Working for Female Managers:

Gender Hierarchy in the Workplace

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(Preliminary, Comments are Welcome.)

Abstract

We study workers' reactions to changes in the gender composition of top management during a merger or acquisition, finding that an increase in the number of female top managers within their occupation makes male workers more likely to quit, and female workers less likely to quit. These effects vary across occupations, depending on the female share, and male workers' aversion to female managers is strongest when the female share nears fifty percent. The effects also vary over time and with age, becoming smaller in more recent years and among younger males, but increase with education level. We find little evidence that these preferences are driven by pecuniary effects.

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1. Introduction

Though women have made striking advances in higher education, labor market participation, and wages in recent decades, they remain severely underrepresented in top positions in corporations, governments, and academia.[1] For example, women held only 15.2% of all Fortune 500 board director positions in 2008, and 16.3% of seats in the US Congress in 2007. Moreover, the growth of these numbers has slowed dramatically in the last several years,[2] raising questions about both social equity and economic efficiency.[3]

One response has been growing political and social pressure to promote gender parity at top positions through diversity programs such as affirmative action and quotas at the workplace as well as in other spheres of society (see, e.g., Kelly and Dobbin 1998). Norwegian legislation, for example, has since 2008 required a minimum of 40% of each gender in all listed companies. At least 22 countries have passed similar laws in the last decade[4], and many corporations and non-profit organizations are explicitly pursuing gender diversity in top management. It remains unclear, however, whether these policies will break the glass ceiling and advance the careers of other women. As we will discuss in the next section, not only theory and public opinion, but also empirical work, yield conflicting results, and few studies have addressed how these policies affect male workers[5].

The present study examines a large and detailed body of Swedish data to ask how changes in the gender composition of a firm's management affect the well-being of the firm's male and female workers. Specifically, we infer male and female workers' preferences for an increase in the proportion of female managers. These preferences are revealed by workers' decisions to quit, or to remain, after a merger or acquisition (M&A) that changes the gender composition of the firm's management.

M&As constitute a natural experiment suited to this application since, though they

[1] See, for example, Connolly and Long (2007) and Costa (2000).
[2] Catalysis Survey (2009), "Women in U.S. Management", available from www.catalyst.org/file/192/qt_women_in_us_management.pdf . See also England (2006).
[3] Findings on the effectiveness of gender quotas at top positions are inconclusive. For example, Adams and Ferreira (2009) show that gender diversity does not necessarily increase the performance of the board of directors, but increases monitoring of the management team. See also Dahlerup and Freidenvall (forthcoming), Squires (2004), and Adams and Ferreira (2008) on board-room monitoring and performance.
[4] For the latest information, check http://www.quotaproject.org.
[5] See Guiliano et al (2006) , where white workers quit when getting non-white managers. See Dee for classroom applications and where teachers of the same gender, race-ethnicity have a positive influence on students of low socioeconomic standing, but undesirable and unintended consequences for the opposite group.

can generate significant changes in the number of women in top positions, firms' decisions to acquire or merge with others are typically *not* driven by gender aspects. In the absence of compounding gender factors that could generate a spurious relationship, we can establish a possible causal link between the changes in the gender composition of management and the subsequent response of other female or male workers. Moreover, our sample covers 443 acquisitions cases and 186,679 workers, in more than 50 occupation groups (e.g. marketing, production, research, financial service, etc.), over 20 years. This breadth allows us to study heterogeneity across occupations, worker ages, time periods, and education, and perhaps to shed light on the mixed results of the previous studies.

We find that when the number of top female managers within the same occupation increases, women become, on average, *less* likely to quit (same-gender attraction). But a much larger effect is that men become *more* likely to quit (opposite-gender aversion).[6] These results are important for both political and managerial gender-policies, since it suggest that, though gender quotas and other diversity programs may indeed help other female workers' careers, they do so at the cost of negatively affecting male workers' careers, and this latter cost may outweigh the benefits to such an extent that quota policies leave all workers, both male and female, worse off.

More important than the broad gender-preference differential between men and women, we find large heterogeneity across occupations, especially due to the difference in average share of female workers. In male-dominant occupations where the average female share is less than 10%, the increase in the number of female top managers *reduces* the male workers' turnover rates. However, in occupations where female share is in between 10% and 50%, an additional female manager increases male workers' turnover rates significantly. In other words, males seem to welcome additional female managers in occupations where women are a weak minority group, but to resist them when women are a strong minority. Interestingly, in female-dominated occupations where the average female share is above 50%, an additional female top manager has little effect on male turnover rates. We find similar patterns of non-monotonicity in the response of female workers to male top managers, but the

[6] The finding of same-gender attraction among women is in accordance with Kanter's predictions and Hultin and Szulkin's empirical findings that more female managers mean a smaller gender wage-gap. But the much greater degree of opposite-gender aversion among men is more in line with the results of, e.g., Tolbert et al. (1995); Almendier and Hackman (1995), who find that proportional population growth can negatively impact the well-being of minority members.

effects on female workers' turnover rates are much smaller.[7]

This result from heterogeneity across occupations is important for several reasons. First, it explains why the female share at top positions grew fast initially, but has slowed significantly in recent years.[8] Initially, when women are a weak minority, male workers do not resist top female managers. As the female share increases, male resistance to additional top female managers increases, slowing the growth of the female share at top positions. Second, even though female workers show similar opposite-gender aversion to male top managers, it is much smaller and often insignificant compared male workers' opposite-gender aversion. This asymmetry suggests that gender policies differ from the generalized model of majority/minority relationships, and require gender-specific consideration. Third, this heterogeneity may explain why previous studies have found mixed evidence, as they have typically focused on a single occupation or a single firm.

Aside from the male/female differential in gender-preference and the variation among occupations with differing gender composition, another salient parameter of heterogeneity among worker's preferences is revealed by analyzing the effects of age and time on the decisions of male workers. If male workers' resistance to female managers is driven by traditional social values and customs (rather than by negative effects on their wages or advancement), it should be less pronounced among younger male workers and those working in more recent years, and our results are consistent with this conventional wisdom. We find that, compared with old or young male workers in 1970s, young male workers in 1980s show, on average, no resistance to female managers.

On the other hand, despite a view that college-educated workers are more liberal and less prone to gender discrimination, we find that male workers' resistance to female top managers is the strongest among the college-educated male workers. Interestingly, male workers' attraction to male top managers is constant regardless of education level.

In predicting the future of gender equity, these patterns of heterogeneity suggest two opposing forces in work simultaneously. On one hand, male workers' resistance to top female managers is fading over time, especially among young male workers, which would promote

[7] Allmendinger and Hackman (1995) find a similar non-monotonicity (called a *threshold effect*) between female share and group attitudes, and satisfaction and performance, as do Tolbert et al. (1995) with respect to turnover. However, neither work controls for the endogeneity of female share or distinguishes male and female responses. In contrast, Bagues and Esteve-Volart (2007) finds no significant effect of female share.

[8] Catalyst 2007 Census of Women Corporate Officers and Top Earners of the Fortune 500, available from (as of 05-07-2009)
http://www.catalyst.org/publication/13/2007-catalyst-census-of-women-corporate-officers-and-top-earners-of-the-fortune-500.

gender parity at top positions in the future. On the other hand, male workers' attraction to male top managers hasn't changed over time or varied with their age or education level. Moreover, male workers' resistance to top female managers become strongest precisely when the female share approaches 50%, and gender equality is achieved. Also, highly educated male workers show stronger resistance to top female managers than other males. These results suggest that initial achievement of gender parity in the last few decades and growing level of education in the workforce do not necessarily guarantee the same speed of improvement in gender parity in the workplace, especially at top managerial positions.

Finally, we find little evidence that an increase in the number of female managers negatively affects male workers' promotions and wage growth rates, at least in the short term. These results, taken together, suggest that male workers' resistance to female managers is driven by social customs or preferences, rather than by short-term pecuniary benefits from gender discrimination.

The rest of the paper is organized as follows: Section 2 provides a quick survey of related literature in economics and sociology. Section 3 describes our data and the construction of key variables, and section 4 infers workers' gender preferences by analyzing how changes in gender proportion among management affect male or female workers' turnover rates. Sections 5, 6, and 7 investigate changes in workers' preferences over time, and across occupations and education levels, respectively. Section 8 analyzes whether the changes in the number of male or female managers have direct pecuniary effect on male or female workers' promotions and wage growth rates. We conclude in section 9.

2. Related Literature

The recent trend toward gender quotas at top ranks is, at least partly, based on the idea that more female managers lead to increased welfare for all female workers, but the explanations of how such diversity programs could break the glass ceiling are diverse, and the predictions ambiguous. They tend to follow Baron and Pfeffer's (1971) claim that quantitatively or qualitatively dominant social and demographic groups will seek to distinguish themselves by creating complex status-systems commanding higher rewards. Hultin and Szulking (2009), for example, find that an increase in female managers reduces the gender wage-gap and conclude that

" [it is] reasonable to assume that female managers in general are less motivated than their

male counterparts to initiate and sustain institutionalized discriminatory practices against women." (p.457)

Reskin and McBrier (1999) show that more formalized recruitment processes lead to more women being hired to managerial positions, while recruitment through informal networks favors men, indicating discrimination in the latter. These studies and several others (Byrne 1971, Brewer and Kramer 1985, Boldy, Wood, and Kashy 2001) emphasize *same-gender attraction,* predicting in particular that women will prefer to work for firms with more female executives. This idea is contested, though, by theories suggesting that female managers are less favorable to female workers because female managers may want to enhance their careers in male dominant occupations or because they want to enhance their social status among females[9]. (Bagues and Esteve-Volart 2007 and Broder 1993).

Whether explicitly or not, such theories and predictions necessarily and crucially address the question of how the growth of a minority affects the welfare of its members in a situation of demographic competition. Many hold that demographic growth is always good for the members of a minority, but many suggest that a growing minority will tend to incur more discrimination from a majority that perceives itself as threatened. Among those suggesting that visibility tends to incur discrimination, there is disagreement about whether growth makes a minority more visible or less visible in comparison to the dominant group. Work on gender demographics in the workplace, including same-gender attraction and opposite-gender aversion (of both men and women) is thus linked to the contested dynamics of the welfare of a growing minority.

Kanter's (1977) celebrated study, *Men and Women in Corporations,* is an ethnographic analysis of work groups in a large corporation and makes an unequivocal case for the benefits of growth to a minority. It develops a *social contact* theory suggesting that networks are necessary to increase individual welfare, and that greater numbers would increase the female minority's ability to establish such networks. Kanter identifies a number of discriminatory social processes and behaviors as characteristic of dominant groups, and proposes that interactions between members of different social groups help undermine the stereotypes that support these processes. (See also Cook 1979, Pettigrew 1986, and Tolbert et. al. 1995 for more discussion.)

[9] Such effects are also called as "queen bee syndrome" in social psychology.

These results, though, are contradicted by others, including a study finding a decrease in the welfare of all members of a symphony orchestra when the female minority grew from 10% to 30% (Allmendier and Hackman 1995), and reduced support for females by males when the proportion of women in a state agency department increased (South et al. 1987). Other studies have shown growth of a minority to exacerbate disparities in income (see, e.g., Frisbie and Neidert 1976, Martin and Harkreader 1993, Wharton and Baron 1987, Tsui et al. 1992). These empirical results are in line with theories that suggest, contrary to Kanter, that an increase in the proportional size of a minority tends to increase the level of intergroup hostility and conflict.

Blalock (1967), for example, posited a curvilinear relationship between minority group size and negative social outcomes based on such an assumption (see also Blalock 1957, Bonachich 1972). Such a relationship implies that, once a minority group expands to some threshold level, the negative consequences of increases in proportions should be reversed. That is, minority status is most disadvantageous when the population is at its most "visible": big enough to be perceived as a threat, but small enough to remain a pronounced minority. A longitudinal study by Pfeffer and Davis-Blake (1987) examined the impact of changes in gender compositor on the salaries of administrators at more than 800 colleges and universities and found a monotonic decline in the salaries of both male and female administrators as the proportion of women increased from token levels to the 30-40% range. Beyond that tipping point, however, further increases in the proportion of women made little or no difference in salaries.

Empirical evidence based on representative data is essential to understanding the welfare effects of a growing minority of women, and this understanding is indispensable for policy decisions. However, the existing evidence is typically limited to small sample or case studies, and the evidence remains mixed. These samples and cases have included a call center (Levin), recruiting at an American university (Graves and Powell 1996), reviewing of NSF proposals (Broder 1993), and judiciary examination committees in Spain (Bagues and Esteve-Volart 2007). This last is an exception[10], but many of the previous studies suffer from potential endogeneity problems, as the gender composition of evaluators is not necessarily exogenous. Moreover, all these cases focus on the reviewers' behavior in a simple evaluation setting, and none analyzes the careers of workers in large and complex corporations, where

[10] In Bagues and Esteve-Volart (2007), the committee members are randomly assigned. Thus, the gender composition is also random.

the preferences driving behavior may be more complex. For example, a female manager may provide more challenging tasks to female workers, but also provide a more supportive relationship, enhancing their careers (see Dansereau et al. 1975). Larger-scale work is needed in order to understand the effects of workplace demographics on female workers' welfare.

3. Data and Measurement

3.1 Data

Our analysis is based on employer–employee matched data covering almost the entire population of white-collar workers in the private sector of Sweden from 1970 to 1990, excluding financial sectors and CEOs. These data were collected to facilitate centralized wage negotiations between the Swedish Employers' Confederation (SAF) and PTK, the main cartel for the private-sector white-collar union; these negotiations determined most workers' wages from 1966 through the system's dissolution in the late 1980's, after which wages were determined by industry- and plant-level bargaining (Calmfors and Forslund 1990), while local plant unions continued to represent workers. Employers decided autonomously about hiring and promotion, but firing workers is strictly regulated by law, and monitored by the labor union.[11] These data were gathered and monitored jointly by both the SAF and the PTK (the two opponents in the negotiations), yielding occupation classifications of high quality with minimal potential for error. For each worker, the data contain annual information on wage, age, education, gender, geographic region, work-time status, firm ID, plant ID, industry ID, occupation code, and rank. Because all the IDs are unique, we can track each individual worker within and across firms and occupations throughout his or her career.

The unique feature of this Swedish data is the four-digit BNT code, where the first three digits (occupation code) describe types of tasks and the fourth (rank code) describes the degree of skill[12] needed to fulfill the tasks. The data cover 51 three-digit occupation-groups such as construction, personnel work, and marketing (for more details, see appendices A and B), and each job within an occupation is ranked from 1 (lowest) to 7 (highest).[13] Crucially, these ranks are designed to be comparable across occupations and firms, allowing us to

[11] For more details on the data and institution, see Kwon and Meyersson Milgrom (2006).
[12] Rank reflects the number of subordinate employees and type of skill needed for decisions at that level.
[13] Not all occupations span the entire 7 ranks: some start higher and some lack not have the top ranks. For more details, see appendix B.

analyze workers' promotion patterns even when they change firms.

One of the goals of the Swedish negotiations was to pay the same wages for the same tasks, resulting in wage compression within each occupation. In practice, however, significant wage variations exist within occupations. For example, the highest-paid workers in a given rank often received larger wages than the lowest-paid workers in the rank above, and the wage variation increases with rank. Such patterns are consistent with those observed in US firms (see Baker et al. 1994).

3.2 The Gender Gap

The gender wage-gap in Sweden, as in many other countries, is small once we control for workers' occupation and rank. But female workers tend to start their careers at lower ranks and get promoted more slowly than male workers, so the female share at the top ranks is very small.[14]

Figure 1 shows that women represent about 30% of white-collar workers, and that their share has been slowly increasing.

[Figure 1 here]

However, Figure 2 shows that women are severely under-represented at higher ranks. The female share averages only 1.15% at the highest rank (rank 7), compared to 78% at the lowest (rank 1).

[Figure 2 here]

Furthermore, Figure 3 shows that women's shares at higher ranks have not increased significantly during the period 1970-1990.

[Figure 3 here]

3.3 Acquisitions

From among the broad data, we focus on firms involved in mergers and acquisitions, using

[14] See Meyersson Milgrom and Petersen (2006) for more details.

M&As as an exogenous shock to the gender composition in top managerial ranks. Since the data do not include firms' financial information, we identify mergers and acquisitions based on the changes in workers' firm IDs. If more than 50% of workers change firm ID[15] from A to B and the old firm ID, A, disappears from the data, then we say "B has acquired A". There are only a few clearly identifiable merger cases where more than 50% of workers from two firms A and B move to a new firm C, while A and B disappear. Therefore, we omit these few cases, but continue to refer to 'mergers and acquisitions', or M&As, because legally some of these acquisitions can represent mergers.[16] We also restrict our attention to firms with more than ten white-collar workers[17].

This sample contains 443 acquisitions cases and 186,679 workers. Table 1 shows the summary statistics of selected variables. Firm size is measured by the number of white-collar workers[18], and shows that acquiring firms are, on average, much larger than acquired firms. The average ratio of acquired to acquirer firm size is 0.61, but there are large variations. The average wage of the acquiring firms (monthly total compensation in 1970 Kroner) is slightly larger than that of acquired firm, but the difference can be mostly explained by the acquiring firms having more high-ranking positions.

[Table 1 here]

Status measures the relative ranking of each worker's wage within his or her firm, where 0 is the lowest and 1 is the highest. Note that the average status of women is very similar between acquiring and acquired firms, as are most other characteristics of female workers, including rank, age, and ratio of part-time workers. This is important to note because our analyses assume that acquisition decisions are independent of both firms' gender aspects, such as female share and status.

Table 2 shows that after controlling for firm size, primary industry, and primary occupation of each firm[19], the correlations between acquiring and acquired firms in gender share and status are quite small. For example, the correlation in overall female share is 20%,

[15] Even when we require more than 90% of workers to change firm ID, there is very little change in our results.
[16] Some firms are involved in more than one M&A during our sample period. Excluding M&As where the same firm is involved in more than one M&A within 6 years does not change our qualitative results.
[17] Focusing on firms with more than 100 white-collar workers does not change the qualitative results of the paper.
[18] Alternatively, we can measure firm size by the total wage payments, but none of our results change.
[19] We first regress female share on firm size, primary industry and occupation, then measure the correlation of residuals between acquiring and acquired firms.

while the correlation in average female status (i.e., relative ranking of wages) is only 5.8%. The correlation in female share at top ranks is relatively large, mostly because the share is zero for most firms.

[Table 2 here]

Overall, female share and women's relative ranks seem not to affect acquiring firms' choices. Moreover, our main analyses control for the gender compositions within each firm and each occupation. Finally, gender composition of management should not influence M&A decisions, since it seems unlikely that a firm would undergo a merger in order to adjust the number of women at top positions, when it could simply hire new female managers.

Though compounding gender effects are less problematic for M&As, M&As are quite heterogeneous. Firms may acquire very similar firms in another geographic market, acquire their competitors in the same market, or acquire very different firms for complementarity or for business line expansions. In order to control for different types of acquisitions, we construct and control for distance measures between two merging firms (see appendix C for more details in the construction of distance measures and the classification of M&As). Alternatively, we also control for M&A fixed effects.

3.4 Gender Composition at Top Managerial Positions

In order to analyze the effects of changes in the proportion of women at top managerial positions,[20] we distinguish two groups of top managers. The first, *top managers within occupation,* includes those at the highest rank, within their occupation, represented at either of the original firms.[21] For example, if firms A and B are merging and the highest ranks in their marketing departments are 4 and 6 respectively, then the top managers within occupation for marketing workers at both firms are those at rank 6. Our M&A sample include 2,352 female and 9,802 male top managers within occupation.

The second group, *top managers within firm,* is those at the highest rank represented in either of the two merging firms, regardless of occupation. Our sample, however, contains

[20] Alternatively, we analyzed the effect of the changes in the *share* of female top managers. However, because both the number of female top managers and the total number of top managers are small, the changes in the share of female top managers are too noisy. Still, the qualitative results do not change.

[21] Alternatively, we could define the top managerial position as ranks 6 and 7. However, not all firms have rank 6 or 7 in each occupation, let alone female managers at ranks 6 and 7.

only 14 female top managers within firm, compared to 2,672 male ones. The number of female top managers within firm thus changes little, even in M&As. Moreover, CEOs and boards of directors are missing from our data. We therefore control for the number of female top managers within firm, but focus on changes in the number of female top managers *within occupation*.

This paper focuses on how these changes affect female and male workers' turnover rates after an acquisition. But for those who quit during an acquisition, those most sensitive to the changes, we do not observe their top managers after the acquisition. Moreover, actual changes in the number of top managers can be correlated with other unexpected structural changes during an acquisition.

Therefore, we use *expected* (or predicted) changes, rather than actual changes, in the number of male or female top managers. More specifically, we combine the two firms' data right *before* an acquisition and treat them as a single firm. In this way we can measure the expected number of female (and male) top managers for each worker, both within occupation and within firm. The difference between this number and the actual pre-merger number of female top managers yields the expected change in the number of top female managers (and similarly for males).[22]

[Table 3 here]

Table 3 shows an example of the computation of expected post-merger measures. In this example, the top rank between the two firms is rank 5. Before the acquisition, the acquiring firm has one woman at the top rank, but the acquired firm has none. If we merge the data between the two firms, then workers in the acquired firm also have one female at the top rank (worker 3), so the expected change in the number of female top managers within firm is one for both workers 4 and 5. Other within-firm measures are computed in a similar way, as are within-occupation measures.

Table 4 shows the summary statistics for the expected changes in the number and the share of female top managers, within occupation and within firm, for both male and female workers.

[Table 4 here]

[22] For more details on these measures, see Kwon and Meyersson Milgrom (2007).

The average male worker has only 0.07 female top managers within his occupation, while the average female worker has 2.9 female top managers within hers. These results arise from gender segregation in occupations. That is, female workers are concentrated in a few occupations that also have female top managers. More importantly, however, the standard deviations for the number of female top managers within occupation, and for its expected changes, are relatively large. These variations are essential for the identification of our parameters.[23]

3.5 Turnovers

We infer workers' preferences from how the changes in the number of female top managers affect their turnover decisions, allowing us to study workers' behavior without relying on potentially problematic survey responses.[24] Also, unlike other decisions, such as consumption, the turnover decision does not rely upon an assumption on how the changes in gender hierarchy affect *marginal* utility of workers (see, e.g., Becker et al. 2005). Though workers can be fired during acquisitions, and it is difficult to distinguish empirically between voluntary and involuntary turnovers, it is generally difficult for Swedish firms to fire workers without consent from labor union. Thus, we expect the number of involuntary turnovers to be small. Moreover, we can identify involuntary turnovers in several ways as discussed later.

The average turnover rate is 12.4% for acquiring firms and 15.4% for acquired firms, while the average turnover rate for all firms in our data (including those not involved in acquisitions) is 14%. In other words, acquiring firms have lower turnover rates than the average firm, but acquired firms have higher rates, suggesting that workers in acquired firms may get systematically fired during acquisitions. Table 5 confirms this pattern using turnover regressions run on a 20% random sample of the complete data.

[Table 5 here]

Table 5 also shows that there is no systematic difference in turnover patterns between male and female workers. Columns [1] and [2] show that female workers are slightly less

[23] Because many of the expected changes in the number of female top managers are either zero or one, we have also used a dummy variable for whether the expected changes are positive or not. The qualitative results do not change.

[24] See, e.g., Bertrand and Mullainathan (2001) for potential problems of using survey responses.

likely to quit than male, but in columns [3] – [6], there exists no significant difference between the coefficients for male and female workers, with the sole exception that part-time female workers are less likely to quit than part-time male workers. These results suggest, importantly, that the gender difference in turnover responses to the female top managers (which will be analyzed in the next sections) is not driven by an underlying gender difference in turnover behavior.

For those who change firms, we also check how their wages have changed. We expect workers who have been fired to have lower wages in another firm than those who quit voluntarily. In Table 6, for only those who change firms, we regress the change in real wages on various individual and firm characteristics.

[Table 6 here]

As suspected, turnovers from acquired firms have much lower than average wage increase, while those from acquiring firms have approximately average wage increase. Therefore, while most quits from acquiring firms are voluntary, many quits from acquired firms appear to be involuntary.

4. Gender Hierarchy and Turnovers

We first infer male and female workers' gender preferences by analyzing how expected changes in the gender composition at top ranks affect other workers' decisions to stay or quit after M&As.

Table 7 estimates the effect of these expected changes on workers' turnover decisions within three years after acquisitions, controlling for various individual and firm characteristics just before the acquisition, including pre-merger number of male/female top managers both within firm and within occupation, "acquired" dummy, age, age squared, part-time dummy, firm size, firm size squared, real wage, firm size change, occupation size change, ratio of workers who change regional code during the acquisition, female share within firm and within occupation, and changes in female shares. We also control for dummy variables for rank (6), education (3), occupation (68), industry (34), county (25), and year

(19), where the numbers in the parentheses show the number of dummy variables in each category.[25]

[Table 7 here]

4.1 Same-Gender Attraction

If female top managers increase female workers' well-being, for example by favoring them or providing role models, the expected increase in the number of female top managers should reduce female workers' turnover rates. Column [6] in Table 7 shows that an additional female top manager within occupation reduces female workers' turnover rates by 0.5 percentage point. Likewise, from column [5], an additional male top manager within occupation reduces male workers' turnover rates by 0.5 percentage point. That is, both male and female workers exhibit the same degree of same-gender attraction for top managers within occupation.

Note that these results differ from those of some recent studies. For example, Broder (1993) and Bagues and Esteve-Volart (2007) find that female evaluators are relatively more favorable to men than to women, which would have led to same-gender aversion, and increased turnover rates, among female workers. These previous studies, however, are based on a simple evaluation setting in a single occupation, while our study is based on more representative data in large corporations. Also, even if female managers favor male workers, they can still provide a role model and motivation for female workers, resulting in a positive net effect on female workers' utility.

Within firm, expected increases in the number of male or female top managers within firm increase, respectively, both male and female workers' turnover rates. Both men and women seem to exhibit same-gender aversion. However, since these results are based on a sample including only 14 female top managers within firm, they are likely to be picking up the M&A-specific effects of those few mergers. Moreover, the effects on male and female workers are statistically the same, and the difference-in-difference (between male and female and between before and after M&A) analysis below shows that the expected increase in number of male or female managers *within firm* has no differential effect on workers'

[25] Those workers at the top ranks within firm or within occupation are excluded from the analyses. However, including them does not change the qualitative results.

turnover rates. Our analysis thus focuses primarily on expected changes in the number of male and female top managers *within occupation*.

4.2 Opposite-Gender Aversion

An expected increase in the number of female managers has the largest effect on male workers. Columns [5] and [6] in Table 7 show, that an additional female managers increases their turnover rates by 2.5 percentage points, or 8.5% of the average three-year turnover rate, suggesting that more female top managers within an occupation have a significant negative effect on male workers' utility.

By comparison, the opposite-gender aversion of female workers is relatively small: a statistically insignificant 0.3% increase in female workers' turnover rates for each additional male top manager within their occupation (from column [6] in Table 7). This may be because female workers take male management for granted as a social norm, and we show later that in female-dominated occupations, female workers respond more negatively to increases in the number of male top managers. Another explanation is that female workers may also have fewer job alternatives, and thus remain in the firm even when their utility is lowered. For example, Tables 5 and 6 in the previous section show that female workers have lower wage-growth from turnovers and lower turnover rates than males.

Though the preferences of both male and female workers for top managers display same-gender attraction and opposite-gender aversion, opposite-gender aversion among males is by far the significant. Gender quotas are typically aimed at improving the lot of female workers, and their effects on male workers are not explicitly considered. However, our results suggest that an additional top female manager would have relatively small effect on female workers' utility, but significant negative effects on male workers' utility. If the costs of all these effects are not weighed in the gender-policy decision process, and firms lose key male personnel without substantially benefiting other female workers, everyone may lose out.

Male and female workers' heterogeneous preferences across occupations add much to the story of the preferences and mechanism behind these turnover patterns, but before moving on we check the robustness of these findings.

4.3 Robustness

- *Voluntary Turnovers*

Our inferences of workers' preferences are based on the assumption that turnovers are voluntary. Though firing is relatively rare in Sweden, some workers are likely to get terminated involuntarily during M&As, especially from the acquired firms. These structural changes should affect both male and female workers, and thus not drive the observed differences in their responses. Still, we institute three checks of robustness designed to focus on voluntary turnovers only.

First, as discussed in the previous section, turnovers from acquiring firms are likely to be voluntary. Thus we repeat our analyses on the workers in acquiring firms only, and columns [1] and [2] in Table 8 show that the qualitative results do not change, and that the observed effect becomes even stronger. For example, an additional female top manager within occupation increases male workers' turnover rates by 5.5 percent while reducing female workers' turnover rates by 0.8 percent point.

[Table 8 here]

Second, a decrease in a worker's real wage after a turnover indicates that it was likely involuntary, as does a worker's temporary or permanent disappearance from the data.[26] Columns [3] and [4] in Table 8 focus only on the turnovers with real wage increase, but the qualitative results do not change.

Third, even an increase in real wage, if the increase is not as large as that of the workers who remain in the firm, can indicate an involuntary turnover. Columns [5] and [6] in Table 8 focus on the turnovers with real wage growth larger than the average rate in the previous firm. Again, the qualitative results do not change.

Though it is generally difficult to distinguish between voluntary and involuntary turnovers, they seem not to drive the gender differences we observe.

- *Types of M&A*

We focus on M&As because they are not driven by gender considerations. But they are heterogeneous in various dimensions. In Table 9 we control for different types of M&As, according to the classification in Table 1A in appendix C.

[26] Some workers may have moved to the public sector or the blue-collar sector. However, the number of these cases is small, and the results do not change even if we count them as voluntary turnovers.

[Table 9 here]

Columns [1] and [2] in Table 9 show the effects that different types of M&A have on workers' turnover rates. For example, the 'growth' type increases workers' turnover rates, but a 'horizontal merger' decreases them.[27] However, the effects of the expected changes in the number of male and female top managers within occupation do not change. Columns [3] and [4] control for all eight distance-measures between acquiring and acquired firms (see Figure 1A in appendix C). Finally, columns [5] and [6] control for M&A fixed-effects using a linear probability model. In all cases, the qualitative effects of the expected changes in the number of top male and female managers within occupation remain robust, for the turnover rates of both male and female workers.

- *Difference-in-Difference*

Estimating the model separately for male and female workers highlights the differences in their revealed preferences. Rigorously speaking, though, the coefficients for male and female workers cannot be directly compared, since our estimates of the marginal effect (dP/dx) are evaluated at different points for the two. Moreover, M&A-specific shocks may bias the coefficients of both. Thus, in Table 10, we estimate an explicit difference-in-difference model, controlling for the interaction terms between the changes in the number of male/female top managers and a female dummy variable.[28]

[Table 10 here]

Column [1] of Table 10 shows, as expected, that, female workers are less likely than male workers to quit when the expected number of female top managers within occupation increases, but more likely than male workers to quit when the expected number of male top managers within occupation increases. Columns [2] – [4] control for the interactions of M&A types with a female dummy variable. Column [4] controls for M&A fixed-effects using a linear probability model.

[27] This difference is not the primary focus of this paper, and will be analyzed in greater detail in a separate paper.
[28] We also control for the interactions between the female dummy and all the pre-merger measures, including numbers of male and female top managers, firm size, etc.

With each of these controls, the results for male and female workers' preferences for changes within occupation remain robust. Note also that changes in the number of male or female top managers within firm have no statistically significant effect.

4.4 Discussion

Both men and women seem to exhibit same-gender attraction and opposite-gender aversion, but to very different degrees. Women show a slight attraction to female managers and a nearly insignificant opposition to male managers. Men, however, show a significant attraction to male managers, and strongest of all the effects is men's resistance to female managers.

From the theoretical perspective, the motives behind workers' preferences can be either pecuniary (the expectation of slower wage growth and promotions) or non-pecuniary (driven only by gender preference). Various mechanisms could drive these motives. For example, similarity attraction (Byne 1971) may lead male workers to expect that male managers will favor them in wage negotiations and promotion decisions (Becker 1957), as well as mentorship and access to professional networks (Athey et al. 2000). Or traditional stereotypes may lead male workers to believe that the feminization of management will have a negative economic or social impact on the firm and thus their jobs (Goldin 2006, Ridgeway 2006). Conversely, female managers may benefit women, even without favoring them, by providing role models and correcting negative traditional stereotypes (Jackson 2006).

From the policy perspective, our findings suggest that gender-quota policies may sometimes have the opposite of their desired effect, reducing rather than increasing the well-being of workers in the female minority. Though increasing the proportion of female managers does fulfill women's same-gender attraction, it has a much larger effect in exciting men's opposite-gender aversion, potentially inciting male workers to behavior that ultimately causes everyone to lose out. Male quits can begin a vicious circle reducing wages for all workers in an occupation with a growing female share, and thus exacerbating gender inequality (see, e.g., Rezskin 1988). And though gender presents a special case, the growth of a quantitatively weak female majority into a larger, more visible one can provoke discriminatory action on the part of the majority, reducing the well-being of members of the minority (see, e.g., Blalock 1967). All this recommends caution in the use of gender-quotas to improve the lot of female minorities in the workplace, since an increase in the proportion of a minority can potentially exacerbate discrimination against its members without proportionally (or even significantly increasing) their ability to benefit one another.

5. Changes over Time

The past half-century has witnessed a dramatic reduction in gender inequality in economic, political, and cultural dimensions, and these changes interact with individuals' preferences and belief systems.

We conjecture that male aversion to female managers is largely driven by non-pecuniary factors: the historical gender bias of conservative culture and policy over time. We should then see an *age effect*[29] where, at a given time, older male workers should be more resistant to female managers. We also expect a *time effect*[30], since social changes in policy and culture are likely to reduce individual male workers' resistance to female top managers over time, no matter the men's age.

It is more difficult to predict age and time effects for female workers. If gender equality implies gender neutrality, then younger female workers would show less same-gender attraction, as would women in more recent years. But if taken to imply the increased status of women, younger women and those in more recent years would show more same-gender attraction.

5.1 Age Effect

We test these conjectures in Table 11, estimating workers' turnover behavior separately for workers under forty and those forty or older.[31]

[Table 11 here]

An expected increase in the number of female top managers within occupation significantly increases older male workers' turnover rates (0.034), but its effect on younger male workers' turnover rates is statistically insignificant (0.016). Older male workers show some resistance to female managers. Younger ones seem not to mind them, within either firm or occupation. Men's same-gender attraction, the economic significance of which is very small, seems not to change with age.

[29] To be precise, the age effect reflects both (birth year) cohort effect and lifecycle (or aging) effect.
[30] The time effect reflects both year effect and (birth year) cohort effect. As well known, one cannot separately identify cohort effect, lifecycle effect, and year effect. (see, e.g., Kwon, Meyersson Milgrom, and Hwang 2009.)
[31] The qualitative results do not change even when the cut-off age is 35 or 45.

Interestingly, older female workers' behavior shows greater same-gender attraction than that of younger female workers, and the latter also show no opposite-gender aversion. This suggests that the younger generation of female workers is not more pro-female, but rather more gender-neutral, than the older generation.

5.2 Time Effect

To infer the extent of time effect, in Table 12, we estimate the model separately for male and female workers, both older and younger, in both the 1970s and the 1980s.

[Table 12 here]

In the 1970s, male workers in both age groups become more likely to quit when the expected number of female managers within occupation increases (columns [1] and [2] in Table 12(a)). Both groups also show approximately the same degree of same-gender attraction. Female workers from the 1970s show little preference for top managers of either gender (columns [3] and [4] in Table 12(a)).

These workers' preferences seem consistent with individual belief systems formed by the male-dominated economic and cultural system of the era in which they were raised, preceding the civil rights movement of the 1960s. In the 1970s male workers of all ages seem equally resistant to female top managers, and equally favorable male top managers. Women are, perhaps, ambivalent; similarity attraction for female top managers may have cancelled out the acculturated belief favoring male top managers.

The results from the 1980s bespeak a change. An increase in the expected number of female managers within occupation still has a significant positive effect on older male workers' turnover rates. However, its effect on young male workers' turnover rates is insignificant (columns [1] and [2] in Table 12(b)). Also, an expected increase in the number of female managers significantly reduces female workers' turnover rates, especially for older female workers (columns [3] and [4]).

Though younger male workers in the 1980s seem more accepting of female management than those in the 1980s, they still favor more male top managers, and are thus still not gender-neutral. Older male workers, meanwhile, have become even less accepting of female managers than their 1970s counterparts, suggesting an interaction between age and time effects. Female workers of both age groups favor female managers more strongly in the

1980s than they did in the 1970s, reflecting the general pro-female time effects that are a broad pattern among all workers. The effect is weaker, however, for younger female workers, who also demonstrate no response to an increased number of male top managers. It appears that young female workers in 1980s, as discussed above, have become gender-neutral rather than pro-female.

6. Heterogeneity across Occupations

Occupations are very heterogeneous in gender composition. In production management (BNT codes 100, 110, 120, 140, and 160), for example, the average share of female workers is less than 3%. However, in personnel work (BNT codes 600, 620, and 640) and office services (BNT codes 970 and 985), the average share of female workers is larger than 60% (see appendix B for more details). This section looks for how the average share of female workers within an occupation affects workers' responses to an additional male or female top managers within that occupation.

Male workers in male-dominated occupations, for example, may be particularly resistant to female top managers because of negative traditional stereotypes about female leadership. Alternatively, though, these male workers may favor a female top manager as a *token* or a symbol of their social responsibility for gender equality or diversity (Kanter 1977). Or they may prefer gender *diversity* at top managerial positions because it improves team performance (e.g. Carter et al. 2003, Adams and Ferreira 2009), or because they simply prefer diversity. In general, in a social system expected to favor the gender *majority*, male workers' should welcome an additional female manager when the female minority share is small, but resist more when it is larger, and show the greatest opposite-gender aversion when male and female shares are equal (Blalock 1967).

Figure 4 illustrates the predictions of each of these various theories of male workers' responses to an additional female top manager.

[Figure 4 here]

In order to compare these predictions with the evidence, we first classify occupations into three groups: (i) those where the share of female workers is less than 10%, (ii) those where the share of female workers is between 10% and 50%, and (iii) those where the share of female workers is larger than 50%. Women represent a weak minority in the first, a strong

minority in the second, and a majority in the third. We estimate the model separately for each group.

[Table 13 here]

Male workers in general show aversion to an additional female top manager within occupation. But dividing occupations by female share reveals a more complex picture. In occupations where women are a weak minority, male workers seem to welcome female management. Consistent with Kanter's notion of tokenism, an additional female top manager reduces their turnover rate (Column [1] in Table 13). But, consistent with the majority mechanism, the greatest resistance to female top managers is from male workers in occupations where women are a strong minority (Column [1], [3], and [5] in Table 13).

Instead of dividing the sample arbitrarily and running separate regressions, in column [7], we estimate the model including the interactions with female share and female share squared using the full M&A sample. Using these estimates, Figure 5 illustrates the male workers' response to an expected increase in the number of female top managers within occupation. Note that the positive (negative) effect on turnover rates implies the aversion (attraction).

[Figure 5 here]

Figure 5 confirms the results of Figure 4, supporting the theories of tokenism and majority decision: male workers welcome additional female top managers in occupations with very small female shares, but resist them most when male and female shares are similar. Female workers in all occupation groups are less likely to quit when the number of female top managers increases, suggesting same-gender attraction (Columns [2], [4], and [6] in Table 13). That the effect in each group is not always statistically significant may be due to the small sample size in each group.

The variation of male workers' resistance to top female managers across different occupations is crucial to the story, for we seek to understand how changes in the gender composition of the modern workplace affect the behavior and the well-being of individual workers, both male and female. For one, it can explain why the growth of the female share at top managerial positions in U.S. has slowed down recently. For example, Figure 6 shows that

the women's share in the board or in corporate officer positions in fortune 500 firms grew steadily in 1990s, but slowed significantly as the women's share passed over 10%, and has decreased since 2005.

[Figure 6 here]

The history of the female share is US corporate governance matches our findings: the female share grew briskly in the 1990s when it was less than 10%, slowing in 2000 when it passed over 12%, and eventually reversing direction as women became a stronger, more visible minority.

These findings should be important to policy makers. They suggest, first, that male resistance make prevent the achievement of gender parity at top managerial positions, in the absence of a gender quota policy. But they also suggest that such policies may negatively impact male workers, without proportionally benefiting female workers in general. The cost of the effect of gender quotas on male workers' careers must be taken into account in the policy decision process, and weighed against a clear assessment of their benefit to women.

7. Heterogeneity across Education Level

The average level of workers' education has been growing over time. For example, the share of college graduates in our sample has more-than-doubled, from 7% in 1970 to 16% in 1987. If higher level of education promotes preference for equity and justice, especially gender equality, continuing trend of higher education level should reduce male workers' resistance to female top managers, and would also explain the patterns of time effects analyzed in section 5.

On the other hand, if higher level of education reinforces traditional social values, especially of the privileged (male) class, continuing trend of higher education level would discourage gender parity.

In order to analyze the effect of education level, we separately estimate our turnover models for three different groups of workers according to the levels of their final education; compulsory (9 years), upper-secondary (2-3 years), and post-secondary.

[Table 14 here]

Table 14 shows that when the number of female top managers within the same occupation increases, male workers' turnover probability increases by 0.7%, 7%, and 18.9% for workers with the level of compulsory, upper-secondary, and post-secondary education, respectively. That is, male workers' resistance to top female managers increases with education level.[32]

Table 14 also shows that when the number of male top managers within the same occupation increases, male workers' turnover rates decreases by 0.5 percentage points, regardless of their education level. That is, male workers' attraction to top male managers is constant regardless of the level of their education.

The education effects on female workers' turnover rates are relatively smaller or statistically insignificant, possibly because the share of college-graduate female workers is still very small, 9% in 1987, or 2% in 1970.

Therefore, despite a view that higher education, especially college education, would encourage preference of equity, especially in gender, it appears that college education, at least in Sweden during our sample period, has reinforced preference for male-dominant social values.

8. Pecuniary Motives

Of all workers' gender preferences, the most salient is male workers' aversion to female top managers. This section explores the motives behind this aversion, asking in particular whether expected increases in the number of female top managers within occupation leads to slower short-term wage-growth and promotion for male workers. To whatever extent men's opposite-gender aversion is not tied to such pecuniary motives, we can conclude that it is motivated by non-pecuniary payoffs such as status and similarity attraction.

A decrease in non-pecuniary payoffs, however, can also reduce long-term pecuniary payoffs by reducing incentives for human capital accumulation, and the event-study nature of our analysis also prevents the use of wide event-windows. We thus focus on men's wage-growth and promotion rates within three years after an M&A only. The results of this section must be considered suggestive, not conclusive, since they cannot capture long-term effects on pecuniary payoffs, and are also subject to a potential selection bias because we can only

[32] Males with higher level of education may resist more to female top managers because they may compete for the top managerial positions. Recall, however, that we control for workers' rank in all our estimations. Moreover, dropping rank dummy variables does not change the qualitative results.

observe the wage growth and promotion rates of those who remain after M&As. In Table 15, with these caveats in mind, we estimate the effect of an additional female manager on male workers' promotions and wage-growth rates within three years after an M&A.

[Table 15 here]

Columns [1] and [2] estimate the effect on the number of promotions within three years after an M&A, where promotion is defined as either an increase in a worker's rank within occupation, or a change in occupation with a real-wage increase of more than 10%. Expected changes in the number of female managers within occupation have little or no effect on the number of male workers' promotions, though it does on their turnover rates. The other effects on promotions are similarly small or statistically insignificant.

Columns [3] and [4] estimate effects on the average wage-growth rate within three years after M&A, and obtain the same result. Again, expected increases in the number of male or female managers within occupation has little effect on workers' wage growth rates, though it can significantly impact turnover rates.

Though these results are only suggestive, we find no evidence that the observed patterns in workers' turnover behavior are driven by pecuniary motives. Non-pecuniary motives seem to play a leading role, especially in male workers' aversion to female top managers.

9. Conclusion

In the wake of the gender revolution of the past half-century, the steady progress toward gender equality shows some signs of stalling, as highly educated female workers end up staying at home[33] while male workers are slow to move into female-typed jobs.[34] There are both optimistic and pessimistic views on the prognosis for gender equality, and this paper presents empirical evidence supporting both.

On one positive side, we find that male workers' aversion to female top managers has declined over time, especially among the younger generation. Young male workers in more recent years seem not to show opposite-gender aversion at all, on average.

[33] Louise Story, "Many Women at Elite Colleges Set Career Path to Motherhood," New York Times, September 20, 2005.

[34] See, for example, England (2006), and see Blau et al. (2006) for a summary.

But on one negative side, we also find that male workers' attraction to male top managers hasn't changed over time or varied with their age, and also that male workers' resistance to top female managers become strongest precisely when the female share approaches 50%, and gender equality is achieved. Moreover, despite growing liberalism in higher education, highly educated male workers, including younger ones, show stronger resistance to top female managers than other males do.

At this crossroads in the gender revolution, government policy may have an important positive role in supporting the progress towards gender equality. But policies like gender quotas must be designed with a clear understanding of their effects on female workers, which depends on many factors, including the female share in a given occupation or firm. Quotas must be instituted with cognizance of how they impact male workers. Only if these costs and benefits are clearly understood can government policy work effectively to promote gender equality in the workplace.

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Appendix A Three-Digit Occupation Codes

BNT Family	BNT Code	Levels	
0			**Administrative work**
	020	7	General analytical work
	025	6	Secretarial work, typing and translation
	060	6	Administrative efficiency improvement and development
	070	6	Applied data processing, systems analysis and programming
	075	7	Applied data processing operation
	076	4	Key punching
1			**Production Management**
	100	4	Administration of local plants and branches
	110	5	Management of production, transportation and maintenance work
	120	5	Work supervision within production, repairs, transportation and maintenance work
	140	5	Work supervision within building and construction
	160	4	Administration, production and work supervision within forestry, log floating and timber scaling
2			**Research and Development**
	200	6	Mathematical work and calculation methodology
	210	7	Laboratory work
3			**Construction and Design**
	310	7	Mechanical and electrical design engineering
	320	6	Construction and construction programming
	330	6	Architectural work
	350	7	Design, drawing and decoration
	380	4	Photography
	381	2	Sound technology
4			**Technical Methodology, Planning, Control, Service and Industrial Preventive Health Care**
	400	6	Production engineering
	410	7	Production planning
	415	6	Traffic and transportation planning
	440	7	Quality control
	470	6	Technical service
	480	5	Industrial, preventive health care, fire protection, security, industrial civil defense
5			**Communications, Library and Archival Work**
	550	5	Information work
	560	5	Editorial work – publishing
	570	4	Editorial work – technical information
	590	6	Library, archives and documentation
6			**Personnel Work**
	600	7	Personnel service
	620	6	The planning of education, training and teaching

	640	4	Medical care within industries
7			**General Services**
	775	3	Restaurant work
8			**Business and Trade**
	800	7	Marketing and sales
	815	4	Sales within stores and department stores
	825	4	Travel agency work
	830	4	Sales at exhibitions, spare part depots etc.
	835	3	Customer service
	840	5	Tender calculation
	850	5	Order processing
	855	4	The internal processing of customer requests
	860	5	Advertising
	870	7	Buying
	880	6	Management of inventory and sales
	890	6	Shipping and freight services
9			**Financial Work and Office Services**
	900	7	Financial administration
	920	6	Management of housing and real estate
	940	6	Auditing
	970	4	Telephone work
	985	6	Office services
	986	1	Chauffeuring

Appendix B Sample Description of Four-Digit Occupation Codes

Occupation Family 1: Occupation # 120- Manufacturing, Repair, Maintenance, and Transportation
11% of 1988 sample
There is no rank 1 in this occupation.
Rank 2 (4% of occupation # 120 employees) - Assistant for unit; insures instructions are followed; monitors processes
Rank 3 (46%) -In charge ofa unit of 15-35 people
Rank 4 (45%) - In charge of 30-90 people; does investigations of disruptions and injuries
Rank 5 (4%) - In charge of 90-180 people; manages more complicated tasks
Rank 6 (0.3%) - Manages 180 or more people
There is no rank 7 in this occupation.

Occupation Family 2: Occupation #310- Construction
10% of the 1988 sample
Rank l (0.1%) - Cleans sketches; writes descriptions
Rank 2 (1%) - Does more advanced sketches
Rank 3 (12%) - Simple calculations regarding dimensions, materials, etc.
Rank 4 (45%) - Chooses components; does more detailed sketches and descriptions; estimates costs
Rank 5 (32%) - Designs mechanical products and technical products; does investigations; has 3 or more subordinates at lower Ranks
Rank 6 (8%) - Executes complex calculations; checks materials; leads construction work; has 3 or more subordinates at rank 5
Rank 7 (1%) - Same as rank 6 plus has 2-5 rank 6 subordinates

Occupation Family 3: Occupation #800- Marketing and Sales
19% of 1988 sample
Rank l (0.2%) - Telesales; expedites invoices; files
Rank 2 (6%) - Puts together orders; distributes price and product information
Rank 3 (29%) - Seeks new clients for 1- 3 products; can sign orders; does market surveys
Rank 4 (38%) - Sells more and more complex products; negotiates bigger orders; manages 3 or more subordinates
Rank 5 (20%) - Manages budgets; develops products; manages 3 or more rank 4 workers
Rank 6 (7%) - Organizes, plans, and evaluates salesforce; does more advanced budgeting; manages 3 or more rank 5 workers
Rank 7 (1 %) - Same as rank 6 plus 2-5 rank 6 subordinates

Occupation Family 4: Occupation #900- Financial Administration
5% of 1988 sample
Rank 1 (1%) - Office work; bookkeeping; invoices; bank verification
Rank 2 (7%) - Manages petty cash; calculates salaries
Rank 3 (18%) - More advanced accounting; 4-10 subordinates
Rank 4 (31 %) - Places liquid assets; manages lenders; evaluates credit ofbuyers; manages 3 or more rank 3 employees
Rank 5 (28%) - Financial planning; analyzes markets; manages portfolios; currency transfers; manages 3 or more rank 4 employees
Rank 6 (12%) - Manages credits; plan routines within the organization; forward-looking budgeting; manages 3 or more rank 5 employees
Rank 7 (2%) - Same as rank 6 plus 2-5 rank 6 subordinates

Appendix C Classification of M&A

We classify different types of M&As based on the distance between two merging firms in various aspects. The distance is measured by 1 – uncentered correlation, as proposed by Jaffe (1986). For example, to measure the distance in occupation structure, we construct a vector of occupation shares for an acquired firm, $f_i=(s_{1i}, s_{2i}, \ldots, s_{54i})$ where s_{ki} is occupation k's share in firm i (in terms of number of workers)[35]. Then, we construct the same vector for its acquiring firm j, f_j. Then, the distance in occupation structure is measured as $1-\frac{f_i f_j'}{(f_i f_i')(f_j f_j')}$. This distance measure is zero if the composition of occupation is the same between the two firms, and is one if two firms do not share any occupation.

[Figure 1A here]

Figure 1A shows the histogram of each distance measures for 436 acquisitions in our sample. The histogram for the distance in occupation structure shows large variations. In other words, some firms are very close in terms of occupation structure, some firms are semi-close, and some firms are completely different in occupation structure. On the other hand, if we look at the distance in industry structure, and county location, firms are either close or far way. Firms are always similar in most other dimensions[36]. Therefore, we classify acquisitions as shown in Table 1A.

[Table 1A here]

For example, if the acquired firm is similar in occupation and industry structures, and in the same region, we call it as a horizontal merger. Also, as they are similar, we expect that workers and business functions of two firms are substitutable. This classification is admittedly arbitrary. However, this classification can give us some sense of whether our results depend on different types of acquisition. Alternatively, we can also control for M&A fixed effects.

[35] We used 54 different occupations, 44 different industries, 24 different counties, 9 different education codes, 6 different age groups (11-20, 21-30, etc.), 7 rank codes, 2 gender codes, and 2 part time codes.
[36] The variation in the rank distance can be mostly explained by the difference in size.

Table 1 Summary Statistics

	Acquirer			Acquired		
	Total	Male	Female	Total	Male	Female
firm size	362.627	273.283	90.533	51.463	37.168	14.457
female ratio	0.302			0.282		
wage	1532.499	1717.705	1054.538	1493.726	1661.137	1015.019
status	0.510	0.623	0.238	0.521	0.633	0.232
rank	3.322	3.715	2.380	3.279	3.630	2.349
age	40.955	42.247	37.446	40.964	42.442	36.753
part time	0.103	0.021	0.280	0.102	0.019	0.293

Note: Wage is a monthly total payment measured in 1970 Kronor. Status is measured as each worker's relative ranking of wages within a firm where zero is the lowest and one is the highest.

Table 2 Correlations between Acquiring and Acquired Firms

	Female Share			Female Status	
	Overall	At Top Rank	At Top Rank within Occup.	Within Firm	Within Occup.
corr(acquiring, acquired)	0.200	-0.325	0.131	0.058	0.064

Note: The correlations after controlling for firm size, firm size squared, primary industry dummy, and primary occupation dummy.

Table 3 Computation of Expected Post-Merger Measures: An Example

					Pre-Merger		Expected Post-Merger	
firm	worker	gender	rank	wage	Number of Female at Top Rank	Relative Ranking within Gender	Number of Female at Top Rank	Relative Ranking within Gender
Acquiring	1	male	4	1500	1	1/1	1	2/2
	2	female	4	1600	1	1/2	1	2/3
	3	female	5	1800	1	2/2	1	3/3
Acquired	4	male	3	1200	0	1/1	1	1/2
	5	female	4	1300	0	1/1	1	1/3

Table 4 Changes in Female Hierarchy

	Male		Female	
	Pre-Merger	Expected Change	Pre-Merger	Expected Change
# Female at Top Rank within the same Occupation	0.071	0.012	2.910	0.372
	(0.765)	(0.205)	(6.732)	(1.839)
Share of Female at Top Rank within Occupation (%)	1.056	0.083	32.775	0.851
	(7.662)	(2.930)	(44.374)	(10.034)
# Female at Top Rank within Firm	0.028	0.011	0.067	0.013
	(0.189)	(0.123)	(0.317)	(0.132)
Share of Female at Top Rank within Firm (%)	0.269	0.087	0.637	0.045
	(2.259)	(1.695)	(3.522)	(2.566)
number of observation	142,176		44,503	

Note: Standard deviations are in parentheses.

Table 5 Turnover Pattern: Probit Analysis

(dependent variable = 1 if quit)

	All		Male		Female	
	[1]	[2]	[3]	[4]	[5]	[6]
age	-0.027	-0.027	-0.027	-0.027	-0.024	-0.023
	(0.000)***	(0.000)***	(0.001)***	(0.001)***	(0.000)***	(0.000)***
age squared	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
part time	0.031	0.033	0.103	0.104	0.021	0.020
	(0.001)***	(0.001)***	(0.004)***	(0.004)***	(0.002)***	(0.002)***
firm size (in thousands)	-0.024	-0.023	-0.024	-0.023	-0.024	-0.022
	(0.007)***	(0.007)***	(0.007)***	(0.007)***	(0.009)***	(0.008)***
firm size squared	0.002	0.002	0.002	0.002	0.002	0.002
	(0.001)**	(0.001)**	(0.001)**	(0.001)**	(0.001)**	(0.001)**
acquirer	-0.031	-0.030	-0.032	-0.031	-0.024	-0.025
	(0.006)***	(0.006)***	(0.006)***	(0.006)***	(0.008)***	(0.008)***
acquired	0.869	0.870	0.875	0.876	0.856	0.857
	(0.002)***	(0.002)***	(0.003)***	(0.002)***	(0.003)***	(0.002)***
female	-0.009	-0.012				
	(0.001)***	(0.001)***				
occupation	NO	YES	NO	YES	NO	YES
rank	NO	YES	NO	YES	NO	YES
Observations	1281454	1281454	901742	901742	379712	379705

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect dP/dx. 20% random sample of full data (including those not involved in acquisitions) is used. Each regression includes dummy variables for education, rank, occupation, industry, county, and year.

Table 6 Wage Changes After Quit

(dependent variable = log(wage_new)-log(wage_old))

	All	Male	Female
	[1]	[2]	[3]
age	-13.988	-23.312	-16.755
	(1.321)***	(2.055)***	(1.739)***
age squared	0.019	0.099	0.136
	(0.017)	(0.025)***	(0.023)***
part	300.552	301.648	280.949
	(10.195)***	(27.510)***	(9.782)***
firm size	0.015	0.020	-0.003
	(0.010)	(0.011)*	(0.008)
firm size squared	-0.000	-0.000	-0.000
	(0.000)*	(0.000)**	(0.000)
acquirer	-0.749	-2.462	-10.609
	(14.559)	(18.287)	(25.635)
acquired	-55.019	-51.938	-42.908
	(10.159)***	(12.081)***	(13.149)***
female	-223.104		
	(7.652)***		
Observations	92803	65356	27447
R-squared	0.13	0.14	0.12

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Among 20% random sample of full data, only those who change firms (including those not involved in acquisitions) are used. Each regression includes education, rank, occupation, industry, county, and year dummies.

Table 7 Number of Female at Top Rank and Turnover: Probit Analysis
(dependent variable =1 if quit within three years after acquisitions)

	Male	Female	Male	Female	Male	Female
	[1]	[2]	[3]	[4]	[5]	[6]
Δ(# *female* top managers	0.025	-0.001			0.025	-0.005
within occupation)	(0.009)***	(0.002)			(0.009)***	(0.002)***
Δ(# *male* top managers within	-0.004	0.008			-0.005	0.003
occupation)	(0.000)***	(0.002)***			(0.000)***	(0.002)
Δ(# *female* top managers			0.073	0.055	0.061	0.056
within firm)			(0.012)***	(0.023)**	(0.012)***	(0.024)**
Δ(# *male* top managers within			0.002	0.003	0.003	0.003
firm)			(0.000)***	(0.000)***	(0.000)***	(0.000)***
pre-merger # *female* top	-0.004	0.002			-0.005	0.002
managers within occupation	(0.002)**	(0.001)***			(0.002)**	(0.001)***
pre-merger # *male* top	-0.001	-0.001			-0.001	-0.001
managers within occupation	(0.000)***	(0.001)**			(0.000)***	(0.001)*
pre-merger # *female* top			-0.026	-0.069	-0.027	-0.067
managers within firm			(0.008)***	(0.012)***	(0.008)***	(0.012)***
pre-merger # *male* top			0.000	0.001	0.001	0.000
managers within firm			(0.000)***	(0.000)*	(0.000)***	(0.000)
Acquired dummy	0.032	-0.025	-0.018	-0.045	-0.005	-0.047
	(0.006)***	(0.010)**	(0.006)***	(0.011)***	(0.006)	(0.011)***
age	-0.070	-0.046	-0.070	-0.046	-0.070	-0.046
	(0.001)***	(0.002)***	(0.001)***	(0.002)***	(0.001)***	(0.002)***
age squared	0.001	0.001	0.001	0.001	0.001	0.001
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
part time dummy	0.228	0.032	0.228	0.033	0.229	0.033
	(0.014)***	(0.010)***	(0.014)***	(0.010)***	(0.014)***	(0.010)***
firm size (in thousands)	-0.054	-0.048	-0.056	-0.055	-0.058	-0.052
	(0.003)***	(0.007)***	(0.003)***	(0.007)***	(0.004)***	(0.007)***
firm size squared	0.003	0.004	0.002	0.003	0.003	0.003
	(0.000)***	(0.001)***	(0.000)***	(0.001)***	(0.000)***	(0.001)***
Observations	142108	44165	142108	44165	142108	44165
Predicted Probabiliy (at mean)	0.294	0.368	0.294	0.367	0.294	0.367
pseudo R-square	0.153	0.128	0.153	0.130	0.154	0.130

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect dP/dx. Each regression includes real wage, firm size change, occupation size change, average female shares within firm and within occupation, changes in average female share within firm and within occupation, ratio of workers who moved regional code, rank, occupation, industry, county, and year dummies.

Table 8 Voluntary Turnovers: Probit Analysis

(dependent variable =1 if quit within three years after acquisitions)

Voluntary Turnovers	Acquirer Only		Real Wage Increase		Wage Growth Rate Increase	
	Male	Female	Male	Female	Male	Female
	[1]	[2]	[3]	[4]	[5]	[6]
Δ(# *female* top managers	0.055	-0.008	0.023	-0.004	0.046	-0.005
within occupation)	(0.013)***	(0.003)***	(0.009)***	(0.002)***	(0.010)***	(0.002)***
Δ(# *male* top managers	-0.014	0.002	-0.006	0.007	-0.007	0.006
within occupation)	(0.001)***	(0.005)	(0.001)***	(0.002)***	(0.001)***	(0.002)***
pre-merger # *female* top	-0.008	0.002	-0.003	0.002	-0.005	0.002
managers within occupation	(0.002)***	(0.001)***	(0.002)	(0.001)***	(0.002)**	(0.001)***
pre-merger # *male* top	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001
managers within occupation	(0.000)***	(0.001)**	(0.000)***	(0.000)	(0.000)***	(0.000)*
Number of Observations	130558	40559	122939	34797	117724	33119

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect dP/dx. Involuntary turnovers are omitted. The other specifications are the same as those in column [5] and [6] in Table 7.

Table 9 Controlling for M&A Types
(dependent variable =1 if quit within three years after acquisitions)

	Probit				OLS	
	M&A Type		Distance Measures		M&A Fixed Effect	
	Male	Female	Male	Female	Male	Female
	[1]	[2]	[3]	[4]	[5]	[6]
Δ(# *female* top managers within the same occupation)	0.029	-0.004	0.029	-0.004	0.024	-0.002
	(0.009)***	(0.002)**	(0.009)***	(0.002)**	(0.006)***	(0.001)*
Δ(# *male* top managers within the same occupation)	-0.005	0.004	-0.004	0.005	-0.001	0.003
	(0.000)***	(0.002)**	(0.000)***	(0.002)**	(0.000)***	(0.002)
pre-merger # *female* top managers within the same occupation	-0.005	0.002	-0.004	0.003	-0.001	-0.002
	(0.002)**	(0.001)***	(0.002)**	(0.001)***	(0.002)	(0.000)***
pre-merger # *male* top managers within the same occupation	-0.001	-0.001	-0.000	-0.001	-0.000	-0.001
	(0.000)***	(0.001)*	(0.000)***	(0.001)*	(0.000)***	(0.000)*
Acquired (=1 if acquired)	-0.005	-0.043	0.007	-0.031	0.028	0.010
	(0.006)	(0.011)***	(0.006)	(0.012)***	(0.006)***	(0.013)
M&A Type = Conglomerate	0	0				
M&A Type =Growth	0.026	0.018				
	(0.005)***	(0.009)*				
M&A Type = Horizontal	-0.092	-0.096				
	(0.006)***	(0.012)***				
M&A Type = Vertical	0.002	0.031				
	(0.005)	(0.010)***				
Distance Measures	NO	NO	YES	YES	NO	NO
M&A Fixed Effects	NO	NO	NO	NO	YES	YES
Observations	142108	44165	142108	44165	142114	44173
pseudo R-square	0.157	0.136	0.167	0.142	0.10	0.08

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect dP/dx. See Table 1A for the definitions of M&A types. Each regression includes age, age squared, real wage, firm size, firm size squared, firm size change, occupation size change, average female share, change in average female share, ratio of workers who moved regional code, dummy variables for part time, rank, occupation, industry, county, and year.

Table 10 Difference-In-Difference
(dependent variable =1 if quit within three years after acquisitions)

	Probit		OLS	
	[1]	[2]	[3]	[4]
Δ(# *female* top managers within occupation) * female	-0.020	-0.025	-0.026	-0.022
	(0.010)**	(0.011)**	(0.009)***	(0.007)***
Δ(# *male* top managers within occupation) * female	0.007	0.008	0.009	0.004
	(0.002)***	(0.002)***	(0.002)***	(0.002)**
Δ(# *female* top managers within firm) * female	0.013	0.003	0.000	0.000
	(0.022)	(0.021)	(0.000)	(0.000)
Δ(# *male* top managers within firm) * female	0.001	0.001	0.006	-0.008
	(0.000)***	(0.000)***	(0.022)	(0.018)
M&A Type = Conglomerate * female		0	0	0
M&A Type = Growth * female		0.018	0.021	0.019
		(0.009)**	(0.008)**	(0.007)**
M&A Type = Horizontal * female		0.022	0.022	0.007
		(0.013)*	(0.011)**	(0.010)
M&A Type = Vertical * female		0.002	0.003	0.004
		(0.009)	(0.009)	(0.008)
M&A Fixed Effects	NO	NO	NO	YES
Observations	174154	174154	174165	174165

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect dP/dx. See Table 6 for the definitions of M&A types. The rest of the control variables is the same as those in Table 7.

Table 11 Age Effect
(dependent variable =1 if quit within three years after acquisitions)

	Male		Female	
	Old	Young	Old	Young
	[1]	[2]	[3]	[4]
Δ(# *female* top managers within the same occupation)	0.034	0.016	-0.012	-0.004
	(0.013)***	(0.013)	(0.003)***	(0.002)**
Δ(# *male* top managers within the same occupation)	-0.005	-0.005	0.005	0.003
	(0.001)***	(0.001)***	(0.003)*	(0.003)
Observations	78566	63520	18443	25679

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Old workers are defined as those with age over or at 40. Young workers are those with age under 40. Reporting marginal effect, dP/dx. The other specifications are the same as those in column [5] and [6] in Table 7.

Table 12 Time Effect

(dependent variable =1 if quit within three years after acquisitions)

	Male		Female	
	Old	Young	Old	Young
	[1]	[2]	[3]	[4]
Δ(# *female* top managers within the same occupation)	0.023	0.025	0.000	-0.004
	(0.011)**	(0.012)**	(0.004)	(0.002)*
Δ(# *male* top managers within the same occupation)	-0.005	-0.004	0.002	0.004
	(0.001)***	(0.001)***	(0.003)	(0.003)
Observations	48090	42832	8491	15063

(a) 1970-1979

	Male		Female	
	Old	Young	Old	Young
	[1]	[2]	[3]	[4]
Δ(# *female* top managers within the same occupation)	0.073	0.003	-0.022	-0.011
	(0.037)**	(0.038)	(0.005)***	(0.006)*
Δ(# *male* top managers within the same occupation)	-0.003	-0.005	0.006	-0.001
	(0.002)**	(0.002)**	(0.007)	(0.006)
Observations	30458	20632	9860	10583

(b) 1980-1988

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Old workers are defined as those with age over or at 40. Young workers are those with age under 40. Reporting marginal effect dP/dx. The other specifications are the same as those in column [5] and [6] in Table 7.

Table 13 Heterogeneity: Share of Female Workers

(dependent variable =1 if quit within three years after acquisitions)

Female Share within Occupation	female share<0.1		0.1<female share<0.5		female share>0.5		All	
	Male	Female	Male	Female	Male	Female	Male	Female
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Δ(# *female* top managers within the same occupation)	-0.170	-0.189	0.145	-0.087	0.028	-0.005	-0.046	0.017
	(0.058)***	(0.162)	(0.054)***	(0.055)	(0.014)**	(0.002)***	(0.041)	(0.074)
Δ(# *male* top managers within the same occupation)	-0.005	0.008	0.010	0.022	-0.011	-0.003	-0.006	-0.003
	(0.000)***	(0.009)	(0.002)***	(0.005)***	(0.005)**	(0.003)	(0.000)***	(0.007)
Δ(# *female* top managers within the same occupation)*fshare							0.281	-0.094
							(0.159)*	(0.188)
Δ(# *female* top managers within the same occupation)*fshare^2							-0.270	0.074
							(0.152)*	(0.116)
Δ(# *male* top managers within the same occupation)*fshare							0.068	0.062
							(0.013)***	(0.035)*
Δ(# *male* top managers within the same occupation)*fshare^2							-0.077	-0.075
							(0.022)***	(0.037)**
Observations	86524	2385	43536	11657	12027	30091	142108	44165

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect, dP/dx. The other specifications are the same as those in column [5] and [6] in Table 7. The estimates from the columns [7] are illustrated by Figures 5.

Table 14 Heterogeneity: Education Level

(dependent variable =1 if quit within three years after acquisitions)

Education	Compulsory (9 years)		Upper Secondary (2-3 years)		Post-Secondary	
	Male	Female	Male	Female	Male	Female
Δ(# *female* top managers within the same occupation)	0.007	-0.009	0.079	-0.001	0.189	-0.015
	(0.011)	(0.003)***	(0.025)***	(0.003)	(0.100)*	(0.009)
Δ(# *male* top managers within the same occupation)	-0.005	0.002	-0.006	0.002	-0.005	0.021
	(0.001)***	(0.002)	(0.001)***	(0.006)	(0.002)**	(0.013)*
Observations	59922	30076	60978	11393	21162	2609

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Reporting marginal effect, dP/dx. The other specifications are the same as those in column [5] and [6] in Table 7.

Table 15 Promotion and Wage Growth After M&A: OLS

Dependent Variable	# of Promotions		Wage Growth Rate	
	Male	Female	Male	Female
	[1]	[2]	[3]	[4]
Δ(# *female* top managers within the same occupation)	-0.001	-0.002	-0.000	-0.001
	(0.001)	(0.001)***	(0.000)	(0.000)***
Δ(# *male* top managers within the same occupation)	-0.028	0.017	0.008	0.036
	(0.034)	(0.031)	(0.004)**	(0.012)***
Observations	97151	27508	97151	27508

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: In columns [1] and [2], the dependent variable is the number of promotions within three years after M&A. In columns [3] and [4], the dependent variable is the average wage growth rates within three years after M&A. Reporting marginal effect dP/dx. The other specifications are the same as those in column [5] and [6] in Table 7.

Table 1A Classification of Acquisition

Occupation	Industry	Region	Description	Classification
Similar	Similar	Similar	Acquisition of Competitor	Horizontal Merger
Similar	Similar	Different	Regional Expansion	Growth Merger
Different	Similar	Similar	Functional Extension	Vertical Merger
Different	Similar	Different		
Similar	Different	Similar	Product Line Extension	Growth Merger
Similar	Different	Different	Product/Region Expansion	Growth Merger
Different	Different	Similar	Business Line Expansion	Conglomerate Merger
Different	Different	Different		

Occupation: *similar* if occupation distance measure is less than 0.2, *different* otherwise.
Industry: *similar* if industry distance measure is less than 0.5, *different* otherwise.
Region: *similar* if regional distance measure is less than 0.5, *different* otherwise.

Figure 1 Percentage of Female among White-collar Workers

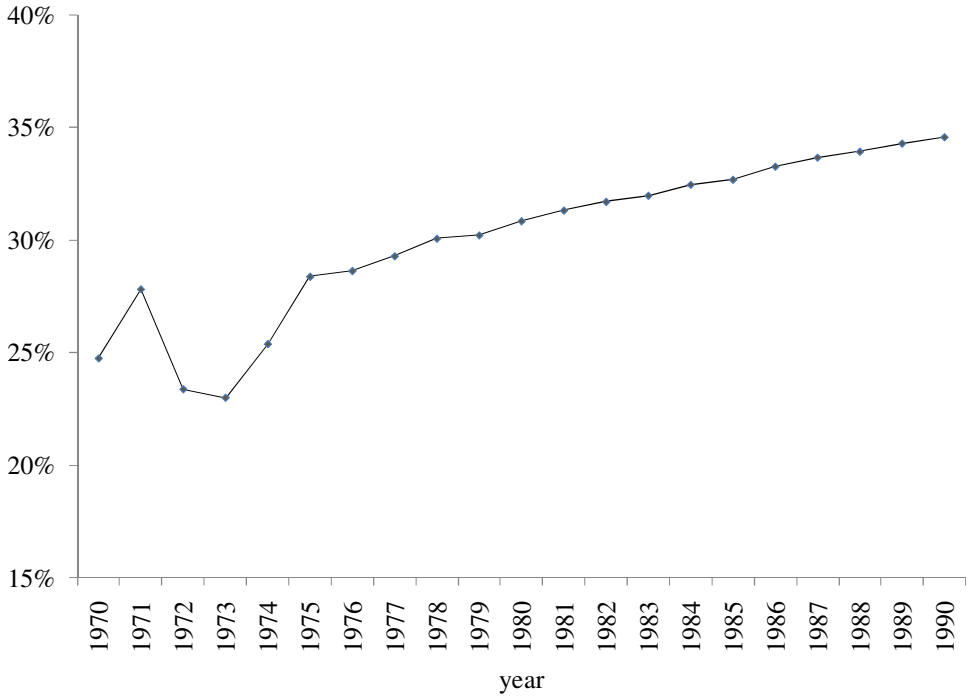


Figure 2 Average Number of Males and Females in Each Rank (in a given year)

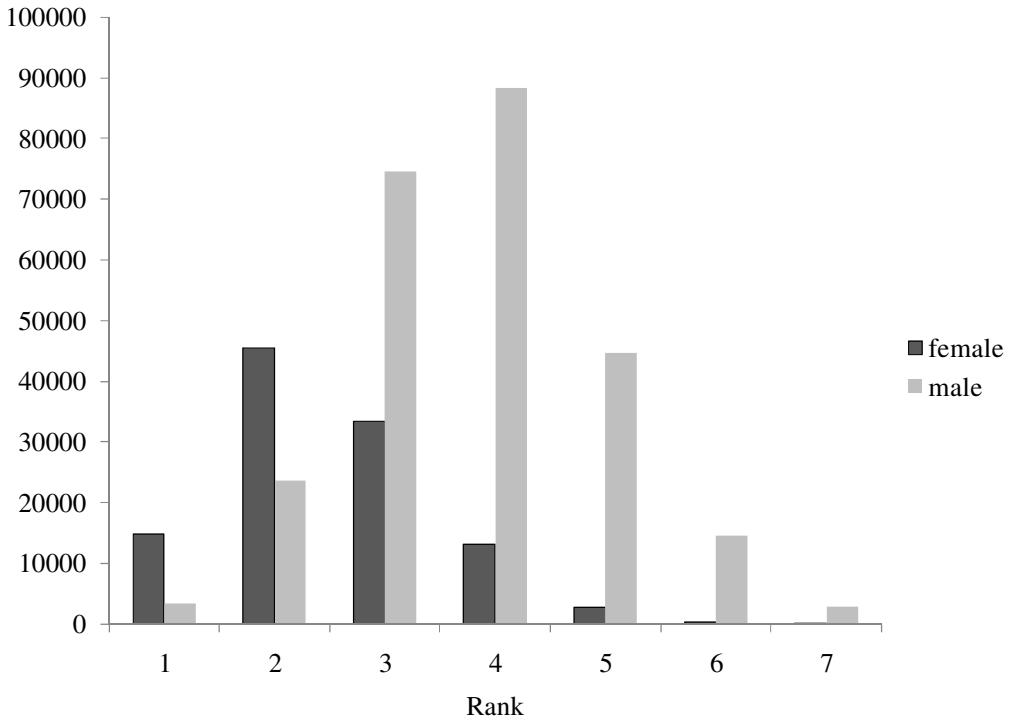


Figure 3 Share of Female in Each Rank over Years

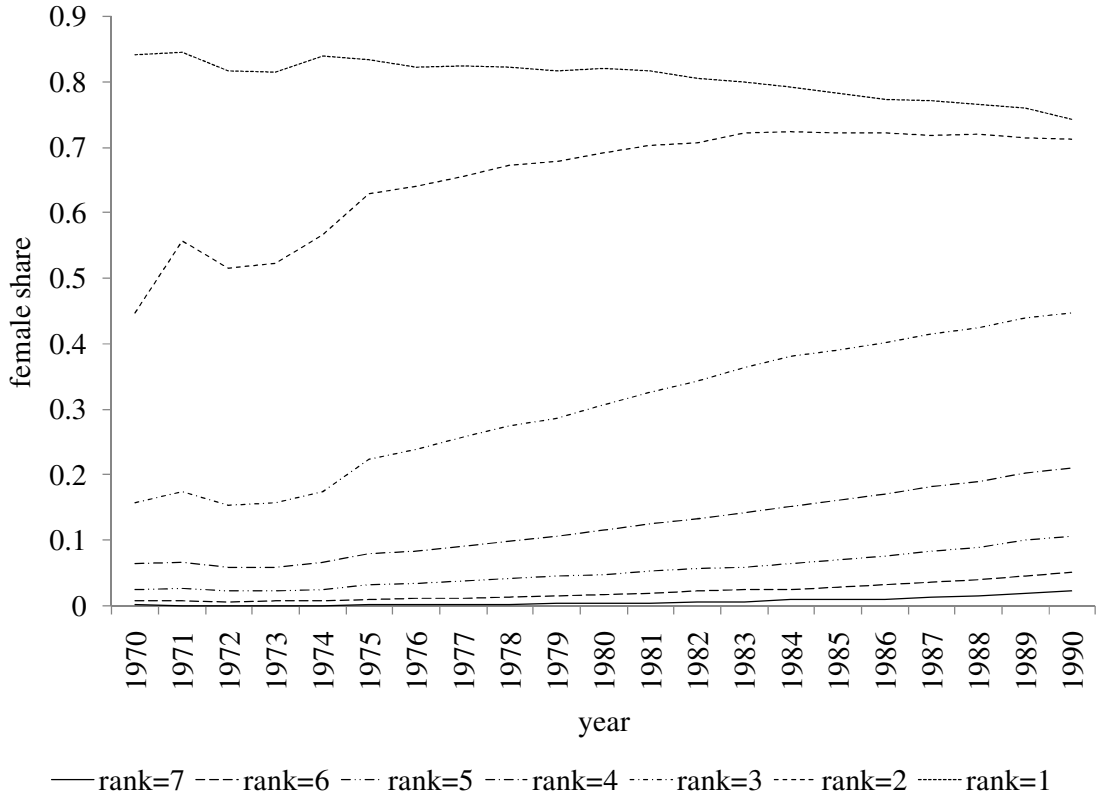
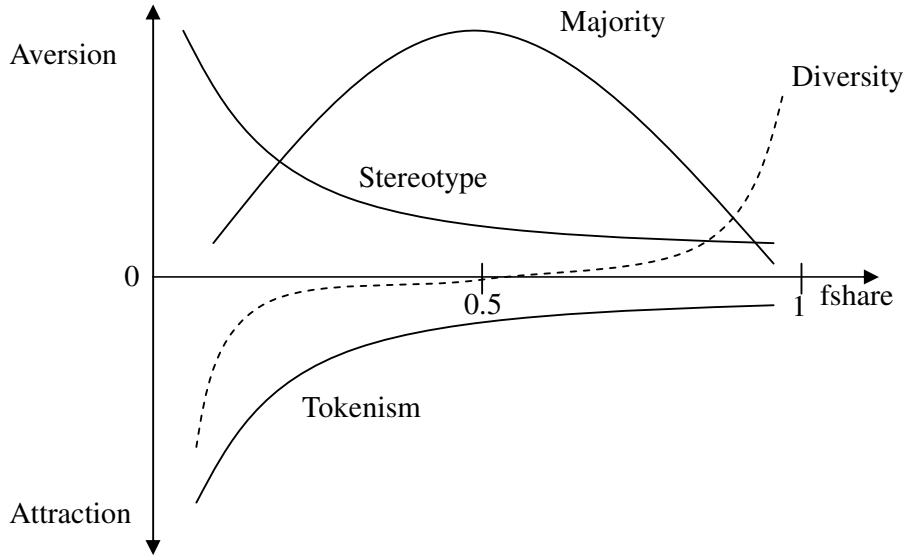
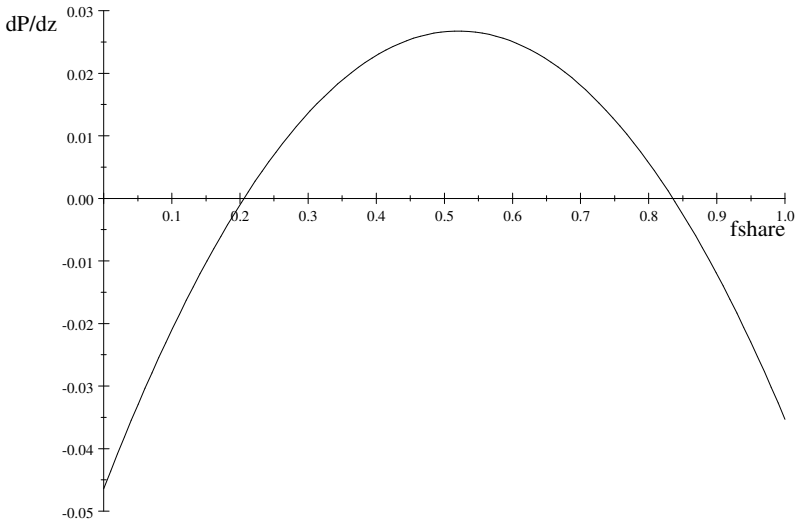


Figure 4 **Male Workers' Response to Female Top Managers: Theory**



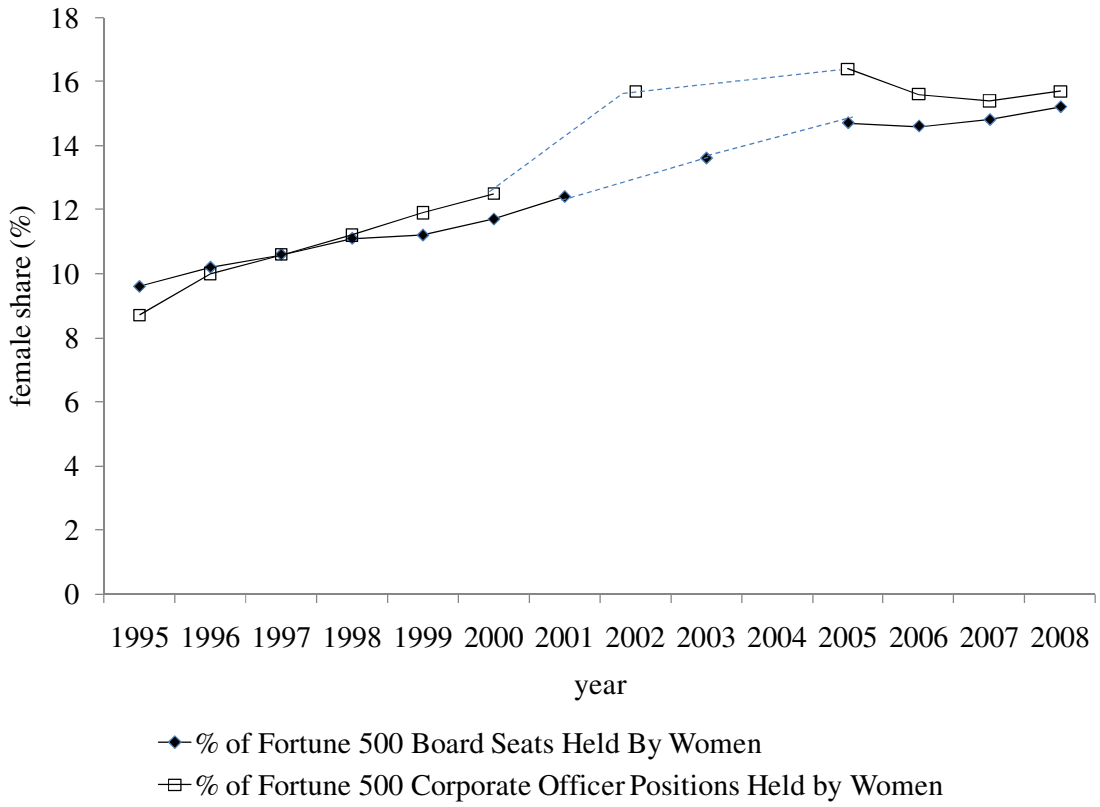
Note: fshare = female share within an occupation.

Figure 5 **Male Workers' Response to Female Top Managers: Evidence**



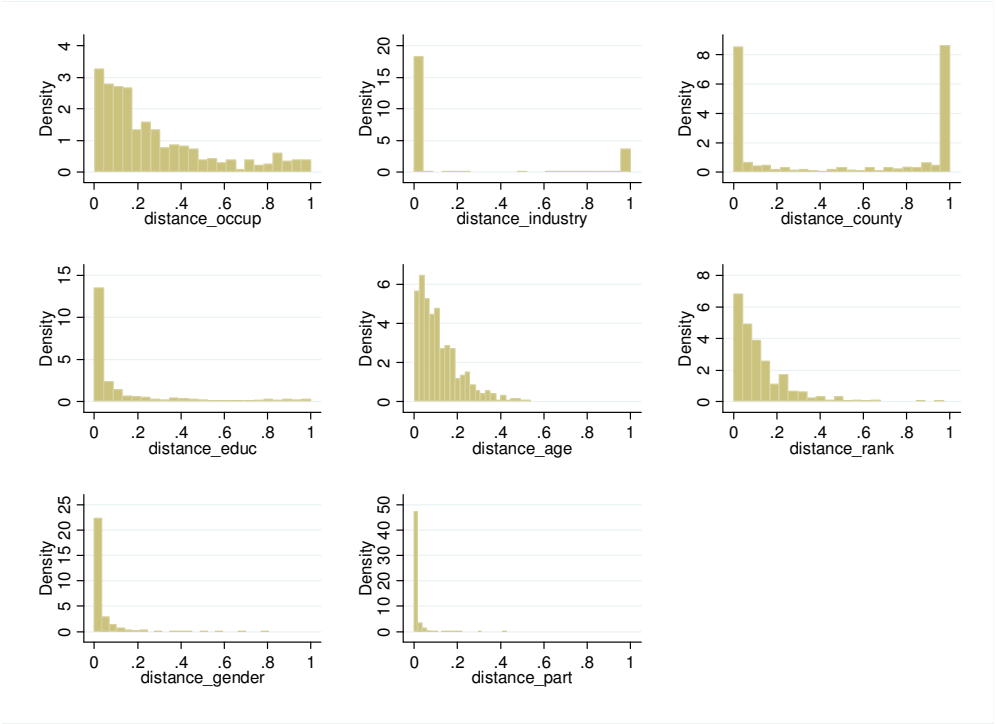
Note: P = probability of turnover; z = (# *female* top managers within occupation); fshare = female share within an occupation. The figure is based on the estimates from column [7] in Table 13.

Figure 6 Share of Women in Top Fortune 500



Source: Catalysis (2009) "Women in U.S. Management",
(http://www.catalyst.org/file/192/qt_women_in_us_management.pdf)

Figure 1A Distance between Acquirer and Acquired



Distance in each dimension is measured as 1 - uncentered correlation. For example, to construct a distance measure in occupation structure, for an acquired firm i, we construct a vector $f_i=(s_{1i}, s_{2i}, \ldots, s_{54i})$ where s_{ki} is occupation k's share in firm i (in terms of number of workers). Then, we construct the same vector for its acquiring firm j, f_j. Then, the distance in occupation structure is measured as $1-\frac{f_i f_j'}{(f_i f_i')^{\frac{1}{2}}(f_j f_j')^{\frac{1}{2}}}$. This distance measure is zero if the composition of occupation is the same between the two firms, and is one if two firms do not share any occupation.