATA

The data for this article come from the Comparative Class Analysis Project (Wright 1989, 1997). Two cross-sectional surveys are available in three of the original countries involved in this project: the United States (1980 and 1991), Australia (1986 and 1993), and Sweden (1980 and 1995) (see Table 2). For purposes of the analytical objectives of this article, the samples have been restricted to employees (thus excluding the self-employed, the unemployed, and people out of the labor force). Because the national surveys differed somewhat in the age range of their samples, we have restricted the samples to respondents between the ages of 19 and 64.

TABLE 2: The Sample

Country	*Date*	*Interview Method*	*Sample Size (after restricting to employees between ages 19 and 65)*
United States	1980	Telephone	1,194
United States	1991	Telephone	1,387
Australia	1986	Personal	1,013
Australia	1993	Mail	1,308
Sweden	1980	Mail/telephone	996
Sweden	1995	Mail/telephone	991

To increase the sample size, especially for the upper levels of the managerial hierarchies, we have combined the two data sets within each country. We then tested to see if there were any interactions between gender and time (coded as a dichotomy to distinguish the first and second surveys in each country).[4] In all three countries, these time-by-gender interaction coefficients were statistically insignificant (at even the 0.1 level of significance) for all of the analyses we conducted. We thus will not include the gender-by-time interaction terms in any of the analyses that follow.[5]

STRATEGY OF ANALYSIS

The data we use enable us to classify employees in the labor force into six hierarchical levels:

0 = nonmanagement
1 = supervisors
2 = lower managers
3 = middle managers
4 = upper managers
5 = top managers

Let the probability of a woman currently in level n being promoted from level n to level $n + 1$ be $\Pr(W{:}n \rightarrow n + 1)$ and the probability of a man being so promoted be $\Pr(M{:}n \rightarrow n + 1)$. The glass ceiling hypothesis predicts that the ratio of these two probabilities—$\Pr(W{:}n \rightarrow n + 1)/\Pr(M{:}n \rightarrow n + 1)$—declines as n increases. If there were no gender differences in promotion possibilities, then these probabilities would be the same and thus the ratio 1. If there was pervasive gender discrimination but its intensity did not increase with hierarchical level, then this ratio would be constant across values of n. The methodological problem, then, is how to get reasonable estimates of these gender-by-level promotion probabilities.

Several features of the process by which people are allocated to positions in authority hierarchies make calculating these probabilities difficult. These include nonstandardization of hierarchies across organizations, variations in the ways in which individuals move into and out of organizational levels, historical legacies of previous allocation rules and changes in gender-specific labor force participation rates, and unmeasured differences in employee quality (see methodological appendix for further discussion of these issues). These complexities may make the use of cross-sectional data quite problematic for the tasks at hand. Since we know that labor force participation rates of women have been increasing rapidly in recent years and that the proportion of all jobs that are located within managerial hierarchies has also been increasing (Wright 1997, chap. 3), cross-sectional data will almost certainly generate biased estimates of gender-specific promotion probabilities.

Despite these biases, we believe that cross-sectional data can potentially provide suggestive evidence relevant to the glass ceiling hypothesis. If it is the case that the biggest sources of likely bias in the estimates will tend to exaggerate the appearance of a glass ceiling, then the data analysis could be quite compelling if it fails to demonstrate the existence of glass ceiling effects. By far the biggest bias in estimates of gender-specific promotion rates from cross-sectional data is likely to be generated by the very rapid rate of increase in women's labor force participation and historic legacies of past discrimination. Since it takes time for expanded cohorts of women to work their way up hierarchies even in the absence of a glass ceiling, rapid increases in labor force participation will result in disproportionate numbers of women in the lower levels of hierarchies and will thus tend to generate the appearance of a glass ceiling even if none in fact exists. If, therefore, despite this bias, we fail to observe a glass ceiling in cross-sectional data, this would constitute credible, if still tentative, evidence against the glass ceiling hypothesis. On this assumption, then, we will use cross-sectional data of the distribution of men and women across levels of authority hierarchies in work as a suggestive test of the glass ceiling hypothesis.

The Basic Model: The Adjacent-Level Model

Our primary model for exploring the glass ceiling hypothesis will be based on a series of logistic regressions that estimate, for people in adjacent levels of the authority hierarchy (level n and $n + 1$), odds ratios for a gender-independent variable predicting whether a person is in the higher of the two levels:

$$\text{Log } [\Pr(n + 1)/\Pr(n)] = a_n + B_n\text{Female}, \quad (1)$$

where $\Pr(n)$ is the probability of being in level n of the hierarchy, $\Pr(n + 1)$ is the probability of being in level $n + 1$, and the subscript n indicates that the coefficients in the equation are for the contrast between level n and $n + 1$. (To estimate this equation, the sample is restricted to people in the two adjacent categories.) The

coefficient B_n, then, is a measure of the "gender gap in authority" at level *n*. If this coefficient is negative, then the odds of a woman being in the higher of the two levels is less than the odds of a man being in that level; if the coefficient is zero, there is no gender gap at all; if it is positive, there is a gender gap in favor of women. Thus, for example, when $n = 0$, the gender coefficient indicates the log of the odds ratio of women compared to men being supervisors rather than nonmanagement. The antilog of this coefficient is the odds ratio of a woman compared to a man being in the higher-level category.

If the glass ceiling hypothesis is correct and if these odds ratios adequately map gender differences in promotion probabilities, then at some point as *n* increases, the coefficient for the gender variable should become significantly more negative than at lower values of *n*.[6] If the glass ceiling hypothesis is taken literally as indicating that an almost impermeable barrier suddenly appears at upper levels of the hierarchy, then the coefficients measuring the gender gap in authority might be modestly negative for $n = 0, 1, 2, 3$ and then suddenly jump to a large negative coefficient at $n = 4$ or 5. If we relax the meaning of the hypothesis, then it simply suggests that the coefficients would tend to be more negative at higher levels than at lower levels of *n*.

Because of the small sample sizes, especially for people at the higher levels of organizational hierarchies, unless there are huge differences in the B_n coefficients across levels of *n*, it will be difficult to formally test the statistical significance of these differences, particularly since the standard errors in tests of differences among regression coefficients are larger than the standard errors of the original coefficients. In general, therefore, we will rely more on observations of the pattern of coefficients than on formal statistical tests of their differences. If it turns out that some of these patterns are consistent with the glass ceiling hypothesis, we will conduct formal tests to establish our level of confidence in the results.[7]

Controls for Individual and Job Attributes

It is always possible that part or all of the gender gap in authority as measured by the gender coefficient in equation (1) is the result not of gender per se but of various personal and job attributes correlated with gender. Such attributes could have the effect of spuriously heightening or dampening the gender coefficient. For example, suppose that because of discrimination in getting into positions of authority, on average, at any level of the authority hierarchy, women are better qualified than men. If gender discrimination is real, then this is one of the things one would expect (i.e., a woman would have to be more qualified in various ways to get a promotion than a man). If this were the case, then controlling for qualifications should, if anything, increase the absolute value of the negative coefficient for gender at higher levels of the authority hierarchy. That is, the gender gap in authority will be bigger when qualifications are included in the equation than when they are not. This could mean that a glass ceiling might not appear to be present in equation (1)—the B_n coefficients for high *n* and low *n* might be same—but when the controls are added in equation (2), the B_n coefficients for high values of *n* might become significantly more negative.

TABLE 3: Control Variables Used in the Analysis

Variable	*Definition*
State	Dummy variable distinguishing public- and private-sector employees (1 = public)
Occupation	Three dummy variables: upper white collar, lower white collar, upper manual; omitted category is lower manual
Part-time	Dummy variable, 1 = works less than 30 hours per week, 0 = works 30 or more hours per week
Education	Years of schooling
Age	Age in years
Age squared	Age in years squared
Children	Dummy variable, 1 = children present in the home, 0 = no children living at home
Marital status	Dummy variable, 1 = married, 0 = not married
Gender	Dummy variable, 1 = women, 0 = men

On the other hand, there may be attributes of women that, when held constant, would reduce the gender gap in authority. Women are more likely to work part-time than are men, and part-time workers are less likely to be promoted than are full-time workers, not because of gender-specific reasons but because of the organizational costs of promoting part-time managers.[8] Similarly, women are more likely to work for the state than are men, and there are proportionately fewer upper-level managers in state organizations than in private corporations. If such factors were included in an equation as controls, therefore, the magnitude of the gender gap should decrease. Some of the apparent gender gap in authority as measured in equation (1) would be the result of the distribution of women into work settings with fewer managerial opportunities rather than any gender-specific obstacles to their acquiring managerial positions within their workplaces. It is therefore important to estimate a second set of logistic regressions in which a range of individual and job attributes are included as controls:

$$\text{Log } [\Pr(n + 1)/\Pr(n)] = a_n + B_n\text{Female} + \Sigma_i B_{ni} X_i, \quad (2)$$

where the X_i are the various compositional controls listed in Table 3.[9] The B_n coefficients in these equations will be referred to as the "net gender gap" in workplace authority (i.e., the gender gap net of the distribution of attributes of men and women in the sample). Our interest in these equations is strictly with the B_n coefficients, not with the controls per se. As in equation (1), the glass ceiling hypothesis implies that these coefficients will become more negative as n increases.

Supplementary Models

In addition to the equations predicting odds ratios for being in level $n + 1$ compared to level n, we will estimate two other models with slightly different dependent

TABLE 4: Alternative Dependent Variables

1. Adjacent-level model (basic model)
   - A_0 0 versus 1 = nonmanager versus supervisor
   - A_1 1 versus 2 = supervisor versus lower manager
   - A_2 2 versus 3 = lower manager versus middle manager
   - A_3 3 versus 4 = middle manager versus upper manager
   - A_4 4 versus 5 = upper manager versus top manager

   This model directly contrasts adjacent levels.
2. Grouped-level model
   - G_0 0 versus 1 = nonmanager versus supervisor
   - G_1 1 versus 2, 3 = supervisor versus lower and middle manager
   - G_2 1, 2 versus 3, 4 = supervisors + lower manager versus middle and upper manager
   - G_3 2, 3 versus 4, 5 = lower and middle manager versus upper and top manager
3. Overall-level model
   - L_0 0 versus 1, 2, 3, 4, 5 = nonmanager versus all positions in managerial hierarchy
   - L_1 1 versus 2, 3, 4, 5 = supervisor versus lower manager and above
   - L_2 1, 2 versus 3, 4, 5 = lower manager and below versus middle manager and above
   - L_3 1, 2, 3 versus 4, 5 = middle manager and below versus upper manager and above
   - L_4 1, 2, 3, 4 versus 5 = upper manager and below versus top manager

   This model compares people at or below a given level of the hierarchy with people above that level.

NOTE: Categories on either side of the "versus" have been combined to form a single category in the dichotomous contrast. Thus, in model 3, for variable L_2, 1, 2 versus 3, 4, 5 indicates that levels 1 and 2 are combined and levels 3 to 5 are combined.

variables. These are listed in Table 4. In the grouped-level model, adjacent levels in the hierarchy are collapsed into broader categories to increase the sample size for the test of the changes in the gender gap coefficients. In the overall-level model, we construct five dummy variables, each of which contrasts people at or below a given level of the hierarchy with people above that level. The gender coefficient in this model indicates the odds of women compared to men being above or below a given cut point in the hierarchy.

There are three reasons why we estimate these additional models. First, because of limitations in sample size, for many of the regressions in the adjacent category model, there are simply too few cases to have high confidence in the values of the coefficients in the equations. By grouping categories together in the supplementary models, we increase the sample size on which the coefficients are estimated. Second, the supplementary models relax somewhat the assumption that the six hierarchical levels in our measure of workplace authority are neatly ordered and comparable across all work settings. Level 2 in some organizations may really be the equivalent of level 3 in others. By grouping the categories together in different ways, we may be able to smooth out some of the messiness in using these categories across many different kinds of organizations. Third, we know in advance that the data do not rigorously conform to the demanding assumptions needed to use the basic model as a rigorous test of the glass ceiling hypothesis. If the basic pattern of

TABLE 5: Gross Gender Gap in Authority at Different Levels of the Authority Hierarchy in the United States, Australia, and Sweden (adjacent category model)

	United States		*Australia*		*Sweden*	
Levels Being Compared	B_n (SE)	n	B_n (SE)	n	B_n (SE)	n
A_0: 0 versus 1	–.56***	2,078	–.30***	1,867	–.71***	1,682
	(.11)		(.11)		(.13)	
A_1: 1 versus 2	.20	540	.28	568	.01	387
	(.26)		(.22)		(.31)	
A_2: 2 versus 3	.02	254	–.76***	258	–1.06**	128
	(.29)		(.26)		(.43)	
A_3: 3 versus 4	–.28	271	.09	248	–.20	111
	(.29)		(.28)		(.56)	
A_4: 4 versus 5	.31	212	–.19	159	.49	79
	(.31)		(.35)		(.59)	

NOTE: Significant contrasts across levels being compared: United States: A_0 versus A_1 is significant; Australia: A_1 versus A_2 is significant, and A_2 versus A_3 is significant; Sweden: A_0 versus A_1 is borderline significant. The B_n coefficients are from the logistic regression: Log [Pr(n + 1)/Pr(n)] = a_n + B_nFemale, where Pr(n) is the probability of being in level n of the hierarchy, Pr(n + 1) is the probability of being in level n + 1, and the subscript n indicates that the coefficients in the equation are for the contrast between level n and n + 1.
**p < .01, one-tailed test. ***p < .005, one-tailed test.

results is quite consistent across these alternative specifications of the dependent variable, this may add some confidence to our interpretations.

RESULTS

Table 5 presents the results for the basic model (the adjacent-level model) for the gross gender gap in authority (i.e., the gender gap not controlling for any attributes of respondents) at different levels of the authority hierarchy. In all three countries, there is a statistically significant gender gap in authority between level 0 and level 1. That is, in each country, the odds of a woman being a bottom-level supervisor (level 1) instead of a nonmanagement employee (level 0) are significantly less than those of men.

While the results in Table 5 thus confirm the presence of a significant gender gap in authority, they provide no support for the specific predictions of the glass ceiling hypothesis for the United States. The glass ceiling hypothesis implies that the gender coefficients in equation (1) should be significantly more negative at the higher levels of the hierarchy than at lower levels. In the United States, for the gross gender gaps in authority, none of the coefficients for contrasts above the bottom of the hierarchy approaches statistical significance, and none is even nominally more negative than the coefficient for the bottom-level contrast. These coefficients are more

TABLE 6: Net Gender Gap in Authority at Different Levels of the Authority Hierarchy in the United States, Australia, and Sweden (adjacent category model, controlling for individual attributes)

	United States		*Australia*		*Sweden*	
Levels Being Compared	B_n (SE)	n	B_n (SE)	n	B_n (SE)	n
A_0: 0 versus 1	–.35**	1,867	–.25*	1,809	–.81***	1,510
	(.14)		(.13)		(.16)	
A_1: 1 versus 2	.30	482	.06	558	.33	349
	(.31)		(.25)		(.37)	
A_2: 2 versus 3	–.35	234	–.57*	254	–.95*	113
	(.34)		(.31)		(.53)	
A_3: 3 versus 4	–.47	248	.14	243	–.27	99
	(.36)		(.33)		(.72)	
A_4: 4 versus 5	.37	187	–.18	154	.59	75
	(.44)		(.41)		(.74)	

NOTE: Significant contrasts across levels being compared: Sweden: A_0 versus A_1 is significant. The B_n coefficients are from the logistic regression: Log $[\Pr(n + 1)/\Pr(n)] = a_n + B_n\text{Female} + \Sigma_i B_{ni} X_{ni}$, where $\Pr(n)$ is the probability of being in level n of the hierarchy, $\Pr(n + 1)$ is the probability of being in level $n + 1$, the X_{ni} are the various compositional controls listed in Table 2, and the subscript n indicates that the coefficients in the equation are for the contrast between level n and $n + 1$.
*$p < .05$, one-tailed test. **$p < .01$, one-tailed test. ***$p < .005$, one-tailed test.

consistent with the view that once women overcome the obstacles to getting into the authority structure, their promotion possibilities do not significantly differ from those of men than they are with the view that there exists a glass ceiling to upward movement.

In Sweden and Australia, the results are not quite so clear-cut. In both countries, the coefficient measuring the gender gap in authority in the comparison of levels 2 and 3 (row A_2 in Table 5) of the managerial hierarchy—lower-level managers and middle managers—is significant and negative: –.76 in Australia and –1.06 in Sweden. This means that among managers at levels 2 or 3 in the hierarchy, the odds of a woman being at level 3 are 46 percent those of a man in Australia and 34 percent those of a man in Sweden. These coefficients also indicate a nominally larger gap in authority at this middle level of the hierarchy than at other levels: The coefficients for contrast A_2 are considerably more negative than those for contrast A_1 (the gender gap between supervisors and lower managers) and for contrasts A_3 (between middle and upper managers) and A_4 (upper managers and top managers) and modestly, although not statistically significantly, more negative than the coefficient for contrast A_0.[10] This pattern is consistent with the claim that there is a glass ceiling effect at the middle level of managerial hierarchies in these two countries.

Table 6 presents the results for the adjacent category models controlling for the range of attributes in Table 3. These results enable us to see if any of the gender gaps in Table 5 can be attributed to the distributions of these attributes across men and

women. While there are some changes in the coefficients, the basic patterns are quite similar to those in Table 5. For the United States, the only difference of note is that the coefficient for the gender gap in contrast A_3 (middle and upper managers) becomes nominally more negative than in contrast A_0, although the A_3 coefficient remains statistically insignificant. For Sweden and Australia, the coefficients for the gender gap in authority in contrast A_2 were slightly reduced (i.e., the coefficient became somewhat less negative), but they are still statistically significant, and they remain the most negative coefficients in these two countries.[11]

Table 7 presents the results for the two supplementary models. Again, the results are very much in line with those discussed in Tables 5 and 6. In none of the regressions is there any trace of glass ceiling effects in the United States, whereas in Sweden and Australia, around the middle levels of the authority structure, women appear to face somewhat greater obstacles than at the bottom.

CONCLUSION

The data in this project do not allow for a definitive test of the glass ceiling hypothesis for several reasons. First, the strategy of assessing relative promotional probabilities from cross-sectional distributions is problematic unless unrealistic demographic assumptions are met. We argued that since the biases of this method are likely to inflate the appearance of glass ceiling effects, if it turns out that no glass ceiling effects appear in the cross-sectional data, they would still be relevant for provisionally assessing the glass ceiling hypothesis. Nevertheless, since there are many possible distortions introduced by using cross-sectional data, and not all of them may work in the same direction, a fine-grained test of the glass ceiling hypothesis should rely on data that directly measure promotional trajectories for men and women. What is needed is a comprehensive set of career histories of a large sample of men and women with detailed descriptions of the organizations within which they have worked and their hierarchical location within those organizations. Second, if glass ceiling effects are highly concentrated at the very apex of organizations, then relying on sample survey data of the sort used in this article will simply miss the phenomenon. At most, survey research would be able to identify glass ceiling effects in the middle to upper tiers of organizations. Third, even given the limitations of the kind of data used in this article, the relatively small sample size has made it difficult to conduct rigorous statistical tests of the differences in odds ratios across levels of the hierarchy. We have had to rely mainly on descriptions of the patterns of coefficients. For all of these reasons, the results of the analysis in this article are at best suggestive.

What they do suggest are three basic conclusions. First, in line with previous research on gender and authority, in all three countries a gender gap in authority exists even when a range of personal attributes is included in the equation. None of the results concerning the presence or absence of strong glass ceiling effects should

TABLE 7: Gender Gap in Authority at Different Levels of the Authority Hierarchy in the United States, Australia, and Sweden (supplementary models)

	United States				*Australia*				*Sweden*			
	Without Controls		*With Controls*		*Without Controls*		*With Controls*		*Without Controls*		*With Controls*	
Levels Being Compared	B_n (SE)	n	B_n (SE)	n	B_n (SE)	n	B_n (SE)	n	B_n (SE)	n	B_n (SE)	n
Grouped category model												
G_0: 0 versus 1	–.56***	2,078	–.35**	1,867	–.30***	1,867	–.25*	1,809	–.71***	1,682	–.81***	1,510
	(.11)		(.14)		(.11)		(.13)		(.31)		(.16)	
G_1: 1 versus 2, 3	.23	711	.09	639	–.20	717	–.31	704	–.55*	459	–.21	411
	(.17)		(.21)		(.16)		(.19)		(.24)		(.29)	
G_2: 1, 2 versus 3, 4	.11	811	–.24	730	–.56***	816	–.49**	801	–1.17***	498	–.95***	448
	(.16)		(.20)		(.16)		(.19)		(.28)		(.33)	
G_3: 2, 3 versus 4, 5	–.11	466	–.29	421	–.30	417	–.11	408	–.42	207	–.44	188
	(.20)		(.25)		(.21)		(.25)		(.37)		(.47)	
Overall-level model												
L_0: 0 versus 1-5	–.47***	2,544	–.39***	2,288	–.45***	2,284	–.38***	2,217	–.97***	1,889	–.93***	1,698
	(.09)		(.11)		(.09)		(.11)		(.11)		(.14)	
L_1: 1 versus 2-5	.18	923	–.00	826	–.34**	876	–.35*	858	–.73***	538	–.41*	486
	(.14)		(.18)		(.14)		(.17)		(.20)		(.25)	
L_2: 1-2 versus 3-5	.15	923	–.15	826	–.59***	876	–.50***	858	–1.06***	538	–.85***	486
	(.14)		(.18)		(.15)		(.18)		(.24)		(.29)	
L_3: 1-3 versus 4, 5	.04	923	–.26	826	–.45**	876	–.30	858	–.90***	538	–.82*	486
	(.17)		(.21)		(.19)		(.22)		(.31)		(.38)	
L_4: 1-4 versus 5	.21	923	.07	826	–.53	876	–.35	858	–.59	538	–.43	486
	(.21)		(.26)		(.34)		(.34)		(.39)		(.49)	

NOTE: The B_n coefficients are from the logistic regressions: Log [Pr(n + 1)/Pr(n)] = $a_n + B_n$Female and Log [Pr(n + 1)/Pr(n)] = $a_n + B_n$Female + $\Sigma_i B_{ni} X_{ni}$, where Pr(n) is the probability of being in level n of the hierarchy, Pr(n + 1) is the probability of being in level n + 1, the X_{ni} are the various compositional controls listed in Table 2, and the subscript n indicates that the coefficients in the equation are for the contrast between level n and n + 1.
*p < .05, one-tailed test. **p < .01, one-tailed test. ***p < .005, one-tailed test.

therefore be taken as indicating the absence of gender discrimination in authority structures.

Second, in the United States at least, there is little evidence for large and systematic glass ceiling effects. This conclusion is consistent with the findings of Yamagata et al. (1997).[12] On the basis of the data analyzed here, the disadvantages women face in acquiring authority are, if anything, greatest at the lower levels of the managerial hierarchy, not the upper levels. If this result is confirmed in research using other methods, it has significant implications for struggles against gender discrimination in workplaces. In the United States, at least, removing gender-related obstacles to getting into the authority hierarchy would appear to be a more pressing task than removing obstacles to promotions in the upper reaches of authority structures.

Third, there do appear to be possible glass ceiling effects in Sweden and Australia but located more around the middle of managerial hierarchies than at the top: In these countries, women appear to be particularly disadvantaged relative to men in moving from lower- to middle-management levels. These enhanced obstacles seem to be especially strong in the Swedish case. Of course, because the biases in our strategy of analysis may tend to exaggerate glass ceiling effects, the appearance of these heightened obstacles in Sweden and Australia may simply be artifacts of our measurement techniques. Nevertheless, given the contrast with the results for the United States, they do suggest that such obstacles are probably stronger in these cases.

Nothing in the data analysis of this article provides an explanation for these cross-national differences. In previous research, Wright and Baxter (1995) hypothesized that the generally greater gender gap in authority in Sweden than in the United States was, at least in part, a reflection of a critical difference between women's struggles against gender inequality in the liberal democratic and social democratic political traditions. In liberal democratic politics, the pivotal focus of struggle is equal rights, and this leads to policies designed to eliminate various forms of discrimination that affect individual opportunities in the market. In social democratic politics, the core issue is satisfaction of needs, which in a capitalist market economy leads to policies directed at the decommodified provision of services (e.g., child care, elder care, public health, etc.) and political regulation of labor market transactions (e.g., legally mandated, generous parental leave policies, active labor market policies). The result is that much less political energy has been devoted to ending gendered discrimination in employment practices in Sweden, which may help explain both a larger overall gender gap in authority and the presence of glass ceiling effects within hierarchies. Australia, in these terms, is somewhat of a mixed case. With a stronger labor movement than the United States and a labor party with a more social democratic cast, the women's movement has been less preoccupied with equal rights, but its overall political culture is still more in the liberal democratic than social democratic tradition.

Even though the results of this article must be taken as very tentative, the basic message here is nevertheless clear: Claims about the existence of a glass ceiling are

quite vulnerable to observational misperceptions. The very low representation of women at the top of authority hierarchies may create an appearance of a glass ceiling—a concentrated structure of impediments to promotion at the higher levels of organization—where in fact discrimination is either more or less constant throughout the organization or even concentrated at the bottom. Since the rhetoric of a glass ceiling may deflect political attention away from struggles over opportunities at the lower levels of hierarchies (which in any case will affect the lives of a greater number of people), the metaphor should be used with caution.

APPENDIX
Methodological Issues in Studying the Glass Ceiling Hypothesis

A number of issues make it problematic to empirically examine the glass ceiling hypothesis with cross-sectional survey data of the sort we use in this article.

1. Nonstandardization of hierarchies. Few organizations have an internal hierarchical structure as simple as the military with unambiguously ranked levels and clear, consistent channels of promotion. Furthermore, the number of levels varies enormously across work organizations, both because organizations vary in size but also because they vary in organizational design. While there may be a sense in which one can treat the apex of organizations and perhaps the bottom hierarchical level of line supervisors as roughly comparable across organizations, it is much less clear that the diverse assortment of levels between these poles has the same hierarchical meaning across organizations of different sizes and shapes. "Middle managers" in a small shop and a multinational corporation are not really in similar hierarchical positions.

2. Movement into and out of levels. A number of complexities in the movement of people in hierarchies make studying gender-specific promotion probabilities difficult. First, recruitment into levels is not simply by promotion from the next lower level within an organization or even by recruitment of people from outside the organization who were in the equivalent next lower level in some other organization. There are many lateral moves within and across organizations as well as recruitment of people into middle and even upper-level positions who did not previously occupy any hierarchical position. The advancement process within managerial hierarchies is thus much less ordered than the movement through levels of an educational system. With rare exceptions in an educational transition process, everyone who enters high school has completed primary education; everyone who enters college graduated from high school; everyone who graduates from college had previously had "some college" (i.e., they did not simply acquire a college degree without intermediate study after high school); everyone who enters graduate school graduated from college; very few people with Ph.D.s go back to school to get a second B.A. degree; and so on. Second, movement can be downward as well as upward. Especially in the context of movement across organizations—for example, movement from the upper levels of a small firm to the middle levels of a large corporation—this is probably not a rare event. Third, people may voluntarily exit organizations and leave the hierarchy before reaching the highest level they could have attained if they had stayed in their jobs. If women voluntarily leave in this way at higher rates then men, then the distribution of men and women across levels may simulate a glass ceiling where none exists.

3. Historical legacies. At any point in time, the actual distribution of men and women across hierarchical levels either within a specific organization or in the society at large will depend not simply on the currently existing allocation rules, whatever those might be, but on the legacies of past allocation rules and past gender-specific labor force participation rates. There is every reason to believe that gender-related promotion practices have undergone at least some recent historical change, and of course, there have been massive increases in women's labor force participation. Distributional patterns that may look like a glass ceiling could thus simply be by-products of past discrimination and past lower levels of women's labor force participation rather than current practices. Discrimination could in principle have been completely eliminated in organizations, or at least differential discrimination across levels could have been eliminated, and yet there would still be high concentrations of women in lower levels of the hierarchy. There simply has not been enough historical time to allow these new cohorts of women to be promoted up to the highest levels they will eventually achieve.

4. Unmeasured differences in employee quality. Even if it were the case that we could solve all of the structural complexities of promotions, the fact that men and women at a given level of an authority hierarchy may have different unmeasured qualities may confound any inferences drawn directly from differential promotion rates. These quality differences could work either to make it seem that a glass ceiling is present when one does not really exist or to mask the presence of a glass ceiling. If, for example, it were the case that men on average have certain qualities that are important for managerial promotions but that are not captured by easily observable measures of individual attributes (e.g., willingness to sacrifice intimate personal relations for careers), and if these attributes become increasingly important as one moves up a hierarchy, then increasing promotion advantages for men relative to women might simply reflect the increasing salience of this personal attribute rather than intensified gender discrimination per se. Women with these attributes might have the same promotion probabilities as men; it is simply less likely that women will actually have these attributes. Gender differences in unmeasured personal attributes, however, could also mask a glass ceiling. Suppose the promotion rate advantage of men relative to women is constant across levels of the hierarchy. In such a situation, it might be expected that women are being selected for promotion on more exacting criteria than men. In effect, women face a more intense competitive selection process than men since it is harder for them to be promoted. In such a context, the average quality of women managers compared to men managers might be expected to increase more rapidly as one moves up the hierarchy. If relative promotion probabilities of men are constant in this situation, this might nevertheless still be consistent with the relative obstacles faced by women steadily increasing: It would become progressively harder for a woman with given personal qualities to get promoted relative to a man with those same qualities.

Given these complications, the ideal data for estimating gender-specific promotion probabilities across levels of hierarchies would be complete work histories (which include detailed specifications of the hierarchical location of all jobs and the hierarchical structure of work organizations)—with detailed inventories of job-relevant personal attributes for a sufficiently large sample of adults, including people who have exited from the labor force—that would make it possible to study cohort-specific probabilities of movement across each level of a hierarchy at various points in the past. With such data, the probability of women in a specific cohort moving from a given level in authority structures to a higher level at different points in the course of their prior career could be compared to the probabilities of men in the

same cohort, controlling for the appropriate range of personal attributes and organizational characteristics. Doing this for all cohorts and all levels of the hierarchy would then make possible a reasonable test of the glass ceiling hypothesis.

Such data, as far as we know, do not exist. An alternative would be to examine time-series data based on employment records for all of the employees of a single organization (see, e.g., Yamagata et al. 1997). Such data would make it possible to estimate gender-specific promotion probabilities across levels of the organization over time. Several problems, however, would confront the use of such data for testing the glass ceiling hypothesis. First, at most, the analysis would evaluate the glass ceiling hypothesis in the specific organization under study, not in society at large. Second, if there is significant recruitment into positions above the lowest levels from outside of the organization, it would be impossible to estimate the probabilities of women compared to men being recruited since there would be no way of estimating the denominator for the probabilities (i.e., the size of the pool of people from which recruitment took place). Third, unless one tracked the subsequent careers of everyone who left the organization, there would be no way of knowing whether people who exited from a given level accepted jobs at a higher level in some other employing organization.

NOTES

1. Yamagata et al. (1997, 571) use the term *glass ceiling* in a way congruent with the usage proposed here: "While, as a metaphor, the glass ceiling conveys a strong connotation . . . when the glass ceiling is actually measured by the mobility of individuals between different hierarchical levels, one recognizes that it has different levels of severity, or closedness, and thus the analyst can investigate the phenomenon as a matter of degree rather than as a dichotomy." While they do not explicitly define the glass ceiling as intensifying relative disadvantages for women in promotions, they recognize that glass ceilings can come in varying degrees of severity, which is consistent with our formulation.

2. Some readers may object to this somewhat looser use of the expression "glass ceiling," feeling that the term should be restricted to extreme cases in which there is absolute, blocked mobility for women confronting an impermeable barrier. If one adopts such a strict usage of the expression, then whenever a corporation would promote a single woman beyond the alleged "ceiling," one would have to say that the ceiling had disappeared for it would no longer be the case that women "cannot advance to higher levels." Few people who use the expression "glass ceiling," however, would abandon the term in the face of token/minimal promotions of this sort. It is for this reason that we believe the sociological content of the glass ceiling metaphor should be understood as vertical intensification of discrimination. In any event, readers who object to this looser use of the "glass ceiling" expression should note that if there exists a glass ceiling in the literal sense of completely blocked mobility, it will satisfy any test of the looser definition. If, therefore, the evidence is against the presence of a loosely defined glass ceiling, this would also imply the absence of a literally defined ceiling.

3. This hypothetical example roughly corresponds to some available organization-level data. In data from a court case, *Marshall et al. v. Alpha Beta*, concerning gender distributions at different levels of a managerial hierarchy in a grocery chain (reported in Reskin and Padavic 1994, 89), 49.9 percent of grocery department clerks were female, 16.8 percent of assistant grocery department managers were female, 7.6 percent of grocery department managers were female, and 3.1 percent of store managers were female. The relative chances of a man compared to a woman being an assistant manager instead of a clerk were roughly 5:1, whereas the relative chances of a man compared to a woman being a department manager instead of an assistant manager were only 2.4:1, and the relative chances of a man

compared to a women being a store manager instead of a department manager were 2.5:1. While women face significant barriers to promotions at all levels of this organization, these barriers appear, if anything, to be stronger at the bottom than at the top.

4. We tested for time-by-gender interactions in a range of models in addition to the ones used in this article. In particular, we tested whether such interactions existed when we aggregated various measures of authority into a more general authority variable. In none of these models were the time-by-gender interactions statistically significant in any of the three countries.

5. Since the proportion of the sample in authority positions does vary across the two samples within each country, we include time as an additive term in the equations.

6. These odds ratios would directly reflect the ratios of promotion probabilities for women and men at each level of the hierarchy—the key issue for directly testing the glass ceiling hypothesis—if four unrealistic assumptions were met: (1) The structure of positions is strictly ordered—everyone at level $n + 1$ was recruited from level n (either within the same organization or from some other organization). There are no demotions and no skipped levels. (2) The relative promotion probabilities of men and women have not changed over time. (3) The distribution of positions has not changed over time. (4) The relative rates of exit (retiring) from every level of the managerial hierarchy for men and for women have not changed significantly over time and do not vary with level of the hierarchy. If these conditions were met, then the system would be in a demographic equilibrium, and the static distributions across levels for men and women would faithfully reflect the gender-specific promotion probabilities. The comparison of the odds ratios in equation (1) at different levels of the hierarchy would then be a direct test of the glass ceiling hypothesis. As we explain in the methodological appendix, these assumptions are not plausible, but since the most pervasive biases are likely to exaggerate the appearance of a glass ceiling, negative findings would still have analytical credibility.

7. It is straightforward to test the statistical significance of differences in the B_n coefficients for nonoverlapping pairs of categories (e.g., the coefficient B_0 for levels 0 and 1 compared to the coefficient B_2 for levels 2 and 3) by testing the significance of an interaction term of gender by comparison in an equation for the sample of people in all four levels. To test the significance level of coefficient differences for overlapping pairs of categories (e.g., the coefficient B_0 for levels 0 and 1 compared to the coefficient B_1 for levels 1 and 2), we use multinominal logistic regressions that enable us to test equality constraints among the coefficients of the model.

8. While the fact that women are concentrated in part-time work might itself be the result of various practices of gender inequality, this would suggest a very different process from the glass ceiling.

9. The list of control variables in Table 3 is fairly limited since it contains only those variables that were available in both surveys in all three countries. A number of relevant control variables—such as total labor force experience, job tenure with current employer, and firm size—were missing from one or more of these surveys. When we added these additional control variables in the analyses of those surveys for which they were available, they did not make any substantive difference in the basic patterns of coefficients.

10. Using multinominal logistic regressions to test the significance of these differences in coefficients, we found that in Australia, coefficient A_2 is significantly more negative than coefficient A_1 and A_3 but not coefficient A_0. In Sweden, coefficient A_2 does not differ significantly from any of the other coefficients. The formal statistical tests of significance of differences in the gender gap coefficients, therefore, do not indicate a significant glass ceiling effect.

11. None of the relevant contrasts across coefficients is statistically significant using multinomial logistic regression tests in Table 6.

12. Yamagata et al. (1997) found that from 1977 to 1989, for federal employees in a selected set of professional, technical, and managerial occupations, the probabilities of women in federal employment reaching the highest grade level were roughly the same as those of a man if one included career trajectories that crossed occupational boundaries as well as those contained within occupational boundaries.

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