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GENDER COMPOSITION IN OCCUPATION HIERARCHIES AND THE
PERSISTENCE OF LABOR MARKET SEGREGATION — NON-
MONOTONIC THRESHOLD EFFECTS OF EXOGENOUS CHANGES

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ABSTRACT

Why is labor market segregation so persistent? This study analyzes one possible mechanism, workers' decisions to quit or stay on as a function of changes in the gender composition of supervisors during mergers and acquisitions. Swedish longitudinal employer-employee matched data for the period 1970-1990 shows that an increase in the share (or number) of female supervisors, within the same occupation and firm, makes both female and male workers more likely to quit. The reverse is not true. Female workers' relative aversion to female supervisors is significant only in occupations where the average female share is between 10% and 50%, while male aversion is monotonic. The effects varies with birth cohorts and life cycle, younger men are less averse than older across cohorts. Suggestive evidence indicates that these revealed preferences are partly driven by pecuniary effects among males and by social values among females.

Keywords

Labor market segregation, gender hierarchies, tipping points, pseudo natural experiment, employer-employee data, non-monotonic functions.

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INTRODUCTION

It is already well-established that gender segregation in labor markets is the key determinant of the gender gap in wages and authority. Another established fact is that the reduction of the gender gap has been either sluggish or stalled for the last 40 years (Costa 2000). To be sure, women have made striking advances in higher education, labor market participation, and wages in recent decades (Goldin 2014). Still, they remain severely underrepresented in certain industries, firms, occupations, and ranks (references). This study focuses on one particular mechanism of segregation by studying the exogenous change in gender composition in occupation hierarchies and the subsequent self-selection of men and women into firms.

Research on gendered labor market segregation suffers from a lack of appropriate data, methods, conceptualization and ".....there is evidently no great rush among gender segregation scholars to move the field beyond these formidable problems." (See Grusky and Charles 2001:689; Tomaskovic-Devey et al. 2006:568.) In addition, the traditional sociological focus on occupational vertical and horizontal segregation may be inadequate as the primary and sole observation of persistent labor market segregation (Mouwe and Kalleberg 2010; Bygren 2013:4). Due to this lack of data, there is, for example, very little information available about workers' choices of firms, controlling for occupation and rank. Finally, if "gender status hierarchy" is a key concept in understanding gender segregation on the labor market, as argued by Ridgeway (2011), then the most sensitive changes to study should not just be changes in co-workers but also in gender proportion among supervisors, and where women's entrances to supervisor positions challenge the existing gender status hierarchy in organizations (see exceptions Bednar and Gicheva 2014; Cohen and Huffman 2007; Hultin and Szulkin 1999, 2003).

This study takes advantage of access to longitudinal employer-employee data and

examines workers' choices of firms, particularly their tendency to remain at a firm or to quit when the gender composition of their supervisors changes. From this workers' preferences for supervisors of a given sex and how these affect the gender segregation of the labor market may be inferred.¹ The data allows study of patterns over time and across cohorts and life cycles.

The empirical strategy employed in this study utilizes non-monotonic threshold models. Threshold models have been suggested to play an important role in workers' behavior, well-being, and attitudes (Blalock 1956, 1957, 1967; Schelling 1971, 1978; Tolbert et al. 1995; South et al. 1982, 1983; South 1987). A *change* in an identity group's proportion, such as gender, race and ethnicity, has been shown to influence both women's and men's behavior, well-being, and attitudes (South et al. 1982, 1983; Blalock 1967; England et al. 2007b; Allmendinger and Hackman 1995; Tolbert et al. 1995; Pfeffer and Davis-Blake 1987; Pfeffer 1983).²

This study argues that the effect of changes is non-monotonic, because it reflects a balance between opposing forces. The literature includes two prominent candidates. Since Allport (1954), scholars argue that under certain conditions the more contact a minority has with a majority identity group, the less hostile the majority members will be, under certain conditions (see, for example, the empirical application by Kanter 1977a, 1977b).³ Another research strand claims that the more contact, the more salient the difference and, hence, the more competition between the two identity groups (Blalock 1956, 1957, 1967). If these two effects are non-linear, their combination can lead to non-monotonic responses to exogenous changes in the proportion

¹ See Coleman's 1990 use of revealed preferences pp. 340, 933.

² For race, see Allport 1954; Blalock 1956. Research based on a more theoretical structural analysis is found in Simmel 1950 and Blau 1977a, 1977b.

³ These conditions are for example equal status; common goals; intergroup cooperation; support of authorities law or customs i.e., a common acknowledgment of a central authority. (See for example Forsyth 2009)

of one identity group (see illustrative cases in Allmendinger and Hackman 1995; Tolbert et al.1995).

Up to this point, research comparing the two explanations, contact and competition theories, has been inconclusive (Turco 2010). Reasons include the non-compatible data used and the unavailability of suitable data. Studying worker self-selection and sorting into firms, controlling for occupation and changing supervisors' gender, benefits from longitudinal employer-employee data. This kind of data enables one not only to compare employees working for the same employer and doing the same kind of job, but also to track their choices across firms and over time.

In addition, the empirical research on the composition effects of different identity groups is rich but has been plagued by various endogeneity problems, including reversed causality issues. For example, do women sort into low-productivity firms, or do they become low-productivity firms once women are clustered in one particular rank, occupation, or plant? (See Kanter 1977a, 1977b; Allmendinger and Hackman 1995; Pfeffer and Davis-Blake 1987, 1992; Tolbert et al. 1995; England et al. 1988.) Other effects involve selection biases such as only focusing on particular jobs or ages (see England et al. 1988; England et al. 2007a, 2007b; Tsui et al. 1992); focusing on the gender composition of supervisors but not the overall gender composition of the occupation (Hultin and Szulkin 1999, 2003); focusing on a cross section of diverse occupations using the Quality of Employment Survey but not keeping control of firms (Wharton and Baron 1987, 1991); focusing on case studies (Kanter 1977a, 1977b) or particular industries such as non-profit organizations, including college administration (Pfeffer and Davis-Blake 1987, 1992), academic departments (Tolbert et al. 1995), or orchestras in Europe (Allmendinger and Hackman 1995); or focusing mostly on flows into the firm such as hiring

(Petersen and Morgan 1995), male selection into female-dominated workplaces (England et al. 2007b), or on both in- and outflows of personnel into firms but only for a restricted data set within a restricted time frame and for one geographic region (Bygren 2013).

The present study aims to contribute to the literature by filling in some of the gaps along the lines of Kalleberg's and Chang's call for using employer-employee data (Kalleberg 1989; Eliason 1995; Chang 2000), and using exogenous shocks to handle the endogeneity issues. This study examines Swedish longitudinal employer-employee matched data that contain detailed information about all workers' occupations and ranks in all firms in the private sector (except the financial sector), and analyzes how exogenous changes in the gender composition of a firm's hierarchical ranks affect the firm's male *and* female workers. Both male and female workers' preferences are revealed by workers' decisions to quit or to remain in the firm after a merger or acquisition (M&A) that changes the gender composition of the firm's occupational rank hierarchies. This breadth allows study not only of the dynamic aspect of gender composition in hierarchies but also of heterogeneity across occupations and worker birth cohorts—and perhaps additionally to shed some light on the mixed results of previous studies.

Why Swedish data? If gender equality exists, it should be found in the famously family- and women-friendly Sweden. Despite the family-friendly attitudes, universal labor market frameworks, coherent family policies, social service acts, and explicit legislation on gender equality, however, labor market segregation by gender is stronger in Sweden than in Norway and the United States (see Mueller et al. 1994; Meyersson Milgrom et al. 2001; Meyersson Milgrom and Petersen 2006). Goldthorpe (in the preface to Eriksson and Åberg 1987) calls Sweden a critical case to study, and elsewhere (Verba et al. 1987) the Swedish welfare system is called a vanguard among nations (per reference by Mueller et al. 1994:556).

But to what extent do other countries differ from Sweden? Jacobs and Lim (1992) review some of the U.S. studies and report estimates of the portion of the earnings gap due to gender segregation of occupation ranging from 17% to 39%, which is comparable to Sweden's 13% to 28% (Meyersson Milgrom et al. 2001). The data is from the 1980s and 1990s, which is an interesting time in the gender revolution: not only did women in general enter the labor market at higher rates than before, mothers in particular did as well. In Sweden this trend matured during the studied period and during the 90s most women were working either full- but mostly part-time. (references)

This study's findings suggest that as the share of female supervisors within an occupation, in a firm, increases, male workers are more likely to quit than when there is no change. The results suggest that men prefer working for supervisors of their own sex. These preferences do seem to be disappearing over generations, but not with age or time. Older men are averse to female supervisors across time, although less intensely so. Additionally, the results show a stronger tendency for men to quit, when female composition approaches 40%. Contrary to expectation women also tend to be averse to female supervisors, but this relationship is non-monotonic. In cases where average gender composition, within the occupation, within the firm, is more than 10% but less than 50% of women, women also quit. The data allow testing of whether there are pecuniary or social reasons behind men's and women's behaviors. The wage-growth rate goes down for non-quitting males 3 years after the M&A (pecuniary values). That is not the case for women, whose wage growth rate exhibits no significant change after the M&A. The promotion rate for men increases men during the period 3-5 years after the M&A, with no significant increase after 5 years. Conversely, the promotion rate for women significantly increases after 5 years (social values). Evidence suggests that men are driven mainly by

pecuniary incentives, while women are driven mainly by social values. The sorting and self-selection of workers into preferred gender composition hierarchies increases segregation of workers by firm.

The present study's contributions to the research literature are threefold. First, the work analyzes a very large and broad data set for a whole nation; this is essential to understanding the effects of a growing number of women in supervisor positions, and it is indispensable for policy decisions about quotas and affirmative action. Second, this study analyzes how the gender preferences of male and female workers, whether driven by social or pecuniary motives, differ across occupations, within firms, birth cohorts and provides a potential explanation for the mixed results found in the previous studies. Third, it formally addresses the endogeneity issue by using M&As as an exogenous shock to the individual employee.

GENDER LABOR MARKET SEGREGATION

Vertical and horizontal gender segregation?

Gendered labor market segregation has been studied from many angles in the research literature. Bielby and Baron (1984) for example found pervasive gender segregation at the firm level—including instances of two separate job titles for the same kind of work: one for men and one for women. The prevalence of within-firm gender segregation led them to conclude that occupation-level data only (excluding firm-level analysis) is severely limited by aggregation biases. Gender segregation on the labor market has also been present in promotion rates. Men have advanced more quickly and reached further up the job ladder (DiPrete and Whitman 1988). When controlling for firm and occupation, however, the gap in reached rank virtually disappears (Meyersson Milgrom and Petersen 2006). Men and women sort and self-select into different

firms. Although the occupations, jobs, may be similar in these firms, firms vary their promotion rates (Meyersson Milgrom and Petersen 2006) and the number of rungs on the promotion ladders (DiPrete and Whitman 1988; Ierulli and Meyersson Milgrom 2004). Men tend to end up in the more advantageous firms, that is, those with more opportunities. Thus the gender gap is perpetuated as workers sort and self-select into different firms, even within the same industry and occupation. Research suggests that promotion of women into management position may benefit all women, but only if female managers reach relatively high positions (Cohen and Huffman 2007). So the specific question presented in this study is if promoting women to top positions will end labor market segregation, both vertically and horizontally.

Instances of men and women being sorted and self-selected into different industries according to gender stereotypes are obvious enough (e.g., the military versus childcare professions), as are instances of sorting into different occupations within an industry (e.g., men becoming doctors and women becoming nurses). Subtler mechanisms are also significant, as through “ghettoization”—a term suggested by Roos and Reskin (1992:71) for the concentration of women and men in different jobs within the same occupation. For example, more male doctors become neurosurgeons and more female doctors become dermatologists; women more often teach at primary schools and men more often at secondary schools (see Strober and Best 1979; Baron and Bielby 1985); and men are more likely to become salesmen at some department stores, while women are more likely to at other, less luxurious ones (Talbert and Bose 1977). Reskin and Roos (1990) also suggest that an employer's preference for men combined with men's and women's preferences for better paying jobs leads to good jobs, paid well relative to their education, going to the men. The mechanism, they argue, is that employers can get no men for the poorly paid jobs relative to their education, but they can get women, hence, the resulting

feminization of occupations.

Another proposed mechanism leading to the persistence of segregation in the labor market, but arguing causation going in the opposite direction, suggested by England et al. (2007b) is that men avoid entering fields where women dominate; feminization of academic fields, like doctorates, at one point in time deters the later entry of men, as predicted by the devaluation perspective in England (1992) and England et al. (2007a, 2007b) and in Schelling's "tipping models" (1971, 1978). Studies on why men would dislike to work with and for women, and vice versa, are often based on ideas in psychology, such as that gender roles, as socially constructed beliefs, prescribe and describe how males and females are expected to behave. These beliefs typically disadvantage women since, for example, masculinity is most often associated with the stereotype of a successful manager while femininity is seen as incongruent with this role (Ely and Meyerson 2000; Kirchmeyer 2002; for an overview see O'Neill and O'Reilly 2011). Male workers may dislike female managers because of the negative stereotype of female managers as leaders or because of the perception that female managers lower the prestige of their job (Brett and Stroh 2003; Bose and Rossi 1983; Goldin 2002). For example, Boldry, Wood, and Kashy (2001) show that men are perceived to possess more of the motivation and leadership qualities necessary for effective military performance than women.

For the same reason, female workers may dislike female managers, and female managers may even try to identify with male managers by discriminating against female workers—Queen Bee syndrome.⁴ For example, Broder (1993) and Bagues and Esteve-Volart (2010) find that female evaluators are relatively less favorable to female applicants. Giuliano et al. (2006) finds

⁴ The Queen Bee syndrome concept originated in the academic literature in the 1970s. Staines, Tavis and Jayaratne 1974 describes women who have reached the top ranks of their company, particular in a male dominated occupation, intentionally hindering the career progress of females on lower levels of the job ladder.

that traditionally lower-status managers (young and black) are more favorable to higher-status employees (old and white); however, they do not find a significant gender effect.⁵

Cecilia Ridgeway proposes a “gender-framing process” (Ridgeway 2011) as the fundamental mechanism that generates gender inequality in the West. She suggests that both men and women unknowingly participate in a cognitive, cultural, and social process that reproduces existing beliefs and perceptions about distinctions among social groups (which may be based on gender, race, socio-economic status, etc.). Cultural beliefs about such categories guide our expectations about group members’ preferences, abilities, and likely responses to our actions, shaping how we act toward and judge them. In this way, accepted beliefs about the characteristics of social groups can function as “self-fulfilling prophecies.” (Such culturally shared systems of categorization fill a need for cognitive simplification and help coordinate social and economic interactions) (Ridgeway 2011:54). Her gender framing perspective suggests a gender status hierarchy and assumes *a threshold* at which an increasing number of women superiors begins to challenge the fundamental basis of the gender hierarchy—that men as a group, if not in every individual case, have a higher status and are more appropriate for authority than women. *And at some threshold women should be equally adverse to male supervisors as men are to women.*

Gender framing helps explain the more general segregation that generates the gender gap (i.e., unequal work opportunities, even if the pay is indeed equal) by affecting the preferences and decisions not only of employers but also of workers, driving the “self-sorting process” that perpetuates gender segregation in the labor market: In what hierarchy do I want to work, and with whom?

⁵ Bednar and Gicheva (2014) suggest that gender interacts with other factors such as management style.

Two Competing Theories

The present paper focuses both on workers' responses to, and thus revealed preferences about, a change in the gender composition of their colleagues as well as among their supervisors. We continue by reviewing two specific theories about how members of a majority identity group respond to an increase in the proportion of a minority identity group: Does an increase in the relative size of the minority increase or decrease the majority's aversion to the minority (i.e., the level of perceived difference)? *Competition theory* holds that an increase in the proportional size of a minority group increases the level of intergroup hostility and conflict. As a minority group grows, it becomes an increasing threat to the majority control of resources, resulting in increased hostility and discriminatory action (Blalock 1957, 1967; Bonacich 1972). This theory has generated some empirical support: for example, when the presence of women increases in a historically male-dominated organization or institution, performance and well-being decrease (South et al. 1982, 1983; Wharton and Baron 1987, 1991; Allmendinger and Hackman 1995) and also might lead to increased turnover (Tolbert et al. 1995). Further, South et al. (1982) examined the frequency and quality of male/female interaction in six offices of a large US federal bureaucracy and found that the higher the proportion of women in the office, the less frequently women interacted with male co-workers and the less support they received from males for promotion (for similar result, see Blalock 1967).

The competition framework also incorporates the idea that, holding demand constant, incumbents have a pecuniary incentive to discriminate against new entrants in order to reduce the

labor supply and thus increase their own wages (see Pfeffer, 1981, 1983; Pfeffer and Davis-Blake 1987). This prediction has also garnered empirical support: a higher proportion of women in college and university administrative positions correlates with lower salaries for both men and women (Pfeffer and Davis-Blake 1987; England et al. 1988). However, if the restriction of labor generates extra rent (Stigler 1971; Pfeffer 1974), it should be symmetrical across gender (i.e. there should be equally virulent discrimination against men in female-dominated occupations and firms) and salaries should be lowest for occupations with equal proportions of men and women, because the labor supply should be greatest in these occupations. However, this is not the case (Bielby and Baron 1986a, 1986b; Pfeffer and Davis-Blake 1987; England et al. 1988).

Competition theory also renders unnecessary the intuitive assumption that individuals favor—or are attracted to or are less likely to discriminate against or be averse to—others similar to themselves. That is, male attraction to male managers in a male-dominated firm/occupation/industry offers no way to distinguish between attraction to the similar group and attraction to the dominant/majority group. The claim that female workers in male-dominated firms/occupations/industries also prefer male managers would suggest the latter; while if they prefer female managers, it would suggest the former.

Contact theory, on the other hand, presented by Allport (1954) and later applied empirically by Kanter (1977a, 1977b), argues that an increase in the proportional size of a minority reduces discrimination and the perception of difference under certain circumstances (see footnote 3). The more individuals interact with members of other social groups, the more likely they are to receive evidence disconfirming the validity of out-group stereotypes; such experiences undermine prejudicial attitudes and thus reduce the propensity to discriminate. Kanter's ethnographic work, cited above, confirms this prediction, but the overall empirical

support for this line of research is inconsistent (see Turco 2010). The effects of being “token” are not the same for all identity groups and do not seem to be linear, contrary to what earlier scholars suggested (e.g., Pfeffer 1981, 1983). In contrast with competition theory, contact theory seems to rely on the notion that discrimination and the propagation of the stereotypes that justify it are driven largely by “social values” rather than pecuniary motives and that individuals are attracted to similarity or to other members of the same group, even if it is not the dominant one (thus predicting, for instance, that female workers will favor female managers, even in a male-dominated industry, occupation, or firm).

Competition theory holds that aversion/resistance/discrimination increases as the size of a minority increases whereas contact theory holds that it decreases. However, the relationship may in fact be non-monotonic and include a “tipping point” (a given percentage) at which the relationship reverses. Blalock (1967), for example, posited a curvilinear relationship between minority-group size and negative social outcomes for minorities, which is supported by empirical studies on gender, such as Allmendinger and Hackman (1995), Tolbert et al. (1995), Pfeffer and Davis-Blake (1987), South (1987), and South et al. (1982, 1983). Essentially, the predictions of contact theory hold up to a point or node (perhaps a little under %) at which the minority becomes large enough to be viewed as a potential threat, after which the proportion/aversion relationship reverses and the predictions of competition theory hold. Further, there may be multiple such points or nodes (i.e., percentages at which the proportion/aversion relationship reverses). The inconsistency of the empirical results, which is due partly to a lack of appropriate data, has made it difficult to evaluate these competing theories. As noted below, our results suggest that a model with two nodes fits best.

Many of the above studies have looked simply at the effect of changing gender

proportion of co-workers in an occupation. But if status is a key part of gender, as argued by Ridgeway (2011), then the most sensitive changes should be in the gender proportions of supervisors, not just co-workers, and this will be distinctively what we will analyze. In our study we will focus both on changes in the gender composition of occupation hierarchies, and in the occupation of the firm.

According to competition theory, if the female share of supervisors increases men will worry about an increase in competition, discrimination, or an increase in conflicts, and leave, whereas women will stay, and if there is an increase in share of male supervisors men will stay and women will leave. According to contact theory, if the female share of supervisors increases, men would learn, adapt, and stay, so would women via-a-vis an increase in share of men supervisors. The following hypotheses have been formulated to test these theories: (i) male workers will behave as if they are averse to female supervisors and will leave when their share increases; (ii) male workers will behave as if they prefer male supervisors and stay if their share increases; (iii) female workers will behave as if they are averse to male supervisors and leave when their share increases; and (iv) female workers will behave as if they prefer female supervisors and will stay as their share increases. These effects will be studied across cohorts/time and lifecycles. In order to test linearity and monotonicity in the relationship, the study will examine employee behavior when female composition in the occupation is a weak minority (less than 10%), strong minority (30%), and majority (more than 50%). Finally the study tests if worker behavior is driven by pecuniary or social preferences.

Study Overview

This study is based on historically unique longitudinal employer-employee data that

makes it possible to use M&As as an exogenous shock to the system. M&As constitute a possible pseudo natural experiment suited to this application since although they can generate significant changes in the number of women in top positions, decisions to acquire or merge with other firms are typically not driven by gender composition of top managers. In the absence of compounding gender factors that could generate a spurious relationship, we can establish a possible causal link between changes in the gender composition of management and the subsequent response of other female or male workers. Even though we cannot rule out the possibility that changes in gender composition of supervisors are correlated with unobserved structural changes during mergers and acquisitions, our results are robust to various specifications including an M&A or firm fixed-effect model.

DATA AND MEASUREMENT

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.⁶ 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 after 1990 (Calmfors and Forslund 1990). Throughout the sample period employers decided autonomously on hiring and promotion, but firing workers was strictly regulated by law and monitored by the labor union. These data were gathered and

⁶ Compared to the probability sample in Kalleberg and Mastekaasa 1994.

monitored jointly by both the SAF and the PTK (the two parties 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, each individual worker can be tracked 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 needed to fulfill the tasks.⁷ 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). Crucially, these ranks are designed to be comparable across occupations and firms, allowing analysis of workers' promotion patterns even when they change firms.

One of the goals of the Swedish negotiations was to secure similar wages for the same tasks. In practice, however, significant wage variations existed within occupations and rank. 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 U.S. firms (see Baker et al. 1994).

Gender and Acquisitions

The gender wage gap in Sweden, as in many other countries, is small when controlled for workers' employer, occupation, and rank. Women represent about 24.8% in 1970 and 34.6%

⁷ Rank reflects the number of subordinate employees and type of skill needed for decisions at that level.

in 1990 in the data of white-collar workers.

However, women are severely under-represented at higher ranks. The female share averages only 1.15% at the highest rank (rank 7), compared with 78% at the lowest (rank 1). (See Figure W2 in Web Appendix www.meyersson.com). Figure 1 shows that women's shares at higher ranks have not increased significantly during the period 1970-1990 in Sweden.

[Figure 1]

The study focuses on those firms in the data involved in mergers and acquisitions, using M&As as an exogenous shock to the gender composition in top managerial ranks. Since the data do not include firms' financial information, mergers and acquisitions are identified based on changes in workers' firm IDs. If more than 50% of workers change firm ID from A to B and the old firm ID, A, disappears from the data, then the inference is made that "B has acquired A."⁸ Only firms with more than 10 white-collar workers are included in the study.⁹

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 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.¹⁰ The average wage of the acquiring firms (monthly total compensation in 1970 Swedish Kroner, SEK) is slightly larger than that of the acquired firms. The difference can mostly be explained by the fact that the acquiring firms have more high-ranking positions.

⁸ 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 both disappear. These few cases are omitted. Some firms are involved in more than one M&A during the sample period. Excluding M&As where the same firm is involved in more than one M&A within six years does not change the qualitative results.

⁹ Focusing on firms with more than 100 white-collar workers or removing this restriction does not change the qualitative results of the paper.

¹⁰ Alternatively, firm size can be measured by the total wage payments, but no results change.

[Table 1]

Relative ranking is assigned for each worker's wage within his or her firm, 0 if at the lowest rank and 1 if at the highest. The average relative wage for women does not differ much between the acquiring and acquired firms, nor do most other characteristics of female workers such as worked rank, age, and ratio of part-time work. This is important to note because the analyses assume that acquisition decisions are independent of both firms' gender aspects, such as female share and relative wage.

Table 2 shows that after controlling for firm size, primary industry, and primary occupation of each firm, the correlations between acquiring and acquired firms in gender share and status are quite small.¹¹ For example, the correlation in overall female share is 20%, 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]

Overall, female share and women's relative ranks do not seem to affect acquiring firms' choices. Moreover, the main analyses control for average female shares within each firm and each occupation. Finally, the 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.

Although compounding gender effects are less problematic for merger and acquisitions, the types of M&As in the sample are quite heterogeneous. Firms may acquire very similar firms in another geographic market, acquire their competitors in the same market, or acquire very

¹¹ First female share is regressed on firm size, firm size squared, primary industry, and occupation; then the correlation of residuals between acquiring and acquired firms is measured.

different firms for complementarity or for business line expansions. In order to control for different types of acquisitions, M&A or firm fixed effects are controlled for.

Gender Composition in Supervisor Positions

In order to analyze the effects of changes in the share of women in supervisor positions, two groups of supervisors are distinguished. The first group, *supervisor within occupation*, includes those at the highest rank within their occupation at either of the original firms.¹² For example, if firms A and B are merging and the highest ranks in their marketing departments are 4 and 6 respectively, then the supervisors within occupation for marketing workers at both firms are those at rank 6.¹³ Our M&A sample include 2,352 female and 9,802 male supervisors within occupation. (See Web Appendix for robustness tests of the results, defining supervisors as those at the top two ranks or as those at all the ranks above a given worker's rank.)

The second group, *supervisors within firm*, includes those at the highest rank in either of the two merging firms, regardless of occupation. The sample, however, contains only 14 female supervisors within firm, compared with 2,672 male supervisors within firm. The number of female supervisors within firm thus changes little, even in M&As. The share of female supervisors within firm is controlled for using firm fixed effects, and with the focus on changes in the share of female *supervisors within occupation*.

In studying M&As, important observations may be lost when employees leave the firm before the merger in anticipation of perceived unfavorable working conditions.. Those who quit

¹² Alternatively, the top managerial position could be defined as ranks 6 and 7. However, not all firms have rank 6 or rank 7 in each occupation, let alone female managers at ranks 6 and 7.

¹³ In this example, the definition of top rank changes for workers in firm A after the merger. However, only 0.6% of workers experience a change in the top rank within occupation as defined this way. That is, for most workers, the top ranks within occupation in two merging firms are the same.

before or during a merger may just be those most sensitive to the change in supervisors. Moreover, actual changes in the share of supervisors can be correlated with other unexpected structural changes during an acquisition. Therefore, *expected* (or predicted) changes rather than actual changes are used in the share of female supervisors. More specifically, the data of the two firms immediately *before* an acquisition are combined and treated as a single firm. In this way, the expected share of female supervisors for each worker both within occupation and within firm can be measured. The difference between the expected share and the actual pre-merger share of female supervisors yields the expected change in the share of top female supervisors. Table 3 shows the summary statistics for the expected changes in the share and the number of female supervisors, within occupation and within firm, for both male and female workers.

[Table 3]

The average male worker has only 0.07 female supervisors within his occupation, while the average female worker has 2.9 female top managers within hers. Alternatively, for an average male worker, only 1% of supervisors in the same occupation are female, while for an average female worker 32% of supervisors in the same occupation are female. These results arise from gender segregation in occupations. That is, female workers are concentrated in a few occupations that have a relatively large share of female supervisors. More importantly, however, the standard deviations for the expected changes in the share of female supervisors within occupation are relatively large. These variations are essential for the identification of the study parameters.

Turnover

Employees' behavior or reaction to the changes in the share of female supervisors is observed by computing their voluntary turnover decisions. This allows study of workers' behavior without relying on potentially problematic survey responses.¹⁴

A drawback of this approach is that workers can be fired during acquisitions, and it is difficult to distinguish empirically between voluntary and involuntary turnover. However, it is generally hard for Swedish firms to fire workers without consent from the labor union. Thus, instances of involuntary turnover can be expected to be rare. Moreover, because workers' wages after changing firms can be observed, involuntary turnover can be identified in several ways.¹⁵

[Table 4]

The average turnover rate is 12.4% for acquiring firms and 15.4% for acquired firms in M&As and the average turnover rate for all firms in the full data/population (i.e., including those not involved in acquisitions) is 14%. In other words, acquiring firms have lower turnover rates than the average firm and acquired firms, whereas the acquired firms have higher rates compared to the average firm, suggesting that workers in acquired firms may be systematically fired during acquisitions. This pattern is confirmed by running a probit regression of turnover on a 20% random sample of the full data including both M&A and *non*-M&A samples. Table 4 shows that in fact the coefficient for the acquired dummy variable is unrealistically large, possibly due to large heterogeneity among firms. Thus subsequent analyses will control for M&A or firm fixed effects. Table 4 also shows that overall turnover patterns of male and female workers are very similar. Columns [1] and [2] show that female workers are slightly less likely to quit than male workers, but in columns [3] through [6] there exists no significant difference between the

¹⁴ See, e.g., Bertrand and Mullainathan (2001) for potential problems of using survey responses.

¹⁵ See Web Appendix C for a series of robustness tests.

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 female supervisors (which will be analyzed in the next sections) is not driven by an underlying gender difference in turnover behavior.

The study also finds that while most quits from acquiring firms are voluntary, many quits from acquired firms appear to be involuntary (i.e. layoffs). The sampled data show that workers who involuntarily leave acquired firms have lower wages compared to those who quit voluntarily, and all employees who left acquired firms have a much lower than average rate of wage increase compared with those from acquiring firms and the non M&A firms in the population. The robustness checks in the Web Appendix show that if only the acquiring firms' workers are incorporated there are no changes in results. Therefore all the M&A firm's workers are included in our analysis below.

When the data is limited to the sample (workers in acquiring or acquired firms with more than 10 workers) workers' average annual turnover rates (excluding those who were hired after M&As) are 9.% in the first year after an M&A, 8.27% in the second year, 8.23% in the third year, and 5.7% in the fourth year. It appears that most of the turnover due to an M&A occurs within three years. Therefore, the study focuses on workers' turnover rates within three years after an M&A as a main dependent variable. However, the results are robust even when using workers' turnover rates within one, two, or four years after the event.

GENDER COMPOSITION OF SUPERVISORS AND TURNOVER

Empirical Specification

The gender preference of workers for their supervisors is inferred by analyzing how expected changes in the gender composition at top ranks affect male workers' decisions to stay or quit after M&As relative to that of female workers. More specifically, for a worker i in firm j at time t , the baseline empirical specification is as follows:

$$\begin{aligned} \text{turnover}_{ijt} = & \\ & \alpha_0 + \alpha_1 E[\Delta \text{share of female supervisors within occup}_{ijt}] + \\ & \alpha_2 E[\Delta \text{number of supervisors within occup}_{ijt}] + X_i \beta + \delta_j + \delta_t + \varepsilon_{ijt} \end{aligned}$$

Where $\text{turnover}_{ijt} = 1$ if a worker quits within three years after an M&A; $E[\Delta \text{share of female supervisors within occup}_{ijt}]$ is the expected change in the share of female supervisors within the same occupation; $E[\Delta \text{number of supervisors within occup}_{ijt}]$ is the expected change in the number of supervisors in the same occupation (regardless of gender); X_i is worker i 's observed characteristics; δ_j is an firm fixed effect, and δ_t is a year fixed effect.

The workers' observed characteristics include pre-merger share of female supervisors within occupation, pre-merger number of supervisors within occupation, pre-merger share of all females within the same occupation, expected change in the share of all females within the same occupation, age, age squared, ratio of occupation size to the size of the same occupation in the

merging firm, real wage, and dummy variables for ranks, occupations, industries, counties, and part-time.

The model is constructed using OLS regression separately for males and females. The parameter of main interest is α_1 . If male workers are averse to female supervisors, for example, male workers would be more likely to quit when the share of female supervisors in the same occupation increases. In this case, α_1 would be positive for male workers.

Preferences for Gender Composition at Supervisory Levels

A separate turnover model is applied to men and women if analysis of the data shows that male workers act as if they are averse to a larger share of female supervisors or if female workers act as if they are attracted to a larger share of female supervisors. Separate turnover models are applied to the male and female cohorts.

[Table 5]

Table 5 shows that an increase in the expected share of female supervisors increases male workers' turnover rates, but does not significantly affect female workers' turnover rates within the occupation within the firm. That is, male workers seem to be averse to an increased share of female supervisors but female workers behave as if they were indifferent.

Cohort, Time Period, and Life Cycle Effects

The past half-century has witnessed a dramatic reduction in gender inequality in economic, political, and cultural dimensions, and these changes presumably interact with

individuals' preferences and belief systems. Consequently, men are expected to exhibit more aversion to female supervisors among earlier *birth cohorts*. This section details the investigation of whether workers' preferences for female supervisors changes across birth cohorts, life cycles, and occupation gender composition. This potential heterogeneity can give further clues to the sources of the difference in male and female workers' preference for female supervisors and the dynamics of gender hierarchy in an organization.

It is more difficult to predict cohort effects for female workers. If gender equality implies gender neutrality, then later (or younger) cohorts of female workers would show less attraction to female supervisors. But if gender equality implies an increased relative wage for women, then later (or younger) cohorts of female workers would show more attraction to female supervisors.

These conjectures are tested by estimating workers' turnover behavior separately for workers who were born before 1940 and after 1940, running OLS regressions with firm fixed effect for age over 40 and under 40 as well as for female and male separately. Table 6 shows the results of 'the expected change in the share of female supervisors.'

[Table 6]

The results show that cohorts before 1940 are not only more averse to an increase in share of female supervisors, but that it is true for both men and women.¹⁶ The effect is strongest for older men and for earlier cohorts. Hence it can be expected that the gender segregated labor market would go away if the reason were only the selection of men and women to jobs and firms.

¹⁶ Median birth year is 1939, and changing years to 1935 or 1945 does not change the results.

Taking the historic time period into consideration, Table 7 shows that older men (but not women) are as averse to women as they are 10 years later.¹⁷

[Table 7]

Gender Composition Effect

Occupations are 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 describes how the average share of female workers within an occupation affects workers' responses to an additional male or female top manager within that occupation.

Male workers in male-dominated occupations may be particularly resistant to female supervisors because of traditional negative stereotypes about female leadership. Alternatively, these male workers may favor a female supervisor as a “token” or a symbol of their social responsibility for gender equality or diversity (Kanter 1977a, 1977b). Or they may prefer gender *diversity* in supervisor positions because it improves team performance (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 can welcome an additional female supervisor when the female minority share is small but resist her more when it is larger, and they show the greatest opposite-gender aversion when male and female shares are equal (Blalock 1967).¹⁸

¹⁷ Time period, birth cohort, and life cycle experience cannot be distinguished at the same time (see Hall 1971). Hence, time period and cohort effects will be conflated in the regressions.

¹⁸ Minority of female is here used in a generic sense, as numerical minority, knowing that that

In order to further test the different predictions of competition and contact theory, gender composition in each occupation is classified 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 group, a strong minority in the second group, and a majority in the third group. The model is estimated separately for each group. Table 8 shows the results.

[Table 8]

In occupations where the share of female coworkers is less than 10% and when there is an increase of the share of female supervisors, men are more likely to quit compared to women. Both men and women tend to quit when the female share of occupation is between 10% and 50%. For men there is a negative monotonic relationship such that men's tendency to quit when the share of female supervisors increases decreases with higher representation of females in the occupation.

Pecuniary Motives and Social Values

The most salient results about workers' gender preferences are (1) male workers' general aversion to an increased share of female supervisors, and (2) female workers' aversion to female supervisors under certain conditions. This section explores the motives behind these different types of aversions, asking in particular whether expected increases in the share of female supervisors within occupations leads to slower short-term wage growth for male workers than for female workers. To whatever extent men's opposite-gender aversion is not tied to such pecuniary motives, it is likely motivated by non-pecuniary payoffs such as status and similarity attraction.

female can also be in majority as well as is in no way a minority in society.

A decrease in non-pecuniary payoffs, however, can also reduce long-term pecuniary payoffs by reducing incentives for human capital accumulation.

[Table 9]

[Table 10]

Columns [1] – [3] of Tables 9 and 10 use the wage growth rates and promotion rates three, five, and seven years after the M&As as dependent variables, and show the results of the respective regressions for men and women. An increase in share of female supervisors has a significant negative effect on male workers' wage growth rates in the first three years compared to when the share of female supervisors does not increase. After five years there are no significant effects. For female workers, an increased share of female supervisors has no significant effects on their wage growth rates after three or five years. With respect to promotion rate there is a positive effects on promotion rates both for men and women. For men it is significant only for the three years after the M&As, and for women it is significant after five and seven years.

A caveat for these analyses is that they only observe wage growth rates for those who remain in the firm. There exists a potential selection bias. However, if male workers who expect the lowest wage growth quit first, the selection bias should make the estimates for male workers smaller (in absolute value), not larger. To partly address this selection bias, the three regressions have been run for men and women respectively based on a sample of workers who remained throughout the seven years. The results do not change.

Testing whether men's general aversion to female supervisors is driven by pecuniary or social values can be inferred by examining where women and men choose to go after an M&A: to firms with fewer female supervisors or more. Table 11 shows that women tend to leave for

firms with more women supervisors and men to firms with fewer (although not significantly so).

[Table 11]

The most likely explanation for men's flight from female supervisors is pecuniary interest. For women, however, the results point to a more status-driven explanation, i.e., to social values. Ridgeway suggests *at some threshold women should be equally averse to male supervisors as men are to women*. And in the present case women are more averse to female supervisors when the composition of females is more than 10% and less than 50%.

DISCUSSION

The findings of this study suggest an important and unexpected difference between the behaviors of male and female workers confronting an increase in female supervisors: the relationship for men is monotonic whilst for women it is non-monotonic. When the proportion of female supervisors within the occupation increases, male workers become more likely to quit, while for female workers there is no significant effect unless the gender composition within the occupation is in between 10% to 50%.

The results suggest that men's coping strategies are of the sort found by Pfeffer and Davis-Blake (1992) and Adams (1965): individuals leave when they feel at a disadvantage in a system with unequal rewards (see Pfeffer and Davis-Blake 1992:754). Why do men leave? The study finds that men staying in female-dominated jobs experience lower wage-growth rates compared with their colleagues that left (compare earlier mixed findings in England et al. 1988; England et al. 2007a; and contrasting findings in Hultin and Szulkin 1999), but not necessarily lower promotion rates. Women also leave, when the composition of the female share is between

10% and 50%, despite the fact that on average in their case wage growth rate increase and the promotion rates increase after the M&A. The authors suggest that the non-monotonic finding and counterintuitive results for women fit the status argument (Ridgeway 2011).

These findings are potentially important for several reasons. First, male response across occupations could be part of an explanation for why increasing female share in top positions has been slow. When women are a weak “minority,” male workers resist female supervisors, and as the female share increases male and female resistance to additional top female supervisors increases, maybe slowing the growth of the female share in top positions. Second, the results may explain why previous studies have found mixed evidence about how opposite-gender supervisors affect mobility, as studies have typically focused on women or men in a single occupation or a single firm. Third, the male and female responses to opposite gender supervisors suggest that a gender-neutral model of majority/minority relationships is potentially misleading.

The results do confirm one of the earlier theories, competition theories, as applied to men. For women, however, the study finds significant threshold effects as in for example in Tolbert et al. 1995 (for composition effects, not supervisor effects) and England et al. 2007a, 2007b. The effect is stronger for both men and women within the threshold points 10% and 50%, hence the relationship for men is monotonic and non-linear and for women non-monotonic and non-linear.

Another potential source of labor market segregation with important policy implications is changing attitudes over time and across birth cohorts. If male and female workers’ resistances to female supervisors are driven by traditional social values and customs that are becoming friendlier, it is possible to conjecture that such resistance should either decline over time or be less pronounced among later (or younger) birth cohorts of male workers. The instant results are

partly consistent with both of these conjectures. In contrast with earlier (or older) birth cohorts in which male workers show aversion to female supervisors, later (or younger) cohorts of male workers show, on average, little aversion to female supervisors. And younger male workers in the 1980s compared are less hostile toward working for female supervisors compared with younger male workers in the 1970s. Conversely, male employees older than 40 yearsold are averse to female supervisors in both the 1970s and 1980s. So the cohort effects demonstrate that aversion might go away, but age and time effects might not. Congruently, competition theory (but not contact theory) would predict that it is time rather than cohort that correlates with reduced hostility to female supervisors and that the effects are monotonic.

From a theoretical perspective, motivations behind workers' choices can be either pecuniary (workers move because of an expectation of slower wage growth and promotions) or non-pecuniary (workers move because they prefer a different working environment). The mechanisms that lead to these effects can be varied and complex. For example, similarity attraction (Byrne 1971) may lead male workers to expect that male supervisors will favor them in wage negotiations and promotion decisions (Becker [1957] 1971), as well as mentorship and access to professional networks (Noe 1988; Athey, Avery and Zemsky 2000). Or traditional stereotypes may lead male workers to believe that a greater number of female supervisors will have a negative economic or social impact on the firm and thus their jobs (Goldin 2002; Ridgeway 2006). Conversely, female supervisors may benefit women, even without actively favoring them, by providing role models and correcting negative traditional stereotypes (Jackson 2006; Beaman et al. 2009). This study cannot distinguish with any fine precision between what drives the behavior—the pecuniary or the social for women. The findings suggest, however, that men may be anticipating the lower wage growth rate and hence leave for other firms with better

wage growths and this tendency will increase with the share of female employees growing. On the other hand the favorable promotion rate would suggest that it is more a taste-based/status-based (i.e., social values) reaction rather than pecuniary. The suggestive evidence however cannot rule out that the motives are pecuniary. For women it is more likely status based reasons, hence social values that drive their decision to stay or leave.

From the policy perspective, the findings suggest that gender quota policies can have complicated effects that may actually reduce the well-being of female workers. While policies to increase the proportion of female supervisors inspire women's attraction, it may incite male workers to behavior that ultimately causes everyone to lose out. Male quits can initiate a vicious circle, reducing wages for all workers in an occupation with a growing female share and exacerbating gender inequality (Reskin 1988). And the growth of a quantitatively weak female minority into a larger, more visible one can provoke other discriminatory action on the part of the majority, reducing the well-being of members of the minority (Blalock 1967).

To the extent that workers' exit behavior is a signal to a firm's potential applicants, the findings suggest another reason that improvement in the gender rank and wage gap is stalling. Men's exit behavior signals to the labor market that men seek jobs elsewhere, which may be detrimental to a firm's efforts to hire talented employees of either gender. If female employees also quit in search of better-status "opportunities," and if the average ability in a firm's applicant pool falls, productivity and wage growth may fall with it. This is all consistent with equilibrium in which female-dominated firms hire less talented workers and so experience lower wage growth, in turn leading men to flee to male-dominated firms where the wage growth rate is higher. The consequences of a gender-segregated labor market for society do mean that mediocrity is winning over meritocracy.

CONCLUSION

In the wake of the gender revolution of the past half-century, steady progress toward gender equality has shown signs of stalling, with little penetration of women into the top echelons within elite spheres (see Costa 2000; Blau and Kahn 2006), and with male workers slow to move into female-typed jobs.¹⁹ There are both optimistic and pessimistic views on the near-term prognosis for gender equality, and this paper finds some empirical evidence for each.

On the optimistic side, there is evidence that male workers' aversion to female supervisors has declined among younger generations. Younger cohorts and young male employees do not on average seem to show opposite-gender aversion. On the pessimistic side, however, older men are hostile to women over time, and older men are more often in positions that recruit.

At this crossroads in the gender revolution, government policy may have an important positive role in supporting progress toward gender equality. Policies like gender quotas do seem to decrease wage gender discrimination against female workers, but we have seen that they may also make talented men and women more likely to select themselves into male-dominated firms. Effective policies must be designed with a clear understanding of their impact on both male and female workers, which as this study demonstrates are neither simple nor linear. Designing and evaluating such policies will require theories that are consistent with these empirical findings and that are able to make successful out-of-sample predictions.

¹⁹ See, for example, England (2006) and Blau et al. (2006).

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APPENDIX A. Three-Digit Occupation Codes

BNT Family	BNT Code	Levels		Female (%)
0			Administrative Work	
	020	7	General analytical work	18.1
	025	6	Secretarial work, typing and translation	99.3
	060	6	Administrative efficiency improvement and development	18.4
	070	6	Applied data processing, systems analysis and programming	16.6
	075	7	Applied data processing operation	24.1
	076	4	Key punching	98.1
1			Production Management	
	100	4	Administration of local plants and branches	0
	110	5	Management of production, transportation and maintenance work	0.3
	120	5	Work supervision within production, repairs, transportation and maintenance work	3.4
	140	5	Work supervision within building and construction	0.2
	160	4	Administration, production and work supervision within forestry, log floating and timber scaling	0.06
2			Research and Development	
	200	6	Mathematical work and calculation methodology	1.8
	210	7	Laboratory work	22.5
3			Construction and Design	
	310	7	Mechanical and electrical design engineering	7.3
	320	6	Construction and construction programming	8.8
	330	6	Architectural work	30.9
	350	7	Design, drawing and decoration	38.8
	380	4	Photography	28.2
4			Technical Methodology, Planning, Control, Service and Industrial Preventive Health Care	
	400	6	Production engineering	1.8
	410	7	Production planning	11.2
	415	6	Traffic and transportation planning	5.4
	440	7	Quality control	4.5
	470	6	Technical service	1.5
	480	5	Industrial, preventive health care, fire protection, security, industrial civil defense	4.4
5			Communications, Library and Archival Work	
	550	5	Information work	43.7
	560	5	Editorial work – publishing	10.3
	570	4	Editorial work – technical information	12.1
	590	6	Library, archives and documentation	78.7

6		Personnel Work	
	600	7	Personnel service
	620	6	The planning of education, training and teaching
	640	4	Medical care within industries
			50.1
			26.4
			91.6
7		General Services	
	775	3	Restaurant work
			76.0
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
	860	5	Advertising
	870	7	Buying
	880	6	Management of inventory and sales
	890	6	Shipping and freight services
			17.2
			19.4
			67.5
			42.8
			31.4
			4.1
			36.0
			21.4
			24.2
			17.0
			43.6
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
			56.4
			29.1
			31.5
			99.7
			42.7

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; ensures instructions are followed; monitors processes

Rank 3 (46%) - In charge of a 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 1 (0.1%) - Cleans sketches; writes descriptions

Rank 2 (1%) - Does more advanced sketches

Rank 3 (12%) - Does 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 1 (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 of buyers; 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

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 are after controlling for firm size, firm size squared, primary industry dummy, and primary occupation dummy.

Table 3
Changes in Female Hierarchy

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

Note: Standard deviations are in parentheses.

Table 4
 Turnover Pattern: Probit Analysis
 (dependent variable = 1 if quit; = 0 otherwise)

	All		Male		Female	
	[1]	[2]	[3]	[4]	[5]	[6]
age	-0.027 (0.000)***	-0.027 (0.000)***	-0.027 (0.001)***	-0.027 (0.001)***	-0.024 (0.000)***	-0.023 (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 (0.001)***	0.033 (0.001)***	0.103 (0.004)***	0.104 (0.004)***	0.021 (0.002)***	0.020 (0.002)***
firm size (in thousands)	-0.024 (0.007)***	-0.023 (0.007)***	-0.024 (0.007)***	-0.023 (0.007)***	-0.024 (0.009)***	-0.022 (0.008)***
firm size squared	0.002 (0.001)**	0.002 (0.001)**	0.002 (0.001)**	0.002 (0.001)**	0.002 (0.001)**	0.002 (0.001)**
acquirer	-0.031 (0.006)***	-0.030 (0.006)***	-0.032 (0.006)***	-0.031 (0.006)***	-0.024 (0.008)***	-0.025 (0.008)***
acquired	0.869 (0.002)***	0.870 (0.002)***	0.875 (0.003)***	0.876 (0.002)***	0.856 (0.003)***	0.857 (0.002)***
female	-0.009 (0.001)***	-0.012 (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 are adjusted for clustering within an occupation and a firm, and 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 5
 Share of Female Supervisors and Turnovers: Male vs. Female
 (dependent variable =1 if quit within three years after M&A; =0 otherwise)

	Male [1]	Female [2]	Male [3]	Female [4]
E[Δshare of female supervisors within occup]	0.1262*** (0.0377)	0.0186 (0.0267)	0.1550*** (0.0406)	0.0009 (0.0298)
E[Δnumber of supervisors within occup]	- 0.0011*** (0.0004)	0.0002 (0.0012)	-0.0009* (0.0006)	-0.0026* (0.0016)
Pre-merger share of female supervisors within occup	0.0143 (0.0168)	-0.0190 (0.0128)	0.0025 (0.0171)	-0.0190 (0.0128)
Pre-merger number of supervisors within occup	- 0.0002*** (0.0000)	- 0.0011*** (0.0003)	0.0001** (0.0000)	-0.0004 (0.0003)
M&A Fixed Effects	Yes	Yes	No	No
Firm Fixed Effects	No	No	Yes	Yes
Observations	142,114	44,173	142,114	44,173
R-squared	0.1021	0.0758	0.1547	0.1321

Standard errors are adjusted for clustering within a firm level in columns [1] and [2], and in parentheses.
 * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The models are estimated in OLS. For columns [3] and [4], the control variables are age, age squared, real wage, occupation size change, average female shares within firm and within occupation, changes in average female share within firm and within occupation, dummies for rank, occupation, part time, industry, count and year. In columns [1] and [2], Pre-merger share of female supervisors, Pre-merger number of supervisors, Acquired(=1), firm size, firm size squared, and firm size change are also controlled for. A positive coefficient means that an increase in female supervisors leads to employees quitting the firm.

Table 6
 Age and Cohort
 (dependent variable =1 if quit within three years after M&A; =0 otherwise)

		Male		Female	
		Born Before 1940	Born After 1940	Born Before 1940	Born After 1940
Age Over 40	E[Δshare of female supervisors within occup]	0.2322*** (0.0519)	0.1414 (0.1067)	0.0867* (0.0479)	-0.0067 (0.0750)
	Observations	65,029	9,386	13,608	3,727
	R-squared	0.2532	0.0965	0.2462	0.1194
Age Under 40	E[Δshare of female supervisors within occup]	-0.0546 (0.2579)	0.0944 (0.0848)	0.1294 (0.1876)	-0.0397 (0.0433)
	Observations	12,643	55,056	2,120	24,718
	R-squared	0.1237	0.0859	0.2435	0.0939

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; ***

Note: Table shows the coefficient of E[Δshare of female supervisors within occupation] for each subgroup of the data based on age and birth cohort. For example, for the males born before 1940 with age over 40, the coefficient of E[Δshare of female supervisors within occupation] is 0.2322. The specification of each regression includes firm fixed effects, and control variables are the same as that of columns [3] and [4] of Table 5.

Table 7
 Age and Time
 (dependent variable =1 if quit within three years after M&A; =0 otherwise)

		Male		Female	
		1970s	1980s	1970s	1980s
Age Over 40	E[Δ share of female supervisors within occup]	0.3503*** (0.1127)	0.1634*** (0.0538)	0.1026 (0.1223)	0.0309 (0.0465)
	Observations	45,788	28,627	8,118	9,217
	R-squared	0.2426	0.2010	0.2326	0.1815
Age Under 40	E[Δ share of female supervisors within occup]	0.0472 (0.1205)	0.0514 (0.1078)	0.0199 (0.0959)	-0.0068 (0.0515)
	Observations	45,220	22,479	15,556	11282
	R-squared	0.0861	0.0880	0.0867	0.1089

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; ***

Note: Tables show the coefficient of E[Δ share of female supervisors within occup] for each subgroup of the data based on age and time. The specification of each regression includes the firm fixed effects, and is the same as that of columns [3] and [4] of Table 5.

Table 8
 Gender/Sex Occupation Composition
 (dependent variable =1 if quit within three years after M&A; =0 otherwise)

	Male			Female		
	female share<0.1	0.1<female share<0.5	female share>0.5	female share<0.1	0.1<female share<0.5	female share>0.5
	[1]	[2]	[3]	[4]	[5]	[6]
E[Δshare of female supervisors within occup]	0.5240* (0.2883)	0.2213*** (0.0574)	0.0340 (0.1277)	0.0000 (0.0000)	0.1947** (0.0930)	-0.0028 (0.0345)
E[Δnumber of supervisors within occup]	- 0.0074*** (0.0006)	-0.0070** (0.0029)	- 0.0620*** (0.0072)	-0.0157* (0.0085)	0.0242** (0.0098)	- 0.0092*** (0.0017)
Pre-merger share of female supervisors within occup	-0.2105* (0.1128)	-0.0136 (0.0304)	0.0257 (0.0511)	-0.1793 (0.4472)	0.0476 (0.0398)	-0.0232 (0.0158)
Pre-merger number of supervisors within occup	- 0.0002*** (0.0000)	0.0021*** (0.0007)	0.0031*** (0.0011)	-0.0011 (0.0008)	-0.0003 (0.0018)	-0.0001 (0.0004)
Observations	86,534	43,536	12,044	2,414	11,661	30,098
R-squared	0.1486	0.1275	0.1758	0.1405	0.1349	0.1343

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Occupations are divided into three groups based on their average shares of females. The same regressions as in columns [3] and [4] of Table 5 are estimated for each of the three group compositions and separately for man and women .

Table 9
 Effects on Wage Growth After M&A
 (dependent variable = average wage growth rate after M&A)

	Male			Female		
	3 years [1]	5 years [2]	7 years [3]	3 years [4]	5 years [5]	7 years [6]
E[Δ share of female supervisors within occup]	-0.0468*** (0.0174)	-0.0253 (0.0347)	-0.0687 (0.0711)	-0.0271 (0.0181)	0.0170 (0.0379)	0.0395 (0.0925)
Observations	113,911	83,943	62,386	32,691	22,112	15,274
R-squared	0.2394	0.3430	0.4391	0.1783	0.2612	0.2990

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The dependent variable is the average wage growth rates after an M&A measured 3 years, 5 years, and 7 years later, respectively. The specification of each regression controls for the firm fixed effects, and is the same as that in columns [3] and [4] of Table 5.

Table 10
 Effects on Promotion After M&A
 (dependent variable = number of promotions after M&A)

	Male			Female		
	3 years [1]	5 years [2]	7 years [3]	3 years [4]	5 years [5]	7 years [6]
E[Δ share of female supervisors within occup]	0.1827*** (0.0552)	0.1500* (0.0841)	0.0238 (0.1467)	0.0515 (0.0329)	0.1406*** (0.0543)	0.3674*** (0.1080)
Observations	113,911	83,943	62,386	32,691	22,112	15,274
R-squared	0.1578	0.2487	0.3018	0.1461	0.2219	0.2674

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The dependent variable is the number of promotions after an M&A measured 3 years, 5 years, and 7 years later, respectively. The specification of each regression controls for the firm fixed effects, and is the same as that in columns [3] and [4] of Table 5.

Table 11
 Move to Firm with Share of Female Supervisors After Turnover
 (dependent variable = share of female supervisors within occupation at the new firm after turnover)

	Male [1]	Female [2]	All [3]
E[Δ share of female supervisors within occup]	-0.01518 (0.01156)	0.28117*** (0.07083)	0.14192*** (0.02564)
E[Δ number of supervisors within occup]	-0.00008 (0.00019)	-0.01279*** (0.00404)	-0.01111*** (0.00131)
Male			-0.19375*** (0.00515)
Male*E[Δ share of female supervisors within occup]			-0.12874*** (0.04128)
Male*E[Δ number of supervisors within occup]			0.01124*** (0.00132)
Observations	21,706	6,959	28,665
R-squared	0.04598	0.31763	0.53571

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The specification of each regression includes the firm fixed effects, and is the same as that of columns [3] and [4] of Table 5. In column [3], we also control for interactions between pre-merger share of female supervisors and male dummy and between pre-merger number of supervisors and male dummy.

Figure 1
Share of Females in Each Rank over Years

