

# The Changing Role of Managers

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## Abstract

This study argues that the increase in middle management in recent decades was accompanied by a major shift in managerial roles. Increased task complexity and a new management philosophy have reduced the need for direct supervision but generated a much greater demand for internal collaboration, leading in turn to the emergence of a managerial class whose primary role is collaboration rather than supervision. To test this, I analyzed a large volume of data, including millions of managerial job postings, a large collection of managers' resumes, job reviews written by employees, and several unique firm-level datasets. These analyses generated three sets of findings. First, in recent decades, the expectations of the managerial role have quickly changed, in almost all sectors, from supervision to collaboration. Second, this new managerial role is especially concentrated in innovation-focused firms. Finally, firms treating managers as collaborators have a much higher proportion of middle managers than those still treating them primarily as supervisors. Thus, accounting for changing managerial roles could explain a significant portion of the managerial growth in recent decades. Together, these findings suggest that the role of managers has fundamentally shifted and that this change helps explain the growth of the managerial class.

**Keywords:** managers, managerialism, leadership, managerial paradox, collaboration, teamwork, occupational roles, social skills, worker control, manager worker relationship, future of work

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# 1. INTRODUCTION

*“The managers, as the cadre of the enterprise, form a hierarchy, graded according to their authority to initiate tasks, to plan and execute their own work and freely to plan and order the work of others. Each level in the cadre’s hierarchy is beholden to the levels above.”* – CW Mills’s description of managerial roles in *White Collar* (1951; p. 81).

Sociologists have long been interested in the roles of middle managers in formal organizations (Bendix 1963; Mills 1951; Weber 1978). As Mills’s quotation suggests, managers were traditionally associated with bureaucracy and control. Executives set a strategy and passed it down to middle managers, who in turn supervised its execution by frontline employees. This bureaucratic system, characterized by formal hierarchy and procedures, dominated US organizations in the early twentieth century, when they were mostly insulated from market discipline. During this era, the managerial ranks grew, as middle managers enjoyed job security, generous pay, and privileged access to internal labor markets (Goldstein 2012).

The shareholder revolution in the 1980s and 1990s supposedly marked the decline of the managerial class (Davis 2009; Dobbin and Zorn 2005; Fligstein and Shin 2007; Tomaskovic-Devey and Lin 2011; Useem 1993). As firms faced growing competition and pressure to increase efficiency, many hoped to reduce the layers of middle management that were often seen as unproductive bureaucracy (Jung 2014, 2016). Through restructuring, firms tried to flatten their organizational hierarchies, increase spans of control, and lower the number of managers. Press releases and annual reports from this period suggest that managers were laid off in droves (Cappelli 1992). Many believed that managers would soon become “an endangered species.”

But managers did not go extinct. On the contrary, they proliferated. From 1980 to 2000, the proportion of managers in the US labor force grew by 35 percent, defying the speculations based on shareholder value. Moreover, this managerial growth continues into the twenty-first century. In the last decade alone, managerial employment has soared an

astonishing 18 percent, more than triple the growth rate of the workforce overall. How do we explain this so-called “managerial paradox”?

Two prominent explanations have been put forth (Goldstein 2012; Gordon 1996; Hollister and Wyper 2013; Levinson 1990; Littler and Innes 2004). First, the US economy’s shift from manufacturing to service could account for this managerial growth, since many service industries have a larger managerial workforce. This explanation, however, could not explain the substantial within-industry growth in the managerial class. Second, the so-called “fat and mean” hypothesis, named ironically after the “lean and mean” ideology of the 1980s and 1990s, holds that the growth in managerial jobs is a direct result of streamlining and increased worker control (Gordon 1996). To cut labor costs and improve efficiency, firms increased their monitoring and supervision, which required additional managers. While this theory explains the within-industry increase in managers, it is not always consistent with existing empirical evidence—such as a large number of managerial layoffs after acquisitions or restructurings (He and Maire 2019; Zhang 2021). Moreover, neither explanation could account for the continued managerial growth in this century, given that the shift to a service economy slowed down after 2010 and the shareholder revolution has also declined somewhat since 2000.

This study offers a new perspective. I argue that the surge in the managerial class corresponds with a fundamental role change. As a result of increased task complexity and a new management philosophy emphasizing workers’ autonomy, organizations are indeed less reliant on direct managerial supervision. These changes do, however, increase the need for coordination and collaboration across units. To facilitate such activity, organizations have hired more managers, but these managers spend less time in supervisory roles and more time collaborating with different units and engaging with workers. As managers change from supervisors to collaborators, their new role is consistent with the shift in overall organizational culture from bureaucracy to collaboration.

I support this theory using a variety of data sources. The main dataset consists of

34 million job postings provided by Burning Glass Technologies, covering nearly all online manager-level openings in the US from 2007 to 2021. To understand how managerial roles are associated with firm characteristics, I merged this job-posting data with various firm-level information, including number of managers, attention to innovation, and shareholder pressure. To trace dynamics in earlier decades, I conducted supplementary analyses using job postings published in newspapers from 1940 to 2000. To offer evidence from the supply side, I examined a large collection of managers' resumes and job reviews written by managers to observe how managers in different time periods described their work experience.

These analyses generate three findings. First, managerial roles have been moving away from supervision and toward collaboration in almost all sectors. From 2007 to 2021, managerial job postings requiring collaborative skills increased by as much as three times, while those requiring supervisory skills decreased by 23 percent. This shift occurs mostly within job titles: the same job is now requiring less supervisory skills and more collaborative skills. In addition, while the desire for collaboration has increased in many occupations, it increased more in managerial positions than in other professional occupations.

Three supplementary analyses lend further support: (a) Examining nearly one million managerial job postings from past newspapers, I found that the changing role of managers started as early as the 1980s. Mentions of collaboration in these ads were quite rare before 1980, but from 1980 to 2000, the number of collaboration-oriented phrases increased by about 15 percent each year. (b) To provide evidence from the supply side, I show a similar—albeit weaker—trend using resume data and employee review data. In a sample of over six million managers, those listing supervisory experience on their resumes decreased by roughly 8 percent from 1985 to 2015, while those listing collaborative experience increased by 37 percent over the same period. (c) Examining 430,000 job reviews on Indeed.com written by managers, mentions of supervisory activities decreased by 22 percent in the past decade, while mentions of collaborative/teamwork activities increased by 28 percent.

The second finding is that the new managerial role of collaboration is most preva-

lent in innovation-focused firms. The more a firm espouses innovation, the more likely it is to require managers to have collaborative skills and the less likely it is to require supervisory skills. Much of this between-firm variation takes place within the same job title: within an industry, the same managerial position requires more collaborative skills in a more innovation-focused firm but more supervisory skills in a less innovation-focused firm.

The third finding, which addresses managerial growth, is that managerial roles are strongly associated with the proportion of managers in an organization. Combining job-posting data with firm-level demographics from 2007 to 2015, I find that firms posting a higher proportion of managerial ads requiring collaboration (supervision) have a much higher (lower) proportion of managerial employees. Depending on the model, controlling for managerial role helps explain anywhere from 8 to 57 percent of the managerial growth in my sample. This association holds across a variety of model specifications, which include firm and industry-year fixed effects and a robust set of firm-year controls.

This paper makes several contributions to the sociological literature on labor markets. First, it provides a systematic analysis of managerial roles on a large scale and over a significant period. By showing a shift in managerial roles—from supervision to collaboration—my findings are consistent with recent work suggesting the growing importance of social skills and declining importance of supervisory experience in the labor market (Deming 2017). This could have implications for labor market inequality. For instance, the role change observed here may increase bias against immigrants and certain racial minorities in managerial promotion and hiring, as they are often perceived as having lower social skills within the context of the mainstream culture. Second, this paper provides a novel explanation for the growth of the managerial class. I argue that organizations increased managerial presence to meet increasing collaboration needs and that these added managers are expected to do less supervision and more collaboration. This changing managerial role is key to explaining the paradox: the growth in managers does not in fact contradict the shift in organizational culture away from bureaucracy and hierarchy because the new managers no longer represent

more bureaucracy and hierarchy. This is a significant departure from older theories suggesting that the increasing managerial presence indicates more supervision. Third, this study calls for a reconsideration of the manager-worker distinction. The traditional sociological paradigm tends to see a power relationship between managers and nonmanagerial workers. However, as the role of middle managers has changed, they have become more similar to nonmanagerial workers, which could necessitate revising the traditional class categories.

## **2. CHANGING MANAGERIAL ROLES**

A manager is a person responsible for overseeing and motivating employees and for directing the progress of an organization (Mintzberg 2013). In Max Weber’s world of bureaucracy, managers are an authority; they command and are obeyed. This view was probably an accurate reflection of middle managers and their roles during the industrial age, when US corporations were governed by bureaucratic systems and centralized decision-making processes. Middle managers were the vital link connecting the small group of executives at the top with the vast ranks of workers responsible for the firm’s output. Middle managers received strategic directives from executives, translated them into specific instructions, and transmitted those to subordinates. In this model, managers are the manifestation of bureaucratic control: their primary role is to direct and monitor their reports. But as the work environment has become ever more complex and new management beliefs and technologies emerge, this conventional conception of managers may no longer hold true.

### **2.1. The Supposed Demise of Middle Managers**

The bureaucratic system that dominated US corporations in the industrial age came under attack starting in the 1980s. Both rising competition and the growing influence of Wall Street pushed firms to pay more attention to generating value for shareholders. To increase the share price, executives tried to financially engineer balance sheets to make firms appear more “lean and mean” (Budros 2002; Fligstein and Shin 2007). The common strategy involved (a) streamlining organizational processes and focusing on core competencies and

(b) adopting cost-cutting measures to minimize redundancy and waste. These changes were often accomplished through internal restructurings, mergers and acquisitions, and technology upgrades (Davis 2009; Davis and Thompson 1994; Dobbin and Zorn 2005; Useem 1993; Westphal and Zajac 1998). As research has shown, US firms pursued these strategies aggressively: the number of mergers, acquisitions, and internal restructurings skyrocketed in the late 1980s, stayed relatively high ever since (Goldstein 2012; Jung 2014; 2016).

This increased focus on shareholder value did not bode well for middle managers, who were often perceived as a sign of bloated bureaucracy. Since they were well compensated and enjoyed good job security, many observers saw their presence as inconsistent with the pursuit of shareholder value. In fact, reducing managerial presence and eliminating hierarchy was often a primary motive for corporate restructuring (Jacoby 2000). The CEO of General Electric, Jack Welch, described middle managers as overpaid and underproductive excess that should be eliminated: “We were hiring people just to read reports of people who had been hired just to write reports” (Gordon 1996: 51). Corporate raider Carl Icahn, often seen as the embodiment of shareholder value, decried the “incompetent, inbred managements of many of our major corporations” and described his job as reducing “layers of bureaucrats reporting to bureaucrats” (Goldstein 2012). To cut the managerial fat, firms adopted flatter organizational structures, often by increasing the span of control within their organizations and eliminating intermediate management layers (Rajan and Wulf 2006). In the 1990s, many predicted the end of the managerial class; scholars referred to middle managers as “cooked geese” and middle management as the “killing field” (Keuning and Opheij 1994; Peters et al. 1992).

Considerable empirical evidence supports this view. Statistics based on the Displaced Workers Survey show that managers have suffered a greater proportion of job loss than other white-collar workers, a trend that started in the 1980s and continued into the 2000s (Cappelli 1992; Hollister and Wyper 2013; Osterman 2006). Similarly, recent work shows that middle management levels drop by as much as 10 percent after a firm is acquired,

demonstrating that mergers and acquisitions frequently result in managerial layoffs (He and Maire 2019; Zhang 2021). This evidence suggests that firms have been consistently laying off middle managers for the past few decades.

## 2.2. Managerial Growth

Surprisingly, macro-level data suggest that the managerial class not only failed to disappear, but in fact has grown significantly since the 1970s. The proportion of managers among all employees rose from 9.2 percent of the labor force in 1983 to 13.2 percent in 2002 and the number of frontline supervisors increased from 5.4 percent to 5.7 percent (see Figure 1). Moreover, this trend shows no sign of slowing down. From 2005 to 2020, the proportion of managers grew by another 23 percent. Although the proportion of supervisors dropped during this period, the combined number of managers and supervisors is still on the rise. This growth cannot be explained by lower managerial wages; the average inflation-adjusted annual wages  $Wage$  is adjusted to 1999-level. for the managerial class rose from 53,000 in 1990 to 58,000 in 2020, a slightly higher rate of increase than that of most nonmanagerial occupations over the same period. Why would the number of managers grow at such a pace and over such a long span of time, especially when many firms were flattening hierarchies and eliminating bureaucracy?

Scholars have put forth two notable explanations (Goldstein 2012; Gordon 1996; Hollister and Wyper 2013; Levinson 1990; Littler and Innes 2004; Naples 2013). The first is that the increase in managers reflects a macro shift in the US economy from manufacturing to service, which tends to have more managerial positions. This shift is likely to account for some of the managerial growth, but it cannot be the only explanation since much of the increase occurs within industries (Goldstein 2012; Littler and Innes 2004). A related possibility is that US firms are getting larger and therefore need more managers (Hollister and Wyper 2013). However, growth in firm size varies significantly across industries; for instance, average firm size in manufacturing and finance has been declining since the 1980s, yet their proportion of managers has been rising. Moreover, it is empirically unclear that



firm size corresponds to a higher proportion of managers.

A second explanation is Gordon’s (1996) “fat and mean” hypothesis (also see Goldstein 2012, Hollister and Wyper 2013, and Naples 2013 for discussions of this theory). Gordon compares carrot strategies and stick strategies for increasing productivity: the former incentivize nonmanagerial workers with benefits such as higher compensation, while the latter relies upon intense supervision and monitoring. He argues that the carrot strategy disappeared in the 1980s as the stick strategy became a potentially more-profitable approach. To extract the most out of workers, firms tried to be “mean”—relying on supervisors to squeeze the most labor out of low-skilled workers—and in doing so, they unintentionally expanded the management layer so that organizational structures grew “fat” again. Although this theory predicts within-industry and within-firm managerial growth, it has been inconsistent with available empirical evidence. For example, managers have been experiencing a higher displacement rate, according to both representative surveys (Cappelli 1992; Hollister and Wyper 2013; Osterman 2006) and studies of restructurings and acquisitions (He and Maire 2019; Jung 2016; Zhang 2021). It is unclear why firms that continue to use managers as means of supervision and control would be both laying off managers and hiring them.

More importantly, neither theory could quite explain post-2000 managerial growth. The macro shift from manufacturing to services largely stopped after 2010, yet the managerial class continued to grow quickly. The average firm size in the US dropped between 2000 and 2010, even as the managerial class grew. Similarly, the fat-and-mean hypothesis predicts increasing shareholder value, but many dimensions of this value declined in the 2000s.

This study proposes a new explanation for managerial growth. In a nutshell, managerial roles have fundamentally changed: firms laid off managers who were playing outdated roles and hired others to play a different role more suited to the overall changes in the firm and the market. In conceptualizing this role change, I discuss three trends: the growing need for cross-functional collaboration, the emergent management philosophy emphasizing workers’ autonomy, and the availability of technology to monitor workers. I argue that these

changes have significantly reduced the need for managerial supervision while driving up the expectation for managers to collaborate with employees and cross-functional groups.

### **2.3. Growing Task Complexity**

Task complexity has increased substantially in many industries over the last few decades (Espinosa et al. 2007). Fueled by new technology and a growing emphasis on innovation, organizations are facing larger and more complex problems which often require multiple areas of expertise (Henderson and Clark 1990; Obstfeld 2005). This has led to significantly more cross-functional collaboration. For example, a project team today could require input from engineers with technical knowledge, salespeople who understand client needs, and business analysts who know the market. Instead of relying on centralized, hierarchical decision-making, organizations increasingly call on cross-functional teams that can better address the complexity and uncertainty of the environment (McGrath 2001).

This should, in turn, create a much greater demand for cross-functional coordination and collaboration, a task that could fall into the job description of middle managers. Organizations therefore may hire more managers to facilitate complex information flows and minimize conflicts across functions. This is perhaps exemplified in the increasingly popular matrix organizational structure, which has multiple lines of command—typically, a functional line and a product or project line. Such a structure facilitates cross-functional collaboration, but also requires significantly more middle managers, as project groups and functional groups need separate managers. In fact, one of the commonly mentioned downsides of the matrix structure is that each employee has too many bosses.

Managers hired to play the liaison role and work across boundaries are likely expected to have strong collaboration and teamwork skills. At the same time, the high task complexity could make supervision difficult. When a project requires expertise from multiple backgrounds, a manager may not have all the knowledge needed to provide explicit direction and oversight. He or she would have to collaborate directly with the various workers who do have that knowledge to accomplish the task. For all these reasons, the growing task

complexity could redefine the managerial role less in terms of supervision and more in terms of collaboration.

## **2.4. New Management Philosophies and Technologies**

Recent decades also brought new management philosophies and technologies. Since the 1970s, many practitioners' books and articles on management have advocated more worker autonomy (Barley and Kunda 1992). According to this view, the traditional command-and-control model impedes workers' motivation and creativity. To spur productivity and new ideas, workers need to be given some autonomy and local discretion (McGrath 2001). Instead of issuing direct commands and exercising close supervision, managers should work together with their subordinates and give them support and mentoring. In this framework, a manager should be more like a personal trainer than an army commander, spending more time listening and providing support than giving orders.

Although adopting this philosophy may not actually decrease organizations' control of their workers, the method of control should become more normative (Barley and Kunda 1992). For instance, many organizations today try to control and monitor workers through cultural codes. Such normative control comes from sources such as peer pressure rather than from direct supervision (Ezzamel and Willmott 1998). Therefore, as this new model of management takes hold, it could reduce organizations' reliance on direct managerial control and managers should shift into a new role of engaging with—rather than controlling—workers.

A related phenomenon is the growing availability of new technologies to track workers' performance. An increasing selection of management software can automatically assign tasks, allocate resources, and closely monitor each worker's daily productivity, further reducing the need for manual oversight (Liu and Grusky 2013). Although these technologies intensify the monitoring of workers, they should reduce managers' supervisory responsibility. The advent of these technologies, coupled with the growing acceptance of worker empowerment, should also lead to less emphasis on managerial supervision and more on collaboration.

This change in managerial roles could help explain the growth in the managerial class. The growing number of managers may appear contradictory to the general organizational trend away from bureaucracy. But as managers transform from supervisors to collaborators, their presence becomes less representative of hierarchy and control. Instead, their role as collaborators could reflect an organization’s attempt to be more flexible, the need for cross-functional collaboration, and the desire for more worker engagement, all of which are consistent with the new organizational culture.

## **2.5. Existing Literature on Managers**

A large literature studies the role of managers (Floyd and Wooldridge 1992; L. Hill 2003; 2007; Mantere 2008; Mintzberg 1973; 2009; 2013; Tengblad 2004; 2006; Wooldridge and Floyd 1990). Some of these suggest that the manager’s traditional role has shifted (e.g., Arthur 1996; Kanter 1989; McCrimmon 2010). For instance, Kanter observes that managerial work has been undergoing “an enormous and rapid change,” possibly spurred by new technology and competitive pressure. Recent work has also emphasized the growing need for managerial coordination and exchange of ideas (Hill 2003). However, this view has not gained universal acceptance (Mintzberg 2009). As Hales (2005) puts it, “the death of the supervisor” is a myth born out of “the popular management literature” and does not reflect reality in organizations; in fact, some argue that managers’ fundamental supervisory role has not changed (Hales 2002, 2005; Tengblad 2006; Watson 2001). This stance is consistent with the prevailing view in sociology, which also continues to see managers primarily as instruments of worker control (Goldstein 2012; Prechel 1994; Smith 1997; Vallas 2003; 2006).

This disagreement partly reflects the difficulty of systematically observing managerial roles. For example, Mintzberg’s (1973) famous study examined only five managers; his recent work (2009) focused on twenty-nine. Even larger-scale studies, such as Hales’s (2005) survey of 135 managers in London and Vallas’s (2006) site visits to four manufacturing plants, cover only a small sector of the economy. These small-scale studies give us in-depth understanding of managerial roles but are less effective in reflecting the overall pattern in the

economy. In fact, as a number of these studies have shown, individual managers have different roles and working styles, so it is difficult to generalize from patterns found in small-scale studies (Tengblad 2006).

To overcome this limitation, my analyses draw from millions of job postings, managerial resumes, and employee reviews to quantify managerial patterns on a large scale and across industries and time.

### **3. DATA AND METHOD**

I draw on a variety of data sources to demonstrate the changing role of managers. My main source is microdata from 34 million online job postings for managerial positions in the United States from 2007 to 2021.<sup>1</sup> Using the role expectations and skill requirements listed in each job description, I systematically examined how organizations have been reconceptualizing the role of managers over this period. I supplement this with analyses of one million newspaper job ads from 1940 to 2000, six million managers’ resumes, and some 430 thousand job reviews written by managers. To understand how firm characteristics are associated with managerial roles, I used several datasets that provide firm-level information on managerial representation, innovation level, pressure from shareholders, and various financial metrics.

#### **3.1. Online Job-posting Data**

The main job-posting data were collected and assembled by Burning Glass Technologies (hereafter BGT), an employment analytics and labor market information firm. BGT examines some 40,000 online job boards and company websites to aggregate job postings, then removes duplicates and parses the reviews into a systematic, machine-readable form. It captures a near-universe of the job openings posted online (Deming and Kahn 2018; Hereshbein and Kahn 2018; Wilmers and Zhang 2022). I obtained data from 2007 and from 2010 to 2021.<sup>2</sup>

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<sup>1</sup>In the early versions of the manuscript, our job posting data stop in 2019. We have then extended our job posting data to May 2021.

<sup>2</sup>BGT started collecting data in 2007, but did not do so in 2008 and 2009.

Although online job postings do not capture all job openings, past studies suggest that 60 to 70 percent of job openings in recent years have been posted online (Carnevale, Jayasundara, and Cheah 2013). Hershbein and Kahn (2018) compare industry-level data from BGT to statistics from the Bureau of Labor Statistics’ Occupational Employment Statistics series. Through a number of key statistics, they conclude that the BGT data is broadly representative of the US labor market at the industry level and that there is an overrepresentation of occupations involving management and professional positions and underrepresentation of low-skill occupations.

I restricted my sample to managerial and supervisory jobs. The Standard Occupational Classification (SOC) code distinguishes between managers and supervisors. The management category (code 11-0000) covers all middle and upper managerial positions, including 59 distinct managerial titles (e.g., supply chain manager). Supervisory positions are scattered across broad occupational categories (including codes 33-1000, 35-1000, 37-1000, 39-1000, 41-1000, 43-1000, 45-1000, 47-1000, 49-1000, 51-1000, 53-1000, and 55-1000). They include first-line supervisors and managers, such as store managers, grocery managers, and floor supervisors.

I searched for job postings with at least one of the following keywords in the job title: *manager*, *supervisor*, *principal*, *director*, and *executive*. Then, with a colleague’s help, I manually checked each job title to ensure that it falls under either a management or a supervisory occupation under the SOC code. This process resulted in 34 million job postings, including around 24 million in manager occupations and around 9 million in supervisor occupations. Since the boundary between managers and supervisors can be blurry, I include both managers and supervisors in my analyses and refer them together as managers unless otherwise noted.

For each posting, the BGT data include education and experience requirements, detailed industry and occupation codes, the date the ad was posted, employer name (when available), location, salary, and—importantly—skill requirements.

### 3.2. Managerial Skill Requirements

Role expectations and skill requirements can be found throughout each job posting, especially in sections describing job duties and required qualifications (see Appendix Figures A.1 for examples). BGT employed a full-time ontology team to come up with a large number of skills—more than 15,000—ranging from technical skills such as *Python* to cognitive and social skills such as *analytical thinking* and *collaboration*. To identify the skills required for each job, the BGT team developed an elaborate set of linguistic rule-based classifiers, comprising thousands of rules and keywords and including numerous neighborhood and negation rules. This allows the team to distinguish between skills described with similar words; for example, between the *chef* in a kitchen and the software tool, *chef*.

I used these coded skills to identify the managerial roles indicated in each job posting. BGT has included both *supervision* and *collaboration* in their skill categories; in fact, those are among the most commonly mentioned managerial skills. To identify any additional skills that could be a synonym for either supervision or collaboration, two colleagues and I independently examined BGT’s entire list of more than 15,000 skill categories. We came across a few possibly related skills: *disciplinary procedures* could be related to supervision and *employee engagement* and *employee relations* could be related to collaboration. Because these four skills are rarely mentioned and including them in the analyses has no substantive impact, I did not include them in my analyses.

Besides supervisory and collaborative skills, the other commonly listed skills include *communication*, *budgeting*, *customer service*, *Microsoft Office*, *planning*, and *scheduling*. Most of these skills do not show a significant shift in their frequency during the study period.

The number of skills listed on job postings varies across the years. In particular, the median job posting in 2007 lists only 6 skills, much lower than the median value of 11 across the other years. In presenting descriptive trends, this variation in the number of skills could be a potential confounder. For example, we may observe a higher proportion of jobs

requiring supervisory skills in 2021 than in 2007, but this may simply be a result of jobs in 2021 having a higher number of skills than those in 2007. My solution is to simply drop the short job postings (listing fewer than five skills) when showing descriptive tables and figures. However, since my firm-level analysis includes year fixed effects, I use all observations when calculating managerial roles at the firm level.

Table 1 lists the most commonly required manager skills and shows how often they co-occur with either supervisory or collaborative skills. Among jobs that required supervisory skills, only 17.9 percent also required collaborative skills, the lowest number in the third column (suggesting the lowest co-occurrence). Conversely, among jobs that required collaborative skills, only 7.3 percent also required supervisory skills, the second-lowest number in the second column. This limited overlap between supervision and collaboration supports my assumption that these two skills reflect distinct managerial types. Among the other commonly required skills, scheduling has a relatively high overlap with supervision, while creativity and problem solving have a relatively high overlap with collaboration. These patterns are consistent with the intuition that supervision is more often associated with formalized and structured processes while collaboration is associated with higher task complexity and creativity.

[insert Table 1 about here]

### **3.3. Merging with Firm Data**

To understand how managerial roles are associated with firm characteristics, my colleague and I manually merged the BGT data with firm-level data from Compustat North America and the EEO-1 database. Compustat contains annual financial information on nearly all publicly traded firms in the US; I use it to measure research-and-development (R&D) expenditure and shareholder pressure. The EEO-1 database includes annual demographic workforce data on all firms in the US with at least 100 employees; I use it to construct the proportion of managers in each firm. Both databases have firm names and industry codes, on which I base my matching. I first matched the BGT data with the



Compustat data, then matched the BGT data with the EEO-1 data. In both steps, I first identified firms that have the exact same name and industry code in both databases and considered them matched. For the rest, I used the *matchit* package in Stata to calculate a similarity score based on firm name; I manually checked pairs with a similarity score above 0.6 to identify the correct matches. I tend to be conservative in my judgment; if I cannot determine a match with certainty, I drop it from my sample. In the end, I have 2,793 firms in the combined BGT-EEO-Compustat sample, representing 10,978 firm-year observations. The BGT data start in 2007 and my EEO-1 data stop in 2015, so the merged dataset spans from 2007 to 2015 (see Appendix Figure A.2 for details on the merging). The merged job-posting sample and the original BGT sample have a similar distribution across industries (see Appendix Table A.3).

In the last step, I set a threshold for the number of managerial job postings per firm-year. When a firm only posts one or two managerial jobs in a given year, they may not accurately reflect the firm’s overall expectation for the managerial role. But setting a high threshold could sacrifice considerable sample size. I tested various thresholds (3, 5, 10, 20, and 50) for the minimum number of managerial postings in a firm-year and, fortunately, results are largely consistent. For simplicity, I used five postings as the cutoff, resulting in 2,285 firms representing 8,780 firm-year observations.

### **3.4. Newspaper Ads, Resume Data, and Job Reviews**

I supplemented the online job-posting data with three other data sources: job ads from newspapers dating back to 1940, a large collection of managers’ resumes, and job reviews written by managers and posted on Indeed.com. These data sources are used to validate the changing role of managers and are not included in firm-level analyses. First, I examined managerial job ads from three mainstream newspapers in the US: the *New York Times* (from 1940 to 2000), the *Wall Street Journal* (from 1940 to 2000), and the *Boston Globe* (from 1960 to 1983). This additional data source allows me to observe changes during earlier periods, overcoming the short time span of BGT’s coverage. The newspaper job ads

data was collected and compiled by Atalay and his coauthors, who recently shared the data in an aggregated format (Atalay et al. 2018). The dataset contains around 9.3 million job ads, 905,659 of which are for managerial positions. For each job title every year, the aggregated dataset shows the number of such openings (from the three newspapers), the average salary, and a set of job characteristics and requirements.

Atalay et al. measured each job’s skill requirements and task activities based on O\*NET’s categories of work styles, skills, knowledge requirements, and work activities. They designed a set of keywords for each attribute and searched them in the job text. For my purpose, the most relevant job attribute is *collaboration*, which Atalay and his coauthors used three keywords to capture: “collaboration,” “collaborative,” and “unselfish.” The dataset has two other attributes that could reflect collaboration: *team building*, captured using keywords “team building” and “team build,” and *interpersonal relationships*, captured using “interpersonal,” “relationships,” “working relationship,” and “relationship building.” I use these three job attributes to measure collaboration roles. Unfortunately, I had difficulty finding relevant job attributes that specifically reflect managers’ supervisory roles.

Second, I analyzed over six million resumes to capture a supply-side view of changing managerial roles. From 2014 to 2018, BGT pulled the resumes of labor market participants from various recruitment and staffing agencies, workforce agencies, and job boards. After removing duplicates, the database contains over 16 million unique resumes, making it by far the most extensive resume database to date (Schubert, Stansbury, and Taska 2020). In cleaning the data, BGT’s research team anonymized all the resume data and encrypted all personally identifiable information, including names, addresses, and other details. For this study, I did not have access to the actual resumes; I used the parsed information from each resume compiled by BGT’s research team.

The resume data provide individual workers’ job histories and education up to their submission of the resume, effectively producing a longitudinal dataset. I reconstructed the data into a person-year format, so that each person-year constitutes a unique observation.

I then compared the occupational distribution in BGT’s resume data and the census data for different time periods (see Online Appendix Figure A.1), finding minimal change over time (most of the markers are close to the 45-degree line). This suggests that the resume data’s occupational-level representation has been consistent over time, making this a suitable dataset for my purpose. For this study, I included only those person-year observations in which the person was working as a manager, resulting in 58.9 million person-year observations for six million individuals.

As in their job-posting analysis, BGT’s research team used a proprietary algorithm to capture skill and experience information listed on resumes, based on each worker’s self-description of past experience and listed skills. These include both supervisory and collaboration experiences, which I assume to represent the two types of management roles I have identified. One limitation of the dataset is that I cannot observe which experience is associated with which position; each worker has a time-invariant list of skills derived from the entire resume. Therefore, this dataset only allowed me to observe changes in managerial roles based on between-individual changes, making it a conservative test.

Third, for additional supply-side evidence, I downloaded all job reviews from Indeed.com—a career intelligence website that invites users to submit free-text reviews of their employers. All reviews are anonymous, which makes them less susceptible to bias stemming from fear of retribution by employers. Reviewers are asked to provide their job title, which I used to identify reviews written by managers or ex-managers. I then cross-validated the Indeed review data with the national administrative data, finding it largely representative across occupations (see Online Appendix Figure A.2; also see Zhang (2023) for details on this dataset).

Indeed.com has 432,000 job reviews written by managers or ex-managers from 2013 to 2019. I designed a set of keywords to capture supervisory/collaborative activities and examined whether or not a job review includes any of them. The top keywords for supervision are “superv\*,” “oversee\*,” “oversight,” and “command” and the top keywords for

collaboration are “collaborat\*,” “teamwork,” “team build\*,” and “work together.” I manually examined each review with at least one of these keywords to rule out false positives, thus identifying 14,577 reviews (3.3 percent) as mentioning supervisory activities and 12,227 (2.8 percent) as mentioning collaborative activities.

### 3.5. Analytical Strategy

I use a three-part analytical strategy. The first part documents how managerial roles have changed; the second examines what firm characteristics predict this change; and the third addresses the managerial paradox by examining how the changing managerial role predicts managerial size (that is, the proportion of a firm’s employees who are managers).

**(1) Documenting trends:** I first descriptively examine changes in managers’ collaborative and supervisory requirements over time and across industries. My four data sources—online job postings, job ads from historical newspapers, resume data, and job reviews from Indeed.com—allow me to capture a wide range of industries over a long period. Using the online job-posting data, I run ordinary least squares (OLS) models both with and without firm fixed effects and firm-job fixed effects. This analysis shows how much of the shift in managerial role is attributable to (a) changes in the same job in the same firm, (b) the creation of new jobs within the same firm, and (c) the creation of new jobs in new firms. Specifically, I run the following equations, clustered by firm:

$$Collaboration_{jit} = \beta \cdot Year + FE + \epsilon_{jit}, \quad (1)$$

$$Supervision_{jit} = \beta \cdot Year + FE + \epsilon_{jit}, \quad (2)$$

where the outcome variables  $Collaboration_j$  and  $Supervision_j$  indicate whether job  $j$  posted by firm  $i$  in year  $t$  requires collaboration and supervision skills, respectively;  $FE$  is either firm fixed effects or firm-job fixed effects; and  $\beta$  reflects the average annual change.

**(2) Identifying firm characteristics:** My second set of analyses explores which firm characteristics predict supervisory/collaborative managerial roles. Using the online job-

posting data, I conduct the following OLS regressions at the job-posting level, clustered by firm.

$$Collaboration_{jit} = \beta \cdot X1_{it} + \gamma \cdot X2_{jit} + FE + \epsilon_{jit}, \quad (3)$$

$$Supervision_{jit} = \beta \cdot X1_{it} + \gamma \cdot X2_{jit} + FE + \epsilon_{jit}, \quad (4)$$

where  $Collaboration_j$  and  $Supervision_j$  are binary variables indicating whether job  $j$  at firm  $i$  in year  $t$  requires collaboration/supervision.  $X1_{it}$  comprises various firm-level characteristics for firm  $i$  in year  $t$ , including innovation culture, R&D expenditure, and shareholder pressure. I discuss these variables in detail below.  $X2_{jit}$  are job-level controls, including college degree requirement, previous work requirement, whether it requires basic software skills, the number of skills required, whether it is a part-time job, and the logged number of words in the job posting.  $FE$  are fixed effects for industry-year, firm, and job title.

**(3) Predicting managerial size:** The third set of analyses examines whether managerial roles have any association with a firm’s managerial size. I aggregate managerial roles to the firm-year level and run OLS regressions at that level, clustered by firm, to predict the proportion of managers in a firm:

$$Manager_{it} = \beta_1 \cdot Collaboration_{it} + \beta_2 \cdot Supervision_{it} + \gamma \cdot X_{it} + FE + \epsilon_{it}, \quad (5)$$

where  $Manager_{it}$  is the proportion of employees who are managers in firm  $i$  in year  $t$ . Variables  $Collaboration_{it}$  and  $Supervision_{it}$  are the proportion of managerial job postings (including supervisors) for firm  $i$  in year  $t$  that require collaboration and supervision skills, respectively.  $X_{it}$  is a set of firm level controls, including total assets, number of employees, cash flow, and debt-to-equity ratio; these are included because a firm’s size and financial state could affect its managerial size (Goldstein 2012).  $FE$  include fixed effects on industry-year and firm.

### 3.6. Firm-level Variables

Key firm-level variables include (a) my key dependent variable, *Managerial Size*, (b) independent variables that predict managerial roles, and (c) various controls.

**Managerial size.** A firm’s managerial size is the ratio of the number of managers to the number of employees in a firm. The data come from the Equal Employment Opportunity (EEO-1) database and cover 2007 to 2015 (see Tomaskovic-Devey et al. (2006) and Zhang (2021) for detail on this dataset). They provide information on the number of employees in each broad occupational category: managers, professionals, technicians, sales workers, office and clerical workers, craft workers, operatives, laborers, and service workers. Although this categorization is rather broad, it has remained constant over the years, unlike those of many other national surveys. This consistency ensures that any observed changes in the proportion of managers are not driven by shifts in coding systems. Note that EEO-1’s definition of managers include both managers and supervisors, based on the SOC code.

**Firm innovation.** To understand firm-level predictors of the new managerial roles, I constructed two variables related to firm innovation. Firms placing a strong emphasis on innovation often have a greater need for cross-functional collaboration and are more likely to embrace worker empowerment, both of which are commonly associated with workers’ creativity and innovative capacity (McGrath 2001; Obstfeld 2005). My first variable measures a firm’s innovation culture. I used a simple script to detect innovation keywords across all job postings, including postings for nonmanagerial jobs. For simplicity, I used variants of the word *innovation*, such as *innovation*, *innovating*, and *innovative*. The resulting variable—*Firm Innovation Culture*—is the proportion of a firm’s job postings in a year that mentions innovation; it spans 0 to 1. My measure is similar in both design and value to that constructed by Li et al. (2020), who use earnings call transcripts to measure innovation culture. My measure, however, provides a wider coverage of firms.

*Firm Innovation Culture* captures firms’ innovation culture, but not the amount of actual investment in innovation activities. I therefore also use *R&D Intensity*, defined as

a firm’s R&D expense over its total revenue. R&D expense, however, is highly industry-specific, as some industries (such as pharmaceuticals and manufacturing) rely on it for innovation more than others. These two variables of firm innovation have a correlation of 0.1, suggesting that they capture different dimensions of a firm’s innovation focus.

**Shareholder pressure.** I constructed three measures of shareholder value, which has often been considered a source of organizational change. First, scholarship has often used the presence of institutional investors as a measure of shareholder value, as they could push firms to be more attentive to stock prices (Jung 2014). *Institutional Shareholder Ownership* measures the percentage of a firm’s shares held by institutional investors. Data on institutional ownership were obtained from Thomson Reuters’ 13-F database. Second, *Shareholder Rewards* is the sum of share repurchase expenses and dividends divided by total firm expenses. It measures how concerned firms are to reward shareholders in the short term (Benton and Cobb 2019). Third, *Num Acquisitions* is the number of acquisitions the firm made in the past five years according to the SDC Platinum database, as M&A transactions are often seen as reflections of shareholder value.

## 4. RESULTS

Three findings emerged from my analyses. First, there has been a major shift in managerial role requirements, away from supervision and toward collaboration. In online job postings, the proportion of managerial jobs requiring collaborative skills tripled from 2007 to 2021, whereas the proportion requiring supervisory skills decreased by 23 percent. Analysis of the old newspaper postings suggests that this change started as early as the 1980s. These patterns are supported by the resume data and the job reviews written by managers, both of which show a similar trend but with a smaller effect. The second finding is that a manager’s role as a supervisor or a collaborator varies significantly and predictably across firms: the more a firm values innovation, the more likely it is to require its managers to have collaborative skills and the less likely it is to require supervisory skills. Third, firms requiring

collaborative skills in their managers are estimated to have 0.9-2.7 percentage points more managers than those not requiring it—approximately a 10- to 20-percent difference. In fact, controlling for managerial role requirements could explain a significant portion of the increase in managerial size in my sample.

#### **4.1. Managerial Role Change: Evidence from Online Job Postings**

Figure 2 shows the changing managerial requirements over time. In 2007, 13.4 percent of managerial and supervisory job openings required collaborative skills and 10.9 percent required supervisory skills. By 2021, 32.5 percent required collaborative skills while only 8.4 percent required supervisory skills; the proportion of managerial jobs requiring collaborative skills increased by 2.4 times while those requiring supervisory skills decreased by 23 percent. Figures 2b and 2c break down the sample into managers and supervisors based on SOC code. For managers, the proportion of jobs requiring collaborative skills went from 14.3 percent in 2007 to 32.5 percent in 2021 and the proportion of jobs requiring supervisory skills dropped from 8.9 percent to 6.9 percent. For supervisors, those requiring collaborative skills went from 10.0 percent in 2007 to 20.7 percent in 2021 and those requiring supervisory skills dropped from 17.8 percent to 12.6 percent. In the following analyses, I will not make further distinctions between middle managers and first-line supervisors: both will be referred to as managers.

Figure 3 explores the source of this managerial role change by examining how it varies across model specifications. If the change largely comes from the emergence of new firms that treat managers differently, then including firm fixed effects should reduce the magnitude of the change. If the change is driven by the creation of new job titles within existing firms, then including job-title fixed effects should reduce the magnitude of the change. As the figure shows, the estimated annual increase (decrease) in collaborative (supervisory) skills is largely similar whether or not I include firm-job fixed effects. In results not shown here, including just firm or job fixed effects also does not change the pattern much. These results suggest that the shift in managerial roles should be attributed neither to firm turnover nor



to the creation of new job titles. Rather, within a firm, the same managerial job is changing to requiring less supervisory skills and more collaborative skills.

[insert Figure 2 about here]

Table 2 breaks down the shifting trend by sector. In general, more knowledge-based industries seek more collaborative managers. In 2020, the three sectors most likely to require collaborative skills were (a) Information, (b) Manufacturing, and (c) Educational Services. Professional, Scientific, and Technical Services also have a large number of jobs requiring collaboration. In contrast, Accommodation and Food Services, Administrative and Support, Waste Management and Remediation Services, and Public Administration were the least likely to require collaborative skills. Wholesale Trade and Transportation were the most likely to require supervisory skills, while Information and Professional, Scientific, and Technical Services were the least likely. These patterns are consistent with my intuition: blue-collar sectors and public administration tend to be more hierarchical and bureaucratic, while knowledge-based sectors tend to require more complex interactions and promote employee empowerment.

[insert Table 2 about here]

However, although there is a marked difference in average managerial requirements between knowledge-based and blue-collar sectors, all sectors show a managerial shift from supervision to collaboration. Table 2 shows that the magnitude of this shift is generally comparable across sectors. Twelve out of 20 sectors experienced a reduction in supervision requirements and all sectors have a major increase in collaboration requirements. Information and Professional, Scientific, and Technical Services experienced the largest increase in collaboration requirements, while Accommodation and Food Services experienced the largest decrease in supervisory requirements. Nonetheless, traditionally blue-collar sectors, including Construction and Wholesale Trade, also experienced notable increases in collaboration requirements. This may reflect the fact that even traditionally blue-collar industries have been increasingly attentive to knowledge-based innovation in recent years.

It is worth noting that collaboration requirements have increased not just for managerial positions, but also for many other occupations. However, the growing importance of collaboration is significantly greater for managerial occupations than for professional occupations more broadly and for the overall workforce (see Appendix Figure A.4). This is consistent with my argument that today’s managers are often liaisons working across boundaries, so they are more likely to require collaborative skills than are nonmanagerial workers whose scope is smaller.

The changing managerial role could have implications for other job requirements. In particular, the proportion of managerial jobs requiring past work experience decreased from 73.3 percent in 2007 to 68.9 percent in 2021 (that is, for postings listing at least five skills). Appendix Table A.1 shows that work experience requirements are positively correlated with supervisory skills requirements, which is consistent with the notion that one often needs some work experience to supervise others effectively. At the same time, Appendix Table A.1 shows that jobs requiring supervisory skills have become less likely to require a college degree. Therefore, a decline in managerial supervision could decrease the value of past work experience while increasing that of a college degree.

## 4.2. Managerial Role Change: Evidence from Old Newspaper Ads

I supplemented BGT’s online job postings with job postings from historical newspapers. A notable limitation of BGT’s dataset is its relatively short time span: coverage is limited to 2007–2019. To test whether the changing managerial role started before then, I used aggregated data of job postings from three major newspapers from 1940 to 2000, compiled by Atalay et al. (2018).

Figure 4 shows the trend in the proportion of posted managerial jobs that require collaboration, team building, and interpersonal relationships. As shown in Figure 4a, mentions of *collaboration* were extremely rare from 1940 to 1980, averaging only 0.14 per 1,000 newspaper ads. This number, however, rose quickly in the 1980s: collaboration-related phrases were used 1.1 times per 1,000 managerial ads in 1980, 2.7 times in 1985, 6.6 times in

1990, 16.5 times in 1995, and 19.4 times in 2000. Thus, from 1980 to 2000, the occurrence of collaboration-related terms increased annually by 15 percent. I found a similar pattern in mentions of *team building* and *interpersonal relationships*. Figure 4b shows that the frequency of managerial ads mentioning *team building* was slightly higher in the 1960s and 1970s than in earlier decades, then rose dramatically in the 1980s. In Figure 4c, prior to the 1980s, only about 1.1 out of 1,000 ads mentioned interpersonal relationships, but this number started to increase after 1980, eventually reaching 28.4. Consistent with my theory, increasing collaborative expectations for managers took off in the 1980s, co-occurring with the rapid increase in the number of managers during that period.

[insert Figure 4 about here]

### 4.3. Managerial Role Change: Evidence from Resumes and Job Reviews

To supplement the demand-side data, I analyzed changing managerial roles using six million resumes and 430,000 employee reviews. It is possible that what has changed is not actual managerial roles, but rather the language used in job postings. My additional data sources address this limitation and offer an additional angle from which to observe changing managerial roles.

Figure 5 shows the proportion of managers who listed supervision or collaborative experiences on their resumes. The inclusion of collaborative experiences has increased steadily since the 1980s. While only 17.9 percent of those who were managers in 1985 highlighted collaborative or teamwork experiences on their resumes, this rose to 21.2 percent for those who were managers in 2000 and 24.5 percent in 2015. From 2000 to 2015, the proportion of managers listing collaborative experiences increased by 15.6 percent. In contrast, the frequency of listing supervisory experience increased slightly in the 1980s, then began to decrease starting in the late 1990s. In 1985, 26.6 percent of those who were managers listed supervisory experiences on their resumes. This number rose to 27.1 percent in 2000 but dropped to 25.2 percent in 2015. From 2000 to 2015, the proportion of managers highlighting supervisory experiences on their resumes decreased by 7.5 percent.

[insert Figure 5 about here]

In Figure 6, I used managerial job reviews from Indeed.com to identify self-mentioned supervisory and collaborative experience, covering 2012 to 2019. As the figure shows, the proportion of reviews mentioning collaboration experience increased from 2.4 percent in 2012 to 3.0 percent in 2019—a 27.8-percent jump. At the same time, the proportion of reviews mentioning supervisory activities decreased from 4.1 percent to 3.2 percent—a 21.5-percent drop.

[insert Figure 6 about here]

These supply-side trends are largely consistent with Figure 2. On an annual basis, the magnitude of the changes shown in Figure 5 is significantly less than that observed in Figure 2 derived from the job posting data, although Figure 6, using job review data, reflects faster change than the job posting data does. One possible explanation is that the resume data only show a person’s aggregate experience and do not reflect their experience each year. Therefore, the trend in Figure 5 could be conservative: the observed changes in managerial roles come only from turnover in managerial cohorts and do not include changes within an individual’s managerial career.

#### **4.4. Managerial Role Change: Additional Evidence**

It is possible that both resumes and employee reviews still reflect stylistic shifts in language use instead of actual role change. To provide some direct evidence of changes on the ground, I analyze job descriptions from the US Department of Labor’s Occupational Information Network (O\*NET) database as a robustness check. The database provides descriptive ratings for numerous attributes of each job, including skill requirements, work activities, work context, work style, work values, and knowledge and ability requirements. These ratings are derived from survey responses from large, representative samples of employees who hold each job and are supplemented with input from occupation experts and analysts. For my purpose, I focus on the following job attributes representing collaboration: *Assisting and Caring for Others*, *Coaching and Developing Others*, *Developing and Building Teams*,

and *Establishing and Maintaining Interpersonal Relationships*. I use *Guiding, Directing, and Motivating Subordinates* to proxy for supervision.

For each job attribute, the O\*NET team rates both its importance for the job and the level of that attribute required to perform the job. These ratings are periodically updated. From 2000 to 2020, they were updated four times. I run OLS regressions with occupation fixed effects to examine how each update predicts changes in collaboration and supervision ratings for managerial jobs. As Appendix Figure A.5b shows, for both importance rating and level rating, the value placed on collaboration has generally increased since 2000, although not in the two most recent updates. For supervision (as in *Guiding, Directing, and Motivating Subordinates*), however, there has been no significant increase in the level rating since 2000 and a decline in the importance rating. The magnitude of these changes is comparable to those for other major trends in the labor market. For instance, for a given increase in collaboration, computer interaction will increase about twice as much and analytical thinking will increase by a factor of about 0.3. This result complements the findings from job postings and resumes and further demonstrates the actual role change for managers.

#### 4.5. What Might Explain the Role Change?

To shed light on what might be driving the role change, Table 3 uses job-level data to examine firm-level predictors of managerial roles. In Models 1 and 4, using industry-year fixed effects, firms with a large R&D investment are significantly more likely to have jobs requiring collaboration: every 0.1 increase in *R&D Intensity* increases the likelihood of requiring collaboration by 4.3 percentage points. Similarly, firms that emphasize innovation culture are significantly less likely to have jobs requiring supervision: going from 0 to 1 on *Firm Innovation Culture* increases the likelihood of requiring collaboration by 5.1 percentage points and decreases that of requiring supervision by 9.3 percentage points. These between-firm models suggest that the expectation that managers will be collaborative is more concentrated in more innovation-focused firms.

[insert Table 3 about here]

Models 2 and 5 in Table 3 add firm fixed effects, exploring within-firm changes. Models 3 and 6 add firm and job-title fixed effects to examine temporal changes within the same job at the same firm. Consistent with the between-firm models, these within-firm models suggest the importance of a firm’s innovation focus: *Firm Innovation Culture* has a statistically significant negative association with supervision requirements and a positive association with collaboration requirements. However, *R&D Intensity* shows no significant association with managerial roles in these models. This is perhaps because R&D expenditures do not change as quickly as my measures of managerial role expectations and *Firm Innovation Culture*, both of which are based on firms’ use of language.

Other than innovation focus, only a few firm-level characteristics consistently predict managerial roles. Firm size, proxied by total assets, does not have consistent associations with managerial roles across models. *Debt-to-Equity Ratio* is negatively associated with collaboration requirements, suggesting that managerial collaboration is more likely to be required in firms with healthier financials. Institutional shareholder ownership is negatively correlated with supervision requirement, but only in within-firm models. The other measures of shareholder value—*Shareholder Rewards* and *Num Acquisitions in Past 5 Years*—are negatively associated with supervision requirements in between-firm models but not in within-firm models. Overall, there is little consistent evidence that shareholder pressure predicts managerial roles.

These results appear to suggest that the new managerial role is associated with firms’ emphasis on innovation. Innovation is often viewed as emerging from the active combination of people, knowledge, and resources (Obstfeld 2005). To foster novel ideas, innovation-focused firms may encourage internal collaboration, especially across functional areas. Moreover, too much supervision may impede employees’ creativity and entrepreneurial drive. It is believed that to generate innovative ideas, employees need to be given greater local discretion that permits them to take risks and experiment with new concepts (McGrath 2001). Firms that value innovation and espouse an innovation-based culture may therefore be

more likely to subscribe to the new management philosophy of greater worker empowerment. Recent work suggests that many executives have increased their attention to innovation in the past few decades (Li et al. 2020), potentially driving some of the changes in managerial roles.

#### 4.6. Explaining Managerial Growth

Finally, I consider how the changing managerial role is associated with the growth in the number of managers. My proposition suggests that organizations should have more managers when the manager’s primary role is to collaborate than when it is to supervise. Table 4 supports this proposition: firms tend to employ more managers when they treat them as collaborators than when they treat them as supervisors. Model 1 controls only for industry-year: requiring all new managers to have collaborative skills is associated with a 3.6-percentage-point-higher proportion of managers, while requiring all new managers to have supervisory skills is associated with a 3.8-percentage-point-lower proportion. The average proportion of managers in my sample is 13 percent, so 3.6 and 3.8 percentage points correspond to 28 percent and 29 percent, respectively. Models 2 and 3 include a number of relevant firm-variant controls, including size, demographics, and financial information. With these controls included, the association between managerial role and the proportion of managers decreases, while remaining quite significant; in Model 3, firms requiring all new managers to have collaborative (supervisory) skills see their proportion of managers increase (decrease) by 2.7 (2.1) percentage points compared to firms not requiring such skills. Model 4, the strictest model, includes both industry-year and firm fixed effects. Firm fixed effects reduce the association between collaborative skill requirements and the proportion of managers to 0.9 and that between supervisory skill requirements and the proportion of managers to a statistically insignificant 0.2. Thus, although much of the association between managerial role and managerial representation comes from between-firm differences, a substantial portion is also attributable to within-firm changes.

[insert Table 4 about here]

Accounting for a shift in managerial roles explains a significant percentage of the growth of the managerial class. Figure 7 compares the estimated managerial growth when including or not including variables for managerial role. Using industry fixed effects, the inclusion of *Prop. Managerial Jobs Req. Supervision* and *Prop. Managerial Jobs Req. Collaboration* reduces the estimated annual managerial growth by as much as 57 percent (the annual growth rate drops from 0.07 percentage points to 0.03). To explore how much of this difference is driven by between-firm turnover versus within-firm changes, I also show results using firm fixed effects, which show that including variables for managerial roles reduces the annual managerial growth by 8 percent (the annual growth rate drops from 0.25 percentage points to 0.23).

[insert Figure 7 about here]

Table 4 offers limited evidence that shareholder value is associated with managerial growth. Institutional ownership and shareholder rewards are positively associated with more managers in between-firm models, but not in within-firm models. Acquisition rate has no significant association with managerial representation across all models. Thus, it seems unlikely that the observed managerial growth is a result of the shareholder revolution.

Managerial roles are associated with a higher wage premium. Appendix Table A.2 shows that managerial positions that require collaboration but not supervision offer significantly higher wages: the same job pays 4.4 percent more when it requires collaborative skills than when it requires supervisory skills (see Appendix Table A.2).<sup>3</sup> The pay gap between the two types of manager may be a result of cross-firm differences in wage premiums, as additional analyses suggest that firms expecting more managerial collaboration pay employees more in general and those expecting more managerial supervision pay less. This may reflect that the former type of firm underscores worker empowerment while the latter emphasizes monitoring and reduced labor cost.

In sum, these results suggest that firms do not become “fat and mean” as Gordon

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<sup>3</sup>Wage data also come from job postings provided by BGT; see Wilmers and Zhang (2022) for the limitation of this wage information.



(1996) theorized. Rather, firms that emphasize managerial supervision are “lean and mean,” employing fewer managers and paying their workers less, while firms that emphasize managerial collaboration are actually “fat and nice”—they have more managers and pay their workers more.

## **5. DISCUSSION AND CONCLUSION**

Sociologists have long been interested in understanding managers and managerial roles. This study—analyzing job postings, job reviews, and employee resumes—provides a systematic analysis of managerial roles across industries and over time. My central thesis is that the role has transformed in the last few decades: as collaboration needs grew and new management philosophies gained traction, organizations had less demand for managerial oversight but more for collaboration across boundaries and engagement with workers. This shifting role for managers has a number of sociological implications, which I discuss below.

### **5.1. Understanding the Resurgence of Managers**

This study speaks to a long-standing tradition in the sociology of managerialism (Bendix 1963; Mills 1951; Weber 1978). Many have tried to understand the rise of managers, a pattern that started as early as the 1970s and, as I show in this paper, persisted into the 2000s (e.g., Goldstein 2012; Gordon 1996; Hollister and Wyper 2013; Levinson 1990; Littler and Innes 2004). Although a few notable theories have been proposed—including the service-to-manufacturing shift and Gordon’s “fat and mean” hypothesis—none could fully explain the managerial growth since the 2000s. By focusing on the changing role of managers, I offer an alternative explanation that could help account for why the managerial class has grown since the 1970s. Empirically, previous studies have generally relied on either qualitative observations or industry-level correlations. This study provides evidence using detailed firm-level demographics and job-level characteristics, providing a more rigorous examination of the association between various factors and managerial growth.

## 5.2. The Growing Importance of Social Skills

The changing managerial role involves the growing importance of social skills and the declining emphasis on past work experience. The need for collaboration means that organizations are increasingly looking to hire managers with excellent social and teamwork skills. This pattern is consistent with the general trend of social skills becoming more important in the labor market, with firms paying an increasing wage premium for them (Deming 2017). This trend could benefit those with college degrees, because some research suggests that college graduates are more likely to understand the implicit social norms of the workplace and often appear to have better social skills (Hout 2012). This may explain why managerial jobs requiring collaborative skills are more likely to require a college degree, even controlling for firm and industry (see Appendix Table A.1). At the same time, my analyses suggest that the proportion of managerial positions requiring past work experience has declined. Firms may be more likely to require managers with work experience when the manager's main role will be to command and supervise. But as supervision becomes less important, the emphasis placed on managers' past work experience may also decline accordingly (see Appendix Table A.1). These trends may further exacerbate inequality between employees with and without a college education, as firms may increasingly prefer college graduates over those with only a high school education, even if the latter have more work experience.

The growing importance of social skills could also have important implications for particular groups in the labor market. For example, a major impediment for women managers is the gender stereotype that portrays women as communal, which is inconsistent with the agentic expectation for managers. But as managerial expectations change, this stereotype may become less of a burden and more of a boon. The changing managerial role may, in fact, explain a portion of women's recent progress in middle management. At the same time, the changing role of managers may negatively affect immigrants' prospects. Immigrants, especially those from culturally distant countries, often face significant disadvantages when it

comes to collaborative skills. The increasing emphasis on collaboration for managers could make it even harder for them to gain managerial positions.

### **5.3. Rethinking the Manager-Worker Distinction**

My findings also suggest a narrowing of the difference between managers and non-managerial workers. Instead of assuming a hierarchical power relationship, managers have become increasingly lateral to other types of worker. They still specialize in certain managerial functions, but in some cases may be perceived as roughly equal in status and power to nonmanagerial workers. This blurring of the manager-worker distinction may mean that we need to rethink our assumptions about career ladders in an organization. Instead of moving “up” the career ladder into managerial positions, it is possible that in the future managers may simply constitute a separate career “track.” For example, some tech firms already have separate career tracks for engineers and for managers, with the understanding that neither is more important than the other.

This blurring of the manager-worker distinction could also necessitate reconsideration of managers’ categorization as an occupational class. Historically, in categorizing middle managers, some have considered them as a “lower strata of the ruling class” (e.g., Becker 1973), others as a separate class between owners and nonmanagerial workers because “their interests are objectively antagonistic to the interests of the working class” (Peschanski 1985; Wright and Perrone 1977). However, as managers’ role changes, perhaps they should be treated more like nonmanagerial workers. In fact, anecdotal evidence suggests that today’s middle managers are increasingly squeezed by organizations: they have been given more responsibilities and tasks but less enforcement power (Osterman 1996). Instead of perceiving them as antagonistic to the interests of the working class, it is perhaps more appropriate to see them as members of the working class themselves.

Ever since the emergence of modern organizations in the nineteenth century, managers have been the subject of study by both academics and practitioners. In the past two

centuries, organizations and their environments have undergone transformation after transformation. Old occupations have disappeared and new ones have emerged. Yet managers are still here. One need only look at the number of management courses in universities and the great volume of management research to get a sense of managers' importance today. In my view, the durability of managers lies in their adaptability. As culture shifted and new technologies emerged, management as an occupation also changed its roles and obligations. Managers today differ from the managers of yesterday and will probably differ from the managers of tomorrow. But as long as managerial roles are adaptive, we can expect managers to remain indispensable.

Ever since the emergence of modern organizations in the nineteenth century, managers have been the subject of study by both academics and practitioners. In the past two centuries, organizations and their environments have undergone transformation after transformation. Old occupations have disappeared and new ones have emerged. Yet managers are still here. One need only look at the number of management courses in universities and the great volume of management research to get a sense of managers' importance today. In my view, the durability of managers lies in their adaptability. As culture shifted and new technologies emerged, management as an occupation also changed its roles and obligations. Managers today differ from the managers of yesterday and will probably differ from the managers of tomorrow. But as long as managerial roles are adaptive, we can expect managers to remain indispensable.

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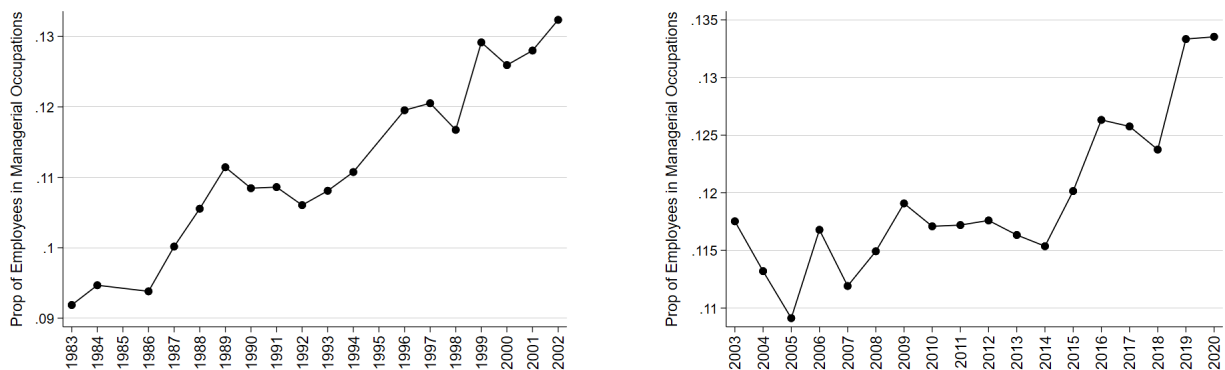
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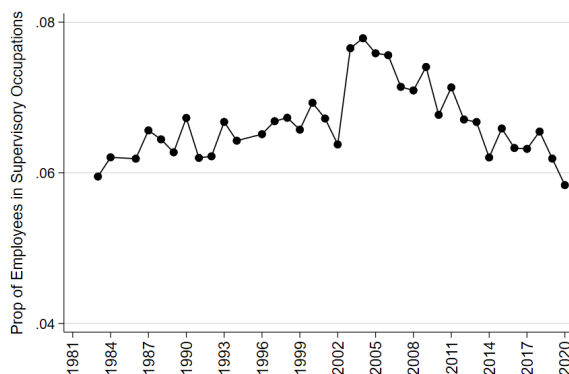
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## TABLES AND FIGURES



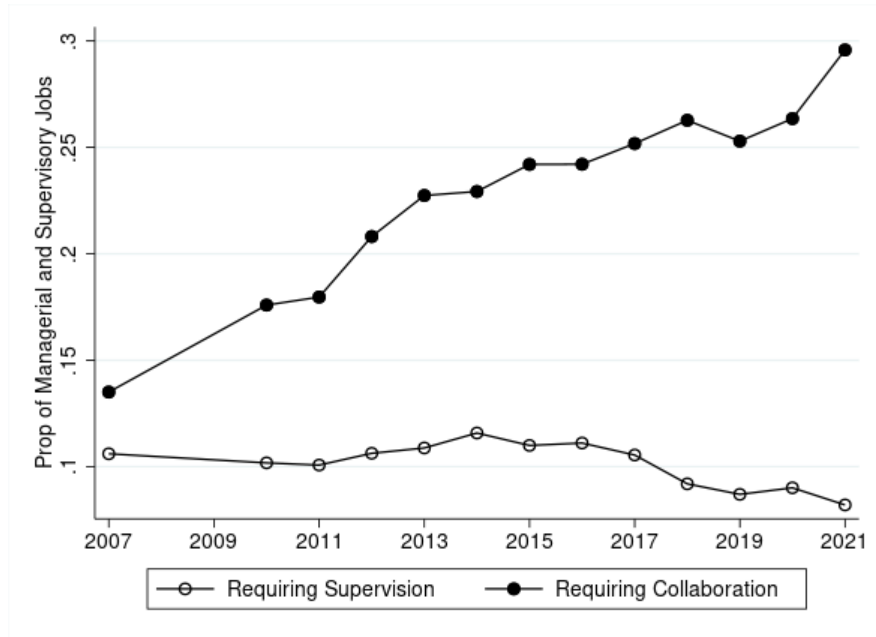
(a) Proportion of Managers



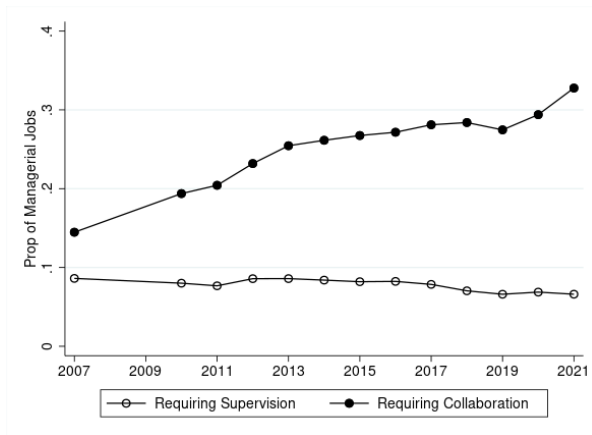
(b) Proportion of Supervisors

Notes: The graph shows the proportion of workers in managerial and supervisory occupations from 1983 to 2020. Data come from the Current Population Survey (CPS). Because the survey revised its definition of managers in 2003, I show the pre- and post-2003 periods for managers separately. Managerial occupations include those with SOC code 11-0000, covering senior and middle managers. Supervisory occupations contain all SOC occupations (outside of managerial categories) that include “supervisor” in their titles, including 33-1000, 35-1000, 37-1000, 39-1000, 41-1000, 43-1000, 45-1000, 47-1000, 49-1000, 51-1000, 53-1000, and 55-1000.

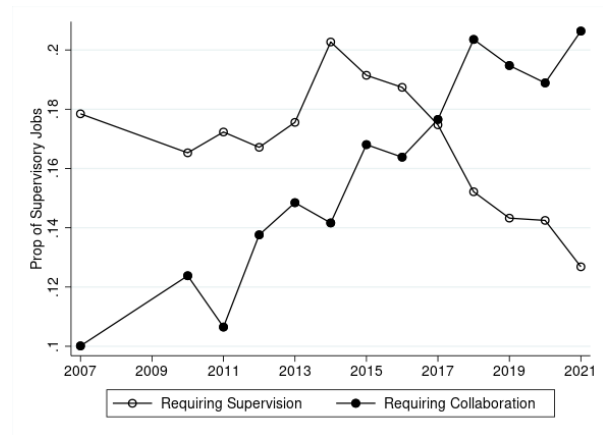
Figure 1: The Rise of Managers



(a) Managers and Supervisors



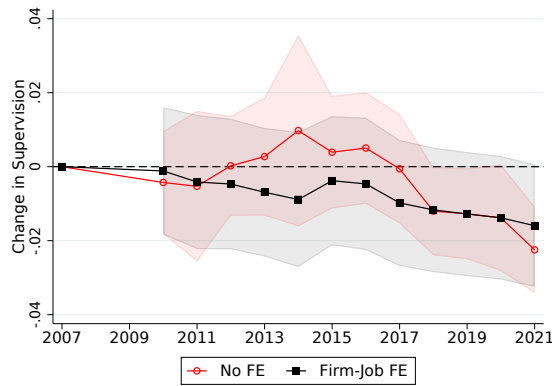
(b) Managers



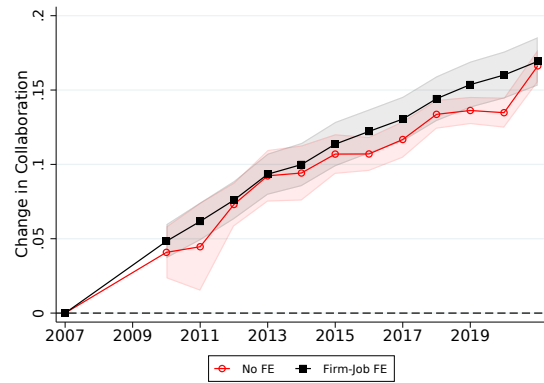
(c) Supervisors

Notes: The graph plots the proportion of managerial and supervisory job postings that require supervision or collaboration. Managerial jobs include those with SOC code 11-0000 and supervisory occupations contain all SOC occupations (outside of managerial categories) that include “supervisor” in their titles. I restrict the sample to postings with a valid employer name and listing at least five skills. The graphs are constructed using 34 million online job postings from 2007 to 2021, provided by Burning Glass Technologies (BGT). Both collaborative and supervisory skills are based on skill categories coded by BGT.

Figure 2: The Changing Role of Managers: Evidence from Online Job Postings 2007-2021



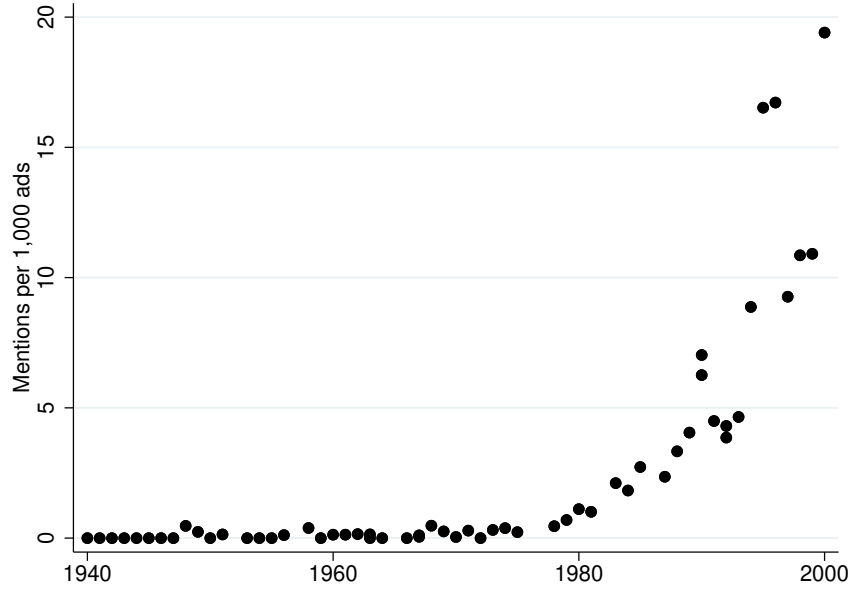
(a) Predicting Supervision



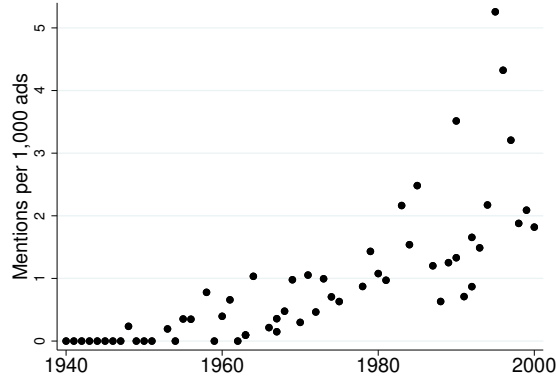
(b) Predicting Collaboration

Notes: The figures show estimated annual change in job requirement, using both firm-job fixed effects and no fixed effects. No additional controls are included. Analyses use ordinary least squares models at the job level and include job postings with a valid employer name and listing at least five skills. Dependent variables are whether the job requires supervisory/collaboration skills, as coded by Burning Glass Technologies.

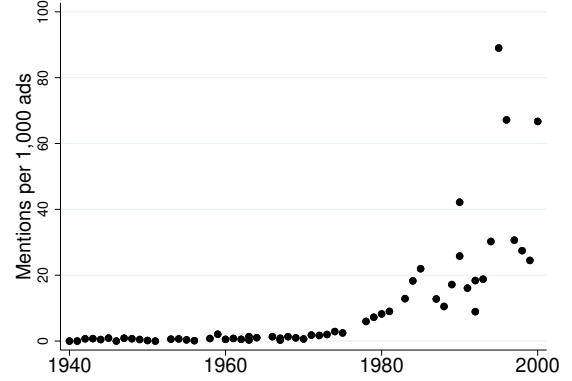
Figure 3: Estimated Managerial Role Change using Different Specifications



(a) Collaboration



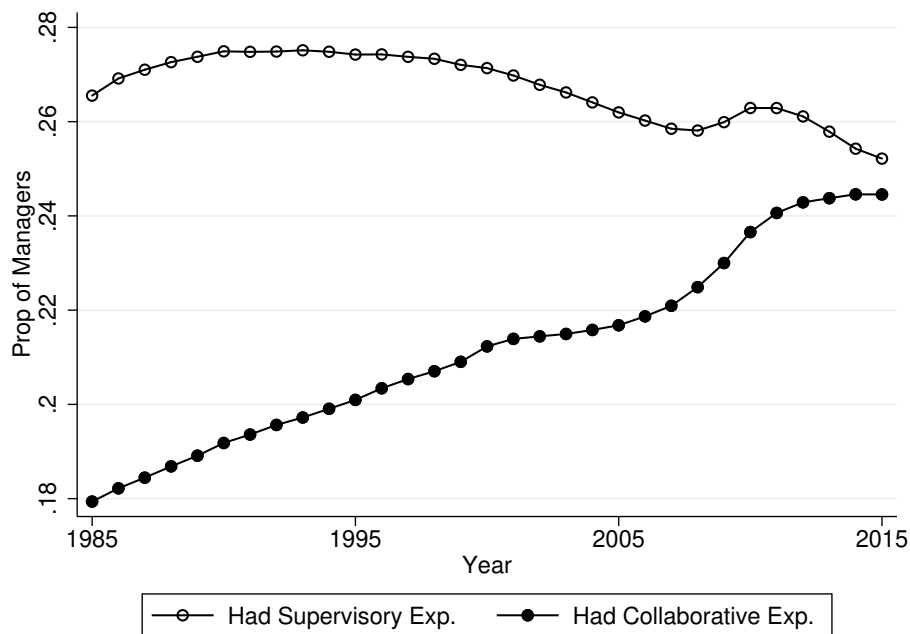
(b) Building Teams



(c) Maintaining Interpersonal Relationships

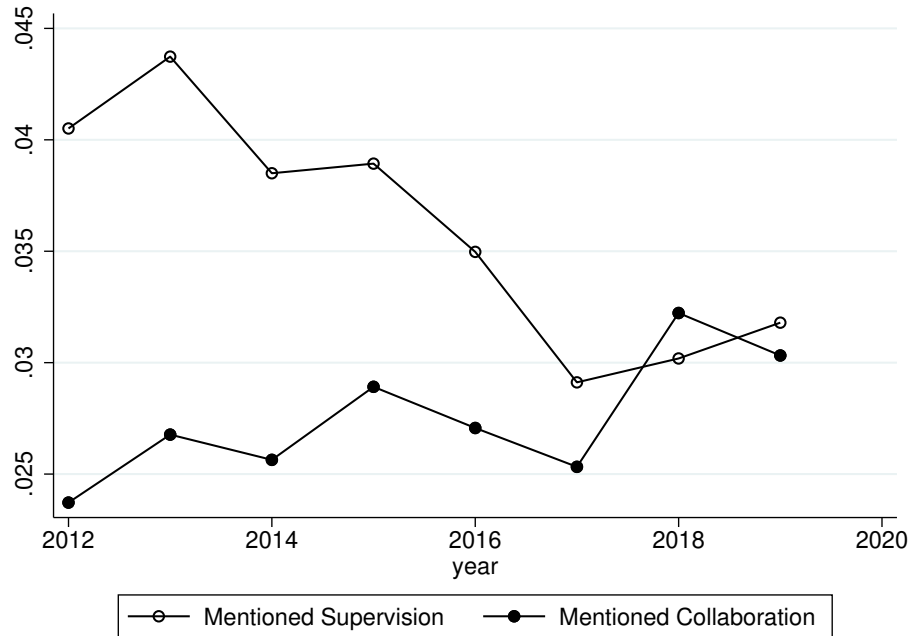
Notes: The graphs show the proportion of managerial job ads that mention collaborative orientations. The data was compiled by Atalay et al. (2018); I obtained it in an aggregated format. It is built from 320,000 newspaper ads for managerial jobs from the *Boston Globe*, the *New York Times*, and the *Wall Street Journal* from 1940 to 2000. The plots are based on the frequency of keywords per 1,000 job ads. Collaboration includes “collaboration,” “collaborative,” and “unselfish” as keywords; Building Teams includes “team building,” “team build,” and “project leader”; Maintaining Interpersonal Relationships includes “interpersonal,” “relationships,” “working relationship,” and “relationship building.”

Figure 4: The Changing Role of Managers: Evidence from Newspaper Ads 1940-2000



Notes: The graph plots the proportion of managers and ex-managers who listed supervisory/collaborative experience on their resumes. The data is built from over six million online resumes provided by Burning Glass Technologies (BGT). Both supervisory and collaborative experience are coded by BGT. I reconstructed the data into a person-year format to observe the proportion of managers in a particular year who had listed such experience on their resumes.

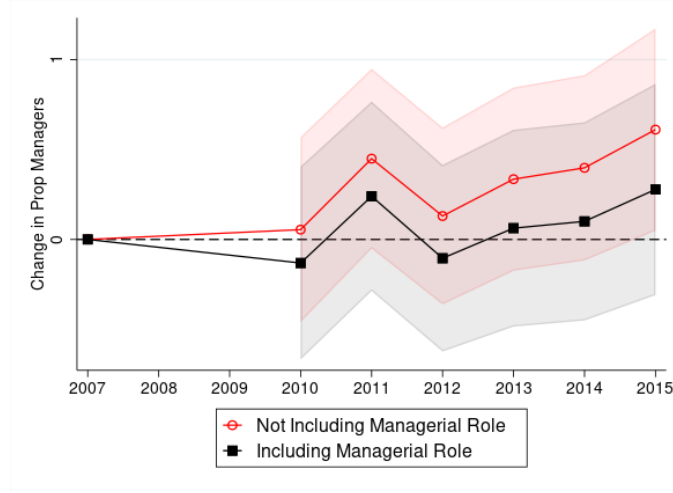
Figure 5: The Changing Role of Managers: Evidence from Resumes 1985-2015



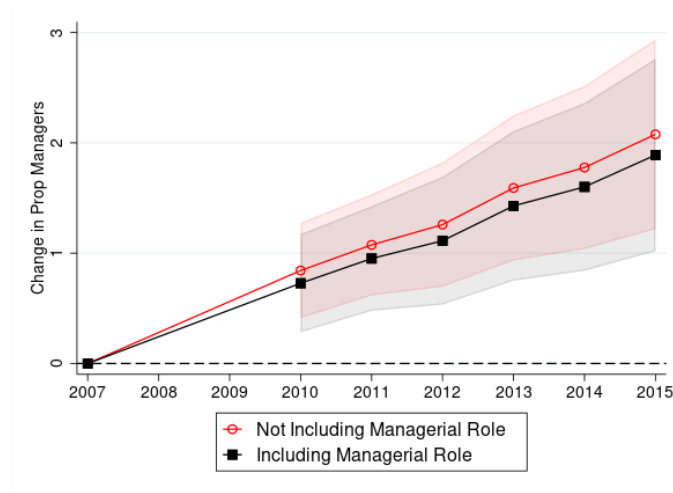
Notes: The graph plots the proportion of managers and ex-managers who mentioned supervisory/collaborative experiences in their job reviews. The data come from Indeed.com and include 430,000 free-text job reviews written by managers or ex-managers. I designed a set of keywords to capture those that mention supervision/collaboration and manually checked them to rule out false positives. The y-axis represents the proportion of job reviews that mention supervision/collaboration activities.

Figure 6: The Changing Role of Managers: Evidence from Indeed Employee Reviews 2012-2019





(a) Industry Fixed Effects



(b) Firm Fixed Effects

Notes: The figures show estimated annual change in the proportion of managers in a firm, using either industry or firm fixed effects. The higher line is the estimated managerial growth without including the two variables for managerial roles (*Prop. Managerial Jobs Req. Supervision/Collaboration*) and the lower line is the estimated model including them. Model specification is based on Table 4. I use all managerial and supervisory job postings to calculate a firm's managerial role each year. Job posting data come from Burning Glass Technologies, data on managerial composition come from the Equal Employment Opportunity (EEO-1) database, and financial variables come from Compustat.

Figure 7: Decomposing the Growth of Managers

Table 1: Descriptive Data on the Most Commonly Required Managerial Skills

Listed Skill	Frequency	Prop Also Requiring Supervisory Skills	Prop Also Requiring Collaborative Skills
All	100.00	10.03	24.77
Supervision	10.03	100.00	17.91
Collaboration	24.77	7.25	100.00
Communication	48.09	10.25	29.72
Microsoft	30.33	9.93	28.18
Customer Service	19.18	12.17	21.97
Budgeting	28.07	11.15	27.66
Planning	37.50	8.96	30.88
Scheduling	23.90	15.59	21.37
Problem Solving	21.80	11.64	32.39
Organizational Skills	21.31	11.38	28.93
Detail Oriented	13.36	11.26	32.54
Creativity	11.84	5.84	38.80

Notes: Frequency reports the proportion of job ads that require the listed skill. *Prop Requiring Supervisory/Collaborative Skills* is the proportion of job ads that require supervisory/collaborative skills given that they already require the listed skill. I restrict the sample to postings with a valid employer name and listing at least five skills. All values are expressed as a percentage.

Table 2: The Changing Role of Managers by Industry

Sector Name	Require Collaborative Skills (%)			Require Supervisory Skills (%)		
	2007	2020	Change	2007	2020	Change
Accommodation and Food Services	10.87	18.58	7.71	26.35	11.21	-15.13
Administrative & Support and Waste Management & Remediation Services	11.68	18.90	7.22	11.92	12.04	0.12
Agriculture, Forestry, Fishing and Hunting	11.22	28.08	16.86	12.96	8.83	-4.13
Arts, Entertainment, and Recreation	13.62	21.90	8.28	7.77	13.50	5.74
Construction	10.39	21.89	11.50	7.14	6.17	-0.97
Educational Services	17.43	34.59	17.16	9.26	9.91	0.65
Finance and Insurance	13.70	30.97	17.27	10.10	5.32	-4.78
Health Care and Social Assistance	14.89	29.01	14.12	12.76	11.83	-0.93
Information	14.95	40.42	25.47	7.33	4.11	-3.22
Management of Companies and Enterprises	16.14	26.60	10.46	9.38	7.67	-1.71
Manufacturing	16.04	34.65	18.61	7.80	7.54	-0.26
Mining, Quarrying, and Oil and Gas Extraction	15.91	20.68	4.77	8.84	7.63	-1.21
Other Services (except Public Administration)	14.04	25.88	11.84	9.00	10.40	1.40
Professional, Scientific, and Technical Services	14.14	32.19	18.05	4.23	4.54	0.32
Public Administration	10.21	19.49	9.28	15.19	12.02	-3.18
Real Estate and Rental and Leasing	5.95	21.87	15.91	14.86	11.15	-3.71
Retail Trade	10.02	19.65	9.63	12.16	12.99	0.83
Transportation and Warehousing	10.99	23.97	12.98	19.50	13.57	-5.92
Utilities	12.15	27.78	15.62	9.62	12.48	2.87
Wholesale Trade	15.00	32.76	17.77	10.75	14.01	3.26

Notes: The table shows the proportion of managerial job ads that require either supervisory or collaborative skill in each industry. All values are expressed as percentages. I restrict the sample to postings with a valid employer name and listing at least five skills.

Table 3: Linear Models Predicting Managerial Roles at the Job Posting Level

	Require Supervision			Require Collaboration		
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Innovation Culture	-9.30*** (2.71)	-13.39** (4.94)	-10.49*** (2.44)	5.06 (3.43)	10.27* (4.24)	8.77** (2.81)
R&D Intensity	0.020 (4.72)	-1.62 (4.24)	0.84 (5.77)	43.18*** (7.70)	-2.13 (4.11)	-3.54 (5.11)
Institutional Shareholder Ownership (pct)	2.54 (3.83)	-5.93* (2.89)	-5.38* (2.59)	2.99 (3.49)	3.66 (3.98)	2.58 (3.58)
Shareholder Rewards	-2.64* (1.32)	0.62 (0.62)	0.48 (0.71)	2.49 (2.45)	-0.05 (0.98)	0.31 (1.00)
Num Acquisitions in past 5 years	-3.11** (1.11)	-0.30 (0.37)	-0.50 (0.33)	-1.00 (1.32)	-0.86 (0.66)	-0.35 (0.66)
Total Asset (log)	0.98* (0.46)	-0.18 (1.37)	0.63 (1.82)	1.58* (0.64)	-0.43 (1.01)	-1.50 (1.39)
Cash Flow (log)	-0.03 (0.10)	-0.02 (0.04)	-0.02 (0.04)	0.02 (0.14)	0.07 (0.12)	0.03 (0.15)
Debt-to-Equity Ratio (log)	-0.88 (1.57)	0.84 (0.62)	0.83 (0.47)	-1.22 (0.87)	-1.33** (0.45)	-1.09* (0.45)
Require College Degree	-8.35*** (2.03)	-5.89*** (1.31)	-2.00* (0.91)	2.69 (1.56)	3.03* (1.41)	2.12* (0.89)
Require Prior Work Experience	9.63*** (2.80)	6.88*** (1.23)	6.40*** (1.23)	-0.09 (1.25)	0.31 (0.80)	0.30 (0.74)
Num of Specific Skills Required	0.42*** (0.09)	0.31*** (0.07)	0.38*** (0.06)	1.53*** (0.10)	1.42*** (0.09)	1.42*** (0.08)
Part Time Job	-10.51* (4.66)	-2.14* (1.07)	-4.46 (2.28)	0.92 (5.46)	5.18* (2.54)	2.26 (2.11)
Observations	3291285	3290602	3110502	3291285	3290602	3110502
$R^2$	0.15	0.27	0.50	0.16	0.25	0.43
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects		Yes	Yes		Yes	Yes
Job-Title Fixed Effects			Yes			Yes

Notes: The table uses ordinary least squares models to predict the likelihood that a job posting requires supervisory/collaborative skills. It includes all managerial and supervisory jobs posted between 2007 and 2019 by firms in the merged BGT-Compustat sample. Standard errors clustered by firm are in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 4: Linear Models Predicting Managerial Size at the Firm Level

	Prop of Managers			
	(1)	(2)	(3)	(4)
Prop Managerial Jobs Req. Supervision	-3.82*** (0.39)	-3.21*** (0.39)	-2.13 (1.21)	0.21 (0.55)
Prop Managerial Jobs Req. Collaboration	3.56*** (0.31)	3.67*** (0.31)	2.67*** (0.76)	0.93* (0.41)
Num of Employees (log)		-1.49*** (0.08)	-1.71*** (0.18)	-3.84*** (0.40)
White Collar Proportion in Workforce		0.03 (0.54)	6.04*** (1.32)	-18.24*** (3.12)
Num of Total Establishments (log)		0.38*** (0.07)	-0.06 (0.15)	0.32* (0.15)
Prop Racial Minority Employees		-1.62*** (0.40)	3.61** (1.35)	-3.33 (3.44)
Prop Women Employees		-0.36 (0.72)	1.12 (1.61)	-9.03 (5.02)
Cash Flow (log)			-0.07 (0.05)	0.01 (0.02)
Debt-to-Equity Ratio (log)			0.02 (0.22)	0.20* (0.10)
Institutional Shareholder Owership (pct)			1.46* (0.70)	1.00 (0.52)
Shareholder Rewards			0.02** (0.01)	0.00 (0.00)
Num Acquisitions in Past 5 Years			-0.07 (0.25)	-0.26 (0.16)
Observations	45619	45618	8780	7798
$R^2$	0.29	0.31	0.44	0.93
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects				Yes

Notes: The table uses ordinary least squares models to predict the proportion of managers in a firm. The dependent variable is the number of managers over the total number of employees in a firm-year. The key independent variables are the proportion of managerial and supervisory job postings in a firm-year that require supervisory/collaborative skills. The first two models include all firms that appear in both the BGT job postings and the EEO-1 dataset. The last two models further restrict the sample to those that also appear in the Compustat database. Standard errors clustered by firm are in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 5: Summary of Key Analyses

Analysis	Key Findings	Data Sources
Documenting managerial role change	Managerial jobs requiring supervisory skills decreased by 23 percent from 2007 to 2021, while those requiring collaborative skills increased by 119 percent (Figures 2 and 3).	BGT online job postings
	The change in managerial role started around the 1980s (Figure 4).	Job postings from old newspapers
	Managers who mentioned supervisory activities on their resumes decreased by 8 percent from 2000 to 2015, while those mentioned collaborative activities increased by 37 percent (Figure 5).	BGT resume data
	Managers who mentioned supervisory activities in job reviews decreased by 22 percent from 2012 to 2019, while those mentioned collaborative activities increased by 28 percent (Figure 6).	Job reviews from Indeed.com
What firm traits predict the role change	Innovation-focused firms are more likely to require managerial collaboration and less likely to require managerial supervision. Firms' shareholder pressure and information technology have no association with managerial roles (Table 3).	BGT online job postings and various firm-level data
Role change and the managerial paradox	Collaborative managerial roles are positively associated with a larger number of managers, while supervisory managerial roles are negatively associated. Accounting for managerial role explains 8.63-55.07 percent of the increase in managerial size (Table 4).	BGT online job postings and EEO-1 data on firm-level managerial size

## APPENDICES

Date: 2007-07-24  
Payroll Manager  
Location: GA - Atlanta  
Employer Name: ADP  
Job Description:  
\* Hires, trains, supervises, motivates, and develops accounts payable staff; manages schedules and workflow.  
\* Responsible for the management and administration of all payroll functions  
\* Investigates and resolves distribution and pay discrepancy questions.  
\* Manages accurate and timely processing of monthly accounts payable expenditures including but not limited to document review, vendor set-up and maintenance, conformance to governmental reporting standards and check distribution.  
\* Reviews, analyzes, modifies, and implements efficient and effective payroll and accounts payable processes, policies, and procedures.

**Qualifications:**  
\* Knowledge of federal, state and local payroll tax legislation  
\* Undergraduate business-related degree  
\* Minimum 5 years prior payroll and accounts payable experience  
\* Prior supervisory experience  
\* Prior multi-unit hospitality experience desired.  
\* Excellent communication and customer service skills  
\* Proficient in Solomon accounts payable software module  
\* Proficient in ADP PayForce version 8.0 or higher  
\* Knowledge of MS Word, Excel and Outlook

Date: 2018-09-08  
Payroll Manager  
Location: Alpharetta, GA  
Employer Name: ADP  
Job Description:  
\* Lead daily activities of the team to ensure that all work is completed according to scheduled deadlines  
\* Train and mentor team members and identify development needs across the team, working with the director to coordinate additional training as needed  
\* Track various productivity and performance standards to ensure that established levels are achieved  
\* Manage escalated issues and provide direction  
\* Collaborate with peers to establish best practices  
\* Evaluate associates on performance and complete annual performance appraisals.  
\* Work in collaboration with associate to establish Individual Development Plans  
\* Hire/Fire authority in conjunction with Human Resources  
\* Participate in task forces, strategic initiatives and collaboration opportunities with other business units

**Qualifications:**  
\* Bachelor's degree  
\* At least 5 years of experience and at least 3 years of people leadership experience  
\* Ability to communicate effectively\* Excellent collaboration, organizational, time management, customer service and problem-solving skills  
\* Ability to work and thrive in a team environment  
\* Ability to maintain cooperative working relationships with all levels of management  
\* Ability to assess team members' performance and provide motivational support  
\* Ability to work both independently and as part of a team  
\* Strong client relationship building skills  
\* Proficient in the latest web technologies

Date: 2007-11-14  
Banquet Manager  
Location: Houston, TX  
Employer Name: Marriott International  
Job Description:  
\* Experience supervising a few banquets at the same time  
\* Maintain a balance between floor supervision, administration, employee training and mentoring, and hosting/communicating with groups  
\* Coordinate meal and set up requests with appropriate Departments  
\* Excellent communications with FO, Catering, and Sales  
\* Be available during all major Banquet functions

**Qualifications:**  
\* High School degree or equivalent  
\* Requires a minimum of 5 year(s) of experience, a minimum of 3 year(s) of supervisory experience.  
\* Strong customer service orientation and skills  
\* Exceptional detail in follow-up  
\* Create courteous, friendly, professional work environment

Date: 2018-06-03  
Banquet Manager  
Location: Houston, TX  
Employer Name: Marriott International  
Job Description:  
\* Supervises daily Food and Beverage (F&B) shift operation and monitors compliance with all F&B policies, standards, and procedures  
\* Understands employee positions well enough to perform duties in employees' absence  
\* Develops specific goals and plans to prioritize, organize, and accomplish work  
\* Establishes and maintains open, collaborative relationships with employees  
\* Creates and nurtures a property environment that emphasizes motivation, empowerment, teamwork and passion for providing service  
\* Stays readily available/ approachable for all team members

**Qualifications:**  
\* High school diploma or GED  
\* 4 years experience in the food and beverage, culinary, or related professional area  
Or  
\* 2-year degree from an accredited university in Food Service Management, Hotel and Restaurant Management, Hospitality, Business Administration, or related major; 2 years experience in the food and beverage, culinary, or related professional area

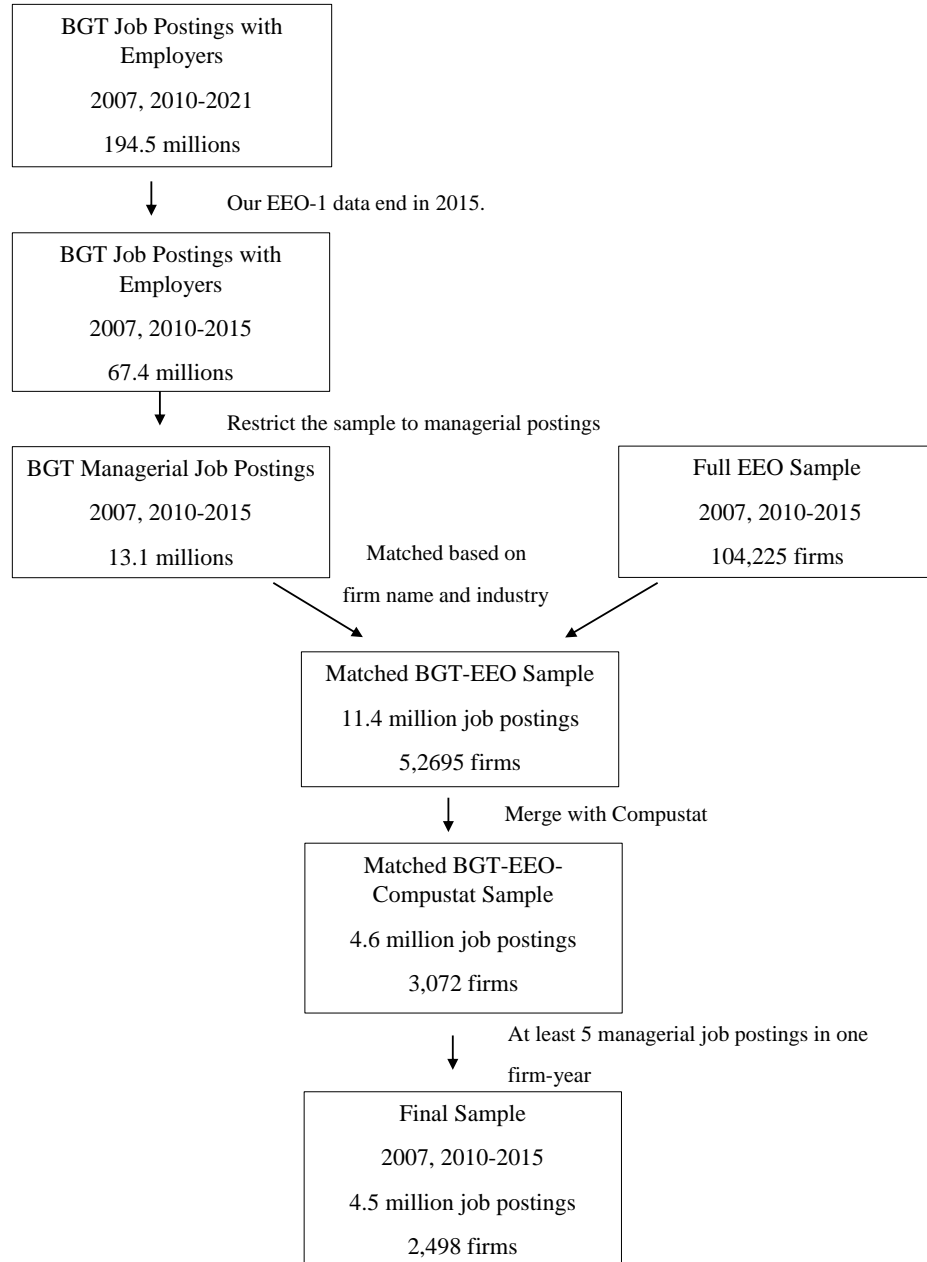
(a) Example Job Posting A

(b) Example Job Posting B

Notes: The figure shows an example of how changing managerial roles are reflected in job postings. The two sample job postings were posted by the same company and for the same position but in different years. They are retrieved from Burning Glass Technologies and some details are omitted in this display. Parts related to supervisory and collaborative skill requirements are highlighted.

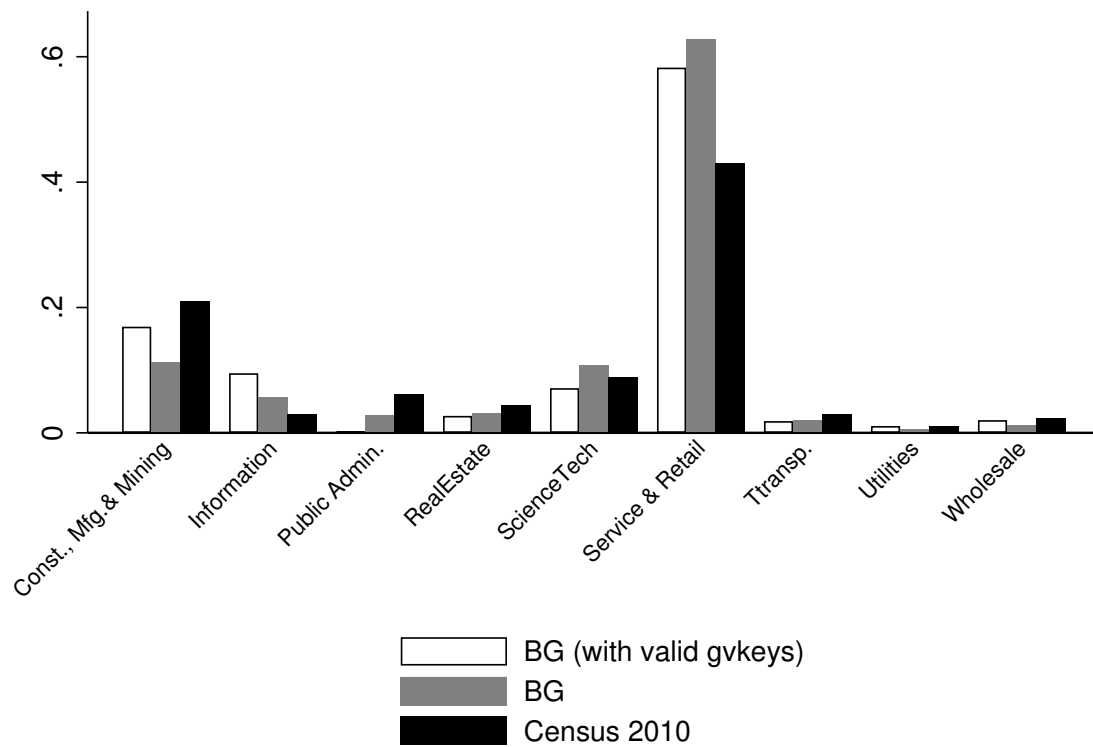
Figure A.1: Example Job Postings





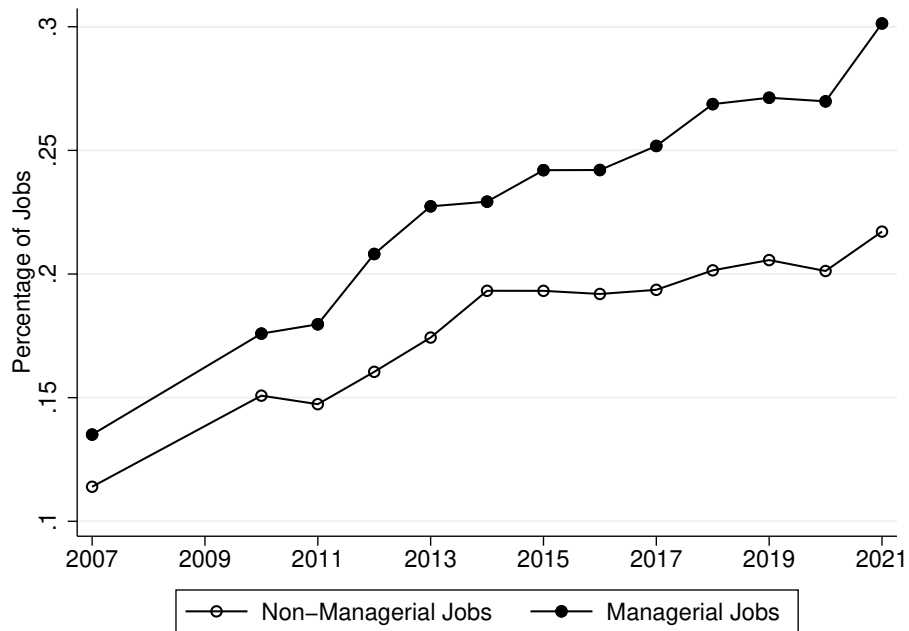
Notes: The chart shows each step in constructing the merged sample for analyses in Table 4.

Figure A.2: The Sample Construction



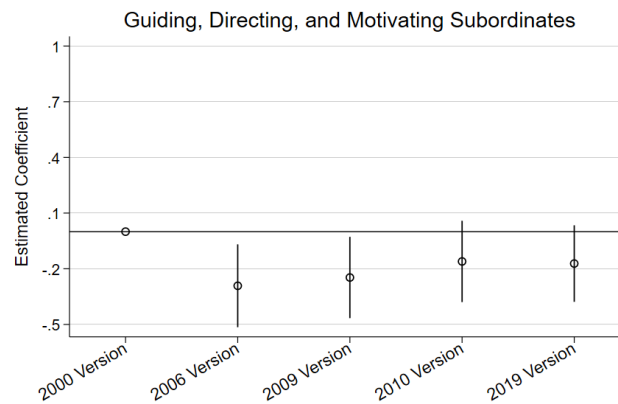
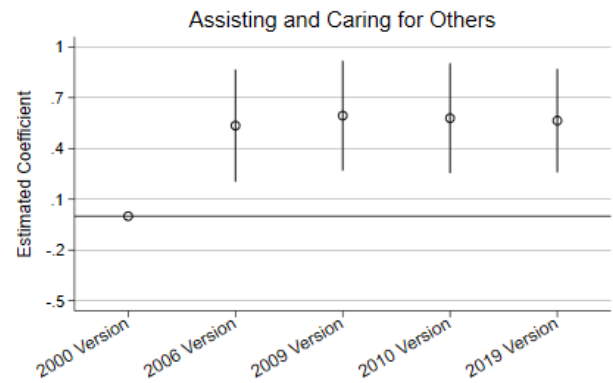
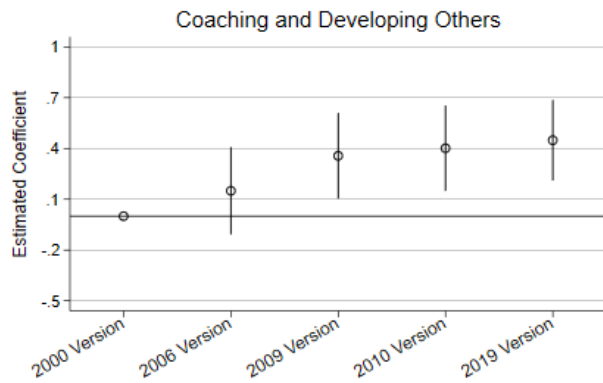
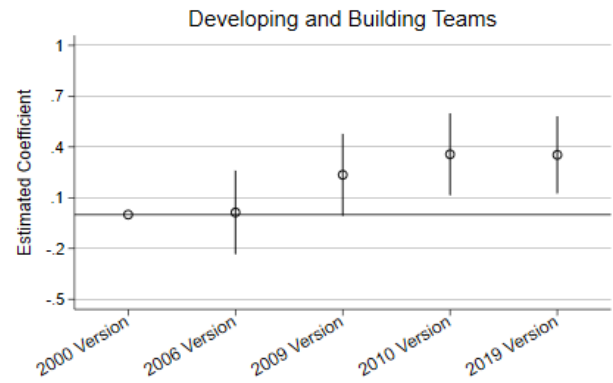
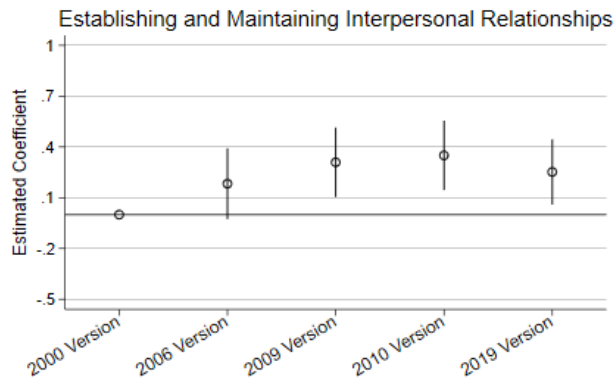
Notes: The figure compares the industry distribution of Burning Glass Technologies data with that of the 2010 Census. It includes only managerial and supervisory positions.

Figure A.3: Comparing BGT Job Posting Data to Census: Industry Distribution for Managerial Positions

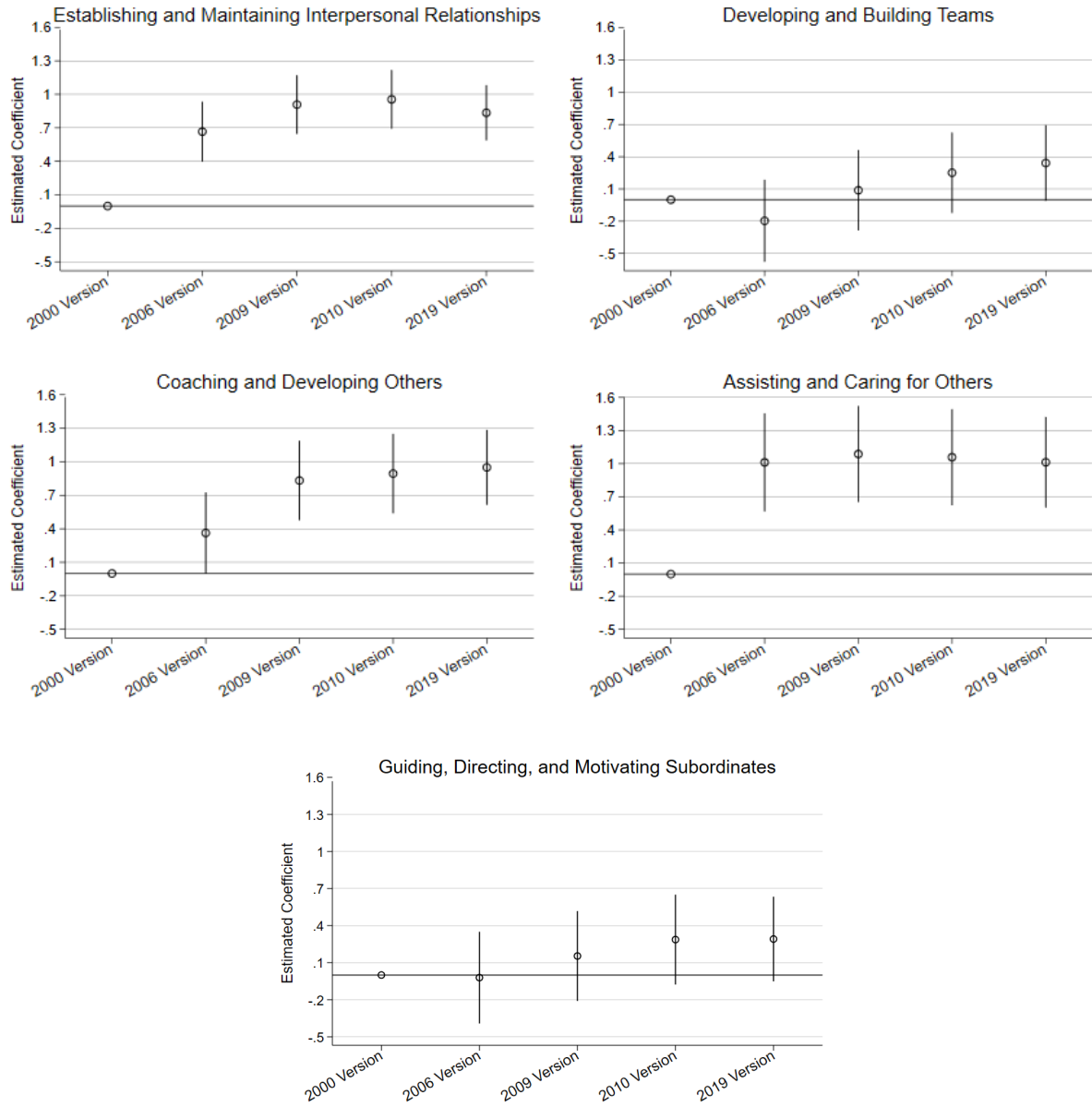


Notes: The graph plots the proportion of job openings that require collaborative skills, sorted by managerial and nonmanagerial occupations. Managerial occupations include both manager and supervisor. I restrict the sample to postings with a valid employer name and listing at least five skills. Job posting data and skill requirements are provided by Burning Glass Technologies (BGT).

Figure A.4: The Changing Role of Managers: Comparing Managerial and Non-Managerial Jobs in Collaboration



(a) Importance of Collaboration and Supervision



(b) Level of Collaboration and Supervision Required

Notes: The graphs show the estimated change in collaboration and supervision ratings of managerial jobs, provided by the US Department of Labor's Occupational Information Network (O\*NET) database. For each job, O\*NET provides descriptive ratings for its various attributes. It specifies the importance of each attribute to the job and the level of that attribute required for the job. These ratings are updated periodically, generally derived from survey responses of large samples of employees and supplemented by input from occupation experts and analysts. I focus on the following job attributes under Work Activities: Interacting with Others, Assisting and Caring for Others, Coaching and Developing Others, Establishing and Maintaining Interpersonal Relationships, and Guiding, Directing, and Motivating Subordinates. The first four represent collaboration and the last represents supervision. I use ordinary least squares models to predict each occupation's rating in each version of O\*NET. The graph shows the estimated coefficient and the 95-percent confidence interval, using the 2000 version as the baseline.

Figure A.5: The Changing Role of Managers: Evidence from O\*NET Descriptive Ratings

Table A.1: Linear Models Predicting Job Requirements at the Job Posting Level

	Software Skills			Work Exp.		College Deg.		Creativity	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Require Supervision	-0.0528*** (0.00670)	-0.0280*** (0.00663)	0.0974*** (0.00968)	0.0977*** (0.0137)	-0.0744*** (0.00880)	-0.0241*** (0.00515)	-0.0296*** (0.00338)	-0.0151** (0.00469)	
Require Collaboration	-0.0409*** (0.00914)	-0.0330** (0.00897)	0.00246 (0.00595)	-0.000806 (0.00806)	0.0341*** (0.00865)	0.0135* (0.00497)	0.0428*** (0.00445)	0.0292*** (0.00423)	
Num of Specific Skills Required	0.0255*** (0.000578)	0.0239*** (0.000486)	0.00864*** (0.00106)	0.00747*** (0.000737)	0.00922*** (0.00105)	0.00525*** (0.000523)	0.00725*** (0.000242)	0.00686*** (0.000304)	
Part Time Job	-0.00671 (0.0159)	-0.00509 (0.00792)	-0.121*** (0.0173)	-0.0530* (0.0254)	-0.140*** (0.0212)	-0.0364 (0.0198)	-0.0112 (0.00809)	-0.00716 (0.0138)	
Observations	9619887	4592774	9619887	4592774	9619887	4592774	9619887	4592774	
R <sup>2</sup>	0.377	0.452	0.327	0.373	0.416	0.528	0.254	0.350	
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Job Title Fixed Effects		Yes		Yes		Yes	Yes	Yes	

Notes: The table uses ordinary least squares models to predict the likelihood that a job posting requires software skills, work experience, a college degree, and creativity. It includes all managerial and supervisory jobs posted between 2007 and 2021, collected by Burning Glass Technologies. Standard errors clustered by firm are in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table A.2: Linear Models Predicting Salary at the Job Posting Level

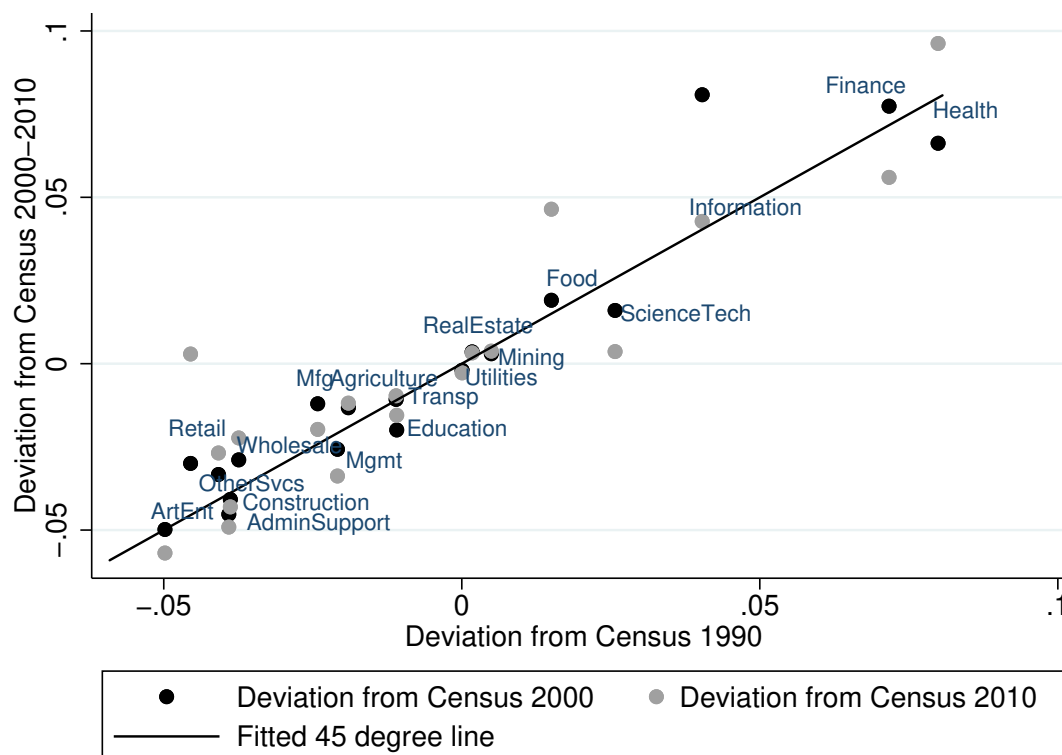
	Salary (log)		
	(1)	(2)	(3)
Require Supervision	-0.0725** (0.0212)	-0.0149 (0.0163)	-0.00697 (0.0100)
Require Collaboration	0.0522* (0.0246)	0.0607** (0.0195)	0.0177 (0.0115)
Require College Degree			0.0997*** (0.0199)
Require Prior Work Experience			0.0180** (0.00608)
Require Basic Software Skill			-0.0199 (0.0108)
Num of Specific Skills Required	0.00883*** (0.000931)	0.00810*** (0.00102)	0.00250*** (0.000406)
Part Time Job	-0.346*** (0.0185)	-0.267*** (0.0307)	-0.119*** (0.0182)
Observations	1658673	1521274	712762
$R^2$	0.213	0.564	0.714
Industry-Year Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects		Yes	Yes
Job Title Fixed Effects			Yes

Notes: The table uses ordinary least squares models to predict the listed salary (logged) on a job posting. It includes all managerial and supervisory jobs posted between 2007 and 2021, collected by Burning Glass Technologies. Standard errors clustered by firm are in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## ONLINE APPENDICES





Notes: The figure validates the representativeness of occupations in BGT's resume data. The x-axis is the BGT's resume share in an occupation in 1990 minus the census job share in the occupation in 1990. The y-axis is these differences for 2000 and 2010. As a benchmark, the 45 degree line indicates occupations where representation in BGT's resume data, relative to the census data, did not change from 1990.

Figure A.1: Comparing Resume Data to Census: Representativeness of Occupations

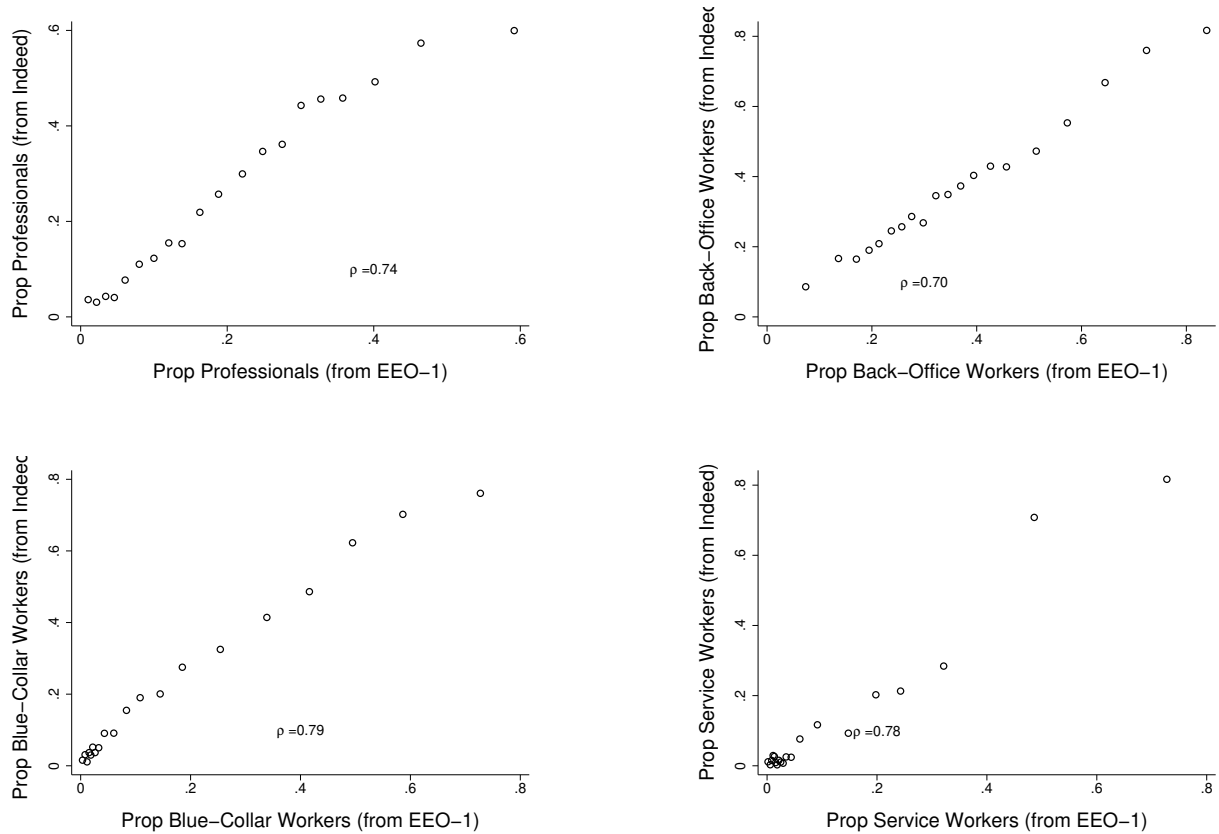
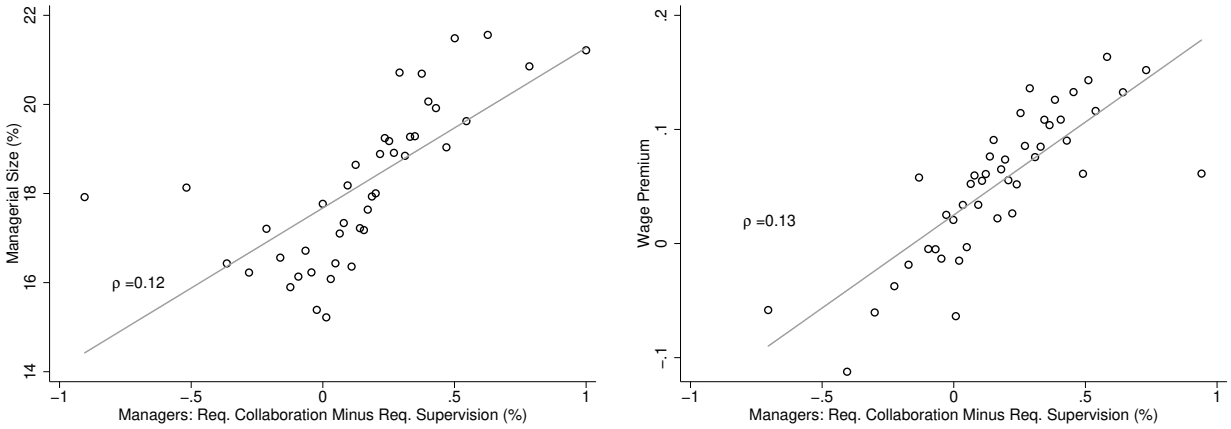


Figure A.2: Validating Indeed Data: Comparing Occupational Composition of Indeed Reviewers to EEO-1 Data

Note: These graphs compare Indeed reviewers' occupational composition to that based on Equal Employment Opportunity (EEO) data, a representative administrative dataset. Each dot represents a unique organization. The x-axis shows an organization's occupational composition information from 2015 EEO data, and the y-axis shows its composition based on its reviewer base from 2012 to 2015. The closer the dots are to the 45 degree line, the more representative is Indeed reviewers' occupational composition (relative to that shown in EEO data). The graphs are binned at 20 equal-size quantile cuts of firm observations.



Notes: The left graph plots the correlation between a firm's managerial roles and its proportion of managers. The right graph plots the correlation between a firm's managerial roles and its wage premium. Managerial role is the proportional difference between a firm's managerial jobs requiring collaboration and those requiring supervision. The graphs show correlation at the firm level and are binned at 50 equal-size quantile cuts of firm-year observations.

Figure A.3: Correlations with Managerial Size and Wage Premium

Table A.1: Correlation Table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Managers Req. Supervision (pct)	1.000											
(2) Managers Req. Collaboration (pct)	-0.031	1.000										
(3) Innovation Culture	-0.138	0.181	1.000									
(4) Citation-based Patents in past 5 years	-0.157	0.085	0.170	1.000								
(5) Institutional Shareholder Owership (pct)	0.004	0.023	0.034	0.008	1.000							
(6) Analyst Coverage: Total Num (log)	0.002	0.070	0.028	0.157	0.520	1.000						
(7) Shareholder Rewards	0.013	-0.011	-0.057	-0.031	0.019	0.076	1.000					
(8) Num Acquisitions in past 5 years	-0.052	0.020	0.030	0.100	0.128	0.147	-0.029	1.000				
(9) Total Asset (log)	0.108	0.015	-0.131	0.146	0.061	0.372	0.131	0.021	1.000			
(10) Total Employees (log)	0.066	-0.008	0.020	0.180	0.107	0.286	-0.086	0.014	0.687	1.000		
(11) Cash Flow (log)	0.008	-0.013	-0.006	-0.047	0.082	0.039	0.007	0.014	-0.029	-0.026	1.000	
(12) Debt-to-Equity Ratio (log)	0.078	-0.064	-0.150	-0.157	-0.083	-0.099	0.023	0.002	0.165	0.076	-0.003	1.000