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**Agents of Change or Cogs in the Machine?  
Re-examining the Influence of Female Managers on the Gender Wage Gap\***

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**Agents of Change or Cogs in the Machine?  
Re-examining the Influence of Female Managers on the Gender Wage Gap**

**Abstract**

Do female managers act in ways that narrow, or instead act in ways that preserve or even widen, the gender wage gap? Although conceptual arguments exist on both sides of this debate, the empirical evidence to date has favored the former view. Yet this evidence comes primarily from cross-establishment surveys, which do not provide visibility into individual managers' choices. Using longitudinal personnel records from an information services firm in which managers had considerable discretion over employee salaries, we estimate multilevel models that indicate no support for the proposition that female managers reduce the gender wage gap among their subordinates. Consistent with the theory of value threat, we instead find conditional support for the cogs-in-the-machine perspective: In the subsample of high performing supervisors and low performing employees, women who switched from a male to a female supervisor had a lower salary in the following year than men who made the same switch.

Keywords: Workplace Inequality; Formal Organizations; Gender; Gender Wage Gap; Managers.

## INTRODUCTION

The gender wage gap remains one of most persistent and widely studied forms of inequality in the workplace (Marini 1989; England 1992; Tomaskovic-Devey 1993; Petersen and Morgan 1995; Cotter et al. 1997; Huffman and Velasco 1997; Nelson and Bridges 1999; Reskin 2000; Tomaskovic-Devey and Skaggs 2002; Cha and Weeden 2014). In 2012, for example, median full-time female workers in the U.S. earned \$37,791, compared with \$49,398 for their male counterparts.<sup>1</sup> Against the backdrop of extensive research on how organizational practices affect gender inequality in the workplace (Baron, Davis-Blake, and Bielby 1986; Elvira and Graham 2002; Kalev, Dobbin, and Kelly 2006; Kalev 2009), a growing body of work has drawn attention to the role of managers in perpetuating or ameliorating inequality (Huffman, Cohen, and Pearlman 2010; Briscoe and Kellogg 2011; Castilla 2011).<sup>2</sup> In light of the inroads that women made into the management ranks of organizations during the 1970s and 1980s and subsequent evidence that this progress began to stall out in the 1990s (Cohen, Huffman, and Knauer 2009), a prominent stream of work (Jacobs 1992; Shenhav and Haberfeld 1992; Hultin and Szulkin 1999; Cohen and Huffman 2007; Penner, Toro-Tulla, and Huffman 2012) has examined the question: How do changes in women's representation in management affect the gender wage gap?

Embedded in this question is a conceptual puzzle. One set of arguments, coined “agents of change” by Cohen and Huffman (2007), suggests that increased representation of women in management will attenuate the gender wage gap as female managers redress the past inequities experienced by female employees. For example, Reskin (1988: 61) argues, “[T]he basic cause of

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<sup>1</sup> Figures obtained from a U.S. Census Bureau report entitled “Income, Poverty, and Health Insurance Coverage in the United States: 2012.” The report was issued in September 2013 and accessed in August 2014 via the web link <http://www.census.gov/prod/2013pubs/p60-245.pdf>.

<sup>2</sup> While some scholars have drawn distinctions between the terms “manager” and “supervisor,” we use them both interchangeably in this article.

the income gap is not sex segregation but men's desire to preserve their advantaged position and their ability to do so by establishing rules to distribute valued resources in their favor..." (see also Reskin and Padavic [1988]; Roth [2006]). Consistent with this view, the agents-of-change perspective anticipates that the influx of women into management positions will tend to counteract this tendency. In contrast, another set of arguments—which Cohen and Huffman (2007) refer to as “cogs in the machine”—indicates that, as they assume managerial roles, women will exert a negligible or even negative effect on the earnings of female employees.

Although conceptual arguments exist on both sides of the debate about female managers' role in influencing the gender wage gap, the preponderance of the empirical evidence to date has favored the agents-of-change perspective. Yet the evidence from which this sociological baseline has emerged comes primarily from cross-establishment surveys, which do not provide visibility into the choices of individual managers. Using longitudinal personnel records from a large information services firm in which employees were matched to supervisors, we analyze how the gender of managers affects the gender wage gap among employees who report to them. In particular, we assess how the salaries of male and female employees changed when they experienced a switch in the gender of their supervisor.

To preview our results, we find no support for the proposition that female managers act to reduce the gender wage gap among employees who report to them. Instead, we find conditional support for the cogs-in-the-machine perspective. Consistent with the theory of value threat, in the subsample of high performing supervisors and low performing employees, women who switched from a male to a female supervisor had a lower salary in the following year than men who made the same switch.

We proceed as follows. First, we distill the conceptual arguments in support of both the agents-of-change and cogs-in-the-machine perspectives and then review the available empirical evidence on the two sets of theories. Next, we describe our research setting and empirical approach, highlighting why both are well-suited to our research objectives and address many of the limitations of prior studies. We then report the results of multilevel regression models of employee salary on a granular set of covariates. We also report within-individual specifications that account for unobserved heterogeneity among employees. We conclude with a discussion of the implications of these findings for research on the gender wage gap and on the role of managers in the dynamics of workplace inequality.

### **WOMEN IN MANAGEMENT AS AGENTS OF CHANGE**

The agents-of-change perspective suggests that the movement of women into management positions will tend to reduce the gender wage gap through a combination of direct and indirect mechanisms. The direct mechanisms are grounded in social psychological theories of in-group preference based on ascriptive similarity (Tajfel and Turner 1986; Baron and Pfeffer 1994; Reskin 2000). Because gender is a highly salient identity marker, particularly in the workplace, it can create a common bond between same-gender employees and a tendency toward homosocial reproduction (i.e., the propensity to advocate for and promote same-gender subordinates) (Kanter 1977a; Elliot and Smith 2004; Gorman 2005). Just as men in supervisory positions may act to preserve the advantaged position of their male subordinates, so women ascending into managerial positions can be expected to take actions that will boost the attainment of their female subordinates. For example, women reporting to a female supervisor have 40% lower rates of reported workplace discrimination compared to women reporting to male supervisors

(Stainback, Ratliff, and Roscigno 2011), and survey evidence suggests that women are more likely to support policies that seek to rectify gender inequality in the workplace than are men (Cohen and Huffman 2007). These factors may lead female managers to disproportionately allocate rewards to female subordinates who may previously have faced inequality.

The tendency to favor same-gender subordinates in reward decisions does not just stem from a desire to rectify past inequities. For example, in a study of supervisor-subordinate dyads, Tsui and O'Reilly (1989) found that subordinates in mixed-gender dyads were rated as performing more poorly and were liked less well than subordinates in same-gender dyads. Moreover, among the four possible configurations of supervisor-subordinate dyads, women subordinates with female supervisors were rated to be most effective and were liked most. This tendency of women to prefer and advocate for other women may have roots that operate at the implicit, or automatic, level of cognition. In four experimental studies, Rudman and Goodwin (2004: 506) found that “even when men are responding automatically, their in-group bias is surprisingly frail.” By contrast, women’s in-group bias in implicit cognition was especially strong.

At the level of the establishment as a whole, the increasing representation of women in managerial ranks may also yield indirect benefits for women, including those who do not themselves report to female supervisors. For example, Ely (1994) found that women in firms with a greater proportion of senior women were more likely to experience common gender as a positive basis for identification with women, more likely to perceive senior women as role models with legitimate authority, less likely to perceive competition in relationships with women peers, and more likely to find support in relationships with other women. To put it differently, in sex-integrated firms, the presence of women in management positions served to positively

reinforce same-gender relationships among women throughout the organization. In these settings, women were also more likely to evaluate women's attributes more favorably in relation to their firms' success requirements (Ely 1995). Consistent with this perspective, Cohen, Broschak, and Haveman's (1998) analysis of job mobility in California savings and loan associations from 1975 to 1987 revealed that women were more likely to be hired and promoted into a particular job level when a higher proportion of women were already at that level. Women were also more likely to be hired and promoted when there was a substantial minority (but not a majority) of women above the focal job level.

The indirect benefits of women's entry into management can reduce the level of sex segregation at all levels within establishments, which could serve to further reduce the gender wage gap by supporting the movement of women into better paying roles elsewhere in the organization. For example, Stainback and Kwon (2012) found in a national sample of South Korean organizations that women's increasing representation in higher-level management positions was associated with lower levels of sex segregation—though their increasing representation in lower-level supervisory positions was associated with higher levels of sex segregation. The gender composition of employees was more balanced in colleges and universities with a higher proportion of female administrators (Kulis 1997), and the rate of gender integration in the California civil service was faster under female rather than male leadership (Baron, Mittman, and Newman 1991). In a similar vein, Cohen and Broschak (2013) examined the relationship between the proportion of female managers in New York-based advertising agencies and the number of new management jobs initially filled by women versus men. Their analyses indicated that an increase in the proportion of female managers was



positively related to the number of newly created jobs filled by women and had mixed effects on the number of new jobs filled by men.

Finally, two more recent studies have drawn on longitudinal data and examined within-firm and within-establishment variation in women's representation in management and subsequent changes in sex segregation. Kurtulus and Tomaskovic-Devey (2012) reported in an analysis of over 20,000 large private sector firms from 1990 to 2003 that an increase in the share of female top managers was associated with subsequent increases in the share of women in midlevel management. Similarly, Huffman, Cohen, and Pearlman (2010), drawing on establishment-level data from 1975 to 2005, found that women's presence in managerial positions was positively related to gender integration. These effects, which were also robust to the inclusion of firm and establishment fixed effects, were stronger in larger and growing establishments—though they appeared to be diminishing over the observation period. In sum, the agents-of-change proposition suggests that, through both direct and indirect mechanisms, the ascension of women into management will tend to erode the gender wage gap.

## **WOMEN IN MANAGEMENT AS COGS IN THE MACHINE**

The cogs-in-the-machine perspective instead holds that the entry of women into management positions will either have no effect or may even serve to augment the gender wage gap. Support for this perspective comes from theories of gender and interaction (Ridgeway 1997; Ridgeway and Correll 2004), which explain the persistence of gender status beliefs—widely held cultural beliefs about the superiority and competence of one gender over another. These beliefs cause “both men and women to implicitly expect (or expect that others will expect) greater competence from men than from women, all other things being equal” (Ridgeway 1997: 221). Because

interaction makes gender a “stubbornly available” distinction, Ridgeway (1997: 224; 230-231) argues that wage inequality will persist even in employment settings where “the usual organizational structures and practices that produce them are relatively absent....” Consistent with this view, Steinpreis, Anders, and Ritzke (1999) reported results of an audit study in which both male and female academics were more likely to hire a male job applicant than a female job applicant with an identical record and were more likely to view the male applicant as having better research, teaching, and service experience. Similarly, Heilman and Haynes (2005) found in a series of experiments in mixed-gender work groups that, unless subjects were explicitly provided information about female participants’ excellent contributions or strong past performance, they judged female participants to be less competent, less influential, and less apt to have taken a leadership role than male participants. Importantly, there were no significant differences in the ratings of male and female research subjects. As these studies illustrate, gender is a primary cultural frame that shapes the evaluations that both male and female evaluators make of women in the workplace (Ridgeway 2011).

Women in positions of authority may be especially unlikely to lend support to other women. For example, token women in male-dominated firms may be selected into leadership roles partly on their willingness to be “team players” who act to protect the status quo. As Kanter (1977b: 978-979) observed, “Through loyalty tests, the group seeks reassurance that tokens will not turn against them....They get this reassurance by asking a token to join or identify with the majority against those others who represent competing membership or reference groups; in short, dominants pressure tokens to turn against members of the latter’s own category....For token women, the price of being ‘one of the boys’ is a willingness to turn occasionally against ‘the girls’.”

Indeed, accounts of the “queen bee syndrome” suggest that women who have been individually successful in male-dominated environments may act in ways that block the ascension of other women (Staines, Tavis, and Jayaratne 1974). For example, in a university setting, female faculty were more likely to perceive female doctoral students as less committed to their careers than male doctoral students, while male faculty perceived male and female students as equally committed (Ellemers et al. 2004), and a more recent survey of senior women in the Netherlands found that those who started their careers with low levels of gender identification and subsequently experienced workplace discrimination were more likely to hold negative stereotypical views about other women’s career commitment (Derks et al. 2011). Consistent with these findings, data from the 2002 National Study of the Changing Workforce revealed that, relative to women, men received more job-related support and were more optimistic about their careers when they reported to a female supervisor (Maume 2011).

When female leaders experience value threat—which occurs when people see themselves as potentially valuable members of a group but perceive that others will see them as less valuable—they are especially unlikely to lend support to female aspirants. Two common manifestations of value threat are competitive threat, wherein a female leader feels threatened by a highly qualified female subordinate; and collective threat, wherein a female leader feels that she will herself be devalued through association with a poorly performing female subordinate (Duguid 2011; Duguid, Loyd, and Tolbert 2012). Thus, when female supervisors feel either competitive threat or collective threat from female subordinates, they are not only unlikely to differentially reward women but may even act in ways that penalize them. In sum, the cogs-in-the-machine perspective predicts that the gender wage gap will either persist or even increase as female representation in management rises.

## **EMPIRICAL EVIDENCE ON WOMEN IN MANAGEMENT AS AGENTS OR COGS**

In spite of the competing predictions made by the agents-of-change and cogs-in-the-machine perspectives, the preponderance of the empirical evidence on the gender wage gap supports the former.<sup>3</sup> At the macro-level, Cotter et al. (1997) examined earnings inequality across 261 metropolitan areas and found that occupational segregation was the primary source of gender-based variance in wages. At the firm-level, Shenhav and Haberfeld (1992) analyzed data from the early 1970s on privately held firms and showed that a higher proportion of female managers had an equalizing effect on the distribution of rewards. In a similar vein, Bell (2005) found that female executives working in female-led firms earned between 10-20% more than their counterparts in male-led firms, while, based on a sample of Portuguese firms, Cardoso and Winter-Ebmers (2010) also reported that the gender wage gap was attenuated in female-led firms relative to male-led firms. With respect to executive pay, Shin (2012) found that when a greater number of women sit on the compensation committee of boards, the gap in executive pay is smaller—though the presence of a female CEO did not influence the gender wage gap.

Using cross-establishment data from Sweden, Hultin and Szulkin (1999; 2003: 156) found that gender wage gaps were lower in private-sector establishments where women had made greater inroads into management. They concluded, “The assumption that female employees in general benefit from working in establishments with a relatively strong female representation among managers and supervisors received support.” Finally, using unique nested data from the 2000 Census, Cohen and Huffman (2007) inferred that the presence of female managers reduced the wage gap, and that this effect was substantially strengthened when the female managers in question were high-status. In sum, the available empirical evidence provides

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<sup>3</sup> A notable exception is Blau and Devaro’s (2007) analysis of survey data from the Multi-City Study of Urban Inequality. Though based on a cross-sectional analysis, they found no association between the gender of supervisors and the wage growth of male or female subordinates.

a clear sociological baseline: Women in management positions should through their actions—for example, how they reward subordinates for a given level of performance—reduce the gender wage gap.

Though this empirically derived baseline expectation may seem intuitive and compelling, it is based primarily on evidence obtained from large-scale, cross-establishment surveys.<sup>4</sup> This research method has the benefit of producing results that can be generalized across a wide range of organizations; however, it is also prone to the ecological fallacy (Firebaugh 1978). Cross-establishment surveys provide no visibility into the on-the-ground choices of supervisors that could potentially influence the gender wage gap. As a result, they do not allow researchers to disentangle macro-level changes occurring at the establishment level from the micro-dynamics of supervisor-subordinate relations (cf. Petersen and Saporta 2004).

The study of personnel records from individual organizations provides an alternative means of identifying the organizational bases of inequality. Although this approach raises questions about generalizability, it can provide clearer visibility than cross-establishment surveys into how particular organizational practices or managerial actions shape inequality. Accordingly, it has proven to be a robust avenue for sociological research. For example, in their study of a large services firm, Petersen and Saporta (2004) found a substantial earnings difference between men and women at the point of hire. Castilla (2008) did not find a gender difference in salary at the time of hire but showed that women experienced less salary growth than observationally equivalent men in a professional services firm—despite the presence of a merit-based compensation system. Similarly, in testing the role of firm-specific training in explaining earnings differentials, Fernandez-Mateo (2009) reported a difference in the trajectory of wages

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<sup>4</sup> Huffman, Cohen, and Pearlman (2010) and Kurtulus and Tomaskovic-Devey (2012) estimate within-firm and within-establishment models, which account for unobserved heterogeneity and represent a methodological advancement; however, the outcomes they studied pertained to sex segregation rather than the gender wage gap.

between men and women in a temporary staffing agency and attributed this difference to men's greater propensity to switch clients. In each case, archival analyses of personnel records provided a level of insight into managerial decision making that would not have been possible with cross-establishment surveys.

Though personnel records from individual organizations have been used to study many facets of organizational inequality, to our knowledge, only one published study has used such records to examine how female managers influence the gender wage gap. Drawing on longitudinal employment records that match employees in a large US-based grocery retailer to the men and women who supervise their work, Penner, Toro-Tulla, and Huffman (2012) found no evidence to support the agents-of-change hypothesis. Rather, the gender of the manager was not positively or negatively associated with the gender wage gap among employees. Though Penner, Toro-Tulla, and Huffman's (2012) work took an important methodological step forward by matching data on employees and supervisors, three features of their empirical setting and research design raise doubts about the inferences they drew. First, as the authors themselves acknowledged, the grocery retailer they studied was under a collective bargaining agreement at the time. In their study using the same data set, Ransom and Oaxaca (2005: 222) noted, "Most employees [in the grocery store chain] were represented by local affiliates of the United Food & Commercial Workers Union, International....The union agreement addressed the usual topics, including pay levels, premia for night or Sunday work, work scheduling, holidays, vacations, and other benefits." Although managers had discretion about whom to place in which job role and in setting work schedules, pay scales for many roles (e.g., clerks) were based on seniority. That is, it seems unlikely that managers in this setting had much discretion in setting employee wages.

This institutional feature is important to consider because prior research indicates that the absence of managerial discretion can substantially mute the agents-of-change effect: Hultin and Szulkin (1999) estimated that the effects of manager gender on reductions in the gender wage gap were three times stronger in organizations where managers had greater discretion (i.e., ones with a decentralized wage-setting process) than in their overall sample. Thus, the absence of support for the agents-of-change perspective in Penner, Toro-Tulla, and Huffman's (2012) analysis may simply have reflected the fact that managers had insufficient discretion to set employee wages.

Second, the industry context may have also stacked the deck against finding a positive effect of female supervisors on the wages of female subordinates. For example, Skaggs' (2008: 1149-1150) study of the effects of discrimination litigation on the movement of women into management noted the supermarket industry's "historically embedded discriminatory labor practices" and "male-dominated leadership." Indeed, perhaps as a reflection of the industry's historical practices, women represented a small proportion of managers in this grocery store chain: only 4.7% of employees had a female manager. To the extent that females were considered tokens in the organization, gender would not likely serve as a positive basis for identification among women, thereby reducing the chances that female supervisors would favor their female subordinates (Ely 1994; 1995).

Finally, none of the regression models reported by Penner, Toro-Tulla, and Huffman (2012) included controls for employee performance—a critical variable in any model that seeks to explain variation in employee wages (Castilla 2008). Without knowing the correlations between gender, employee performance ratings, and salary, it is difficult to evaluate the direction and magnitude of this omitted variable bias.

In this paper, we build on the empirical approach taken by Penner, Toro-Tulla, and Huffman (2012) while addressing many, though not all, of the shortcomings of prior studies. In doing so, we seek to contribute to the debate about whether female managers are agents of change or cogs in the machine by bringing to bear data and analyses from an empirical setting that is appropriate to this task. Following Penner, Toro-Tulla, and Huffman (2012), we draw on multiple years of personnel data from a large information services firm. We similarly match employees and managers in the data set and examine how the gender of the manager influences the gender wage gap among those who report to the manager. Our analyses were conducted, however, in the context of an industry sector and a firm in which women had made substantial inroads such that gender was more likely to serve as a positive basis for identification among women and in which women were apt to receive support in same-gender relationships (Ely 1994). Moreover, the firm that serves as our research site had a non-unionized labor force and afforded managers considerable autonomy to influence the salaries of employees who reported to them. Our analyses also accounted for past employee performance and therefore addressed concerns about omitted variable bias in prior studies (Penner, Toro-Tulla, and Huffman 2012; Abraham 2013).

In addressing these shortcomings, we provide a fairer and more credible test of the agents-of-change versus cogs-in-the-machine propositions. At the same time, we urge caution in generalizing from analyses based on five years of data from a single firm. It is also important to note that our analyses only assess the direct means through which female managers can influence the gender wage gap—that is, through the discretionary choices they make about subordinates' salaries. As reviewed above, the influx of women into managerial roles can also have indirect effects—for example, promoting greater gender integration (Huffman, Cohen, and Pearlman



2010; Kurtulus and Tomaskovic-Devey 2012)—that could subsequently affect the gender wage gap in ways that would not be accounted for in our analyses.

## METHODS

### Research Setting and Sample Characteristics

A leading firm in the information services industry served as our research site. It was typical of major players in this industry in size, gender composition of the workforce, and human resource policies and practices. Our sample included all 1,701 full-time employees in the US who worked for the company from 2005 to 2009 and for whom the company had complete employment records—including salary, reporting structure, performance evaluations, and demographic information.<sup>5</sup> Our data set therefore included 8,505 employee-year spells, though models with lagged performance ratings as a control had 6,531 observations.<sup>6</sup> To protect employee privacy and confidentiality, all identifying information was replaced with irreversibly encrypted identifiers. These identifiers also enabled us to link each employee to his or her manager in a given year.

Table 1 reports descriptive statistics from a representative year in the middle of the observation period (2007). There were slightly more women (55%) than men in the sample, and a greater proportion of women (0.63) than men (0.44) had female managers. The mean employee

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<sup>5</sup> Within our sample, 242 employees (14%) were missing at least one year's performance rating. Employees with missing performance data were not significantly different from those with complete performance rating data on conceptually relevant dimensions such as gender, salary, propensity to report to a female manager, and the propensity to switch managers. There were, however, significant differences on other dimensions such as age, tenure, and ethnicity. To account for potential selection bias due to missing data, we conducted a supplemental analysis (not reported) using Inverse Probability Treatment Weights (Hernán, Brumback, and Robins 2001; Wooldridge 2002; Azoulay, Ding, and Stuart 2009). The results were materially unchanged from those reported in Table 6.

<sup>6</sup> As a robustness check, we re-estimated all of our models using the full sample—that is, including employees who were absent during parts of the observation window. Doing so did not materially alter any of our results. In Model 5, estimated off the full sample, *Female*×*Female Manager* was not significant.

salary was \$63,780 with a standard deviation of \$32,830. Women earned \$56,920 on average compared to \$72,295 for men. The mean age was 43 and mean tenure in the firm was 8.85 years. The ethnic composition of employees was as follows: 79% White, 11% Black, 6% Asian, 2% Hispanic, and 2% Other (employees who chose not to report ethnicity or could not be clearly classified). Finally, employees received annual performance ratings (details of which are described below) that could range from “Does Not Meet Expectations” to “Exceeds Expectations.” The mean rating on this four-point scale was 2.55, with higher numbers reflecting superior performance. Across the observation period, employees were supervised by 630 unique managers, of which 480 were present in 2007. Women constituted 47% of these managers. Consistent with expectations, managers earned significantly more than employees, tended to have slightly higher performance ratings, and were more likely to be White.

**\*\*\*Table 1 about here\*\*\***

Table 2, which was constructed by hand coding and categorizing job titles, shows the amount of sex segregation in the firm by job level in a representative year (2007). We separate out managers (who supervise others) from employees (who have no direct reports). Consistent with the pattern found in many large corporations, women’s representation was greater in less senior jobs such as administrative support and lower in more senior jobs. Similarly, women constituted a greater share of more junior managers (56%) and were at parity with men in the senior manager ranks. Women were, however, relatively scarce among executive managers (29%).

**\*\*\*Table 2 about here\*\*\***

### **Performance Evaluation and Compensation Process**

Our understanding of the firm's performance evaluation and compensation process was informed by interviews with company representatives, including the Senior Vice President responsible for the performance management process and the Chief Human Resources Officer. Performance reviews were conducted on an annual basis, with the process starting in December. Employees would initiate the process by conducting a self-assessment relative to their individually defined goals for the year and a standardized set of behaviors the company sought to foster in all employees (e.g., customer focus, teamwork). This self-assessment would be submitted to managers via an online system. Upon receiving a subordinate's self-assessment, managers would conduct their own independent assessment and then schedule a one-on-one meeting to discuss the feedback. Following this discussion, the manager would submit a final performance rating in the online system. Once all of the ratings were submitted, second-line managers (i.e., managers of managers) would receive a report with the distribution of ratings given by the managers reporting to them and were encouraged to have calibration meetings to ensure some level of consistency in the use of ratings—for example, asking a manager who only gave the highest possible rating to all subordinates to adjust certain ratings downward and thereby increase the range. In practice, only about half of second-line managers held calibration meetings, and a small percentage (less than 5%) of ratings were adjusted. Thus, managers had considerable discretion in rating the performance of their subordinates.

Once ratings were finalized, managers had the opportunity to make recommendations about merit-based increases to base salary and, in some cases, a performance-based bonus for their subordinates. Each manager was given a merit increase budget for his or her department as a whole, typically in the 3% to 5% range. For each subordinate, they also received a report

indicating how the employee's salary compared to a market reference point, which was based on an industry-level compensation survey to which the firm subscribed. Managers then used this market reference data and performance ratings to determine how to allocate the merit increase budget across their subordinates. At the same time, managers determined the annual performance-based bonus for subordinates who were on one or more of the myriad bonus plans in place in the company. Again, they had considerable discretion to make merit increase and bonus decisions, which were rarely challenged or overturned. Outside of the annual performance review process, managers could also recommend subordinates for promotion, which often also led to an increase in base salary. Based on their knowledge of and experience working in other firms, our interviewees believed that this performance management and compensation process was typical of that in place in many large corporations. It was also very similar to the processes in place in other settings from which personnel records have been drawn in prior research (e.g., Elvira and Graham 2002; Castilla 2008; Castilla 2011).

### **Dependent Variable**

In a study of managers' roles in influencing the gender wage gap, the ideal dependent variable is one that: (1) managers have considerable discretion to set; (2) is based primarily on individual, rather than organizational, performance; and (3) is available on a consistent basis for all employees. These criteria strongly favored our choice of dependent variable: the log of annual pre-tax employee salary.<sup>7</sup> As noted above, managers in this firm, which was not unionized, could influence a subordinate's annual pre-tax salary through both promotion and merit increase decisions. Moreover, these choices were based on an employee's individual, rather than departmental or firm-wide, performance, and salary data were available on a consistent basis for

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<sup>7</sup> Studies of the gender wage gap sometimes use hourly wages (e.g., Penner, Toro-Tulla, and Huffman 2012) as the dependent variable to account for potential gender differences in hours worked. Because our sample included only full-time, salaried employees, we focused instead on annual salary.

all employees in our sample.<sup>8</sup> Table 3 describes the distribution of this variable by employee gender.

\*\*\*Table 3 about here\*\*\*

### Independent Variables

To assess how female managers influenced the annual pre-tax salaries of the male and female employees who reported to them, we used the following variables: *Female*, set to 1 for female employees; *Female Manager*, set to 1 for employees who reported to a female manager in a given year; and the interaction term: *Female* × *Female Manager*. In models with these terms, the reference category was therefore men working for male managers. *Female* represented the difference in salaries between men working for male managers and women working for male managers. *Female Manager* indicated the difference in salaries between men working for male managers and men working for female managers. The interaction term, *Female* × *Female Manager*, captured the difference in salaries between women reporting to female managers and men reporting to female managers. If this interaction term were significant and positive in a wage regression with appropriate controls, it would be consistent with the notion that female managers helped to ameliorate the gender wage gap within the work groups they supervised. By

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<sup>8</sup> We considered but ultimately did not choose an alternative dependent variable: the annual performance-based bonus award made to employees. Not every employee was eligible for such a bonus, and the company had several different plans in place. Moreover, only about 1/3 of the bonus decision was based on an employee's individual performance; the rest was based on how well the firm performed as a whole and how well the department in which the employee worked performed relative to department-wide goals. Finally, bonus data were not tracked on a consistent basis for all employees since many were not eligible and because different plans existed in different functional areas (e.g., sales). In short, the annual performance-based bonus fared poorly relative to the three proposed criteria for an appropriate dependent variable. Nevertheless, we replicated our multi-level models using bonus data as the dependent variable for the subset of employees who had available bonus data. In these analyses (not reported), we obtained consistent results to those reported in Table 6. Only in Model 5 was *Female* × *Female Manager* significant (switching to a female manager led to a ~1% decrease in the predicted bonus for women relative to men who made a comparable switch). This effect was not, however, robust to the inclusion of performance rating as a control. We thank an anonymous reviewer for prompting us to check whether the gender of managers might have mattered in bonus decisions, even if it was not a significant factor in salary increase choices.

contrast, if this interaction term were not significant or negative, there would instead be support for the cogs-in-the-machine hypothesis.

### **Control Variables**

In models without indicators for each employee, we included the following control variables:

*Age*; *Age Squared*; *Tenure*; indicators for race / ethnicity (with *White* as the reference category); indicators for the seven divisions within the firm to account for salient differences, such as the level of sex segregation, across these organizational subunits; and period (year) indicators.

Models with employee indicators subsumed the time-invariant control variables. To account for time-varying differences in performance that are associated with salary increases, in some specifications we also controlled for *Rating*, a four-point, time-varying measure of employees' annual performance. *Rating* was lagged by one year.

### **Estimation**

Because our data set consisted of five annual snapshots of the firm's personnel records, each employee was listed as reporting to a single supervisor in a given year. Yet many employees changed supervisors during the observation period. That is, employees were not nested within supervisors but were instead *partially crossed* with supervisors. Given this data structure, we estimated multilevel models that included a varying-intercept group effect for supervisors (Singer and Willett 2003; Gelman and Hill 2007). We estimated these models in R using the lme4 package (R Development Core Team, Bates et al. 2014). In some specifications, we included a varying-intercept group effect for employees. To account for unobserved employee heterogeneity, we also estimated *within-individual* models (that is, models that included an

indicator variable for each employee).<sup>9</sup> The latter identified the effects of managerial gender on the salaries of men and women by considering how salaries changed when employees *switched* to a manager of a different gender.

Our research aims supported the use of within-individual models because they accounted for the possibility that the matching of subordinates to supervisors occurred on the basis of unobserved attributes that were also associated with our dependent variable. For example, women deemed to have high potential for future advancement could be disproportionately channeled through formal or informal organizational practices to female supervisors who would serve as mentors (e.g., Kram 1985; Noe 1988; Ragins 1999). To the extent that unobserved potential is associated with higher salaries, women reporting to female supervisors would have higher salaries—but not necessarily because of the latter’s salary decisions. Similarly, unobserved employee characteristics—for example, strength of gender identification and adoption of traditional versus nontraditional sex roles (Cooper 1997; Derks et al. 2011)—could potentially influence a manager’s choice to disproportionately allocate rewards to certain same-gender subordinates. To move closer toward causal estimates of the effects of managerial gender on the salaries of female versus male subordinates, it was therefore essential to estimate within-individual models. Finally, a Hausman specification test ( $H = 474.96$ ,  $p < .001$ ) also favored the use of within-individual models over ones with “random effects” for employees (Wooldridge 2002).

Depending on the year, between 15% and 22% of employees in our sample switched to working for a different supervisor. Approximately half of the employees in the sample switched managers at least once in the observation period. Our within-individual models identify off of a

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<sup>9</sup> Within-individual models are also often referred to as “fixed effects” models. Following Gelman and Hill (2007), we use the terms “fixed effects” and “random effects” sparingly because their meaning can be ambiguous in the context of multilevel modeling.

particular subset of these switchers: employees who not only switched managers in a given year but who also switched to working for a manager of a different gender. Table 4 reports characteristics of switchers and non-switchers. The key comparison is between employees who switched managers and experienced a change in the gender of their manager and all other employees. On the whole, switchers who experienced a change in the gender of their manager resembled other employees on observable characteristics and on key variables of interest, such as pre-tax salary, performance rating, and gender. The former group was, however, somewhat younger and had less tenure in the organization, and these two differences were statistically significant.

**\*\*\*Table 4 about here\*\*\***

## RESULTS

Table 5 reports the correlations among the main variables used in our analyses. Consistent with expectations, there was a positive and significant correlation between *Logged Salary* and *Rating*, *Age*, *Tenure*, and *White*. Less expected was a significant and slightly positive correlation between *Logged Salary* and *Hispanic*. Finally, there was a negative and significant correlation between *Logged Salary* and *Black*, *Female*, and *Female Manager*.

**\*\*\*Table 5 about here\*\*\***

Table 6 presents the results of linear mixed-effect (multilevel) models of logged salary on covariates. These models all included a varying-intercept group effect for supervisors. Model 1, which also had a varying-intercept group effect for employees, represented the baseline with control variables. *Female* was significant and negatively related to logged salary. Consistent with prior research (e.g., Petersen and Saporta 2004; Fernandez-Mateo 2009), the difference in



predicted salary between female and male employees was approximately 17%.<sup>10</sup> *Age*, *Age Squared*, and *Tenure* were all significantly associated with logged salary. None of the ethnicity indicators attained significance, except for *Black*, which was negatively associated with logged salary. Model 2 added *Female Manager*, which was significant and had a negative sign. Male employees reporting to female managers were predicted to earn approximately 5% less than male employees reporting to male managers. In Model 3, we included the interaction term *Female*×*Female Manager*, which was slightly negative but not significant. That is, the difference in the salaries of women reporting to female managers and men reporting to female managers was not statistically significant, and Model 3 therefore indicated no support for the agents-of-change proposition.

Model 4, which added indicator variables for each employee, yielded within-individual estimates. In this model, *Female Manager* was not significant, suggesting that experiencing a switch in the gender of their manager did not have an overall effect on employees' subsequent salaries. Model 5 added the interaction term, *Female*×*Female Manager*, which was significant and (slightly) negatively associated with logged salary. Relative to men who switched from working for a female manager to a male manager, women who made such a switch were predicted to earn 1.4% less. Thus, the within-individual estimates also provided no support for the agents-of-change expectation. Though the effect size was small, this result was more consistent with the notion of female managers as cogs in the machine. In Model 6, however, which added the important control for lagged performance rating, *Female*×*Female Manager* was

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<sup>10</sup> Following Wooldridge (2009: 233) we report the logarithmic approximation of effect sizes. More accurate estimates can be obtained by taking the exponent of the coefficient, subtracting 1, and multiplying the result by 100. This estimate is, however, sensitive to base group differences: one obtains different percentage estimates when reporting how much male salaries exceed female salaries than when reporting how much female salaries lag male salaries.

no longer significant.<sup>11</sup> In sum, the models reported in Table 6 indicated no support for the agents-of-change perspective, while Model 5 provided suggestive evidence that female managers, if anything, may have acted in ways that lowered the relative salaries of women who switched into working for them.

**\*\*\*Table 6 about here\*\*\***

### **Extensions: Exploring Contingent Effects**

Although our main models suggested that female managers' decisions about subordinates' salaries neither reduced nor expanded the gender wage gap, we conducted supplemental analyses to test whether the agents-of-change and cogs-in-the-machine expectations held conditionally in subsamples where the mechanisms underlying the two hypotheses were more likely to be operative.

We first considered two conditions that would increase the likelihood of detecting an agents-of-change effect. Because the proportion of women in management can influence the strength and quality of women's relationships throughout an organization (Ely 1994; Ely 1995), we considered the possibility that the women-helping-women effect held conditionally for

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<sup>11</sup> In supplemental analyses (not reported), we assessed whether the direction of switching mattered. First, we split the sample of employees who experienced a gender switch into three groups: (1) those who only switched from a male to female supervisor; (2) those who only switched from a female to male supervisor; and (3) those who experienced both kinds of switching. We then re-estimated Table 6—Models 4, 5, and 6 in each of these subsamples. When lagged performance rating was not controlled for, the interaction term of interest was significant and of comparable magnitude in subsamples (1) and (2) but was not significant in subsample (3). Women who switched from a male to a female supervisor were predicted to earn about 2% less than men who made the same switch, while women who switched from a female to a male supervisor were predicted to earn about 2% more than men who made this switch. The interaction term was not, however, significant in any of the models that controlled for lagged performance rating. Second, we split the sample of employees who switched managers into three other subsamples: (a) those who experienced a managerial change because they moved jobs; (b) those who experienced a managerial change because their manager moved jobs; and (c) those who experienced both forms of switching. Analyses based (a) should be less susceptible to the confounding influence of unobserved factors that shape selection into switching for managers. Conversely, analyses based on (b) should be less susceptible to the confounding influence of unobserved factors that shape selection into switching for subordinates. Reassuringly, results based on these subsamples did not differ substantively from those based on the full sample. The interaction term of interest was not significant for any of these subsamples irrespective of performance. We thank an anonymous reviewer for suggesting these supplemental analyses.

divisions within the firm that had a high ratio of female-to-male supervisors. The company contained seven divisions, which encompassed its core product lines as well as smaller firms it had acquired but allowed to remain fairly separate. Two of these divisions had a relatively high share of female employees (64%) and female managers (49%), while the remaining had a lower share of female employees (51%) and female managers (43%). This difference was statistically significant. When we estimated our main models on subsamples of employees in these two sets of divisions, however, there were no significant differences in the results.

Second, the agents-of-change hypothesis is predicated on managerial discretion. More senior managers likely have greater salary-setting discretion than less senior managers. On the other hand, salary decisions in the upper echelons likely encounter higher levels of scrutiny than those made for employees lower in the hierarchy. Though based on models that did not include controls for performance rating or employee fixed effects, Abraham (2013), for example, reported that female managers who oversaw the work of low-skilled employees (e.g., tellers) in a retail financial services firm appeared to reduce the gender wage gap among their employees but found no support for this effect at higher organizational levels. We therefore investigated the possibility that the agents-of-change proposition held conditionally—for supervisors at the higher or lower levels of the hierarchy. With respect to the former, we estimated a three-way interaction with the variable *Senior*, which was set to 1 for the most senior supervisors. In a representative year (2007) approximately 15% of employees worked for senior supervisors. The inclusion of this variable, the three-way interaction, *Female* × *Female Manager* × *Senior*, and all relevant two-way interactions and main effects did not materially change our findings. Similarly, we estimated a three-way interaction with the variable *Junior*, which was set to 1 for managers who oversaw employees with an aggregated mean compensation in the bottom quartile of the

salary distribution. Again, none of the two-way interactions or the three-way interaction *Female*×*Female Manager*×*Junior* attained significance. Thus, we found no evidence for the conditional version of the agents-of-change proposition.

Next we turned to conditions under which the cogs-in-the-machine expectation is more likely to hold. Women in leadership may experience two distinct forms of threat from the ascension of other women: competitive threat and collective threat (Duguid 2011; Duguid, Loyd, and Tolbert 2012). A female supervisor is most likely to experience competitive threat when her own performance is weak, and she is managing a high-performing subordinate. By contrast, a female supervisor is most likely to experience collective threat when her own performance is strong, and she is managing a low-performing subordinate. To investigate the roles of competitive and collective threat, we divided managers and their subordinates into high and low performance categories based on their mean performance rating over the observation period.<sup>12</sup> We then re-estimated our models on four subsamples, defined by these performance categories. As reported in Table 7, this analysis provided suggestive evidence that the collective threat mechanism was operative: *Female*×*Female Manager* was negative and significant in the subsample that included higher performing supervisors and lower performing employees. The magnitude of this effect was substantial: Low performing women who experienced a switch from a male manager to a high-performing female manager had 30% lower salaries than low-performing men who experienced the same kind of switch. The interaction term of interest was not significant in any of the other subsamples. Indeed, the significant and negative coefficient of the *Female*×*Female Manager* term in Table 6, Model 5 (based on the full sample) may simply

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<sup>12</sup> Performance ratings were available for 228 of the 630 supervisors in our data. On observable characteristics, supervisors with missing performance data were not significantly different from those for whom we had ratings with the exception of salary.

reflect a trace of the result reported in Table 7, Model 1 (based on the subsample of high-performing managers and low-performing subordinates).

Taken together, these supplemental analyses revealed no support for the agents-of-change expectation, even in the divisions and hierarchical levels where it was most likely to be detected. They also provided preliminary and suggestive evidence of a cogs-in-the-machine effect among the subset of female managers who faced potential collective threat from women who reported to them.

**\*\*\*Table 7 about here\*\*\***

## **DISCUSSION AND CONCLUSION**

The goal of this article has been to reexamine, with new empirical evidence, what has become received wisdom in sociological research: that the increased representation of women in management will lead to a reduction in the gender wage gap. This expectation that women will act as agents of change is grounded in both direct and indirect mechanisms. Social psychological theories of in-group preference based on shared gender identity (Tajfel and Turner 1986; Tsui and O'Reilly 1989; Baron and Pfeffer 1994; Reskin 2000), the desire of female managers to redress past gender inequality (Cohen and Huffman 2007), and the stronger in-group preference that women exhibit relative to men in implicit, or automatic, forms of cognition (Rudman and Goodwin 2004) all imply that female managers will take direct action to allocate a disproportionately large share of rewards to their female subordinates. The ascension of women into management is also expected to yield indirect benefits—for example, increases in within-establishment gender integration (e.g., Huffman, Cohen, and Pearlman 2010; Kurtulus and

Tomaskovic-Devey 2012; Stainback and Kwon 2012), which could serve to further reduce the gender wage gap.

In contrast, an alternative set of conceptual arguments, termed “cogs in the machine” (Cohen and Huffman 2007), suggests that female supervisors will have a limited effect on or even exacerbate the gender wage gap. This expectation stems from the persistence of gender status beliefs that lead both men and women to assume that men will be more competent than women (Ridgeway 1997; Steinpreis, Anders, and Ritzke 1999; Ridgeway and Correll 2004; Heilman and Haynes 2005) and from research indicating that, especially when they perceive competitive or collective threat from other women (Duguid 2011; Duguid, Loyd, and Tolbert 2012), women in positions of authority may act to block the ascension of subordinate women (Staines, Tavis, and Jayaratne 1974; Kanter 1977a, 1977b; Ellemers et al. 2004; Derks et al. 2011). It also acknowledges that, even when female managers wish to allocate more rewards to female subordinates, they may lack the discretion to do so in certain organizational contexts (Kanter 1977a; Pfeffer and Davis-Blake 1987; England 1992). Though compelling conceptual arguments exist on both sides of the debate, the empirical evidence to date has largely supported the agents-of-change perspective (e.g., Hultin and Szulkin 1999, 2003; Cohen and Huffman 2007).

Yet, with one notable exception (Penner, Toro-Tulla, and Huffman 2012), prior work on the role of managers in influencing the gender wage gap has drawn on cross-establishment surveys, which do not provide visibility into the choices of managers and are prone to the ecological fallacy (Firebaugh 1978). Though Penner, Toro-Tulla, and Huffman (2012) advanced the literature by using longitudinal, matched supervisor-subordinate data from a single firm, their study was conducted in an industry where gender was unlikely to serve as a positive basis for

identification (Skaggs 2008) and a firm setting in which managers were unlikely to have sufficient discretion to influence the gender wage gap (Ransom and Oaxaka 2005). Moreover, they did not have access to data on employee performance ratings, which can importantly influence the distribution of rewards (Castilla 2008).

Building on the groundwork laid by Penner, Toro-Tulla, and Huffman (2012), the present study sought to examine the direct effects that female supervisors can have on the gender wage gap among the employees that they supervise by estimating within-individual models. These models, which relied on the switching of individuals between male and female supervisors to identify causal effects, accounted for unobserved individual differences that could influence what kinds of subordinates were matched to male or female supervisors or be associated with a person's likelihood of obtaining differential rewards from same-gender supervisors. Importantly, these analyses were conducted in an industry and firm context where women had already made significant inroads and gender could therefore serve as a positive basis for identification (Ely 1994, 1995), where managers had significant discretion over subordinates' salary decisions, and where data on past employee performance were available.

Results of both between- and within-individual models indicated no support for the agents-of-change expectation; rather, across a variety of specifications, we found that the gender of managers had no discernible effect on the gender wage gap among their subordinates. Supplemental analyses indicated that, insofar as managerial gender mattered, it was in the subsample of high performing managers who supervised low performing employees. In this group, female managers, perhaps responding to collective threat, appeared to act in ways that amplified, rather than diminished, the gender wage gap. Taken together, these findings constitute an important negative result in that they challenge the prevailing view of women in management

as agents of change who act in ways that reduce the gender wage gap. Surprisingly, our results indicate that—at least in contexts where they might perceive collective threat from less qualified female aspirants—female managers may instead act in ways that *amplify* the gender wage gap. Thus, our analysis lends support to the view that gender serves as a primary frame that colors evaluations that not only male managers but also female managers make of subordinate women in the workplace (Ridgeway 2011).

Because our analyses were based on five years of data from a single firm, we urge caution in generalizing from these results. For example, the level of gender inequality in organizations can vary by firm size, the degree of formalization in the employment relationship of workers, the availability of firm-level resources (Anderson and Tomaskovic-Devey 1995) and occupational differences in the expectations of and returns to overwork (Cha and Weeden 2014). Future research could profitably replicate our empirical approach across a range of firms and occupations that vary on these dimensions. Similarly, the proportion of women in management can influence the strength and quality of women's relationships with each other throughout the organization (Kanter 1977b; Ely 1994; Ely 1995; Gorman 2005), and the role of female supervisors in ameliorating the gender wage gap could differ across organizations that vary on this characteristic. It is worth noting, however, that Ely (1994; 1995) defined a sex-integrated firm, where gender served as a positive basis for identification among women, as one having at least 15% female partners. In our setting, women constituted an even larger share of managers (47% in 2007), making it unlikely that our null result could be attributed to a dearth of senior women. Moreover, we found no differences in our results across divisions in the firm that varied in their level of female representation in management.



Next, whereas our data only included an employee's ultimate annual performance rating and salary increase, researchers with access to performance evaluations and compensation recommendations from multiple supervisors for the same subordinate (e.g., Castilla 2011) could examine potential gender-based variation in evaluations and rewards of the same employee in the same review period. Another avenue for future research would entail investigating whether the tendency of female managers to differentially reward female subordinates can be detected in the distribution of bonuses, over which managers often have greater discretion (Elvira and Graham 2002), even if it is not observed in annual salary increases. That would require obtaining similar data from organizations such as professional service firms with consistent and widely applied discretionary bonus systems. Finally, although we estimated within-individual models, our models could not account for other unobserved, non-linearly varying employee attributes that could be associated with salary increases.

These limitations notwithstanding, our findings have broader implications for sociological research on the role of managers in exacerbating or alleviating gender inequality in the workplace. In many cases, prior research has theorized about the actions of managers but observed only aggregate-level changes in outcomes of interest. For example, Dezsó and Ross (2012) reported that an increased representation of women in management was positively associated with firm performance when a firm's strategy was focused on innovation and attributed this result in part to the interactive leadership style of female leaders. Similarly, Skaggs, Stainback, and Duncan (2012) found that having more women in corporate boards was associated with greater female managerial representation at the establishment level and suggested that enhanced mentoring and access to social networks provided by female board members to female managers accounted for this effect. Among the mechanisms that Cohen and

Broschak (2013) used to explain their finding that the number of newly created jobs filled by women increased with the proportion of female managers in advertising agencies was the creation of new jobs by women seeking new bases of distinctiveness in the workplace. Though our results do not directly challenge or invalidate any of these findings, our study does highlight the potential pitfalls of the ecological fallacy and the need for more studies that illuminate the direct actions of managers and their consequences for attainment.

Finally, our work suggests the need to rethink some of the policy prescriptions proposed in prior studies. For example, Cohen and Huffman (2007: 699-700) concluded: “[N]ot only are women blocked from upper-level managerial positions and denied the benefits of those jobs, but their absence has ripple effects that shape workplace outcomes for nonmanagerial women as well....[I]nroads made by women into upper-status managerial positions will ‘lift all boats’ by also boosting the wages of women employed in nonmanagerial occupations.” Although our results do not speak to the potential indirect mechanisms through which women in management could ameliorate the gender wage gap, they do call into question the assumption that female managers will directly influence the gender wage gap by allocating a disproportionately large share of rewards to the women who report to them. In a similar vein, Huffman, Cohen, and Pearlman (2010: 273-274) asserted: “[T]he finding that the entrance of women into managerial roles improves the status of other women at the establishment speaks directly to debates about the role of affirmative action in employment. To the extent that affirmation action and EEO/anti-discrimination programs are associated with women’s entry into management and increased workplace opportunity... more rigorous enforcement could represent a mechanism for jump-starting the gender stall we document.”

Although our results do not speak to sex segregation as an outcome, they raise doubts about whether the entrance of women into management will by itself increase attainment for other women—at least in the form of reductions in the gender wage gap. If anything, they reinforce Huffman, Cohen, and Pearlman’s subsequent conclusion that the increased representation of women in management may be a necessary but not sufficient condition for ameliorating gender inequality. Insofar as our findings about the potential role of collective threat in shaping the distribution of rewards generalize to other settings, they also suggest that firms should exercise caution when assigning low performing women to work for high-powered female supervisors. More broadly, our results underscore the need for organizational initiatives that can counteract the negative effects of tokenism (Duguid 2011), foster women’s positive identification with their gender identity (Duguid, Loyd, and Tolbert 2012), and shift the deeply rooted cultural schemas that underlie gender inequality (Ridgeway 1997; Haveman and Beresford 2012). Absent these more fundamental changes, it may be wishful thinking to assume that the further inroads of women into management will by itself close the gender wage gap.

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TABLES

TABLE 1  
EMPLOYEE AND MANAGER CHARACTERISTICS, BY GENDER

Variable	Employee characteristics			Manager characteristics		
	All	Male	Female	All	Male	Female
Number of employees	1,701	759	942	480	256	224
Salary (in dollars)	63,780	72,295	56,920	120,559	135,313	103,696
Rating (out of four)	2.55	2.53	2.56	2.68	2.65	2.71
Proportion with female manager	0.55	0.44	0.63			
Age (in years)	43	42	43	44	44	45
Tenure (in years)	8.85	8.19	9.38	9.91	9.30	10.60
Proportion switched manager	0.50	0.52	0.48			
Proportion White	0.79	0.82	0.78	0.88	0.88	0.89
Proportion Black	0.11	0.06	0.14	0.05	0.03	0.08
Proportion Hispanic	0.02	0.03	0.01	0.03	0.03	0.02
Proportion Asian	0.06	0.06	0.05	0.02	0.03	0.00
Proportion Other	0.02	0.03	0.02	0.03	0.04	0.01

NOTES.—Data for both employees and managers are from 2007, the middle year in the sample. Employee characteristics varied significantly ( $p < .05$ ) by gender, with the exception of: *Rating* ( $p = .36$ ), *Proportion switched manager* ( $p = .11$ ), *Asian* ( $p = .24$ ) and *Other* ( $p = .18$ ). *Switched Manager* was coded as 1 for each employee who switched managers at least once during our observation window and as 0 otherwise. 480 managers were present in 2007, while the full sample includes 630 unique managers. The following manager characteristics varied significantly ( $p < .05$ ) by gender: *Salary*, *Tenure*, *Black* and *Other*.

TABLE 2  
SEX SEGREGATION BY JOB LEVEL FOR MANAGERS AND EMPLOYEES

Job Level	Percent Female
Managers	
Executive Managers	29%
Operational Managers	50%
Supervising Managers	56%
Employees	
Senior Employees	36%
Professional Employees	58%
Support Employees	67%

NOTES.— Data for both employees and managers are from 2007.

TABLE 3  
EMPLOYEE AND MANAGER SALARY DISTRIBUTION, BY GENDER

Salary Distribution	Employee distribution			Manager distribution		
	Range	Male	Female	Range	Male	Female
1 <sup>st</sup> Quartile	23,188 - 40,012	32%	68%	30,443 - 80,516	36%	64%
2 <sup>nd</sup> Quartile	40,024 - 55,167	42%	58%	80,647 - 105,217	48%	52%
3 <sup>rd</sup> Quartile	55,235 - 78,280	42%	58%	105,255 - 140,000	55%	45%
4 <sup>th</sup> Quartile	78,358 - 353,600	64%	36%	140,051 - 615,000	74%	26%

NOTES.— Data for both employees and managers are from 2007.

TABLE 4  
CHARACTERISTICS OF EMPLOYEES WHO SWITCHED MANAGERS AND THOSE WHO DID NOT

Variable	All	Switchers	Non-Switchers	T-Stat (P-value)	Gender Switch	T-Stat (P-value)
Number of employees	1,701	853	848		400	
Salary (in dollars)	63,780	64,392	63,165	-0.77 (.44)	65,791	-1.40 (.16)
Proportion female	0.55	0.53	0.57	1.60 (.11)	0.51	1.90 (.06)
Rating (out of four)	2.55	2.54	2.56	0.77 (.44)	2.51	1.38 (.17)
Age (in years)	43	42	44	5.20 (.00)	42	2.40 (.02)
Tenure (in years)	8.85	8.42	9.28	2.88 (.00)	8.29	2.10 (.04)
Proportion White	0.79	0.79	0.80	0.24 (.81)	0.78	0.84 (.40)
Proportion Black	0.11	0.10	0.11	1.07 (.29)	0.09	0.95 (.34)
Proportion Hispanic	0.02	0.02	0.02	-0.81 (.42)	0.03	-1.69 (.09)
Proportion Asian	0.05	0.06	0.05	-0.29 (.77)	0.06	-0.91 (.36)
Proportion Other	0.02	0.03	0.02	-1.54 (.12)	0.03	-1.15 (.25)

NOTES.— Data are from 2007. Switchers are employees who experienced at least one managerial change during the observation window. Gender switchers are employees who switched from a male to female manager or vice-versa at least once during the observation window. The first column of t-statistics compares switchers to non-switchers. The second column of t-statistics compares gender switchers to all other employees.

TABLE 5  
CORRELATION MATRIX

	1	2	3	4	5	6	7	8	9	10	11
1. Logged Salary	1										
2. Rating	0.222*	1									
3. Age	0.120*	-0.074*	1								
4. Tenure	0.246*	-0.001	0.376*	1							
5. White	0.156*	0.097*	0.109*	0.083*	1						
6. Black	-0.199*	-0.128*	-0.040*	0.033*	-0.682*	1					
7. Hispanic	0.023*	0.021	-0.041*	-0.035*	-0.295*	-0.052*	1				
8. Asian	-0.012	0.017	-0.054*	-0.105*	-0.464*	-0.081*	-0.035*	1			
9. Other	-0.014	-0.041*	-0.090*	-0.100*	-0.306*	-0.054*	-0.023*	-0.036*	1		
10. Female	-0.234*	0.031*	0.055*	0.092*	-0.051*	0.131*	-0.054*	-0.030*	-0.036*	1	
11. Female Manager	-0.290*	-0.036*	-0.046*	-0.023*	-0.044*	0.062*	0.002	-0.006	-0.002	0.196*	1

NOTE.— $N = 8,505$  employee-year observations. \*  $P < .05$



TABLE 6  
 LINEAR MIXED-EFFECTS MODELS OF LOGGED SALARY ON COVARIATES

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Logged Salary	Logged Salary	Logged Salary	Logged Salary	Logged Salary	Logged Salary
Intercept	10.081** (0.0499)	10.101** (0.0501)	10.100** (0.0502)	11.143** (0.0300)	11.140** (0.0300)	11.046** (0.0268)
Age	0.041** (0.0018)	0.041** (0.0018)	0.041** (0.0018)			
Age squared	-0.000** (0.0000)	-0.000** (0.0000)	-0.000** (0.0000)			
Tenure	0.012** (0.0014)	0.012** (0.0014)	0.012** (0.0014)			
Black	-0.143** (0.0253)	-0.141** (0.0251)	-0.141** (0.0251)			
Hispanic	0.051 (0.0506)	0.051 (0.0503)	0.051 (0.0503)			
Asian	0.000 (0.0338)	0.001 (0.0336)	0.000 (0.0336)			
Other	-0.014 (0.0478)	-0.013 (0.0475)	-0.014 (0.0476)			
Female	-0.171** (0.0156)	-0.167** (0.0156)	-0.162** (0.0160)			
Female Manager		-0.048** (0.0153)	-0.044** (0.0157)	0.002 (0.0088)	0.009 (0.0093)	-0.002 (0.0076)
Female × Female Manager			-0.009 (0.0067)		-0.014* (0.0062)	-0.002 (0.0062)
Lagged rating						0.008** (0.00094)
Division indicators	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes
Employee indicators	No	No	No	Yes	Yes	Yes
<u>Error Terms</u>						
Varying intercept group effect for employees	0.087	0.086	0.086			
Varying intercept group effect for supervisors	0.030	0.030	0.030	0.007	0.008	0.004
Residual	0.002	0.002	0.002	0.002	0.002	0.001
Deviance	-18541	-18551	-18553	-28610	-28615	-24946
N	8505	8505	8505	8505	8505	6531
AIC	-18497	-18505	-18505	-25182	-25185	-21516

NOTES.— Standard errors in parentheses. White is the omitted reference category for ethnicity.

\*  $P < 0.05$ ; \*\*  $P < 0.01$

TABLE 7  
 LINEAR MIXED-EFFECTS MODELS OF LOGGED SALARY ON COVARIATES, BY SUBSAMPLES OF  
 EMPLOYEE-SUPERVISOR PERFORMANCE BASED ON MEDIAN SPLITS

Variables	(1) Logged Salary Employee: Low Supervisor: High	(2) Logged Salary Employee: Low Supervisor: Low	(3) Logged Salary Employee: High Supervisor: High	(4) Logged Salary Employee: High Supervisor: Low
Intercept	11.270** (0.0315)	11.030** (0.0170)	10.807** (0.0228)	10.918** (0.0207)
Female				
Female manager	0.284** (0.0212)	-0.010 (0.0077)	-0.027 (0.0220)	-0.0142 (0.0116)
Female × Female manager	-0.301** (0.0274)	0.015 (0.0121)	-0.018 (0.0281)	0.0142 (0.0146)
Division indicators	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes
Employee indicators	Yes	Yes	Yes	Yes
<u>Error Terms</u>				
Varying intercept group effect for supervisors	0.000	0.000	0.000	0.000
Residual	0.001	0.001	0.001	0.001
Deviance	-3054.4	-5404.0	-3144.9	-4406.0
<i>N</i>	688	1371	807	1177
AIC	-2618.4	-4650.0	-2664.9	-3768.0

NOTES.— Standard errors in parentheses. We calculated mean performance ratings for each employee and created an indicator for “high” versus “low” performers based on a median split. We performed the same calculation for managers. Thus, the models represent subsamples defined by pairings of employee-supervisor performance groups. For example, the first column includes the subsample of low-performing employees who report to high-performing supervisors.

\*  $P < 0.05$  \*\*  $P < 0.01$