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WOMEN AND THE LABOR MOVEMENT:
OCCUPATIONAL SEX COMPOSITION AND UNION MEMBERSHIP, 1983-2005

by

Teri Jo Fritsma

A thesis submitted in partial fulfillment of the
requirements for the Doctor of Philosophy degree in Sociology
in the Graduate College of
The University of Iowa

May 2007

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PH.D. THESIS

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To Nick and Rosa

Social movements are successful because they speak to the needs of their time. They can learn from the past, but they cannot succeed by imitating it.

Dorothy Sue Cobble, *The Other Women's Movement*

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Barbara Kingsolver once said, “My work routine is like any working mother’s: I write when my children are in someone else’s care.” Three people in particular filled this role in my life. They include my own extraordinary mother, Paula Vander Hoven, whose supply of wisdom and patience knows no bounds. Also my beloved second parents, Mary Jo Pedriana—who has a true gift for seeing what people need and graciously providing it—and Tony Pedriana, who meets his granddaughter on her level and makes her feel “*snug as a sock in a rock.*” During the many hours I worked on this project, my daughter Rosa was being loved by these people, and for this I am more grateful than I can say.

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ABSTRACT

This dissertation brings together two distinct strands of labor market research. Studies on union decline seek to explain the dramatic drop in union membership and influence in the post-World War II era. Studies on occupational sex segregation seek to document how and understand why most women tend to work in occupations with other women. These two broad processes have received much of scholarly attention individually; but there has been little effort to understand how they might be linked. Historical accounts suggest that many unions practiced social closure, ignoring or actively avoiding the causes of working women. And as women have entered the labor market in large numbers in recent decades, they have generally taken positions in the so-called hard-to-organize sectors—industries and occupations that have little historical exposure to unionism, and are regarded as fundamentally incompatible with traditional unionism. My research links the two bodies of work by examining the extent to which varying levels of unionization across different sectors of the labor market is directly attributable to the varying sex composition of those sectors.

I rely on data from the 1983-2005 Current Population Survey Merged Outgoing Rotation Group Files, and use statistical purging techniques which allow me to examine what union coverage rates would have been had the so-called hard-to-organize sectors not been disproportionately comprised of female-dominated occupations. Because processes of unionization are quite different in the public and private sectors, I estimate separate models for these two groups. The private sector findings provide modest support for my arguments, and indicate that union coverage rates in some of the hard-to-organize sectors would have been slightly higher had these sectors been comprised of an even mix of

male- and female-dominated occupations. And in the sectors that are *more* compatible with traditional modes of unionism, union coverage rates would have been *lower* had these sectors not been heavily male-dominated. The public sector findings tell a different story, and suggest that some public sector unions organize along traditional lines vis-à-vis occupational sex composition, while others have found ways to organize on new, female-dominated terrain.

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CHAPTER 1: INTRODUCTION

Two distinct strands of labor market research offer two virtually ironclad findings. The first is that U.S. union membership and influence is at an all-time low. The second is that female-dominated occupations offer lower market rewards than male-dominated occupations, all else equal. Given the insecurity of organized labor and the vulnerability of many working women, sympathetic scholars and commentators have begun to see the advantage of an affiliation between these two groups. In the last ten years, the AFL-CIO has prioritized organizing, and has made some inroads into previously unorganized, low-paying sectors of the economy, including industries and occupations where women dominate (Clawson and Clawson 1999; Fantasia and Voss 2004). Women now comprise the majority of new workers being organized—in part because union organizing campaigns have been more successful in bargaining units that are female-dominated (Bronfenbrenner and Hickey 2004; Bronfenbrenner 2005). In summary, “The potential for forging a creative, productive partnership between working women and unions is greater now than at any other historic moment” (Cobble 1994:3).

Yet women and unions have a turbulent past. Until recently, the relationship between women and organized labor generally exemplified the sociological concept of social closure. As a relatively privileged and overwhelmingly male group, unionists historically sought to preserve their economic dominance by limiting women’s access to the labor movement. Residue from these past exclusionary tactics may have limited unions’ penetration in the non-unionized and so-called “hard-to-organize” sectors of the economy, because many occupations in these sectors are female-dominated. I argue that

until recently, U.S. unions were ill-equipped to organize workers in female-dominated occupations today precisely *because* of the sex composition in those occupations.

This dissertation poses the following question: *to what extent is labor's difficulty in penetrating the hard-to-organize sectors of the economy directly attributable to the **sex composition of occupations** in those sectors?* Research indicates that one of the key explanations for union decline is the change in the U.S. economic structure—that is, the contraction of traditionally unionized industries and occupations, coupled with the expansion of traditionally non-unionized industries and occupations. However, few studies have made a serious attempt to investigate whether, or how, the sex composition of the expanding sectors limits (or enhances) the capacity for union organizing. Examining these trends over the last 20 years allows us to examine changes over the ten years preceding, and following, the turnaround in the AFL-CIO's organizing agenda.

This study joins the literatures on occupational sex segregation and union membership, and has implications for both. One of the goals of the literature on sex segregation is to theoretically and empirically disentangle the causes of the gender gap in labor market rewards. All else equal, union members earn more than non-members, and therefore sex segregation research examining wage differentials often regards union membership to be a “legitimate source of variation” between disadvantaged and advantaged groups (Glass 1999). Sometimes union membership is treated as a characteristic of jobs that raises wages of disadvantaged groups (and by extension, reduces inequality between advantaged and disadvantaged groups). Other times, union membership is included as a control variable in earnings equations with little theoretical justification. Rarely does research in this area investigate whether, how, or why union

membership is related to the gender composition of occupations in the first place. By the same token, much of the research on union decline does not adequately consider the changing gender composition of the U.S. workforce, and the impact that may have on a labor movement that has—until about ten years ago—tended to marginalize working women. Our understanding of the labor movement and its decline could be much improved by incorporating what sociologists know about processes that create gender segregation in the labor market.

Plan of the Dissertation

The dissertation is organized as follows. Chapter 2 provides the theoretical background and sets the stage for the empirical analysis. I review the literature on the post-war decline of the labor movement, summarizing one of the major explanations for the decline of union membership in the private sector. I then describe the relationship between the labor movement and working women, both historically and in more recent years, building the conceptual background for my research. Chapter 3 summarizes the data and methodology used to answer the question. I describe my data source (the Current Population Survey-Merged Outgoing Rotation Group files) in detail, highlighting the methodological changes that the CPS underwent during the time period included in my analysis, which have the potential to affect my findings. Chapter 3 also describes my measurement of each variable, and finally, the statistical techniques I use to address the research question. Chapters 4 and 5 present the statistical findings. Chapter 4 provides a set of descriptive findings which begin to tell the basic story about the relationship between occupational sex composition and unionization over the past twenty years. Chapter 5 then presents findings from the main statistical analyses. These results permit

a look at what unionization rates in so-called hard-to-organize sectors *would have been* over the years, had those sectors not been heavily female. Finally, Chapter 6 brings the discussion full circle, by offering discussion of the results in light of my conceptual arguments. Here, I also summarize the limitations of the study, and discuss broader implications for research on union decline and occupational sex segregation.

CHAPTER 2: UNION DECLINE, OCCUPATIONAL SEX SEGREGATION, AND SOCIAL CLOSURE

Post-War Decline of the U.S. Labor Movement

The United States' labor movement has long been regarded as 'exceptionally' weak relative to other nations, and current statistics indicate that it is getting weaker. Labor union membership peaked in the years just after World War II, when more than one-third of the labor force was organized (Bronfenbrenner et al. 1998). Since then, unions have seen a gradual but steady drop in membership, and today less than 13 percent of all workers belong to a union (U.S. Department of Labor 2006a). Scholars acknowledge that labor faced a particularly hostile organizing climate during the 1980s. Reagan's defeat of the 1981 Professional Air Traffic Controllers' Organization (PATCO) strike and his appointment of anti-labor commissioners to the National Labor Relations Board (NLRB) undoubtedly marked a historic low point for labor. However, academic research and ample empirical evidence reveal that union decline in the 1980s was simply an acceleration of a longer historical trend, which has continued unabated (Farber and Western 2004; Western 1995; Troy 2004; Goldfield 1987; Galenson 1996; Lipset 1986; Bronfenbrenner et al. 1998; Lawler 1990).

Figure 2.1 below shows trends in public and private sector union membership from 1930 to 2004.¹ Union density—a key indicator of the vitality of the labor

¹ For several reasons, the data in Figure 2.1 should be viewed with caution. First, there are many breaks in the series. The 1930-1978 data come from a single source (the Bureau of Labor Statistics), and the 1993-2005 data come from the Current Population Survey, but the data for the 1980s come from several different publications and are therefore somewhat piecemeal. Additionally, the comparability of the estimates could be affected by a change in the definition of union membership in 1968. Until 1968, the Bureau of Labor Statistics did not include employee associations in their count of union membership, but as Goldfield (1987:9) notes, employee associations during the 1960s often took the same role as unions. Finally, BLS estimates of AFL-CIO-affiliated union membership are based on unions' per capita payments to the Federation, and as both Goldfield (1987) and Galenson (1996) suggest, this could lead to underreporting of

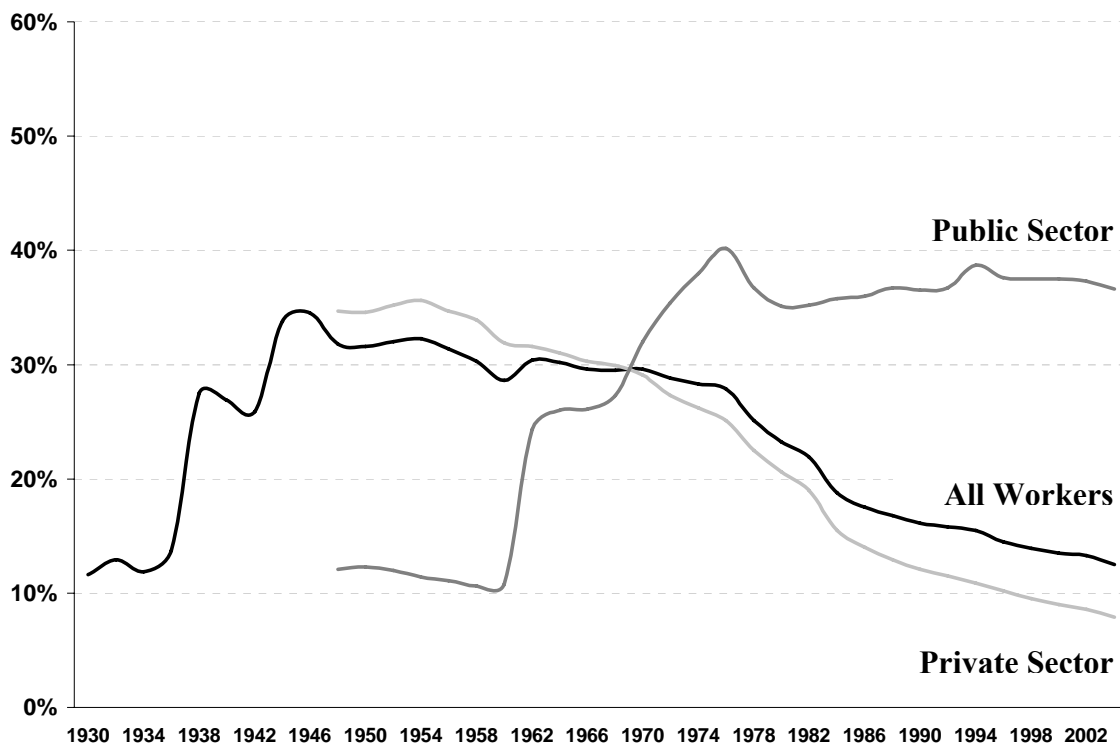
movement—is the percentage of the employed and unemployed labor force belonging to a union. The American labor movement peaked between 1930 and 1945, with private sector union density expanding quickly during this period. Unions made the most dramatic gains in the years just after the passage of the National Labor Relations (Wagner) Act in 1935. The Wagner Act gave workers the right to organize and, among other things, forbade certain unfair labor practices by employers. During the 1930s and 1940s both the American Federation of Labor (AFL) and the newly formed Congress of Industrial Organizing (CIO) successfully campaigned to organize workers in a variety of industries. By 1946, more than one in three workers belonged to a union. Union density remained fairly stable between 1948 and 1960, but beginning in 1960, private sector union membership has seen a gradual but uninterrupted decline. Union members as a proportion of the non-agricultural workforce dropped by more than one-half during this time period.

The trajectories of public and private sector unions in the second half of the 20th century have been very different (Farber 2005; Troy 2004). From Figure 2.1, it is clear that during the same period that private sector unions were losing ground, public sectors unions were gathering steam. There are many reasons for this, but scholars studying public sector unionism largely agree that that the growth can be attributed primarily to the passage of federal, state, and local laws and regulations governing public sector unionism (Freeman 1986; Farber 1988, 2005), which afforded unions a more hospitable climate in

union membership to save money. Thus, while temporal comparisons should be made with care, most authors agree that the “deficiencies are not sufficiently great to affect basic trends” (Galenson 1996:1). Moreover, it is generally agreed that the BLS and CPS estimates are simply the best available.

which to organize. Farber and Western (2004:323) note, “the political process gives employers [in the public sector] neither the tools nor the incentives to resist organization effectively.” There is also evidence to suggest that public sector unions work differently, and have different goals, than private sector unions (Freeman 1986). For these reasons, most analyses of union membership trends treat public and private union membership as fundamentally different (see, e.g., Troy 2004), and many analyses focus on one (Farber and Western 2004) or the other (Freeman 1986).

Figure 2.1: Historical Levels of Union Membership in the United States



Source: See Footnote 1.

For the purposes of this research, it also is important to note that public sector unions appear to have been far more successful than private sector unions in recruiting women members. Women are also more likely to occupy leadership roles in public sector unions (Bell 1987; Milkman 1993). Bell (1987) suggests that this is not due as much to unions' efforts to target women as it is to the fact that women happen to be heavily represented in the public sector. The difference between public and private sector unions is most evident among professional specialty workers, such as teachers, counselors, and librarians. My arguments about the relationship between union decline and occupational sex segregation apply to private sector unionism, but a cursory examination of empirical trends indicates that they probably do not apply to public sector unions. Because the goal of this project is not necessarily to explain differences between public and private sector settings, I do not attempt to make separate arguments to describe the different processes and draw separate predictions for the two sectors. However, since public sector workers comprise a fairly substantial proportion of the total workforce (approximately 16 percent in 2006) it would be inappropriate to exclude them from the analysis; doing so would leave out an important part of the story about women and unions. Therefore, following the example of the scholars cited above, I analyze public and private sector trends separately.

Explaining the Decline in Private Sector Unionism

One of the major explanations for union decline points to post-war economic restructuring (Voos 1982; Dickens and Leonard 1985; Troy 2004, 1986; Farber and Western 2004; Western 1997; and see Goldfield 1987 for a summary). Changes in employment levels in industries and occupations—along with the shifting occupational

mix within traditionally unionized industries—have led to a net drop in union density. Additionally, unions have actually lost members in sectors such as manufacturing, where they previously dominated, contributing to the overall decline. While there is a great deal of research attempting to discern *how much* the changing structure can account for union decline (see, e.g., Farber 1987) scholars generally agree, and recent empirical findings indicate, that economic restructuring is a leading cause of the decline. Troy (2004:17) asserts, “The goods-to-services transformation is one of the essential building blocks to understanding the twilight of the Old Unionism. Even if unions did not lose a single member, the transition would, by itself, reduce the density rate of the Old Unionism.” Likewise, Farber and Western (2004) find that the failure of union organizing to keep pace with the employment growth in non-unionized sectors of the economy is a more powerful force than anti-labor public policy and employer resistance to unionization. And finally, in their review of this literature, Clawson and Clawson (1999) indicate that economic/structural shifts can account for anywhere between 20 to 60 percent of the decline in union membership.

The current industrial structure barely resembles that of the mid-1900s when labor union membership reached its peak. The percentage of jobs in traditionally unionized industries has shrunk, while the share of jobs in traditionally unorganized industries has rapidly expanded. The shift is most clearly illustrated by comparing growth in two industries: service and manufacturing. In 1945, the manufacturing industry comprised nearly 40 percent of all non-agricultural employment while the service industries comprised just over ten percent. By 1995, manufacturing’s share had dropped to just over 15 percent, while service’s had risen to nearly 30 percent (Meisenheimer 1998).

More generally, industries that were historically less-unionized now make up the lion's share of employment in the U.S. Combined, the wholesale and retail trades, leisure and hospitality, services, information, and financial activities industries comprise over three-quarters of private employment (U.S. Department of Labor 2006b).

Similarly, the *occupational* make-up of the American economy has changed dramatically. Union membership has traditionally been strongest in blue-collar occupations, such as craft and construction workers and operatives. In 1983, over 41 percent of all blue-collar workers were union members, while just over 18 percent of both service and white-collar workers were unionized (Goldfield 1987:126). In the last half-century, however, much employment growth has occurred in professional and service occupations, while relatively little has occurred in blue-collar craft and repair occupations. Although tracking occupational employment in the 1950s to today is complicated by within-occupation change in the nature of work as well as changes in data collection methods, even examining the change from 1983 to 1993 is revealing. Rosenthal (1995:47) estimates that during this time period, employment in service, professional, and clerical occupations grew by 28.2, 34.7, and 20.7 percent, respectively; employment in the operator/fabricator/laborer category grew just 7.2 percent, and employment growth in the precision production/craft/repair category was just 5.9 percent. Moreover, white collar employment now far exceeds blue collar employment in the U.S.: management, professional, service, sales, clerical, and agricultural occupations comprise over 77 percent of all employment, while construction, extraction, installation, maintenance, repair, production, and transportation occupations comprise under 23 percent (U.S. Department of Labor 2006c).

Why are workers in these growing, non-goods-producing sectors of the economy inherently difficult to organize? The literature points to differences in both the nature and the organization of work in these new growing sectors of the economy.

First, education and skill requirements in growing sectors tend to be different from those in manufacturing occupations (Troy 1986:94). Occupational education requirements in the service industry, for example, tend to be somewhat polarized—most service and clerical occupations require little formal training, while most professional occupations require much higher levels (Meisenheimer 1998). Historically, union members had relatively low levels of formal education (Freeman and Medoff 1984:27) so it is often assumed that employees in occupations that require high levels of education will be resistant to union organization, all else equal. Moreover, as Schnabel and Wagner (2005:11) note, “[M]ore educated employees usually have greater individual bargaining power (and thus a lesser need for collective voice), and sometimes they identify more with management than with the labour movement.”

Another reason that workers in these new growing sectors are considered hard to organize is that in many professional, service, and clerical occupations, the traditional employer-employee relationship often includes a third party: the customer, client, or patient (Cobble 1994; Green and Tilly 1987). Cobble (1994) argues that service workers often feel a greater sense of responsibility or accountability to their clientele than to their employers, and are therefore less concerned with issues directly related to the traditional employment relationship, which unions historically stressed.

Additionally, whereas many of the new jobs in the historically unionized goods-producing sector are automatically unionized, many of the jobs that created in this sector

are “born nonunion” (Farber and Western 2004; see also Voos 1982). Because of the limited history with unionization in these sectors, employees in these sectors also tend to have little experience with unions and are unaware of the potential for unionization, making union organizing more difficult in industries and occupations that have lower levels of organization historically (Voos 1982; Cobble 1994; Hurd and McElwain 1988). Some authors have suggested that workers in these new occupations have shown little interest in union membership (Troy 1986:94) though others (e.g., Blum 1991; Yates 2006) argue that once such workers are exposed to unionism, they are often staunch supporters of organized labor.

In addition to differences in the nature of work, these new economic sectors also differ from production sectors in how employment is organized. Generally speaking, the largest establishments are viewed as the easiest “organizing targets” (Goldfield 1987), and establishment sizes vary greatly between the organized manufacturing sector and the unorganized service sectors. Whereas manufacturing work sites are large and centralized, service establishments tend to be small and decentralized. Green and Tilly (1987) note that the average service firm has 12 employees, while the average manufacturing firm has 27. More recent figures from the Bureau of Labor Statistics tell a similar story. Approximately 56 percent of manufacturing establishments had nine or fewer workers, compared to 82 percent of business and professional service establishments, 70 percent of education and health services establishments, and 92 percent of other service establishments. Until relatively recently, most unions adhered to what Cobble (1991, 1994) calls the “mass production model,” an organizing style that emerged during the 1930s and 1940s in response to the needs of a growing industrial workforce. Following

this style of organizing, unions focus on organizing single work sites that are generally within large, centralized manufacturing firms.² But the expansion of service sector employment renders this model of unionism meaningless for much of today's workforce (Cobble 1994; Green and Tilly 1987; Kochan, Katz, and McKersie 1986).

Another way the organization of work in the service sector differs from that of manufacturing is that work arrangements in the new service sector are generally more flexible, and attachment to a particular job or employer appears to be somewhat lower, making unionization more difficult. For example, median years of tenure with a single employer is estimated to be as much as two years lower in most service industries than in manufacturing (U.S. Department of Labor 2006d). Likewise, the permanent employment relationship common in the traditionally unionized sectors is, to some extent, being replaced by the "alternative" work arrangement. Service sectors are more likely than any other group of workers to be independent contractors, on-call workers or day laborers, temporary workers, or to be contracted out by the firm in which they worked on a full-time basis (Cobble 1994; Engberg 1994; Green and Tilly 1987). This suggests that unions will have more difficulty organizing workers in the service sector, and a harder time maintaining their membership pool once it has been established.

To summarize, private sector union density has gradually but steadily fallen between 1960 and 2005. One of the leading explanations for the drop points to economic restructuring—the growing share of employment in non-unionized sectors of the economy, and the shrinking share in unionized sectors. Both the nature and organization

² Although they may have historically focused their organizing efforts in large firms, unions have historically been more *successful* in elections with smaller bargaining units, and are increasingly focusing their efforts on small elections, and are becoming *increasingly* more likely to win elections when the number of voters is small (Farber 2001).

of work in the dynamic sectors of the economy are not readily reconciled with the traditional model of unionization in the U.S. Different types of workers, different types of organizations, and different types of work have limited unions' ability to penetrate this sector, and union organization has not kept pace with employment growth in non-unionized industries and occupations.

Yet to suggest that the labor movement was simply a casualty of restructuring is to overlook the role that organized labor played in its own demise. By most accounts, the labor movement's self-limiting and short-sighted choices stunted its own growth in new sectors of the economy. Researchers and commentators have noted that through much of the second half of the twentieth century, unions regularly opted to spend resources protecting and servicing current members, rather than organizing new ones (Fantasia and Voss 2004; Voss and Sherman 2000; Goldfield 1987). There is a compelling argument to suggest that much of this conservatism was the result of adapting to historical and present-day external constraints—particularly employer resistance and anti-labor legislation (Voss 1993; Fantasia and Voss 2004; Fantasia 1988). This is an important point, to which I return at the end of this chapter. Nevertheless, even by these authors' and the AFL-CIO's own accounts, most segments of the labor movement in the mid-to-late twentieth century were insular, and rejected broad-based organizing strategies targeting traditionally excluded groups, including and especially women.

Social Closure and the Labor Movement

Historical research indicates that the relationship between women and unions in the U.S. was tumultuous.³ Kessler-Harris (1987:122) whose study focuses primarily on the female-dominated garment manufacturing industry in the 1920s, asserts that by this time, with respect to women, “most U.S. trade unionists had become what they have remained since: agents of ‘social closure’.” Some labor unions, according to Kessler-Harris, were apathetic or even hostile towards working women, and evidence suggests that in many cases, this attitude can be attributed largely to unionists’ fear of competition from cheaper female labor. Primarily unskilled workers, women were often regarded as a weak link in the labor movement and a threat to unions’ ability to represent the interests of male members (Brenner and Ramas 1984; Cobble 1994:5-7; Feldberg 1987; Kessler-Harris 1987). Brenner and Ramas (1984:45) suggest that trade unions in the 1800s actively excluded women, because when they could not do so, the result was a “rapid” decline in wages and “a general degradation of the work” which threatened the dominant economic position of working men.

It would be misleading to suggest that social closure has been a constant part of labor’s history; the relationship between women and unions has differed across time periods, unions, industries, and occupations (Cobble 2004; Milkman 1993; Bronfenbrenner 2005). Nevertheless, much historical and sociological literature suggests that exclusion of women from the labor movement—and leadership positions within the movement—recurred, particularly during the first half of the twentieth century. American unions’ commitment to small-scale bread-and-butter gains on the one hand, and working

³ My description of the labor movement’s historical social closure vis-à-vis women is based on secondary historical sources. Although I do not discuss primary historical data here, Table A.1 in the Appendix summarizes the primary data and documents upon which some of the authors cited here rely.

women's own reliance on their status as "different" on the other, strained relations between women and unions. During the first two decades of the twentieth century, working women often invoked their status as the "weaker" sex in order to gain protective legislation for shorter hours, better pay, and better working conditions (Kessler-Harris 1987; Foner 1980). The notion that women should be treated as special, rather than equal, members of the labor force, exacerbated friction between male unionists and female workers.⁴ Particularly after World War I, when returning veterans wished to claim old jobs, women were often viewed not as allies, but as subversive members of the labor movement (see especially Foner's [1980] account of streetcar workers). Trade unionists believed that protecting their advantage and pursuing relatively narrow economic gains required a unified front—a "tight political structure and loyalty upon which they could rely" (Kessler-Harris 1987:121). This meant that where women were in direct competition with men for jobs, they were often excluded from union membership. Where competition between men and women was less salient, such as in the female-dominated garment manufacturing trades, women were commonly unionized but did not generally hold positions of leadership within the union (Kessler-Harris 1987; Waldinger 1987; Kenneally 1985; Foner 1980). Foner (1980:367) notes that during World War II, women made up approximately 75 percent and 50 percent of membership in the International Ladies' Garment Workers Union (ILGWU) and the American Clothing

⁴ It may be incorrect to suggest that women were the first to exploit the idea of female workers as different. Jenson (1990:168) notes the initial impetus for protective legislation actually came prior to the 1890s from male trade unionists who feared the competition of cheaper female laborers. And while the American Federation of Labor avoided legislative action as a rule, it made an exception on the issue of hours and working conditions for women. Protective legislation, endorsed by labor and upheld by the Supreme Court's 1908 decision in *Muller v. Oregon*, solidified the notion that because of their unique physical needs, women were different from men and therefore needed special protection from the exigencies of the workplace. However, by the 1920s, many working women and the National Women's Trade Union League were ardent supporters of protective legislation (see also Foner 1980; Kenneally 1985).

Workers (ACW), respectively, but in 1941, each of these unions had just one woman on their executive boards.

Historical examples of social closure can be found in many factions of organized labor. The Knights of Labor—the first national movement aimed at organizing less-skilled workers across gender, ethnic, and racial lines, appears to have had a somewhat ambivalent attitude toward women, at least initially. Knights founder Uriah Stephens advocated including “men and women of every craft, creed, and color” (cited in Foner 1987:161). Because the Knights was originally intended to be a secret association, however, and because Stephens was convinced that women could not keep secrets, he did not open membership to women until nearly 10 years after its inception (Foner 1987). The American Federation of Labor (AFL) had a particularly poor record of including and representing women workers prior to World War II. Officially, the AFL acknowledged the importance of organizing women and supporting efforts for equal pay for men and women, but its unofficial position was frequently inconsistent with this view. In spite of some instances of cooperation between working women and unions, early AFL leaders and affiliated unions were often more concerned with preserving male unionists’ advantage and preventing direct competition between the sexes than they were with organizing women and fighting for equal pay. Until the end of World War II, many AFL-affiliated unions and their locals excluded women without repercussions from the AFL governing body. In several articles published in the AFL’s official journal, AFL leader Samuel Gompers openly advocated excluding women from certain “male” occupations (Foner 1980).

The CIO was substantially more sympathetic to women's interests, and indeed is credited for organizing large numbers of women in the late 1930s and early 1940s (Foner 1980; Kenneally 1985). However, evidence suggests that the CIO's (and later, the AFL-CIO's) treatment of women was mixed. Gabin (1990) studies the United Auto Workers' (UAW) union from the 1930s to the 1975 era. She argues that while "the UAW tended to marginalize women in the union hall and on the shop floor...never making gender equality a central demand of its collective-bargaining agenda" (1990:4) the union was in some ways, ahead of its time vis-à-vis sex discrimination. However, the CIO made few special efforts to target women specifically (Gabin 1990; Milkman 1993). Perhaps more importantly, when women's interests conflicted with men's, such as when female unionists opposed separate jobs and seniority systems by sex, some male unionists often sought to preserve the existing systems of job segregation and separate seniority rules by sex in order to retain better-paying jobs, even though it frequently meant the dismissal or demotion of women (see, e.g., Gabin [1990] and, for an account of Iowa packinghouse workers in the 1960s, Stromquist [1993, pages 224-234]; see also Kenneally 1985:80 for a discussion of job classification systems during World War II). Sex segregation and separate seniority rules for men and women benefited employers, who could pay women less for doing substantially the same work under different job titles. To preserve the existing wage and seniority structures, which favored males, unions often sided with employers over their female members (Gabin 1990; Stromquist 1993).

It is clear that the relationship between women and unions has varied across time, unions, occupations, industries, and regions, and one can find many exceptions to the social closure characterization. However, the general thinking by leading scholars

studying gender and the labor movement is that, *in general*, the alliance between women and unions was rocky at best. Clawson and Clawson (1999:98) note:

The flawed record of unions vis-à-vis women and racial minorities is reflected not only in failures of organizing, but an internal reluctance or inability to address issues raised by the feminist or civil rights movements. Women's presence as union members, for example, falls short of their presence in the labor force as a whole, while gains in leadership have been 'quite modest' in relation to gains in membership.

Post World War II Trends

During the same time that the economy was transforming structurally, it was also transforming demographically. Since World War II, the national female labor force participation rate has nearly doubled, and women now comprise almost one half of the labor force. To some extent, unions did respond to the changing gender composition of the workforce. Between 1956 and 1978, the percentage of union members who were women increased from 18.6 percent to 24.2 percent (Milkman 1993). However, Milkman (1993:304-05) argues that this organization of women was an incidental by-product of the changing supply of potential union members:

The feminization of the labor movement was not the result of any special commitment to organizing workers *as women*. Rather, it was the unintended consequence of a series of efforts to offset the general decline in membership by organizing particular types of occupational groups... The expansion of unionism among women workers has been quite selective, so that while some occupational categories are now highly organized, others—most importantly, private sector clerical, service, and sales occupations, remain largely outside of the labor movement.

The 1990s marked a U-turn in labor's long-standing indifference toward historically unorganized groups, including women. The October 1995 AFL-CIO election brought new leadership, in particular the new president John Sweeney, whose priorities were strikingly different than those of his predecessors (Mort 1998; Milkman 1998;

Fantasia and Voss 2004). Consciously looking outward, the new leadership espoused a broad and inclusive organizing agenda, encouraged innovation, and used rhetoric that is more reminiscent of social activism than the “push-button unionism” for which the AFL-CIO had become known. At least stylistically, it is clear that this New Voice (as it was called) leadership departs from its predecessors in an important way: ascriptive characteristics are no longer seen as a basis for exclusion, nor are they viewed as inconsequential to the process of organizing. Instead, the AFL-CIO has, at least symbolically, embraced the notion that the future of the labor movement depends on its ability to organize those workers previously considered unorganizable. The labor movement has devoted more to organizing and representing women workers. For example, President Sweeney immediately increased the representation of women on the AFL-CIO Executive Council from 17 to 27 percent, and formed the Working Women’s Department in the AFL-CIO (Nussbaum 1998; Milkman 1998). Moreover, case studies on organizing efforts in particular industries or occupations suggest that these efforts have met with a modicum of success, and a nascent body of academic research has begun to study the revitalization of the labor force, using optimistic words and phrases such as “renaissance,” “social movement unionism,” and “new organizational forms” to describe (and in some cases, advise) the most progressive sections of organized labor (Fantasia and Voss 2004; Voss and Sherman 2000; Freeman 2004).

Perhaps because of variability in organizing strategies across and within industries and unions, many studies on gender and union organizing have focused on particular cases or specific groups of workers, rather than on general trends (see, e.g., Engberg 1994; Blum 1991; Hurd 1986, 1994; Cobble 1991; Fantasia and Voss 2004; Hoerr 1997).

To the extent that generalizations are possible, research indicates that in recent years the labor movement has become substantially more open to women and committed to representing their interests. In many cases, unions have adopted strategies that are more effective for reaching new *types* of workers, such as women. Some local restaurant and clerical unions, for example, have adopted more personable grass roots organizing drives that center around receptions or potlucks, as opposed to formal meetings and speeches (Fantasia and Voss 2004; Green and Tilly 1987; Hurd 1986, 1994). Others, tapping into the concerns of health care and other service workers, have begun to stress “quality of service” issues rather than emphasizing strife between employees and the employer (see, e.g., Engberg’s 1994 study on nurses in California). Some locals have even begun to adopt strategies that specifically target women. Green and Tilly (1987) note that service unions have begun to “cut the issues” in ways that reflect women’s concerns, stressing general themes such as pay equity and comparable worth during organizing campaigns.

Yates (2006), Bronfenbrenner (2005), and Bronfenbrenner and Hickey’s (2004) studies on union organizing among women since the mid-1990s are some of the few quantitative studies that describe *general patterns* in union organizing among female-dominated bargaining units since the 1995 change in leadership. Bronfenbrenner’s (2005) work includes both public and private sector trends, and offers several important findings. First, although Bronfenbrenner stresses that several female-dominated sectors of the economy, such as retail trade, are almost entirely “untouched by organizing,” unions have made the most gains in sectors that are predominantly female. Shifting their organizing efforts away from light manufacturing sectors, which are vulnerable to global competition, unions have focused more resources in less mobile service sector jobs,

including hotels, hospitals, food service, and laundries. Additionally, Bronfenbrenner's findings indicate that although union *organizing efforts* are divided equally between male-dominated and female-dominated bargaining units, union *success rates* are higher in female-dominated units. These findings are consistent with earlier research indicating that controlling for relevant factors, such as education, age, occupation, industrial sector, region, firm, and labor market size, women's desire for unionization is greater than that of men's (Moore 1986; see also Yates 2006; Crain 1994; Schur and Kruse 1992; Farber 1989; Leigh and Hills 1987). As a result, Bronfenbrenner (2005:441) notes that "women are fast becoming not just the majority but perhaps as much as 60 percent of the new workers organizing each year." Thirdly, unions have been hiring a more diverse staff of organizers, including women, but in over one-third of organizing drives in female-dominated bargaining units, there is no female organizer on staff—and women (particularly women of color) are still underrepresented in leadership positions in the labor movement. Finally, the unions focusing on female-dominated bargaining units are also more likely to use a combination of organizing tactics, which increases union win rates (see also Bronfenbrenner and Hickey 2004). Thus, the evidence suggests that in recent years—perhaps because of the changing focus of AFL-CIO since 1995—the labor movement in this country has not only left social closure tactics behind but begun to shift its focus to previously unorganized sectors and workers.

Occupational Sex Segregation

Studies on gender and union organizing often make passing mention of the literature on occupational sex composition. In general, however, these studies have focused primarily on the sex composition of union *bargaining units* as opposed to

occupations. Thus, no studies focusing on gender and union organizing have systematically drawn on concepts or methodologies from the sex segregation literature to help understand the relationship between women and unions. Likewise, though “it has become increasingly clear that labor unions are the only major U.S. institution equipped to help women overcome...barriers in the workplace” (Bronfenbrenner 2005), the literature on occupational sex segregation has given little conceptual or historical attention to union membership or organizing, and how it might relate to occupational sex composition. As discussed below, recent scholarship goes further to explicitly acknowledge the interplay between service sector expansion and sex segregation (Grusky and Charles 2004), but to date, discussions about union organizing have been largely absent from the sex segregation literature.

An in-depth review of the extensive literature on occupational sex segregation is beyond the scope of this study, but it is worth noting some of the broad contours of this research. A large body of sociological and economic work has established that people of the opposite sex are unlikely to work together in the same jobs in the same workplaces (see, e.g., Weeden 2004; Baunach 2002; Wells 1999; Tomaskovic-Devey 1993a, 1993b; Cotter et al. 1995; Jacobs 1989; Macpherson and Hirsch 1995). Sex segregation in occupations and jobs appears to have declined in recent decades, but research suggests it remains widespread and substantial. Earlier studies on sex segregation, many of which incorporate summary measures of segregation such as the index of dissimilarity, suggest that sex segregation in the U.S. has been on the decline. Cotter et al. (1995) estimated that among year-round, full-time workers, the index of dissimilarity was 51.5 in 1990, meaning that 51.5 percent of women would have to change occupations in order to

achieve perfect sex integration. Tomaskovic-Devey (1993a, 1993b), in his study of workers in North Carolina, estimated that over two-thirds of women would have to change jobs in order to achieve a sex-integrated distribution. And in their sample of jobs constructed from the cross-classification of industries, occupations, and metropolitan areas, Cohen and Huffman (2003) find that overall, men work in jobs that are 26.4 percent male and women work in jobs that are 70.9 percent female, and that, while sex segregation varies geographically, approximately 40 percent of women would have to change jobs to achieve sex integration even in the most sex-integrated metropolitan labor market. Scholars generally agree that sex segregation is even more pervasive at the job than the occupational level (see, e.g., Bielby and Baron 1986a).

An important new line of sex segregation research, developed by Charles and Grusky (2004), involves the notion that segregation is fundamentally *two-dimensional*. That is, segregation exists vertically—such that men tend to dominate the more desirable occupations across the labor market. However, segregation also exists horizontally—such that men are far more likely to be employed in the manual sector (craft, operative, and laborer occupations) while women are more likely to be employed in the non-manual sector (professional, managerial, technical, sales, and service occupations). This conceptualization helps to solve the puzzle of continuing sex segregation even in the presence of liberal, egalitarian norms, because such norms are not necessarily inconsistent with deeply held cultural notions about masculinity and femininity (Charles and Grusky 2004:27). Moreover, it provides a more precise way to understand how the expansion of service-producing industries has helped to sustain sex segregation: “the occupations of clerk and manager, for example, should become feminized to the extent

that they are increasingly performed in service industries that tend to recruit or attract women” (Charles and Grusky 2004:29). Charles and Grusky’s work has important implications, particularly for understanding and formally modeling cross-national differences in occupational sex segregation. However, it also serves as a valuable conceptual lens through which to view sex segregation and the processes that give rise to it (see, e.g., Weeden 2004; Charles, Chang and Han 2004; Charles 2004). And indeed, my theoretical discussion and statistical analyses are consistent with the notion of two-dimensional sex segregation, in that my modeling of the relationship between sex composition and unionization are contextualized by labor market sector (e.g., the historically more-unionized goods-producing versus service-producing industries and manual versus non-manual occupations).

Union Decline: Alternative Explanations

To this point, I have suggested that the labor movement’s own narrowness vis-à-vis women has contributed to its demise, and that a statistical association between occupational sex composition and union presence can be viewed as the leftover residue of labor’s history of social closure toward women. Further, I have argued that if my analyses reveal such a status composition effect, then the economic restructuring argument would be improved by formally incorporating *demographic* restructuring per se as a part of the explanation.

At this point, it is important to acknowledge that there are several other explanations for the decline of unions in the United States. Many authors view these as alternatives to the economic restructuring argument, and a great deal of scholarship has advanced one account over another, or parsed the relative effects of economic

restructuring with one or more other explanations (see, e.g, Troy 2004; Farber and Western 2004; Goldfield 1987; Voss 1993). It is not my goal to enter this particular debate; for my purposes it is sufficient to acknowledge that while economic restructuring is a key cause of the decline, many other factors have likely acted (and interacted) with it to hasten the drop in union membership. However, because my analysis does not statistically control for these factors, it is important to make the case that even though other processes have contributed to the decline, and *even if* they have specifically limited unions' ability to penetrate hard-to-organize sectors, they will have had little or no bearing on the relationship between occupational sex composition and unionization once other sector characteristics are controlled. In the next section, I review three of the major competing explanations for union decline: the political/legal climate for union organizing, the employer counteroffensive, and business migration and globalization. After each review, I discuss the extent to which these factors might affect the relationship between occupational sex composition and union membership.

Political/Legal Climate for Organizing

A large body of work investigates how the political and legal climate in the United States has shaped the fate of the labor movement (for a few examples, see Fantasia and Voss 2004, pp. 46-77; Forbath 1991; Lipset 1986; Freeman 1980, 1988; Freeman and Medoff 1984; Galenson 1996; Farber and Western 2002, 2004; Vallely 1993; and Goldfield 1987 provides a good review). Certainly, there are some examples of labor-supportive developments in American politics (notably Section 7A of Roosevelt's National Industrial Recovery Act in 1933, which gave unions the right to exist and bargain collectively with employers, and the Wagner Act in 1935, which established a

constitutionally defensible basis for unions and required employers to bargain collectively). However, the arguments and empirical evidence generally suggest that, at least since the labor's period of expansion in the 1930s and 1940s, the state, the courts, and specific political actors have intervened in ways that have more typically curtailed—rather than enhanced—unions' presence and influence (Fantasia and Voss 2004). Much of this line of inquiry can trace its roots to the classic question raised by Werner Sombart more than 100 years ago: “Why is there no socialism in the United States?” (Sombart 1974). For example, some authors argue that the U.S. labor movement was not born insular and conservative, but rather became so by trading a militant brand of class consciousness for a modicum of institutionalized legitimacy (see, e.g., Forbath 1991).

An extensive review of the many overt and subtle ways the state has constrained the labor movement is beyond the scope of this dissertation. Instead, I focus on what are perhaps the two most familiar examples, which illustrate how public policy has had both symbolic and concrete implications for unions' ability to organize. First is the Taft-Hartley Act of 1947. Widely regarded as the single most devastating development for the U.S. labor movement (see, e.g., Fantasia and Voss 2004), the Taft-Hartley Act was passed in reaction to the increasing—and increasingly militant—strike activity in industries across the country. This sweeping legislation reigned in much of the power that had been given to labor by the Wagner Act and during World War II. Among other provisions, Taft-Hartley prohibited unfair labor practices on the part of unions, and extended “free speech” rights for employers during union organizing campaigns, which allowed employers to influence the outcome of union elections to a greater degree than they had before. The Act also purged the labor movement of communist leaders by

requiring every union official to sign an affidavit saying that s/he was not a member of the communist party. It outlawed sympathy strikes and secondary boycotts, and gave employers a legal right to sue for breach of contract—at once both repressing wildcat strikes and creating a divide between labor leaders and rank-and-file membership by placing union leaders in the position of having to reign in striking workers. Taft-Hartley also outlawed the closed shop—such that membership in a union no longer could be a condition of employment. Finally, it permitted states to pass right-to-work laws which gave individual workers in unionized establishments the right not to join the union or pay dues. As a whole, the Act created both a labor-unfriendly environment, and a powerful legal resource for businesses pestered by labor's demands.

More recently, Reagan's defeat of the Professional Air Traffic Controller's Organization (PATCO) strike has brought attention to the relationship between partisan politics in union organizing. While Farber and Western's (2002) research indicates that the decline in NLRB union organizing activity preceded the PATCO incident, it is still regarded as a "conspicuous public humiliation" for the labor movement (Fantasia and Voss 2004: 68). And beyond PATCO, the Reagan administration policies advanced deregulation and a free-market ideology, effectively lowering workers' expectations about job security and wages (Vallely 1993). Reagan's appointments to the NLRB also appear to have had concrete implications for labor's ability to organize. Farber and Western (2002) note that under Reagan's NLRB, unions faced significant barriers and delays in certification elections, while employer conduct was deregulated. "Under a line of [NLRB chairman Donald] Dotson Board rulings, employers obtained greater latitude to interrogate union supporters, make misleading campaign statements, speculate about

the adverse effects of unionization, and discharge union supporters” (Farber and Western 2002:11; see also Valley 1993).

It seems indisputable that both the Taft-Hartley Act and the developments of the Reagan era have limited unions’ ability to effectively regroup and respond to expanding service sector employment. In the case of Taft-Hartley, for example, Cobble (1991) describes how closed-shop unionism allowed waitresses working early in the twentieth century to maintain a viable collective force, even in the face of high turnover. Since union membership was a condition for employment, and since unions provided free services to jobseekers, people in particular occupations had an incentive to maintain their union membership even after exiting a particular firm. The provisions of Taft-Hartley prevent such efforts today, effectively limiting unions’ reach in sectors of the economy with high turnover and a relatively transient workforce. Additionally, Taft-Hartley prevents supervisory employees—such as shop floor foremen first-line supervisory employees in the service sector—from joining unions (Fantasia and Voss 2004; see also Rabban 1989) which certainly limits organizing opportunities. With respect to the political conservatism of the 1980s, Valley (1993:122) argues that the deregulated labor market, defeat of PATCO, and conservative appointments to the NLRB “placed great pressure on unions to expend scarce resources on protecting existing organizations, which militated against a strategy of organizing the unorganized.”

Clearly, then, it is reasonable to suggest that the legal and political climate has *interacted* with changes in the economic structure to limit unions’ ability to penetrate the so-called hard-to-organize sectors of the economy. The relevant question for my research, however, is do such political/legal conditions have different implications for

unions' ability to organize in male- and female-dominated occupations? In my review of the literature on new union organizing, I have not found any line of research to suggest that the provisions of the Taft-Hartley Act, or the restrictions placed on labor by a conservative NLRB, would *specifically* inhibit union organizing in female-dominated occupations more than male-dominated occupations, *once other sector characteristics have been accounted for*.⁵

However, even if we accept that unions practiced social closure toward women, a broader question is, to what extent was this closure *imposed* on the labor movement from the outside in? Might labor unions have developed a more inclusive organizing agenda under different legal/political conditions? For example, would a more broad, class-based philosophy have taken root in the post-war labor movement had Taft-Hartley not expunged communist leaders from the labor movement? Had unions not had to struggle just to retain and service existing members, might they have been less threatened by, and allocated more resources towards organizing, different types of workers? These questions of causal ordering are important and interesting in their own right, but their answers require a complex historical or comparative inquiry which I do not undertake here (but see Crain and Matheny [2001] for an analysis of how labor law limits unions' ability to pursue issues of gender and racial discrimination, for example). Rather, I rely on the ample evidence summarized in the previous section to justify my position that, regardless of *why* they did, labor unions *did* practice social closure with respect to women

⁵ A very recent ruling by the NLRB, however, does appear to have the potential to differentially affect union coverage in female-dominated occupations in the future. The October, 2006 ruling in the Kentucky Rivers case held that in most cases, charge nurses with limited managerial responsibilities are considered "supervisors" and are therefore ineligible for union membership. Although the ruling clearly has implications for fields outside of nursing, and is projected to affect 8 million American workers (Eisenbrey and Mishel 2006) the blow to nurses is most immediate and clear. Even if this ruling has the potential to affect nursing unions disproportionately, it will not affect overall conclusions in this study because the time frame included is only 1983-2005.

and that this will have had implications for the relationship between occupational sex composition and union membership.

Employer Resistance to Union Organizing

Several authors make a convincing case that it is the employer counteroffensive, bolstered by anti-labor legislation, that has been the primary cause of union decline (see, e.g., Goldfield 1987; Levitt and Conrow 1993; Freeman and Kleiner 1990; Fantasia and Voss 2004; and Voss 1993). Employer resistance strengthened during the 1980s, as political developments made a “union free” workplace seem a realistic goal. Specific examples of tactics employers use to fight union organizing include using anti-labor consulting firms—so-called “union busters”—during union organizing drives; public relations campaigns during union elections designed to threaten or cajole workers into voting against union certification; tactics to delay the union elections; and union decertification elections. Some have argued that the hostile and powerful response by capital caused the labor movement to adopt a bureaucratic business unionism which emphasized servicing existing members over broad, class-based organizing campaigns (Fantasia and Voss 2004).⁶ And as Goldfield (1987:226) writes:

A major capitalist offensive has been, in the main, successful in steadily eroding union strength and in lower the probabilities of union successes in new organizing. While the traditional weapons of the blacklist and blackmail, of spies and thugs, have not disappeared, new weapons have risen to prominence. These include the use of antilabor consulting firms, the large-scale growth of anti-union employer organizations, the rise in numerous illegal tactics, the engagement in lengthy election delays, and the lessening of the ready acceptance of union rights and prerogatives, even in traditionally unionized sectors. These manifold tactics, and their

⁶ However, both Troy (2004, 1986) and Farber and Western (2004), in very different analyses, weigh the different contributions of employer resistance and industrial restructuring to union decline. These authors conclude that industrial restructuring, specifically the different rates of employment growth in union and non-union sectors of the economy, is the more powerful explanation.

concerted, widespread application, have proven to be a major reason for union decline in this country.

Getman (1986) also provides a unique, detailed, and qualitative analysis of the effectiveness of employer tactics to resist union organizing. Union-avoidance techniques are now a predictable part of most organizing drives, and there is evidence that they are effective at thwarting union organizing (Freeman and Kleiner 1990). It is not clear whether such techniques are more common or more effective in the relatively unorganized service sector than in the more traditionally organized sectors of the economy. There are surely examples of union-busting techniques in the manufacturing sector (see, e.g., Levitt and Conrow 1993). However, there are also ample cases of fierce union-avoidance tactics in the non-unionized sectors. For example, union-busting techniques in the world's largest retail employer, Wal-Mart, are widely recognized (Bianco 2006; Dicker 2002) and have been effective at preventing unionization among the 1.8 million employees working in the 6,500 Wal-Mart stores worldwide (Wal-Mart 2007). However, again there is no real evidence to indicate that, once sector characteristics are controlled, employer resistance has been stronger or more effective in female-dominated occupations than male-dominated occupations.

Indeed, there is some research to suggest that the opposite is true. Yates (2006) and Martinello and Yates (2004) report on results from a Canadian survey which asked union organizers whether employers had used any of 20 different union-busting strategies during organizing campaigns. The survey revealed few significant differences in employers' tactics to prevent union organizing in male- versus female-dominated workplaces. Indeed, the only significant difference suggested that employers were *more* likely to hire a management consultant or outside law firm during a union organizing

campaign in male-dominated workplaces. Yates (2006) speculates that this difference may be due to employers' (erroneous) assumptions that women will be less likely than men to support unionization. Whatever the reason for the difference, if employer resistance to new organizing is the same in male- and female-dominated workplaces, or stronger in male-dominated workplaces, this provides some evidence that a statistical association between occupational sex composition and union membership is unlikely to reflect more heavy-handed union-avoidance tactics in female-dominated occupations.

Business Migration and Globalization

Finally, a third reason for the decline of unions is due to business migration to non-union, "right-to-work" areas of the U.S. (e.g., the southern and southwestern United States) and overseas. Although this might be viewed as capital's rational response to globalization of trade, many see it as simply another form of union-avoidance (Koeppel 1978), bolstered by NLRB rulings in the 1980s which made it easier for employers to move production plants (Miscimarra and Schwartz 1997). Fantasia and Voss (2004:74) report that the northern and Midwestern states lost 1.5 million manufacturing jobs, during the 1980s, most to the states with "right-to-work" policies. Additionally, employers encouraged growth and expansion of non-union plants—not unionized ones—which encouraged the development of more cutting-edge technology in non-union plants (Kassarda 1995).

Again, while business migration to non-union areas must certainly be included as a part of the overall picture of union decline, there is little reason to suspect that this process would limit unions' ability to organize in female-dominated occupations more than male-dominated ones. Some service-sector occupations, such as customer service

representative, can be outsourced and moved to non-union locations, but many health care, teaching, social service, clerical, and sales occupations rely on person-to-person contact, and therefore cannot. To the extent that female-dominated occupations are more likely to be found in service and retail trade, it is reasonable to think female-dominated occupations would be *less* vulnerable to the threat of capital mobility than many male-dominated production occupations.

Summary and Research Questions

Private sector union membership has been steadily declining since the 1960s. In today's private sector, less than one in ten workers belongs to a union. One of the major explanations for the decline points to economic restructuring—a shrinking share of employment in traditionally unionized industries and occupations combined with a dramatic increase in traditionally non-unionized industries and occupations. The dynamic sectors of the economy have typically been seen as “unorganizable” because the U.S. labor movement evolved and grew around an entirely different mode of work and type of worker. Moreover, until recently, U.S. unions could be characterized as insular and conservative, focusing their efforts on servicing its current members rather than organizing new ones. Across industries and at many different points in time, unions proactively excluded and marginalized working women.

The economic transformation in this country coincided with a demographic transformation. Female labor force participation rates nearly doubled during this period, and women now comprise approximately one half of the workforce. The labor movement responded by organizing women, although it was not until 1995 that it entirely revamped its message and stance vis-à-vis the organization of historically excluded groups. Recent

research on gender and union organizing suggests that women now comprise the majority of new workers being organized, in part because women are statistically more likely to desire unionization, and in part because of the innovative and comprehensive tactics of unions that organize sectors of the economy where women dominate.

The literature on declining union membership frequently neglects to consider or model the extent to which the influx of women into the labor market—most of whom are concentrated in female-dominated occupations—impacted union decline. And the literature on occupational sex segregation has not given adequate conceptual consideration to the changing relationship between women and unions in the U.S. The analysis that follows takes a step toward integrating ideas in these bodies of work. Specifically, I answer the following question: *To what extent is labor's difficulty in penetrating the hard-to-organize sectors of the economy attributable to the **sex composition of occupations** in those sectors?*

CHAPTER 3: DATA, METHODS, AND MODELS

Chapter 2 described the decline in labor union membership, and reviewed an important explanation for that decline: the industrial and occupational restructuring of the U.S. economy. I argued, however, that the drop in union membership over the post-war years may be due not just to a changing economic structure, but to the changing demographic composition of the workforce as well. Women now comprise nearly half of the workforce—and most women work in occupations with other women, and are disproportionately employed in service-producing sectors of the labor market, which have had relatively little historical exposure to unionism. Yet because unions have a history of excluding women and marginalizing their interests, I argued that the sex composition of occupations may have an effect on union membership that operates over and above the effects of the labor market segment in which a worker is employed. Research suggests that unions have become more open to women in recent years, particularly since the change in AFL-CIO leadership in 1995. With this background, the remainder of this dissertation investigates the research question: *To what extent is labor's difficulty in penetrating the hard-to-organize sectors of the economy attributable to the sex composition of occupations in those sectors?*

This chapter details the data, measurement, and models I use to answer this question. The chapter is organized as follows. The first section describes my data source: the Current Population Survey Merged Outgoing Rotation Group (CPS-MORG) files. In addition, it outlines the changes in the CPS methodology over the years, some of which have the potential to affect the findings and conclusions about the key patterns over time. The second section of Chapter 3 provides detailed descriptions of how each

variable was constructed, along with the univariate distribution (from 1983 to 2005) of each variable. I opt to include a discussion of the univariate statistics in the measurement chapter, rather than the results chapter, because it is important to view any shifts or jumps in the distributions of these variables in light of changes in the CPS methodology and/or alterations in my coding that were necessary because of those changes. Finally, the third section of this chapter details the statistical models I use to address the research question.

Data: The Current Population Survey MORG Files

My statistical analyses are based on data from the Current Population Survey Merged Outgoing Rotation Group files (hereafter referred to as CPS-MORG). The CPS is a monthly survey of U.S. households, and is designed to be a nationally representative sample of labor force participants. It is perhaps the primary source of data which includes both labor force and demographic variables, and is optimal for my study because it contains questions on individuals' union membership, occupation, industry, and demographic characteristics. I know of no data source better suited to addressing the question I have posed.

The CPS union membership questions are asked monthly, but only to the outgoing rotation group—households which are in either their fourth or eighth month of the survey.⁷ This group comprises approximately one-quarter of the total CPS sample each month. The National Bureau of Economic Research has created CPS-MORG files by concatenating all 12 outgoing rotation groups from a single year into one file. For example, the 2005 CPS-MORG file contains data from the outgoing rotation groups from January through December of 2005. The resulting CPS-MORG sample for each year is

⁷ CPS households participate in the survey for four consecutive months, are then left out of the sample for eight months, and return to the sample for four final months before rotating out permanently.

approximately 12 times larger than the CPS outgoing rotation group for any single month. The large sample size is critical for my study, since people who are actually covered by a union contract make up a small (and decreasing) proportion of the sample each year. For all the years included in this study, the total unweighted CPS-MORG sample size, including public and private sector employees, ranged from a low of 280,692 in 1997 to a high of 353,695 in 1985. The CPS-MORG file is commonly used by scholars studying U.S. labor movement dynamics (see, e.g., Card 2001; Rosenfeld 2006; Farber and Western 2004) and/or wage inequality between demographic groups (see, e.g., Macpherson and Hirsch 1995; Western and Pettit 2005). It is important to note that although the CPS-MORG file includes all the information needed for this analysis, it does not include every variable available in the original CPS public use files. In some instances—such as in the case of information on hours worked—the CPS-MORG offers only summary variables or recoded or combinations of several variables that are included in the CPS public use files.

I use the CPS-MORG data from 1983 to 2005, including every other year in between, to track the relationship between occupational sex composition and union membership over the last two decades. I begin with 1983 because it is the first year in which the CPS set of earnings-related items included union membership and union coverage questions.⁸ I include every other year, as opposed to every year, because the CPS-MORG files from contiguous years contain overlapping samples. This is because of the outgoing rotation group design: as noted in footnote 7 above, CPS households are

⁸ The May CPS did include questions on union membership from 1973 through 1981. However, the earlier union questions are not strictly comparable to the current series of questions. It was only in 1983 that union membership questions began to be included in the set of survey items related to earnings and asked of the outgoing rotation group.

surveyed for four consecutive months, ignored for eight months; then surveyed again for another four consecutive months. Thus, a household in its *fourth* month of the survey in, say, April of 1983, would be in its *eighth* month in April of 1984. That same household would be included in both the 1983 and 1984 MORG files. Thus, I include every other year in the statistical analyses below. Since my research examines broad trends in union coverage over three decades, there is little reason to think that including only every other year would change overall conclusions.

Union decline is a dynamic, unfolding process, and studying the cross-sectional association between occupational sex composition and union membership—even at different points in time—does not capture the totality of the process. My research does not aim to do this, however; its purpose is to contribute to the discussion on union decline by investigating the role played by the sex composition of the growing sectors of the labor market. Using the critical time period of 1983 through 2005 also allows me to gauge whether the relationship between sex composition and union coverage has shifted since the election of new AFL-CIO leadership in 1995.

CPS Changes Over Time

Before moving to the details of variable construction and measurement, I discuss the changes that the CPS underwent during the time period included in this analysis. Between 1983 through 2005, the CPS saw many adjustments—some relatively minor and others more substantial. Especially critical to my study are some significant methodological changes in 1994. Since these coincide temporally with the election of new AFL-CIO leadership, any post-1995 shifts in the relationship between occupational percent female and union presence must be interpreted with an eye toward these changes;

it would be important to rule out the possibility that such shifts are solely a product of the CPS methodological modifications.

There were a few minor changes to the CPS between 1983 and 1994—most notably the move from the 1970-based sampling frame to the 1980-based sampling frame. Certain revisions to the sampling frame introduced in 1985 affected estimates of the Hispanic population (U.S. Census Bureau 2002), but should have no bearing on the estimates in my study since I do not include race or ethnicity as covariates.

Additionally—and more relevant to this study—the CPS changed the way it measured educational attainment in 1992, moving from a measure based on years of schooling completed to a credential-oriented measure based on highest degree obtained. This change does have implications for my research, which I discuss more fully in the measurement section below.

In 1994, the CPS methodology was overhauled. First, the instrument was moved to a Computer-Aided Telephone Instrument (CATI) design, permitting more complicated skip patterns, more accurate coding, dependent interviewing (information from previous months' interviews could be used in the current month's survey), and allowing interviewers to edit information for accuracy at the time of the interview (U.S. Census Bureau 2002). Additionally, the questionnaire itself was redesigned, with the express purpose of measuring labor market activity more precisely. Specifically (and relevant to this study), the redesigned survey appears to do a better job of capturing a broad range of labor market activity, including intermittent, informal, and home-based employment. For example, prior to 1994, the labor force portion of the CPS interview began with the question, "*What were you doing most of LAST WEEK (working, keeping house, going to*

*school, or something else?)."*⁹ In the 1994 redesign, this question was replaced with: “*Last week, did you do ANY work for (either) pay (or profit)?*” This change accomplished two things: first, it made it clear that the survey was concerned with labor force activity, as opposed to activity outside the labor force. Second, the re-worded question encouraged a broader definition of labor force activity—one which might include temporary, irregular, or home-based work (Cohany et al. 1994). Additionally, there were several changes to particular labor force items, including the way respondents were asked about the number of hours they worked, the occupation or industry in which they worked, and their earnings.

A comparison of the 1994 redesign with a parallel survey, using the old design and conducted at the same time as the redesigned survey, suggested that these modifications did in fact affect certain labor force estimates. First, more women were being properly classified with a labor force status of self-employed. Additionally, a slightly higher percentage of women were classified as being employed in Agriculture and Management occupations, and a slightly lower proportion of men were employed in Sales occupations (Cohany et al. 1994). Finally, changes to the hours worked questions affected the estimates of the number of people working part-time and the number of people working part-time for economic reasons (U.S. Census Bureau 2002). Again, this specific change has implications for my study, and I discuss it more fully in the next section on variable construction.

⁹ Additionally, this question was sometimes tailored to the particular respondent; that is, women were often asked whether they were “working, keeping house, or something else?” while men were often asked whether they were “working or [doing] something else.” In the redesigned survey, questions were no longer tailored to the particular respondent.

Finally, in 1996, the CPS sample was reduced because of funding cuts, shrinking the number of households in the sample from about 56,000 to approximately 50,000. This could potentially reduce the precision of my estimates from 1997 through 2001, when the sample size was increased again from 50,000 to 60,000 households.

Variable Measurement and Construction

Dependent Variable: Union Coverage

The outcome to be explained in this study is union presence across various segments of the labor market. I measure union presence using two questions from the CPS. The first is “*On this job, is [the person] a member of a labor union or of an employee association similar to a union?*” The second is “*On this job, is [the person] covered by a union or employee association contract?*” An individual is coded as having union coverage if s/he is *either* a member of a union or if his/her workplace is covered by a union contract. Strictly speaking, union coverage is not the same thing as union membership, and many studies on labor movement dynamics define the central concept—union density—as the percentage of the employed workforce belonging to a union (see, e.g., Visser 2006; Bain and Price 1980; Western 1995). However, for my research question it is not necessary or desirable to distinguish between individuals who have chosen to become dues-paying members and those who are covered by a union contract.¹⁰ The share of workers covered by a union contract is a more appropriate than union membership as a measure of union presence in the labor market (Visser 2006).

¹⁰ Moreover, non-union members who have union coverage [so-called free-riders] benefit from collective bargaining: Bureau of Labor Statistics figures indicate that median weekly wages for full-time workers in 2005 were \$801 for union members, \$795 for non-union members with union coverage, and \$622 for non-union members without union coverage (U.S. Department of Labor 2005e).

Table 3.1 below shows the univariate distribution of the union coverage variable from 1983 through 2005. The table includes unweighted figures in the two left-hand columns, weighted figures in the middle two columns, and for comparison purposes, and published estimates of union coverage from the Bureau of Labor Statistics web site. The comparison figures from 1991 and earlier are from the Hirsch and Macpherson *Union Membership and Coverage Database* (Hirsch and Macpherson 2003). Hirsch and Macpherson's estimates match BLS estimates exactly, according to a note on the web site. For half of the years in my analysis, my own estimates match published BLS figures exactly; however, for half of the years (shown in bold) my estimates differ from published percentages—but only very slightly.¹¹

Independent Variables: A Note on the Level of Measurement

Before discussing the construction of the independent variables, it is important clarify a point about the level of measurement. The unit of analysis in my study is the individual; however, *all independent variables included in the statistical models are characteristics of individuals' occupations or industries*. This is because my research question centers on why individuals in different sectors of the labor market do or do not have union coverage. Based on the literature reviewed in Chapter 2, I believe that this is better explained by characteristics of the sector than characteristics of the individual. The choice to wage a union organizing campaign is a strategic and economic calculation

¹¹ I investigated several possibilities to explain why my estimates did not match the published BLS estimates. My initial concern was that I had applied the incorrect weight to the data, but after a conversation with a senior analyst at the CPS, I concluded that was not the problem. Next I investigated whether it was due to the compilation of the CPS Outgoing Rotation Group files. However, after a conversation with the analyst responsible for compiling these files (Jean Roth at NBER) I concluded again that this was not the case. Ultimately I concluded that the slight discrepancies were likely due to differences in inclusion criteria between my figures and the BLS's, and that they were unlikely to affect my overall results.

**Table 3.1: Univariate Distribution of Union Coverage Variable,
Private and Public Sectors Combined, 1983-2005**

Year	Union Coverage (Unweighted Figures)		Union Coverage (Weighted Figures)		Union Coverage (Published BLS Estimates, in thousands)*	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
1983	39,805	23.0%	20,532,146	23.26%	20,532.1	23.3%
1985	36,673	20.9%	19,283,855	20.92%	19,358.1	20.5%
1987	34,468	19.4%	19,019,928	19.46%	19,051.0	19.2%
1989	32,033	18.5%	19,155,368	18.82%	19,197.6	18.6%
1991	32,852	18.7%	18,727,232	18.43%	18,733.8	18.2%
1993	30,978	18.1%	18,631,387	17.91%	18,646	17.7%
1995	28,670	16.8%	18,346,326	16.67%	18,346	16.7%
1997	24,267	15.7%	17,923,005	15.65%	17,923	15.6%
1999	24,508	15.4%	18,182,278	15.28%	18,182	15.3%
2001	25,534	14.9%	18,035,541	14.75%	17,875	14.8%
2003	25,786	14.3%	17,448,363	14.26%	17,448	14.3%
2005	24,465	13.7%	17,223,365	13.7%	17,223	13.7%

on the part of the *union*. The literature reviewed in Chapter 2 suggests that the traditional mode of union organizing is incompatible with new forms of employment relationships—such as part-time or short-term employment—in the expanding sectors of the economy. This implies that unions are less likely to launch organizing campaigns in sectors of the labor market where part-time or short-term workers are concentrated, but it does not imply that unions avoid organizing *individuals* who work in short-term or part-time arrangements. Therefore, individual-level characteristics are theoretically irrelevant: the individual part-time or short-term employee is only less likely to be unionized if s/he works in a sector that is heavily comprised of part-time or short-term workers.¹²

¹² However, individual characteristics are probably not *empirically* irrelevant. A part-time or short-term worker is almost certainly less likely to be unionized than a full-time or long-term worker, all else equal. But I argue that this is more a function of where the individual is employed than the individual's own labor market attachment.

Additionally, it should be clear that while unions' organizing strategies and activities are central to my arguments, they are not measured. Rather, as described above, I regard the statistical findings here as analogous to those in studies on occupational sex composition and market rewards. While social closure and/or discrimination in these studies is not measured, the statistical relationship between sex composition and market rewards (the so-called status composition effect) is treated as the observable residue of social closure or discriminatory processes. My discussion in the last section of Chapter 2 helps to bolster my claim that it is social closure, as opposed to other processes, that gives rise to any relationship between sex composition and union coverage.

Occupational Sex Composition

The primary independent variable is occupational sex composition, as measured by the percentage of women in the occupation at the 3-digit [detailed] occupational level. I use CPS-MORG data to estimate the proportion of women in each occupation for each year. The CPS classifies occupations with Census codes; at the detailed level there are approximately 500 such codes. Even with a total sample size of over 200,000 per year, samples *within* occupations can be quite small for any given year. For example, in 1985, the year with the largest overall sample size, 32 out of approximately 500 (about six percent) of 3-digit occupations had an unweighted sample size of 10 or fewer. Therefore, estimates of occupational percent female had the potential to be imprecise. To increase precision, I estimated the percent female for each year based on *pooled* samples from two years of CPS-MORG files, thereby doubling the sample size within each occupation.

The ideal logic for pooling samples might have been to use data from the current and one contiguous year (e.g., combining 1983 and 1984 data to estimate occupational

percent female in 1983). However, the CPS sampling design prohibited pooling two contiguous years, and required instead that I pool data from samples that were two years apart (e.g., 1983 and 1985). The reason is the outgoing rotation group design: as noted above, CPS households are surveyed for four consecutive months, ignored for eight months; then surveyed again for another four consecutive months. Thus, a household that was in its fourth month of the survey in January of 1983 would be in its eighth month in January of 1984—and that household would be in both the 1983 and the 1984 data. Therefore, my general logic was to pool samples from CPS-MORG files that were two years apart, resulting in completely unique sets of respondents in the pooled samples. The one exception to this process was in 1993. The 1994 CPS redesign prohibited pooling 1993 data with later years. However, occupational codes changed in 1992, making it impossible to pool 1993 data with earlier years. Therefore, I estimated occupational percent female (and other occupational variables) for 1993 using 1993 data alone.

For the purposes of coding sex composition and the other occupation-level variables described below, the pooled samples included all public and private sector employees who were in the labor force (either employed or unemployed), who were not in the armed forces, and who had a valid occupation code. The pooled sample estimates of percent female and other occupational characteristics were also weighted by the CPS Final weight, which is designed to produce population estimates for basic monthly CPS items by adjusting for sampling procedures and non-response (U.S. Census Bureau 2002; personal conversation with a CPS HelpDesk Senior Analyst on 9/13/2006.)

The level of measurement for the primary independent variable has some limitations, as Bielby and Baron's (1986) well-known research has revealed that

measuring sex composition at the level of the occupation, as opposed to the job, is likely to understate the true level of sex segregation in the workplace. Measured at the 3-digit occupational level, some occupations—particularly managerial and professional—appear to be sex-integrated (for example, financial managers and systems analysts are 51 and 46 percent female, respectively). A more detailed breakdown of occupational groups would likely reveal much higher levels of segregation by sex. Due to the course nature of the independent variable, there is the possibility that my measurement could understate the true level of sex segregation within occupations, and therefore the analysis would understate the association between occupational sex composition and union coverage. Job-level data, however, is not widely available, and many studies are forced to measure sex composition at the occupational, rather than the job, level (e.g., England 1992; Kilbourne et al. 1994; Cotter et al. 1995; Reid 1998; Macpherson and Hirsch 1995).

Table 3.2 below shows the unweighted univariate distribution of the occupational percentage female variable for 1983 through 2005.¹³ This table indicates that there are no abrupt fluctuations or other unexpected patterns in this variable over time. Over the course of the twenty year time span included in the analysis, the univariate distribution reveals that occupations go from being slightly more sex-segregated (with the highest share of employees in the most male-dominated and female-dominated occupations) to

¹³ In the remaining univariate analyses in this chapter, I present unweighted frequencies to show the exact number of cases included in the sample for each year. However, in separate analyses I estimated the weighted frequencies for each year and for all variables, using the CPS earnings weight (recommended for all analyses based on the outgoing rotation group sample) divided by the mean of that weight. For all 12 years included in the analysis, and for all seven independent variables, the differences between the weighted and unweighted percentages were very slight. In only one case did the difference between the weighted and unweighted percentages exceed 1.0 percent; here the difference was only 1.5 percentage points.

slightly less sex-segregated, where higher percentages of employees work in the 26-50 percent female and 51-75 percent female categories.

Table 3.2: Unweighted Univariate Distribution of Occupational Percent Female Variable, Public and Private Sectors Combined, 1983-2005

Year	25% or Less Female		26% to 50% Female		51% to 75% Female		76% or More Female	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
1983	58,182	33.5%	39,913	23.0%	26,887	15.5%	48,940	28.1%
1985	57,165	31.7%	44,114	24.5%	27,958	15.5%	50,944	28.3%
1987	56,297	31.2%	44,793	24.8%	28,720	15.9%	50,578	28.0%
1989	52,826	30.0%	45,853	26.0%	28,868	16.4%	48,850	27.7%
1991	52,288	29.1%	47,507	26.5%	29,540	16.5%	50,211	28.0%
1993	47,570	27.3%	49,208	28.2%	28,165	16.1%	49,642	28.4%
1995	45,503	26.7%	45,792	26.9%	33,556	19.7%	45,429	26.7%
1997	39,234	25.3%	45,360	29.3%	27,789	17.9%	42,560	27.5%
1999	40,449	25.4%	47,220	29.6%	28,871	18.1%	42,829	26.9%
2001	46,544	27.2%	43,828	25.6%	38,201	22.3%	42,730	24.9%
2003	48,008	26.6%	45,174	25.0%	41,707	23.1%	45,940	25.4%
2005	48,255	27.0%	44,936	25.1%	41,342	23.1%	44,609	24.9%

Other Independent Variables

Based on the review of the union decline literature in Chapter 2, several other labor market sector variables—which are almost certainly associated with occupational sex composition—are thought to affect the likelihood of union coverage. Specifically, as outlined in Chapter 2, certain occupational or industrial characteristics are commonly regarded as incompatible with traditional modes of union organizing. The *occupational* characteristics in my analysis include: (1) whether or not the occupation in which one works has historically been *more* or *less* unionized; (2) the level of education in one's occupation; and (3) the percentage of part-time workers in one's occupation. Industry characteristics include: (1) whether or not the industry in which one works has historically been *more* or *less* unionized; (2) the average level of turnover in one's

industry, and (3) the average establishment size in the industry in which one works. Generally speaking, based on the literature reviewed above, being employed in an occupation that has historically been less-unionized, requires higher levels of education, and employs more part-time workers will make one less likely to have union coverage. Likewise, being employed in an industry that has historically been less-unionized, has high turnover levels, and smaller establishments will reduce the likelihood of union coverage. The crucial question in this analysis revolves around a counterfactual: *what would union coverage rates be in these sectors if occupations within them were **not** sex-segregated?* The difference between the actual rates of union coverage and the rates under the counterfactual scenario that occupational sex composition is independent of other sector characteristics provides the answer to this question. I return to a discussion of the statistical models used to answer this question later in this chapter, but first I describe in detail how each of the labor market sector variables was constructed.

Coding Historically Unionized Occupations and Industries. To code historically unionized occupations and industries, I classified major occupational and industrial groups into two categories: the “historically more unionized” and “historically less-unionized” groups.¹⁴ Ideally, one might wish to use more detailed occupational or industrial breakdowns—such as two- or three-digit classifications—to pick up variation in historical levels of unionization *within* major occupational or industry groups. In the manufacturing industry, for example, there was likely variation in historical levels of unionization between, say, the auto and garment manufacturing industries. Likewise, within service occupations, there were surely differences between elevator operators and

¹⁴ Guiding my coding decisions were several sources, including Farber and Western (2004); Goldfield (1987:99) and Rogers (1993). I chose to code the Public Administration industry as historically less-unionized because union coverage in public administration was quite low until the 1960s and 1970s.

child care workers. My coding system does not capture variation within major occupation or industry groups because there was no feasible way to do so: changes in the occupational and industrial structure of the U.S. economy over the past 75 years—along with the corresponding changes in the occupational and industrial coding systems—made it impossible to simply apply union membership statistics from detailed historical occupation/industries to detailed contemporary occupations/industries. Many occupations and industries that exist today did not exist (and therefore had no code) 50 years ago. To accurately code historical levels of union membership at the detailed level would have required historical research on each detailed group, which was impractical given the scope and time constraints for this project.

On the other hand, the crudeness problem is alleviated somewhat because the statistical analysis cross-classifies occupational and industry variables. For example, the manufacturing industry is coded as “historically more-unionized,” but people working within this industry might be employed in a “less-unionized” occupation, such as manager, clerk, or janitor. Likewise, service industry groups, such as business or health care services are coded as “less-unionized,” but a maintenance worker employed at a hospital would be coded as working in a “historically more-unionized” occupation in a “historically less-unionized” industry.

My coding of these groups is summarized in Table 3.3. Because CPS industry and occupational codes changed in 2002, there were slightly different major industry and occupation groups in 1983-2001 than in 2002-2005. As shown in Table 3.3, the historically more-unionized group of occupations generally corresponds to blue collar, manual occupations, and the historically more-unionized group of industries by and large

corresponds to the goods-producing sector (with the exception of transportation, communication, and public utilities, which have a history of high unionization rates (Farber and Western 2004) and were unionized at rate of nearly 50 percent in 1980 (Goldfield 1987:122).

Finally, Tables 3.4 and 3.5 below show the unweighted univariate distributions of these variables from 1983 through 2005. Again, there are no abrupt or unexpected fluctuations in the univariate distributions over time that would indicate a problem with coding or a change in CPS methodology. Not unexpectedly, there is a gradual decline in employment in historically more-unionized groups over the past 20 years. Table 3.4 shows that the percentage of employees working in historically more-unionized occupations dropped from 29.0 percent to 22.6 percent, while the percentage of people in historically less-unionized occupations steadily increased from 71 percent to 77.4 percent over the period. There were slightly more dramatic changes among historically more- and less-unionized industries. In 1983 more than one-third of employees worked in historically more-unionized industries; by 2005, the percentage had dropped to less than one-fourth. Likewise, the share of people working in historically less-unionized occupations increased from just under two-thirds to over three-fourths during the period.

Coding the Percentage of Part-Time Workers in Detailed Occupations. Like the occupational sex composition variable, this measure was constructed for each year in the analysis by pooling two years of CPS-MORG data and estimating the percentage of part-time workers in each 3-digit occupation. The information on hours worked per week came from the CPS-MORG item “full-time/part-time labor force status,” which was constructed from several questions and provides information on whether the employee

Table 3.3: Coding Historically More-Unionized and Historically Less-Unionized Occupations and Industries

Years	Historically More-Unionized Occupations	Historically Less-Unionized Occupations
1983-2001	Precision Production, Craft & Repair Transportation & Material Moving Handlers & Equipment Cleaners Machine Operators, Assemblers & Inspectors	Executive, Administrative & Managerial Professional Specialty Technicians & Related Support Sales Administrative Support, Incl. Clerical Private Household Service Protective Service Other Service Farming, Forestry & Fishing
2002-2005	Construction & Extraction Installation, Maintenance & Repair Production Transportation & Material Moving	Management, Business & Financial Professional & Related Service Sales & Related Office & Administrative Support Farming, Fishing & Forestry
Years	Historically More-Unionized Industries	Historically Less-Unionized Industries
1983-2001	Mining Construction Manufacturing Transportation Communications Utilities & Sanitary Services	Agriculture Wholesale Trade Retail Trade Finance, Insurance & Real Estate Private Household Services Business & Repair Services Personal Services (Except Household) Entertainment, Professional & Related Svcs. Hospitals Medical Services, Except Hospitals Educational Services Social Services Other Professional Services Forestry & Fisheries Public Administration
2002-2005	Mining Construction Manufacturing Transportation & Utilities	Agriculture, Forestry & Fishing Wholesale & Retail Trade Information Financial Activities Professional & Business Services Educational & Health Services Leisure & Hospitality Other Services Public Administration

Table 3.4: Unweighted Univariate Distribution of Historically More-Unionized and Historically Less-Unionized Occupations, Public and Private Sectors Combined, 1983-2005

Year	Workers in Historically Less-Unionized Occupations		Workers in Historically More-Unionized Occupations	
	Freq.	Percent	Freq.	Percent
1983	123,522	71.0%	50,410	29.0%
1985	128,590	71.4%	51,642	28.7%
1987	129,866	72.0%	50,568	28.0%
1989	127,260	72.2%	49,129	27.9%
1991	132,138	73.6%	47,399	26.4%
1993	129,883	74.4%	44,712	25.6%
1995	127,030	74.6%	43,275	25.4%
1997	116,043	74.9%	38,912	25.1%
1999	120,188	75.4%	39,190	24.6%
2001	131,612	76.8%	39,709	23.2%
2003	140,153	77.5%	40,677	22.5%
2005	138,712	77.4%	40,436	22.6%

Table 3.5: Unweighted Univariate Distribution of Historically More-Unionized and Historically Less-Unionized Industries, Public and Private Sectors Combined, 1983-2005

Year	Workers in Historically Less-Unionized Industries		Workers in Historically More-Unionized Industries	
	Freq.	Percent	Freq.	Percent
1983	113,859	65.5%	60,073	34.5%
1985	117,745	65.3%	62,487	34.7%
1987	119,631	66.3%	60,803	33.7%
1989	117,907	66.8%	58,504	33.2%
1991	122,681	68.3%	56,879	31.7%
1993	121,289	69.5%	53,306	30.5%
1995	118,735	69.7%	51,572	30.3%
1997	108,537	70.0%	46,418	30.0%
1999	112,809	70.8%	46,569	29.2%
2001	126,898	74.1%	44,282	25.9%
2003	136,484	75.5%	44,346	24.5%
2005	135,376	75.6%	43,772	24.4%

worked fewer than 35 hours during the reference week, and if so, whether s/he usually worked part-time and whether the part-time schedule was for economic or non-economic reasons. This item changed twice between 1983 and 2005. Table 3.6 shows my coding decision for each category over the years.

After coding each individual as part-time or full-time according to the coding rules in Table 3.6, I estimated the percentage of part-time workers in each 3-digit occupation, again applying the CPS Final weight to the estimates. Based on these weighted estimates, I then coded individuals into two groups: those working in occupations where one-third or more employees were part-time, and those working in occupations where less than one-third of employees were part-time. I chose one-third as the cutoff for this variable for two reasons. First, it seemed on its face a reasonable proportion to use to discriminate between those occupations where a typical worker might be employed part-time. Second, even using the relatively low proportion of one-third yielded relatively few people (less than 25 percent of the sample each year) working in occupations where one-third or more employees were part-time. That meant that one-third was about the largest meaningful percentage which still yielded enough variance to conduct statistical analyses on this variable.

For simplicity's sake, I often refer to these groups as individuals working in "part-time" occupations and those working in "full-time" occupations, though many part-time occupations have full-time workers and many full-time occupations have part-time workers. To examine the face validity of the measure, Table 3.7 below shows the unweighted percentage of individuals working in part-time occupations by major occupational group in the first and last years of the analysis. As shown, the sales and

service groups have higher shares of people working in part-time occupations, while production and construction occupations have lower shares.

Table 3.6: Coding of Part-Time/Full-Time Status Variable

1983-1987 Full-Time/Part-Time	
Labor Force Status Categories	Coded as
Not in the labor force	Not included in sample
Employed full-time	Full-time
Part-time for economic reasons	Part-time
Unemployed full-time	Not included in sample
Employed part-time	Part-time
Unemployed part-time	Not included in sample
1989-1993 Full-Time/Part-Time	
Labor Force Status Categories	Coded as
Not in the labor force	Not included in sample
Full-time schedule	Full-time
PT for economic reasons, usually FT	Full-time
PT for economic reasons, usually PT	Part-time
PT for non-economic reasons, usually PT	Part-time
Unemployed FT	Not included in sample
Unemployed PT	Not included in sample
1995-2005 Full-Time/Part-Time	
Labor Force Status Categories	Coded as
Not in the labor force	Not included in sample
Full-time schedule	Full-time
PT for economic reasons, usually FT	Full-time
PT for economic reasons, usually PT	Part-time
PT for non-economic reasons, usually PT	Part-time
Unemployed FT	Not included in sample
Unemployed PT	Not included in sample
Not at work, usually FT	Full-time
PT for non-economic reasons, usually FT	Full-time
FT usually PT for economic reasons	Part-time
FT usually PT for non-economic reasons	Part-time
Not at work, usually PT	Part-time

Table 3.7: Unweighted Percentage of People Employed in “Part-Time” Occupations, 1983 and 2005

Major Occupational Group	Percent of People Employed in “Part-Time” Occupations in 1983
Executive, Administrative, and Managerial Occupations	0.1%
Professional Specialty Occupations	9.2%
Technicians and Related Support Occupations	2.2%
Sales Occupations	46.1%
Administrative Support Occupations, Including Clerical	5.4%
Private Household Occupations	100.0%
Protective Service Occupations	7.3%
Service Occupations, Except Household and Protective	80.4%
Precision Production, Craft, and Repair Occupations	0.7%
Machine Operators, Assemblers, and Inspectors	1.3%
Transportation and Material Moving Occupations	10.4%
Handlers, Equipment Cleaners, Helpers, and Laborers	27.6%
Farming, Forestry, and Fishing Occupations	38.9%
Total, All Major Groups	20.5%

Major Occupational Group	Percent of People Employed in “Part-Time” Occupations in 2005
Management, Business, and Financial Occupations	0.0%
Professional and Related Occupations	8.1%
Service Occupations	42.1%
Sales and Related Occupations	47.8%
Office and Administrative Support Occupations	0.7%
Farming, Fishing, and Forestry Occupations	0.0%
Construction and Extraction Occupations	0.0%
Installation, Maintenance, and Repair Occupations	0.0%
Production Occupations	0.5%
Transportation and Material Moving Occupations	0.8%
Total, All Major Groups	14.6%

Comparing the two time periods, it is important to point out that there is a substantial change in the percentage of people working in part-time occupations: the overall percentage of people working in part-time occupations shrank from 20.5 percent in 1983 to 14.6 percent in 2005. Additionally, there were shifts within occupational groups, including administrative support, laborer, and farming categories. These differences appeared to be due almost entirely to the change in the CPS-MORG full-time/part-time labor force status variable. With the expanded categories in 1989 and again in 1995, it became possible to identify people who worked part-time during the reference week, but who usually worked full-time. This group of people comprised more than eight percent of the total sample in 2005, and (as shown in Table 3.6 above) were accurately coded as working *full-time* in the later years. In the years 1983 through 1987, the same individuals would likely have been coded as “part-time for economic reasons” and therefore would have been classified as part-time.

The unweighted univariate distribution of the part-time variable over time is shown in Table 3.8 below. In spite of the coding changes in 1989 and 1995, the *overall* percentage of people employed in part-time occupations showed no abrupt changes that would suggest coding errors.

Coding Education Level in Detailed Occupations. Once again, when coding occupational education levels, it was important to note changes in the way the CPS measured education over the time span included in my analysis. In 1983 through 1991, the CPS captured educational attainment with two variables: first, with a question on the highest grade the individual *attended* (response categories included years of schooling, and ranged from “Elementary 1” to “College 6 +”); and second, with a dummy variable

Table 3.8: Unweighted Univariate Distribution of Occupational Percent Part-Time Variable, Public and Private Sectors Combined, 1983-2005

Year	Less than One-Third Part-Time		One-Third or More Part-Time	
	Freq.	Percent	Freq.	Percent
1983	138,365	79.6%	35,563	20.5%
1985	149,519	83.0%	30,713	17.0%
1987	150,019	83.1%	30,415	16.9%
1989	149,077	84.5%	27,334	15.5%
1991	151,241	84.2%	28,319	15.8%
1993	145,508	83.3%	29,086	16.7%
1995	141,342	83.0%	28,963	17.0%
1997	128,936	83.2%	26,014	16.8%
1999	132,854	83.4%	26,522	16.6%
2001	146,316	85.4%	25,005	14.6%
2003	154,777	85.6%	26,053	14.4%
2005	153,006	85.4%	26,142	14.6%

indicating whether or not the individual *completed* the highest grade attended. Beginning in 1992, the CPS switched to a credential-oriented measure, collecting information on educational attainment with the question “*What is the highest level of school [the person] has completed or the highest degree received?*” Response categories ranged from “Less than 1st Grade” to “Doctorate Degree.” Beginning in 1998, the CPS-MORG offers a *third* variable with imputed education values. This variable “allows researchers to come closer to the ‘highest grade completed’ measure available before 1992” (Feenberg and Roth 2006). The NBER variable has the same response categories as the pre-1992 education variable, except that each level now represents the highest level of education completed (not attended). Table 3.9 displays all three education variables and their corresponding numeric values.

Table 3.9: Changes in CPS Educational Attainment Variable

Education Variable Values, 1983 through 1991	Numeric Value
Elementary one (not completed)	1
Elementary one (completed)	1
Elementary two (not completed)	1
Elementary two (completed)	2
Elementary three (not completed)	2
Elementary three (completed)	3
Elementary four (not completed)	3
Elementary four (completed)	4
Elementary five (not completed)	4
Elementary five (completed)	5
Elementary six (not completed)	5
Elementary six (completed)	6
Elementary seven (not completed)	6
Elementary seven (completed)	7
Elementary eight (not completed)	7
Elementary eight (completed)	8
High School one (not completed)	8
High School one (completed)	9
High School two (not completed)	9
High School two (completed)	10
High School three (not completed)	10
High School three (completed)	11
High School four (not completed)	11
High School four (completed)	12
College one (not completed)	12
College one (completed)	13
College two (not completed)	13
College two (completed)	14
College three (not completed)	14
College three (completed)	15
College four (not completed)	15
College four (completed)	16
College five (not completed)	16
College five (completed)	17
College six (not completed)	17
College six (completed)	18

This table continues on the next page.

Table 3.9 continued

Education Variable Values, 1993 through 1997	Numeric Value
Less than 1 st Grade	31
1 st through 4 th Grade	32
5 th or 6 th Grade	33
7 th or 8 th Grade	34
9 th Grade	35
10 th Grade	36
11 th Grade	37
12 th Grade—No Diploma	38
High School Graduate—Diploma or GED	39
Some College but no Degree	40
Associate Degree—Occupational or Vocational	41
Associate Degree—Academic Program	42
Bachelor's Degree	43
Master's Degree	44
Professional Degree	45
Doctorate Degree	46

Education Variable Values, 1999 through 2005	Numeric Value
Elementary one	1
Elementary two	2
Elementary three	3
Elementary four	4
Elementary five	5
Elementary six	6
Elementary seven	7
Elementary eight	8
High School one	9
High School two	10
High School three	11
High School four	12
College one	13
College two	14
College three	15
College four	16
College five	17
College six	18

Like the first two occupation-level variables, the measure of occupational education level was constructed for each year in the analysis by pooling two years of CPS-MORG data and coding occupational education level based the weighted estimates of median education level by 3-digit occupation.¹⁵ For the purposes of the purging analysis, I coded individuals into two categories: those working in occupations with a median education level of high school or less, and those working in occupations with a median education level of greater than high school. In the years 1983 through 1991, and again in 1999 through 2005, individuals working in occupations with a median education level of less than 13 were assigned to the “high school or less” category and individuals working in occupations with a median education level of 13 or higher were assigned to the “more than high school” category. For the years 1993 through 1997, individuals working in an occupation with a median education level of less than 40 were assigned to the “high school or less” and individual working in occupations with a median education level of 40 or higher were assigned to the “more than high school” category.

Table 3.10 shows the unweighted proportion of individuals in the two occupational education groups. It is clear that the CPS change in coding has a sizeable effect on this variable: between 1991 and 1993 (exactly when CPS switched to a credential-oriented system) the share of employees in “high school” occupations dropped from 61.5 percent to 47.6 percent, and the share of employees in occupations with a median education level of greater than high school jumped from 38.6 to 52.4 percent. These methodological changes have implications for my statistical findings, a point to which I return during the discussion of the results.

¹⁵ I opted to use the median as opposed to the mean education level because the means in many occupations appeared to be sensitive to outliers, and would have resulted in nonsensical coding in some cases.

Table 3.10: Unweighted Univariate Distribution of Occupational Education Variable, Public and Private Sectors Combined, 1983-2005

Year	Workers in Occupations with Median Education Levels of High School or Less		Workers in Occupations with Median Education Levels of More than High School	
	Freq.	Percent	Freq.	Percent
1983	122,045	70.2%	51,887	29.8%
1985	122,541	68.0%	57,691	32.0%
1987	121,184	67.2%	59,250	32.8%
1989	110,155	62.4%	66,256	37.6%
1991	110,347	61.5%	69,213	38.6%
1993	83,057	47.6%	91,538	52.4%
1995	76,211	44.8%	94,096	55.3%
1997	69,044	44.6%	85,911	55.4%
1999	69,717	43.7%	89,661	56.3%
2001	78,446	45.8%	92,875	54.2%
2003	77,878	43.1%	102,952	56.9%
2005	77,249	43.1%	101,899	56.9%

Coding Establishment Size. The literature reviewed in Chapter 2 suggested that unions have typically targeted large establishments (allowing them to organize hundreds of worker during a single organizing campaign) and avoided organizing smaller ones (which might yield only a handful of new members). If female-dominated occupations are more likely to be housed in small establishments, then it would be important to control on establishment size to disentangle the pure effect of sex composition on union coverage. I measure average establishment size with data from the BLS Quarterly Census of Employment and Wages (QCEW) Survey (formerly ES-202). Based on a census of establishments covered by Unemployment Insurance, the QCEW program publishes an annual and quarterly count of employment and wages at the county, state, and national levels. To code this variable, I used annual national-level data. Each year, the QCEW

reports, at the detailed industry level, the total number of employees and the total number of reporting units. A reporting unit is a single establishment engaged in one type of economic activity, generally in a single physical location. Large firms typically have multiple reporting units.

Coding establishment size over time required several decisions about how to apply QCEW to CPS data. The QCEW produced detailed industry-level data using the 1972 Standard Industrial Classification (SIC) codes for 1983 through 1987; then switched to 1987 SIC codes from 1988 through 2000, and finally, updated to the North American Industrial Classification System (NAICS) for 2001 through 2005. For the years with SIC-based codes, I recoded QCEW detailed industry classifications into the Census CPS coding structure, using the 1972 and 1987 SIC crosswalk provided in CPS codebooks. However, the NAICS coding system, beginning in 2001, posed a significant challenge, because quite often there was no one-to-one match between NAICS and CPS Census codes. Rather, one CPS industry group might be comprised of two or more NAICS groups, or, alternatively, smaller sub-sections of a single larger industry grouping. For example, Census code 190 (Forestry, Except Logging), was comprised of two NAICS groups—1131 and 1132. Alternatively, Census code 1270 (Bakeries, Except Retail) was comprised of NAICS code 3118 *except* 311811. Computing average establishment size by Census industry group required manually combining employment and reporting unit totals for NAICS categories. For example, to obtain the correct total for Census code 190, I combined the number of establishments (and total employment) for NAICS groups 1131 and 1132. For Census code 1270 I used the totals for group 3118 *minus* the totals for group 311811. This was a painstaking process for which there were no automated

shortcuts. In addition, it was important to calculate all totals separately for public and private establishments, since establishment sizes in public the public sector were much larger, on average, than those in the private sector.¹⁶ Because of the effort involved, and because the gains from doing this for each year seemed minimal, I opted to conduct this process only once—with the 2003 data. I then used the 2003 establishment size estimates for the 2003 and 2005 analysis years.

I used 2000 QCEW data to estimate average establishment sizes for the 2001 analysis. This is because the CPS used 1980 Census codes in 2001, while the QCEW had already switched to NAICS codes by that year. While there was a crosswalk between 1987 SIC codes (used by the QCEW in 2000) and 1980 Census codes, I could locate no crosswalk between the 1980 Census industry codes and the new NAICS codes. Again, I believe the 2000 average establishment sizes are a reasonable approximation of 2001 establishment sizes.

Once I had used crosswalks to regroup (in the case of 2003 and 2005 data) and recode (in the case of 1983 through 2001 data) I merged QCEW estimates of average establishment size with CPS data, so that each 3-digit CPS industry now had an estimate for its average establishment size. Since I had unique establishment size estimates for public and private employers, I merged QCEW estimates with CPS using both 3-digit industry and class of worker. Finally, I coded individuals into one of two groups: those working in industries with an average establishment size of 25 or fewer, and those working in industries with an average establishment size of greater than 25. The literature provided no particular guidance for a cutoff point on this variable, so 25

¹⁶ The average establishment size for private employers was approximately 38 employees; the average establishment size for public employers was approximately 174.

employees was a somewhat arbitrary choice. However, again I tried to select a cutoff that was reasonable substantively and would provide ample variance. In this case, 25 seemed a sensible number with face validity. Moreover, across all years, approximately half of the people in the CPS-MORG sample were employed in industries with more than 25 employees, providing sufficient variation on this variable. The unweighted univariate distribution of this variable is shown in Table 3.11. Over the time period included in this analysis, there was a slight increase in the percentage of people working in industries with average establishment sizes of 25 employees or less.

Table 3.11: Unweighted Univariate Distribution of Establishment Size Variable, Public and Private Sectors Combined, 1983-2005

Year	Workers in Industries with Average Establishment Size 25 or Fewer Employees		Workers in Industries with Average Establishment Size More than 25 Employees	
	Freq.	Percent	Freq.	Percent
1983	80,792	46.5%	92,873	53.5%
1985	99,486	55.3%	80,407	44.7%
1987	81,935	45.7%	97,547	54.4%
1989	77,783	46.0%	91,318	54.0%
1991	80,828	46.9%	91,543	53.1%
1993	84,867	49.2%	87,640	50.8%
1995	83,850	49.7%	84,733	50.3%
1997	77,364	50.5%	75,977	49.6%
1999	84,853	53.9%	72,716	46.2%
2001	88,612	52.4%	80,427	47.6%
2003	94,168	52.7%	84,682	47.4%
2005	94,993	53.6%	82,332	46.4%

Coding Employer Tenure. To code employer tenure, I used published BLS data on median years with the same employer at the 2-digit industry level. These estimates were available for the following points in time: January, 1983; January, 1987; January

1991; February 1996; February 2000; January 2002; and January 2004. I compared the average tenure level in a 2-digit industry to the overall average tenure level for the year. I coded individuals as either working in an industry with “average or higher-than-average” employer tenure, or “lower-than-average” employer tenure. For example, in 1989, the average employer tenure across all industries was 3.6 years. The Mining industry had an average tenure level of 5.8 years, and the Retail Trade industry average was 1.9 years. Individuals working in the Mining industry were coded in the average or higher-than-average group; individuals working in Retail Trade were coded in the lower-than-average group. Since the BLS publishes employer tenure data every three years, I used each published BLS estimate to cover at least two years. (For example, the 1989 data might have been used to measure 1987 and 1991 employer tenure levels.) It is important to note that since estimates of industry tenure levels fluctuate slightly from year to year, as does the overall average tenure level, any given industry will not necessarily be coded into the same way (average or above average tenure; below average tenure) each year.

Table 3.12 shows the unweighted univariate distribution on this variable. It is clear that these estimates fluctuate somewhat from year to year, which is not entirely surprising given that this variable is measured at a highly aggregate level. The only shifts that are rather troubling are in the years 1995 and 1997, in which the percentage of employees in industries with below-average levels of tenure drops to under 50 percent—down by approximately 15 percentage points from the adjacent years. Coding for both 1995 and 1997 is based on published BLS data from February, 1996, and the drop appears to be driven primarily by a change in the Educational Services industry. This

industry is quite large, making up just under ten percent of employment in my sample in 1995, for example. In every year before and after the February 1996 estimates, the

Table 3.12: Unweighted Univariate Distribution of Employee Tenure Variable, Public and Private Sectors Combined, 1983-2005

Year	Workers in Industries with Average or Above-Average Tenure		Workers in Industries with Below-Average Tenure	
	Freq.	Percent	Freq.	Percent
1983	71,481	41.1%	102,451	58.9%
1985	70,265	39.0%	109,967	61.0%
1987	68,310	37.9%	112,124	62.1%
1989	69,137	39.2%	107,274	60.8%
1991	69,422	38.7%	110,138	61.3%
1993	65,876	37.7%	108,719	62.3%
1995	95,527	54.3%	77,780	45.7%
1997	82,318	53.1%	72,637	46.9%
1999	63,457	39.8%	95,921	60.2%
2001	64,607	37.7%	106,974	62.3%
2003	71,148	39.4%	109,682	60.7%
2005	68,853	38.4%	110,295	61.6%

Educational Services industry had industry tenure levels that were below average, putting employees in the Educational Services industry in the “below average” tenure category (see Table 3.13). In February of 1996, Educational Services had an estimated tenure level that was exactly average (3.8 years in this case) so employees in the industry were coded as having “average or above average” tenure levels in both 1995 and 1997. Since this industry group is relatively large, this single—and relatively small—change can account for most of the drop in 1995 and 1997 compared to earlier and later years. The fluctuation in the distribution of this variable, therefore, is a reflection of the relative crudeness of the measure, but not inaccurate or inconsistent coding decisions. However,

this change does have implications for the interpretation of my findings, as I discuss more fully in Chapters 4 and 5.

Table 3.13: Educational Services Industry Tenure Levels, 1983-2005

Year	Average Years of Tenure in the Educational Services Industry, From BLS Published Estimates	Overall Average Tenure Level Across All Industries	Coding of Tenure Level
1983	2.7	3.5	Below Average
1985	3.1	3.4	Below Average
1987	3.1	3.4	Below Average
1989	3.5	3.6	Below Average
1991	3.5	3.6	Below Average
1993	3.5	3.6	Below Average
1995	3.8	3.8	Average or Above
1997	3.8	3.8	Average or Above
1999	3.2	3.5	Below Average
2001	3.6	3.7	Below Average
2003	3.8	4.0	Below Average
2005	3.8	4.0	Below Average

Tables 3.14 and 3.15, below, summarize the preceding measurement discussion.

Table 3.14 offers a list of all eight variables included in my analysis along with the values of each. Then, Table 3.15 offers a slightly more technical summary of the procedures I used to code each variable—including how I pooled the data, which years of QCEW data I applied to which years of CPS data, and which years of published BLS estimates of employer tenure I applied to which years of CPS data.

Table 3.14: Summary of Variables

Variable	Measurement
Union Coverage	Based on two questions from the CPS, individuals are coded as: <ul style="list-style-type: none"> (1) Being a union member or having union coverage (2) Not being a member/not having union coverage
Occupational Percentage Female	Based on estimates from pooled CPS-MORG data, each occupation was assigned a value of percent female. For the purging analysis, individuals were coded in the following four categories: <ul style="list-style-type: none"> (1) Employed in occupations with 25% or fewer women (2) Employed in occupations with 26% to 50% women (3) Employed in occupations with 51% to 75% women (4) Employed in occupations with 76% or more women
Historically More-Unionized /Less-Unionized Industries	Based on their major industrial group, individuals were coded as: <ul style="list-style-type: none"> (1) Employed in historically more-unionized industrial groups (2) Employed in historically less-unionized industrial groups
Historically More-Unionized /Less-Unionized Occupations	Based on their major occupational group, individuals were coded as: <ul style="list-style-type: none"> (1) Employed in historically more-unionized occupational groups (2) Employed in historically less-unionized occupational groups
Occupational Percentage of Part-Time Workers	Based on estimates from pooled CPS-MORG data, percentage of employees working fewer than 35 hours per week was estimated. For the purging analysis, individuals were coded as: <ul style="list-style-type: none"> (1) Employed in occupations with 1/3 or more part-time workers (2) Employed in occupations with fewer than 1/3 part-time workers
Occupational Education Level	Based on estimates from pooled CPS-MORG data, median education level for each occupation was estimated. For purging, individuals were coded as: <ul style="list-style-type: none"> (1) Employed in occupations with education level H.S. or less (2) Employed in occupations with education level more than H.S.
Industry Establishment Size	Based on estimates from QCEW data, individuals were coded as: <ul style="list-style-type: none"> (1) Employed in industries with average establishment size ≤ 25 (2) Employed in industries with average establishment size > 25
Industry Turnover Levels	Based on published BLS data on employer tenure, individuals were coded: <ul style="list-style-type: none"> (1) Employed in an industry with average or above-average tenure (2) Employed in an industry with below-average tenure levels

Table 3.15: Summary of Coding Process

Year of analysis	Years of pooled CPS data used to code occupation-level variables	Date of published BLS data used to code employee tenure	Year of QCEW data used to code establishment size	Notes
1983	1983 and 1985	January, 1983	1983	1980 Census occupation codes introduced in 1983.
1985	1985 and 1987	January, 1987	1985	
1987	1985 and 1987	January, 1987	1987	
1989	1989 and 1991	January, 1991	1989	Change in CPS computer processing system in 1989; estimates from 1989 forward not strictly comparable to 1983-1987.
1991	1989 and 1991	January, 1991	1991	New measurement of educational variable introduced in 1992.
1993	1993 only	January, 1991	1993	Major redesign of CPS survey in 1994; estimates before and after 1994 not strictly comparable. Occupation codes changed in 1993; could not pool earlier years with 1993.
1995	1995 and 1997	February, 1996	1995	
1997	1997 and 1999	February, 1996	1997	
1999	1997 and 1999	February, 2000	1999	
2001	2001 and 2003	January, 2002	2000	No industry crosswalk between QCEW and CPS data for 2001; used 2000 data to estimate 2001 average establishment size.
2003	2003 and 2005	January, 2004	2003	CPS occupation codes change to Census 2002 codes in 2003.
2005	2003 and 2005	January, 2004	2003	No one-to-one crosswalk linking CPS and QCEW industries for 2001 onward; used 2003 to estimate 2003 and 2005 average establishment size.

Statistical Models

Descriptive Analyses: Binary Logit Models

The analysis begins with initial, descriptive look at the relationship between occupational sex composition and union coverage using binary logit models. I regress the union coverage variable on the seven key independent variables described in the previous section: percentage of women in the occupation; percentage of part-time workers in the occupation; median years of education in the occupation; average establishment size in the individual's detailed industry; average years of tenure in the individual's 2-digit industry; whether or not the individual works in an occupation that has historically had high levels of union membership; and whether or not the individual works in an *industry* that has historically had high levels of union membership. For the purposes of this descriptive analysis only, all independent variables that could be kept continuous were kept continuous; this included all independent variables except whether or not the occupation and industry in which the individual works is historically less or historically more unionized.

The binary logit model is appropriate when the analysis includes a binary dependent variable, as is the case here. Under this model, the probability that an individual has union coverage on his or her job is written as:

$$P(Y_i = 1 | X_i) = \frac{\exp(\sum \beta_k X_{ik})}{1 + \exp(\sum \beta_k X_{ik})} \quad (1)$$

Where X_{ik} is the set of independent variables described above and β_k is the set of parameters ($k = 1, \dots, 7$). This model has no distributional assumptions, and no error term.

The log-odds of union membership is constant across levels of the independent variable (that is, the relationship between union membership and each independent variable is linear in the log-odds).

The CPS Sampling Design and Computation of Standard Errors

It is important to note that the design of the Current Population Survey has implications for the inferences from this analysis.¹⁷ The sample is selected to be representative both of the nation and of each state; therefore, the survey uses a complex multistage stratified design. The sample is drawn in the following way: first, the entire United States is divided into primary sampling units (PSUs). PSUs can consist of single counties or several contiguous counties grouped together. The PSUs are then grouped into strata within each state. These groupings maximize within-PSU heterogeneity, while the strata are designed to be as homogeneous as possible with respect to labor force characteristics that are highly correlated with unemployment. In each stratum, one PSU is selected for sampling, with the probability of selection being proportional to the Census population figures. (Approximately one-quarter of all PSUs are in strata by themselves; these are self-representing and are selected into the CPS sample with certainty.) In the second stage of sampling, a sample of housing units is selected from each selected PSU. These “ultimate sampling units” (USUs) are comprised of four housing units (addresses) that are similar both demographically and geographically. Additionally, the CPS Technical Paper 63RV, pg. 3-7, points out that the USUs are designed to be minimize survey costs: the “[u]se of housing unit clusters lowers travel costs for field representatives.”

¹⁷ My description of the CPS sampling design is based on U.S. Census Bureau (2002), pages 3-1 to 3-17.

The CPS' complex sampling design has the potential to significantly affect the estimated standard errors in my statistical analyses. Because the PSUs are designed to be as heterogeneous as possible on labor market characteristics, this should increase efficiency of estimates, compared to a simple random sampling design. On the other hand, the clustering of USUs in the CPS will likely reduce the efficiency of statistical estimates (Lee and Forthofer 2006; Kish 1965; Kalton 1983; Joliffe 2003). Because the USUs—housing units—are selected in clusters that are similar to one another in demographic and geographic characteristics, the correlation between USUs within a cluster (the intra-cluster correlation) may be quite large. Joliffe (2003) demonstrates that the loss of efficiency for statistical estimates that are based on a clustered sampling design depends on (1) the size of the clusters (in this case, the number of housing units per cluster) and (2) the correlation between observations within a cluster (a.k.a. the intra-cluster correlation). That is, larger clusters, and larger correlations within clusters, will tend to increase standard errors of estimates.

The issue of proper variance estimation for analyses based on data from complex survey designs is an important one. A growing body of empirical research demonstrates just how large sampling design effects can be—and how far inferences can be “off” when researchers neglect to account for them (see, e.g., Deaton 1997; Lemeshow et al. 1998; Johnson and Elliot 1998). For example, an analysis by Xue et al. (2005) using the Medical Expenditure Panel Survey (MEPS)—a multistage stratified cluster survey—revealed that the standard LOGISTIC procedure in SAS yielded standard errors 100 times smaller than standard errors that were adjusted for design effects. This is troubling because many analyses are based on surveys that use complex or multistage sampling

designs, yet until recently, most typical routines in standard statistical packages computed standard errors with formulas based on the assumption of simple random sampling.

Several standard packages now include procedures that allow researchers to account for complex sampling schemes. SAS offers the SURVEYLOGISTIC procedure, which permits analysts to enter strata and/or cluster variables, along with sampling weights. This procedure uses the Taylor series expansion method to estimate variance, one of several variance-estimation techniques that are appropriate for complex sampling designs (Lee and Forthofer 2006).

A major obstacle for my own analysis, however, is that the CPS public use files do not include strata or cluster information because of concerns about respondents' anonymity. To get around this problem, I followed a technique proposed by Joliffe (2003), which involves creating synthetic clusters and strata specifically for CPS data. The method works as follows: first, the analyst creates synthetic clusters by sorting the data on the primary variable of interest—in this case, union coverage. Using the sorted data, the analyst then assigns each consecutive four housing units to its own cluster. Joliffe (2003) notes that “the purpose of the sorting is to induce a high level of intracluster correlation, and the choice of four matches, on average, the actual cluster size of the CPS.” Next, the analyst creates the synthetic strata, loosely mimicking the CPS stratification process by assigning each of the four major geographic regions (Northeast, Midwest, South, and West) to its own stratum. The CPS strata are designed to be as similar as possible with respect to variables that are correlated with unemployment. Joliffe argues that although the number of strata in the synthetic approach (four) deviates greatly from the number in the CPS design (792 in the year 2000), the differences across

these four regions with respect to characteristics correlated with labor force experiences are substantial enough to make this choice of strata defensible. Additionally, since stratification in general makes estimates more efficient, and since it is probably reasonable to assume “that the synthetic strata will induce a smaller reduction in estimated variance than the actual strata,” Joliffe’s strategy is fairly conservative. That is, estimated standard errors using this synthetic approach would probably be larger than those estimated with actual strata information.

I followed Joliffe’s recommendations, and the results in Chapter 4 incorporate the synthetic design variables as well as CPS sample weights.¹⁸ I also estimated identical models using the SAS LOGISTIC procedure without weights or design variables. In general, the unweighted/uncorrected standard errors *were* slightly smaller than the weighted/corrected results. However, though a handful of coefficients in the unweighted/uncorrected results were significant where they were not significant (or significant at a higher p-value) in the weighted/corrected results, very few conclusions about either specific effects or broad trends would change depending on which set of results were used. Therefore, I do not include the unweighted/uncorrected results in the dissertation, and my discussion is based solely on the weighted/corrected results.

Purging Models

The heart of the analysis for this dissertation involves purging techniques described by Clogg and Eliason (1988) and Clogg, Shockey and Eliason (1990) and used by Clogg, Eliason and Leicht (2005). These models are appropriate when both

¹⁸ I used the CPS earnings weight, which is the appropriate weight to use when conducting analyses on all earnings-related items which are asked of the outgoing rotation group. Since this weight sums to 12 times the population for the CPS-MORG files, I opted to apply the relative weight—the earnings weight divided by its mean—for each year of the analysis (Lee and Forthofer 2006).

independent and dependent variables are categorical. Certain types of purging models (specifically, *marginal composition-group* models) permit the researcher to statistically create a counterfactual scenario in which two independent variables are orthogonal to each other. This mimics random assignment in experimental design. Applied to my research question, these purging models allow me to examine what unionization rates in so-called hard-to-organize sectors of the economy *would have been* if occupations in those hard-to-organize sectors were not disproportionately female. For example, I can estimate hypothetical unionization rates among workers in clerical occupations under the counterfactual condition that clerical workers are not disproportionately female. The arithmetic difference between such hypothetical rates and the actual rate is a simple, straightforward measure of the pure contribution of occupational sex composition on union membership. In the discussion of the results in Chapter 5, I often refer to this simple arithmetic difference between the actual (or observed) rate, and the hypothetical (or purged) rate, as the status composition effect.

To illustrate the purging technique mathematically, consider a cross-classification of three categorical variables. Using Clogg and Eliason's (1988) notion, a *composition* variable will be denoted as C (with I levels), a *group* variable will be denoted as G (with J levels), and dependent variable as D (with K levels). Assume then that the independent variables, C and G , are correlated with each other. Using the marginal CG adjustment method, it is possible to purge the CG interaction from the model in the following way. First, estimate the saturated model for the two-way C -by- G table as follows:

$$F_{ij+} = \gamma \gamma_i^C \gamma_j^G \gamma_{ij}^{CG} \quad (1)$$

where F_{ij+} is the expected frequency in cell ij (with levels of D collapsed); γ refers to the parameter for the main effect, γ_i^C refers to the parameter for the main effect of C , γ_j^G refers to the parameter for the main effect of G , and γ_{ij}^{CG} refers to the parameter for the interaction between C and G . The γ_{ij}^{CG} is called the marginal CG interaction because it refers to the interaction of C and G summing across levels of D . Then, the purged frequencies, F_{ijk}^* , are computed as:

$$F_{ijk}^* = F_{ijk} / \gamma_{ij}^{CG} \quad (2)$$

Here, F_{ijk} represents the expected frequencies from some model—in the results presented below it is the saturated model, which implies that these are simply the observed frequencies in the sample. Dividing the expected frequencies by the confounding CG interaction effect creates a set of purged frequencies where the two independent variables, C and G , are not associated.¹⁹

One important advantage of the purging method over traditional loglinear models is the simplicity and ease with which results can be interpreted. In order to describe the relationships among C , G , and D using ordinary loglinear models, one would estimate parameters and compute log-odds or odds for every IKK combination. That is, one would compute the odds that $D=k$ given that $C=i$ and $G=j$ for every level of I , J , and K . If there are many levels, or if the analysis covers many different time points, the interpretation of results quickly becomes unwieldy, and general conclusions get lost in the details. Using

¹⁹ This can be shown algebraically by using equations (1) and (2): $F_{ij+}^* = F_{ij+} / \gamma_{ij}^{CG} = \gamma \gamma_i^C \gamma_j^G$. This reveals that the purged frequencies, F_{ij+}^* , are equal to the product of the main effect and the marginal C and G effects, which is equivalent to saying that the joint frequencies equal the product of the marginals in a cross-classification table.

the marginal composition-group purging method described here, I can simply produce two sets of frequencies: one actual set and one where the effects of occupational sex composition are removed.

In the analysis in Chapter 5, the composition variable C is occupational sex composition, and the group variable G is the set of control variables—the labor market sector variables that are thought to influence the likelihood of unionization, as described in Chapter 2 and summarized earlier in this chapter. In a preliminary set of purging models presented in Chapter 5, I include each labor market sector variable in a model individually. This permits an examination of the difference between observed rates and the purged rates under the condition that each individual labor market sector is uncorrelated with occupational sex composition. The second set of purging results include all relevant labor market sector variables combined into one group variable, G . This analysis allows us to compare observed union coverage rates versus purged rates, under the condition that occupational sex composition is independent of the labor market sector. Here the “labor market sector” is the combination of control variables, cross-classified and combined into one variable. For example, one labor market sector is: historically less-unionized occupations requiring more than a high school diploma, having less than one-third of employees working part-time, in historically more-unionized industries where tenure levels are shorter than average. For the full purging models, I omitted the establishment size variable. I explain the rationale for this below.

Sparse Data Problems

It should be quickly apparent that even with very large sample sizes for each year, cells in the 32-category group variable have the potential to be quite small. For example,

there are simply not many individuals employed in historically highly-unionized, high-school, part-time occupations who also happen to work in industries that are historically less-unionized with longer-than-average tenure levels. Further cross-classifying this group variable with the sex composition and dependent variables produces even smaller—and many zero—frequencies within group/composition/dependent cells.

However, the procedure for estimating parameters and standard errors for these models assumes large cell sizes. The rates, purged rates, and standard errors presented below were estimated in Eliason's (1992) *Categorical Data Analysis System (CDAS)* (version 4.0) with the jackknife technique. The general logic of jackknifing is that a statistic is calculated by "reusing" the sample: with a sample of size n , the statistic is calculated n times, using $n-1$ observations each time, and the jackknifed estimate of the statistic is the mean of the n calculations. Lee and Forthofer (2006) provide a general description of the jackknifing technique; see Clogg and Eliason (1988) or Clogg, Shockey and Eliason (1990) for details on jackknifing in the specific context of contingency tables and purging models. In the case of contingency tables, the jackknife estimate could be any statistic that is based on the expected frequency under some model within a given *cell*—the observed or purged rate or log-rate, for example (Clogg, Eliason, and Shockey 1990). Here then, the jackknife estimate is computed using the n observations within that cell, each time calculating the statistic with $n-1$ observations (and then taking the mean of the n calculation as the jackknife estimate). Since the value of the statistic of interest is the same regardless of which observation in the cell is deleted, the jackknife procedure requires only one calculation per cell. However, when a

cell frequency is 1 or less, the jackknife estimate cannot be reliably calculated, because deleting one observation produces a zero-frequency cell.²⁰

To handle the sparse data problem in my analysis, I used a technique described by Clogg and Eliason (1988). This technique is in the family of those that involve adding a small constant (e.g., 0.5) to each cell before conducting analyses (see e.g., Goodman 1970, 1978). However, here rather than adding a constant to all cells—which arbitrarily increases sample size—Clogg and Eliason (1987) suggest adding values that simultaneously account for the marginal distribution of the dependent variable and limit the total number of observations that are added to the sample. The general logic here is to apply the proportions from the marginal distribution of the dependent variable (here, the percentage of individuals with and without union coverage), multiplied by the quantity: the number of non-redundant parameters in the model divided by the number of response patterns in the data. Here, the number of response patterns is simply the number of cells in the contingency table divided by 2, since union coverage is a two-category variable (covered/not covered).

In the case of my analysis, however, this general logic needed to be adjusted to ensure that each cell in the table would not have a frequency of less than 1.5. Again, this was due to the computation of the jackknife estimates and their standard errors, which would have been unstable had cell frequencies been below 1.5. Therefore, rather than applying the *proportions* of individuals with and without union coverage, I applied the *odds* of union coverage, using 2.5 as a base for the non-union-covered cells. So for example, in 2005, the odds of not having union coverage were 10.78 to 1, or about 26.95 to 2.5. In 2005, there were 84 non-redundant parameters and 116 response patterns in the

²⁰ Indeed, the CDAS manual indicates that cell sizes of less than 1.5 yield “unstable” results.

contingency table; therefore, I multiplied 26.95 by the quantity $84/116$ (or 0.72). The product was 19.51. I added this product to each of the non-union-covered cells. I then added $(2.5 \times [84/116]) = 1.81$ to each of the union-covered cells. This process ensured a large enough sample size within each cell to calculate jackknife rates, log-rates, and standard errors.²¹ Each year, the exact value of the constant varied because the marginal odds of union coverage varied, as did the number of parameters and response patterns.

I made one final adjustment to the purging models, which helped to increase sample sizes within cells. The preliminary analyses presented in Chapter 4 indicate that one of the labor market sector variables—average establishment size in the individual's industry—is not closely associated with occupational sex composition. That is, female-dominated occupations are apparently equally likely to be found in industries with large establishments and industries with small establishments. Therefore, there was no strong justification for including this variable in the full purging models. Dropping this variable from the analysis would not only increase cell sizes, but also dramatically ease the interpretation of results. Even without the establishment size variable, there are 32 possible group variable values; with the establishment size variable there would have been 64, making for a fairly unwieldy discussion.

The final point about the purging models involves significance testing. Since the major research question I laid out involves a comparison between the observed rates and the rates adjusted for the marginal *CG* interaction, I would ideally conduct significance

²¹There was an additional technical issue to contend with, however: initially, I was unable to obtain jackknife estimates when using weighted cell frequencies as input. When estimating the purging models without rounded data, the CDAS/PURGE routine gave me the following error message: run-time error M6201: MATH- sqrt: DOMAIN error. Through trial and error, I found that using rounded cell frequencies to the nearest whole number allowed me to estimate the parameters. Therefore, the final input that I used for the purging models was the rounded frequencies. This meant that the smallest cell size was 2.

tests for the difference between these quantities (allowing me to determine whether the difference was significantly different from zero). However, the formula for this significance test requires the covariance between the observed and purged rates—a quantity which CDAS does not provide. Therefore, rather than conduct precise significance tests on the difference between observed and purged rates, I constructed confidence intervals around the log-rates (for both the observed and purged values) and examined the intervals to determine if there was overlap between the two. Since it was safe to assume that the covariance between the observed and purged rates was positive, no overlap between the observed and purged confidence intervals provided evidence that the rates were significantly different from one another. If there *was* overlap, the “test” was inconclusive, since subtracting the (positive) covariance in a formal significance test might have eliminated the overlap.

Summary of Data, Methods, and Models

To summarize, the question driving my analysis is: *to what extent is labor’s difficulty in penetrating the hard-to-organize sectors of the economy attributable to the sex composition of occupations in those sectors?* The analysis relies on the CPS-MORG data files, which are a concatenation of all 12 outgoing rotation groups in any calendar year, meaning that the CPS-MORG file for one year is approximately 12 times larger than the CPS outgoing rotation group sample for any given month. Because I am principally concerned with union coverage disparities between individuals employed in different occupational/industrial sectors, all independent variables included in the analysis are characteristics of the individual’s occupation or industry. I opted to present the univariate distributions of each of these variables in this chapter, along with the

measurement discussion, because it was critical to discuss the trends and fluctuations in the univariate statistics with an eye toward changes in the CPS methodology that took place over the time period included in the analysis. Two variables—the occupational education variable and the industry tenure variable—showed clear variation that was due to methodological changes and coding issues (as opposed to substantive shifts). Finally, I described my statistical models. The descriptive analysis, presented in Chapter 4, relies primarily on weighted logistic regression models that I estimated with SAS' PROC SURVEYLOGISTIC and synthetic strata and clusters that take into account the CPS multistage sampling design. The heart of the analysis, which directly answers the research question laid out above, relies on purging models that allow me to compare actual rates of union coverage across various labor market sectors to those under the counterfactual scenario that the labor market sector(s) are uncorrelated with occupational sex composition. The arithmetic difference between the actual and purged (counterfactual) rates is a straightforward way to quantify the pure contribution of occupational sex composition on union coverage in a particular labor market sector.

I return now to an important point from Chapter 2: my empirical analysis reflects the notion that segregation by sex is two-dimensional. Charles and Grusky (2004) suggest that segregation operates vertically—such that men tend to dominate the more desirable occupations across the labor market. However, segregation also operates horizontally—such that men are far more likely to be employed in the manual sector (craft, operative, and laborer occupations) while women are more likely to be employed in the non-manual sector (professional, managerial, technical, sales, and service occupations). Although the theoretical focus of my dissertation is on occupations and industries that are historically

more- versus historically less-unionized, the historically more-unionized occupations here generally correspond empirically to the manual sector and the historically more-unionized industries generally correspond empirically to the goods-producing sector (with the exception of the Transportation, Communications, and Utilities industries, which traditionally have had high levels of union coverage but are not goods-producing). Moreover, my analysis examines the effect of vertical segregation *within* horizontally sex-segregated sectors. That is, I am able to examine the effect on union coverage of percent female within the manual (historically more-unionized) and non-manual (historically less-unionized) sectors.

CHAPTER 4: DESCRIPTIVE RESULTS

I begin to answer the research question laid out in Chapter 2 by presenting some descriptive analyses which summarize both the nature of the relationship between occupational sex composition and union coverage and changes in this relationship over the past two decades. These results are useful in that they lay the groundwork for the full purging model results in Chapter 5. In addition, because they are generally quite consistent with the conceptual discussion in Chapter 2, the descriptive findings provide further assurance of the criterion validity of my measures. In the first section of this chapter, I discuss results from the weighted logistic regression analyses, which summarize the *additive* effects of sex composition on union membership, controlling for the sector variables. In the second section, I discuss results from basic cross-tabulations of sex composition, sector, and union membership, to explore and describe the *interactions* among these variables. Since I summarized the univariate distributions of all variables in Chapter 3, I do not present univariate findings again here.

Weighted Logistic Regression Results

Table 4.1 presents the results from the private sector weighted logistic regression analyses for the years 1983 through 2005. I include both a reduced model with only the occupational sex composition variable, and a full model with all independent variables. In addition to the estimates and standard errors in parentheses below them, the table shows the exponentiated value of each estimate—the variable’s partial effect on the odds of union coverage controlling for the other variables in the model.

Private Sector Results

The results from the private sector logistic regression models reveal several noteworthy patterns. First and foremost, the findings from the reduced models indicate that the percentage of women in an occupation does significantly affect the likelihood of union coverage. The full model findings reveal that this relationship holds net of other labor market sector characteristics. In the private sector, higher concentrations of women in occupations are associated with lower rates of union coverage—and this association remains fairly stable over time. The coefficients from the full models range from a low of -0.004 to a high of -0.002. In some of the later years of the analysis (2001 and 2005, for example) the relationship between occupational percent female and union coverage is relatively weak compared to earlier years. This might be interpreted as modest evidence of a trend toward more equal-opportunity organizing with respect to sex, though given the small changes in the occupational percent female coefficient, there is certainly not unequivocal evidence for such an interpretation.

In general, the effect of occupational percent female is fairly small. The partial effect of the percent female variable on union coverage is only slightly below 1 (ranging from 0.996 to 0.998 for all years in the analysis). However, it is worth pointing out that in these models, the occupational percent female variable was kept as a continuous variable, so that the exponentiated value of $\hat{\beta}$ represents the effect of a one-percentage-point increase in the share of women in the occupation on the odds of union coverage. An intuitive way to visualize the results from the logistic regression model is to plot the predicted probability of union coverage based on the findings from the logistic regression

Table 4.1: Weighted Logistic Regression Results, 1983-2005, Private Sector

1983	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.900** (0.016)	0.407	-0.460 (0.178)	0.632
Percent Female in Occupation	-0.015** (0.000)	0.985	-0.004** (0.000)	0.996
Average Years of Employee Tenure			0.141** (0.006)	1.151
Median Education Level in Occupation			-0.136** (0.013)	0.873
Percent Part-Time in Occupation			0.008** (0.001)	1.009
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.361** (0.017)	0.486
Historically Less-Unionized Occupations			-0.524** (0.018)	0.351
1985	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.054** (0.017)	0.349	-0.545** (0.184)	0.580
Percent Female in Occupation	-0.015** (0.000)	0.985	-0.003** (0.000)	0.997
Average Years of Employee Tenure			0.139** (0.006)	1.150
Median Education Level in Occupation			-0.142** (0.014)	0.867
Percent Part-Time in Occupation			0.009** (0.001)	1.009
Average Establishment Size			0.001** (0.000)	1.001
Historically Less-Unionized Industries			-0.357** (0.017)	0.490
Historically Less-Unionized Occupations			-0.529** (0.019)	0.347

* p < 0.05 ** p < 0.01

Table continues on the next page.

Table 4.1 continued

1987	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.149** (0.018)	0.317	-0.929** (0.190)	0.395
Percent Female in Occupation	-0.016** (0.000)	0.984	-0.004** (0.001)	0.996
Average Years of Employee Tenure			0.145** (0.007)	1.155
Median Education Level in Occupation			-0.120** (0.014)	0.887
Percent Part-Time in Occupation			0.009** (0.001)	1.009
Average Establishment Size			0.001** (0.000)	1.001
Historically Less-Unionized Industries			-0.315** (0.018)	0.533
Historically Less-Unionized Occupations			-0.540** (0.019)	0.340
1989	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.209** (0.019)	0.298	-1.934** (0.197)	0.145
Percent Female in Occupation	-0.016** (0.000)	0.984	-0.003** (0.001)	0.997
Average Years of Employee Tenure			0.166** (0.007)	1.180
Median Education Level in Occupation			-0.059** (0.015)	0.943
Percent Part-Time in Occupation			0.013** (0.001)	1.013
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.326** (0.020)	0.521
Historically Less-Unionized Occupations			-0.605** (0.022)	0.298

* p < 0.05 ** p < 0.01

Table continues on the next page.

Table 4.1 continued

1991	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.266** (0.019)	0.282	-1.767** (0.180)	0.171
Percent Female in Occupation	-0.016** (0.000)	0.984	-0.004** (0.001)	0.996
Average Years of Employee Tenure			0.167** (0.007)	1.182
Median Education Level in Occupation			-0.073** (0.013)	0.929
Percent Part-Time in Occupation			0.015** (0.001)	1.015
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.319** (0.019)	0.528
Historically Less-Unionized Occupations			-0.555** (0.020)	0.329
1993	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.328** (0.020)	0.265	-0.000 (0.539)	1.000
Percent Female in Occupation	-0.016** (0.000)	0.985	-0.004** (0.001)	0.996
Average Years of Employee Tenure			0.175** (0.007)	1.191
Median Education Level in Occupation			-0.070** (0.013)	0.932
Percent Part-Time in Occupation			0.014** (0.001)	1.014
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.275** (0.020)	0.577
Historically Less-Unionized Occupations			-0.540** (0.020)	0.339

* p < 0.05 ** p < 0.01

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Table 4.1 continued

1995	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.439** (0.022)	0.237	0.095 (0.603)	1.100
Percent Female in Occupation	-0.015** (0.000)	0.985	-0.003** (0.001)	0.997
Average Years of Employee Tenure			0.182** (0.010)	1.199
Median Education Level in Occupation			-0.076** (0.015)	0.927
Percent Part-Time in Occupation			0.014** (0.001)	1.014
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.262** (0.021)	0.592
Historically Less-Unionized Occupations			-0.560** (0.023)	0.326
1997	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.149** (0.023)	0.317	-1.175* (0.580)	0.309
Percent Female in Occupation	-0.016** (0.001)	0.984	-0.004** (0.001)	0.996
Average Years of Employee Tenure			0.153** (0.011)	1.166
Median Education Level in Occupation			-0.043** (0.014)	0.958
Percent Part-Time in Occupation			0.016** (0.001)	1.016
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.314** (0.022)	0.534
Historically Less-Unionized Occupations			-0.557** (0.023)	0.328

* p < 0.05 ** p < 0.01

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Table 4.1 continued

1999	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.515** (0.024)	0.220	-1.237** (0.587)	0.290
Percent Female in Occupation	-0.016** (0.001)	0.984	-0.004** (0.001)	0.996
Average Years of Employee Tenure			0.086** (0.014)	1.089
Median Education Level in Occupation			-0.033* (0.014)	0.968
Percent Part-Time in Occupation			0.012** (0.001)	1.012
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.421** (0.022)	0.431
Historically Less-Unionized Occupations			-0.503** (0.024)	0.365
2001	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.640** (0.024)	0.194	-2.706** (0.196)	0.067
Percent Female in Occupation	-0.014** (0.001)	0.986	-0.002* (0.001)	0.998
Average Years of Employee Tenure			0.097** (0.013)	1.101
Median Education Level in Occupation			0.006 (0.014)	1.006
Percent Part-Time in Occupation			0.008** (0.002)	1.008
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.233** (0.022)	0.627
Historically Less-Unionized Occupations			-0.601** (0.026)	0.300

* p < 0.05 ** p < 0.01

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Table 4.1 continued

2003	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.738** (0.025)	0.176	-2.552** (0.195)	0.078
Percent Female in Occupation	-0.014** (0.001)	0.986	-0.003** (0.001)	0.997
Average Years of Employee Tenure			0.112** (0.012)	1.119
Median Education Level in Occupation			-0.019 (0.014)	0.981
Percent Part-Time in Occupation			0.011** (0.001)	1.011
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.252** (0.022)	0.777
Historically Less-Unionized Occupations			-0.539** (0.027)	0.583
2005	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-1.846** (0.025)	0.158	-2.991** (0.197)	0.050
Percent Female in Occupation	-0.013** (0.001)	0.987	-0.002** (0.001)	0.998
Average Years of Employee Tenure			0.127** (0.012)	1.135
Median Education Level in Occupation			0.004 (0.014)	1.004
Percent Part-Time in Occupation			0.010** (0.001)	1.010
Average Establishment Size			0.002** (0.000)	1.002
Historically Less-Unionized Industries			-0.213** (0.023)	0.808
Historically Less-Unionized Occupations			-0.528** (0.028)	0.590

* p < 0.05 ** p < 0.01

model, where the hypothetical percentage of women in an occupation is allowed to vary from zero to 100, and the value of each control variable is fixed.²²

Figure 4.1 shows these predicted probabilities for the findings from 1983, 1995, and 2005. As a heuristic, for the private sector results, I have chosen the values of the control variables to match those of a cashier (SOC code 4720 in 2005) working in a department or discount store (SIC code 5380 in 2005). The fixed values of all the control variables were assigned based on their actual value in the sample. For example, in 2005, cashiers had a median level of education of 12 (corresponding to about a high school degree); the percentage of cashiers working part-time was 55; and cashier was in the historically non-unionized group of occupations, corresponding to a value of 1 in the model. The department/discount store industrial classification had an average employer tenure of 2.8 years; the average establishment size was 139 employees; and this detailed industry was in Retail Trade, and therefore was coded as historically less-unionized (corresponding to a value of 1 in the model).²³

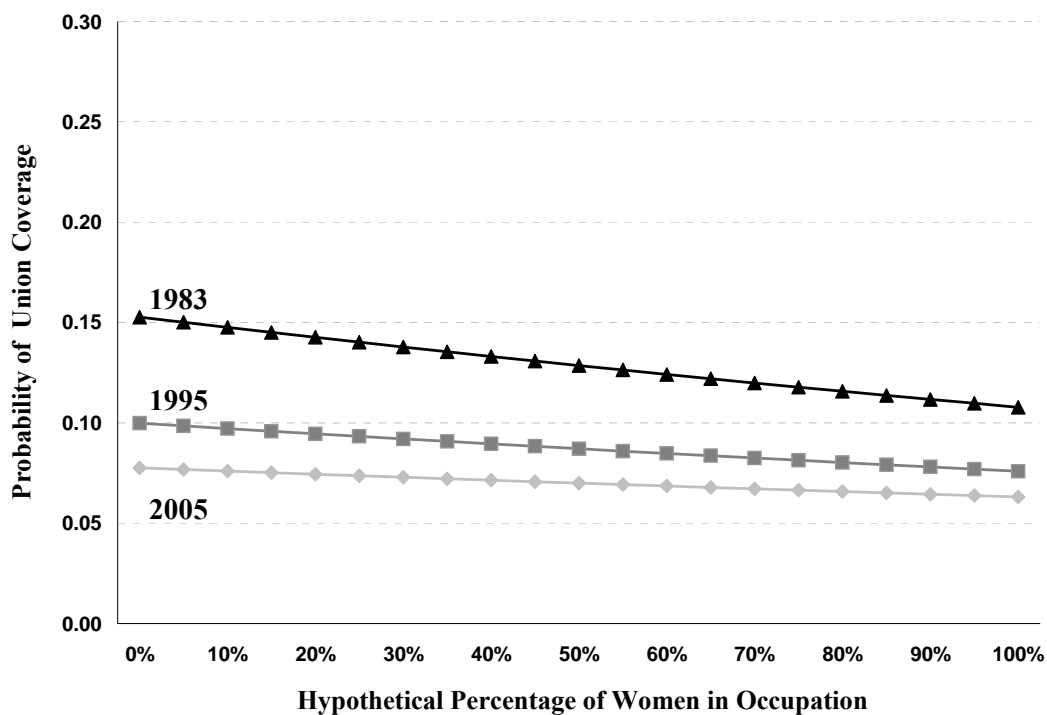
As illustrated in Figure 4.1, the effect of occupational percent female on union coverage is modest, but not inconsequential. In 1983—the year with the strongest relationship between occupational percent female and union coverage—the probability of union coverage among cashiers in large discount/department stores would have been just over 10 percent if cashier was an all-female occupation; but if cashier was an all-male

²² This is done by adapting equation (1) above. The predicted probability of union coverage for given values of independent variables is:

$$\frac{\exp(\hat{\beta}(\text{PctFemale}) + \hat{\beta}(\text{AvgIndTenure}) + \hat{\beta}(\text{Education}) + \hat{\beta}(\text{PctPartTime}) + \hat{\beta}(\text{AvgEstSize}) + \hat{\beta}(\text{HistOcc}) + \hat{\beta}(\text{HistInd}))}{1 + \exp(\hat{\beta}(\text{PctFemale}) + \hat{\beta}(\text{AvgIndTenure}) + \hat{\beta}(\text{Education}) + \hat{\beta}(\text{PctPartTime}) + \hat{\beta}(\text{AvgEstSize}) + \hat{\beta}(\text{HistOcc}) + \hat{\beta}(\text{HistInd}))}$$

²³ A more conventional way to present the information is to plot the predicted values of union coverage at different levels of the percent female variable using sample *mean* values of the control variables, rather than values that correspond to an actual occupation/industry combination. This information is provided in the Appendix in Figure A.1 (for private sector results) and Figure A.2 (for public sector results).

Figure 4.1: Predicted Probability of Union Coverage In Sample Occupation: Cashiers Working in Large Department Stores



occupation, the probability of union coverage would have been just over 15 percent.

This suggests that by changing nothing but the sex composition of the occupation—going from entirely female to entirely male—union coverage among cashiers working in discount/department stores would have increased by nearly five percent. Patterns in the subsequent two years shown in Figure 4.1 are slightly less striking: in 1995, union coverage would have ranged from approximately seven percent to about ten percent (rising with the proportion of men in the occupation) and in 2005, increasing the proportion of male cashiers working in discount/department stores would have increased union coverage by only about 1.5 percentage points. The visual presentation of the findings does suggest that the disparity in union coverage between male- and female-

dominated occupations decreased slightly over the time period included in the analysis, but given the modest and uneven changes in the occupational percent female coefficient shown in Table 4.1, it is important not to overstate these temporal changes.

In terms of the control variables in the private sector models, most effects are in directions that would be expected, based on the literature reviewed in Chapter 2. I devote some space here to discussing these effects, for two reasons. First, in spite of the large literature on industrial restructuring and union decline, I know of few quantitative studies that have ever directly examined the combined effects of industrial and occupational characteristics on an individual's likelihood of union coverage. And I know of no study that has investigated whether this relationship has changed over the critical time period of the last two decades. These findings therefore represent a contribution to the literature on the dynamics of union organizing and decline. Secondly, because the findings overall are consistent with expectations based on the literature summarized in Chapter 2, they offer evidence of criterion-related validity. This is crucial, because many of my measures were based on industry or occupation averages and/or computed from outside data sources that had to be merged with CPS data, leaving a room for both coding and computational errors. If the variables relate to union coverage in a predictable way, this provides additional support for my operationalization and measurement.

Individuals working in industries with longer average levels of tenure with the same employer are more likely to have union coverage than those working in industries where average tenure is short. The effect of tenure levels in one's industry on the odds of union coverage fluctuate slightly over the two decades included in the analysis, but not in a way that would indicate a general trend toward organizing in new types of industries—

those in which workers are relatively transient or employment is temporary. It is also worth pointing out that the coding problems with this variable (the change in tenure levels in the educational services industry in 1995 and 1997 discussed in Chapter 3) have no apparent effect on the private sector findings.

The effects of occupational education level are interesting, and do suggest a real and gradual change over time. In the early years of the analysis—1983 through 1987—the effect of occupational education level is fairly strong and negative. In 1983, for example, increasing the median education level in one’s occupation by just one year decreases the odds of union coverage by 0.873. However, beginning in the late 1980s, the negative effect of occupational education level on union coverage begins to wane, and by 2001 and in subsequent years, the effect is no longer significantly different from zero. The changing relationship between occupational education level and union coverage cannot be attributed solely to changes in the way CPS measured education level and the changes in the distribution of the occupational education variable that resulted. As discussed in Chapter 3, the CPS moved away from capturing the highest year of schooling completed to a credential-based measure (highest degree obtained) in 1992. This change shifted the distribution of the education variable, causing an abrupt increase in 1993 in the percentage of employees working in occupations requiring more than a high school degree. If the change in the relationship between occupational education level and union coverage were due entirely to the changes in the measurement and distribution of the education variable, one would expect a sudden difference in the 1993 estimate compared to earlier years. This is not the case, however. Rather, the waning effect of occupational education level is gradual between the late 1980s through 2005.

There are two general explanations for the weakening negative relationship between education level and union coverage. One is that the occupational make-up of union-covered employees has remained stable, but education levels in the heavily unionized sector—e.g., blue collar occupations—has increased. A second possibility is that education levels in heavily unionized occupations have remained stable, but the share of union-covered employees from low-education occupations has declined and the share of union-covered employees from higher-education occupations has increased. These possibilities are not necessarily mutually exclusive, and my own examination of CPS data from 1983 and 2005 indicates that it may be a little of both. In 1983, median education level across all blue collar occupations (construction/extraction, installation/maintenance/repair, production, and transportation/material moving) averaged 11.96—just under a high school degree—and ranged from 9 to 14, corresponding to about a freshman in high school to about a sophomore in college. In 2005, the average was 12.07—just over a high school degree, and the range was 11 to 16, corresponding to about a junior in high school to a college graduate. On the other hand, the occupational make-up of people with union coverage changed between 1983 and 2005 as well. My analysis also indicated that while the share of union-covered employees in blue collar occupations actually grew between 1983 and 2005 (in 1983 about 40 percent of union-covered employees were blue collar, compared to almost 53 percent in 2005), the share of union-covered employees who were employed in professional occupations also grew, from approximately five to 16 percent. In general, these results suggest that the relationship between private-sector union coverage and education level is changing, and that the typical union-covered employee no longer works

in an occupation requiring a high school degree or less. While this appears to be partly due to increasing educational requirements in occupations across the board, that is not the sole reason for the change.

The effect of the percentage of part-time workers in an occupation on union coverage is surprising: in the private sector, the higher the concentration of part-time workers in one's occupation, the *greater* the likelihood of union coverage. From the literature summarized in Chapter 2, contingent and flexible work arrangements, including part-time employment, have been assumed to be incompatible with union organizing. The results do not bear this out. Additionally, the results indicate that the relationship between occupational percent part-time and union coverage has not changed much over the last two decades. Since this finding was surprising, I conducted a sensitivity analysis to try to uncover the explanation for the positive coefficient. The zero-order relationship between occupational percent part-time and union coverage was negative. It seemed reasonable to think that perhaps the correlation between occupational percent female and occupational percent part-time was high enough to cause a sign flip in the full logistic regression model, so I estimated a model first with only occupational percent part-time and next with percent part-time and percent female together. However, the percent female variable alone did not cause the sign to flip, nor did adding the variable indicating the historically unionized/non-unionized occupations. Only when I added the variable indicating historically highly unionized/non-unionized *industries* did the sign of the percent part-time variable become negative, indicating that holding constant the industry in which an individual works and the percentage of women in one's occupation, having more part-time employees in one's occupation increases the likelihood of union coverage.

Working in industries with relatively large average establishment sizes increases the likelihood of union coverage, as expected based on the review of the literature. This effect is small but remarkably stable over time. Finally, working in occupations and industries that historically have been unionized at relatively low levels has, as expected, a negative effect on the likelihood of union coverage, and again, for both variables the effects are fairly stable over time.

Public Sector Results

The public sector results from the weighted logistic regression models are shown in Table 4.2. Again, I include both the reduced and full models. The reduced models, by and large, indicate that the zero-order relationship between occupational percent female and union coverage in the public sector is essentially zero. That is, without controlling for other characteristics of one's sector, the sex composition of one's occupation has no bearing on whether or not s/he will have union coverage in the private sector. On the other hand, the full model results indicate that after controlling on other sector characteristics, a higher share of women in an occupation has a *positive* effect on the likelihood of union coverage in the public sector. This effect is similar in magnitude to the private sector coefficient—for example, a one-percentage-point increase in the share of women in one's occupation increase the odds of having union coverage by 1.004 in 1983. This effect fluctuates slightly throughout the years included in the analysis, but it is generally larger in the last ten years than it is in the first ten years.

When considering what might be driving this positive relationship between occupational percent female and union coverage, one might immediately think of public sector teachers' unions. And indeed, my own analysis of 1983 CPS data indicated that

among union-covered employees working in occupations that are 75 percent or more female, nearly 38 percent are elementary school teachers. However, elementary school teachers are just one of 55 different occupations that comprise this group, and each of the following comprises at least three percent: librarians, registered nurses, secretaries, typists, teachers' aides, and nursing aides/orderlies/attendants. This indicates that the positive relationship between occupational percent female and union coverage in the public sector cannot be chalked up as *solely* a "teachers' union" effect; there appears to be a more general difference between public and private sector unions' capacity to organize workers in female-dominated occupations.

Figure 4.2 plots the predicted probability of union coverage at varying levels of occupational percentage female. Again, to provide an intuitive illustration of the "pure" effects of occupational percent female on union coverage, I have selected the fixed values of the control variables to match those of an actual occupation and industry—librarians working in elementary or secondary schools. Here, the predicted probabilities indicate that in 1983, holding everything else constant while increasing the percentage of women in this occupation from zero to 100 would increase the likelihood of union coverage from approximately 39 to 49 percent. In 1995 the overall likelihood of union coverage in this occupation/industry combination decreased, but the gain that would have resulted from increasing the share of women in the occupation remained about the same: if librarians were 100 percent male, the likelihood that an individual librarian working in an elementary or secondary school would have union coverage would be about 28.5 percent. If librarians were 100 percent female, the likelihood of union coverage for these employees would be nearly 40 percent—still an increase of

Table 4.2: Weighted Logistic Regression Results, 1983-2005, Public Sector

1983	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.152** (0.036)	0.859	0.045 (0.161)	1.046
Percent Female in Occupation	-0.001 (0.001)	0.999	0.004** (0.001)	1.004
Average Years of Employee Tenure			-0.095** (0.012)	0.909
Median Education Level in Occupation			0.041** (0.010)	1.042
Percent Part-Time in Occupation			-0.019** (0.001)	0.981
Average Establishment Size			0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.425** (0.031)	0.427
Historically Less-Unionized Occupations			0.015 (0.035)	1.031
1985	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.222** (0.034)	0.801	0.123 (0.164)	1.131
Percent Female in Occupation	-0.001 (0.001)	0.999	0.004** (0.001)	1.004
Average Years of Employee Tenure			-0.105** (0.011)	0.900
Median Education Level in Occupation			0.035** (0.010)	1.036
Percent Part-Time in Occupation			-0.020** (0.002)	0.980
Average Establishment Size			0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.367** (0.033)	0.480
Historically Less-Unionized Occupations			-0.014 (0.036)	0.972

* p < 0.05 ** p < 0.01

Table continues on the next page.

Table 4.2 continued

1987	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.212** (0.039)	0.809	0.036 (0.164)	1.037
Percent Female in Occupation	-0.001** (0.001)	0.999	0.003** (0.001)	1.003
Average Years of Employee Tenure			-0.088** (0.012)	0.916
Median Education Level in Occupation			0.032** (0.010)	1.033
Percent Part-Time in Occupation			-0.021** (0.002)	0.979
Average Establishment Size			0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.382** (0.033)	0.465
Historically Less-Unionized Occupations			0.102** (0.039)	1.226
1989	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.233** (0.036)	0.792	-0.318 (0.168)	0.728
Percent Female in Occupation	-0.000 (0.001)	1.000	0.004** (0.001)	1.004
Average Years of Employee Tenure			-0.104** (0.012)	0.902
Median Education Level in Occupation			0.067** (0.010)	1.069
Percent Part-Time in Occupation			-0.019** (0.002)	0.982
Average Establishment Size			0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.423** (0.035)	0.430
Historically Less-Unionized Occupations			0.004 (0.040)	1.007

* p < 0.05 ** p < 0.01

Table continues on the next page.

Table 4.2 continued

1991	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.215** (0.034)	0.807	-0.017 (0.155)	0.983
Percent Female in Occupation	-0.001 (0.001)	0.999	0.004** (0.001)	1.004
Average Years of Employee Tenure			-0.095** (0.012)	0.910
Median Education Level in Occupation			0.044** (0.009)	1.045
Percent Part-Time in Occupation			-0.019** (0.002)	0.982
Average Establishment Size			-0.000* (0.000)	1.000
Historically Less-Unionized Industries			-0.382** (0.032)	0.466
Historically Less-Unionized Occupations			-0.015 (0.038)	0.971
1993	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.280** (0.036)	0.756	0.670 (0.453)	1.954
Percent Female in Occupation	0.001 (0.001)	1.001	0.006** (0.001)	1.006
Average Years of Employee Tenure			-0.093** (0.011)	0.911
Median Education Level in Occupation			-0.004 (0.012)	0.996
Percent Part-Time in Occupation			-0.024** (0.002)	0.976
Average Establishment Size			-0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.311** (0.032)	0.537
Historically Less-Unionized Occupations			0.005 (0.039)	1.009

* p < 0.05 ** p < 0.01

Table continues on the next page.

Table 4.2 continued

1995	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.212** (0.039)	0.809	1.542** (0.508)	4.674
Percent Female in Occupation	-0.001 (0.001)	0.999	0.005** (0.001)	1.005
Average Years of Employee Tenure			-0.117** (0.013)	0.889
Median Education Level in Occupation			-0.021 (0.012)	0.979
Percent Part-Time in Occupation			-0.024** (0.002)	0.976
Average Establishment Size			-0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.329** (0.034)	0.518
Historically Less-Unionized Occupations			0.074* (0.041)	1.160
1997	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.299** (0.042)	0.741	1.957** (0.523)	7.078
Percent Female in Occupation	-0.000 (0.001)	1.000	0.006** (0.001)	1.006
Average Years of Employee Tenure			-0.126** (0.013)	0.882
Median Education Level in Occupation			-0.033** (0.013)	0.968
Percent Part-Time in Occupation			-0.029** (0.002)	0.971
Average Establishment Size			-0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.315** (0.036)	0.533
Historically Less-Unionized Occupations			0.070 (0.043)	1.151

* p < 0.05 ** p < 0.01

Table continues on the next page.

Table 4.2 continued

1999	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.320** (0.041)	0.726	1.779** (0.521)	5.924
Percent Female in Occupation	0.000 (0.001)	1.000	0.005** (0.001)	1.005
Average Years of Employee Tenure			-0.123** (0.012)	0.885
Median Education Level in Occupation			-0.030* (0.012)	0.970
Percent Part-Time in Occupation			-0.029** (0.002)	0.972
Average Establishment Size			-0.000 (0.000)	1.000
Historically Less-Unionized Industries			-0.224** (0.036)	0.639
Historically Less-Unionized Occupations			0.075 (0.044)	1.163
2001	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.331** (0.040)	0.718	-0.380* (0.173)	0.684
Percent Female in Occupation	-0.000 (0.001)	1.000	0.005** (0.001)	1.005
Average Years of Employee Tenure			-0.066** (0.011)	0.936
Median Education Level in Occupation			0.056** (0.011)	1.057
Percent Part-Time in Occupation			-0.020** (0.002)	0.980
Average Establishment Size			-0.000* (0.000)	1.000
Historically Less-Unionized Industries			-0.395** (0.036)	0.454
Historically Less-Unionized Occupations			-0.093* (0.040)	0.830

* p < 0.05 ** p < 0.01

Table continues on the next page.

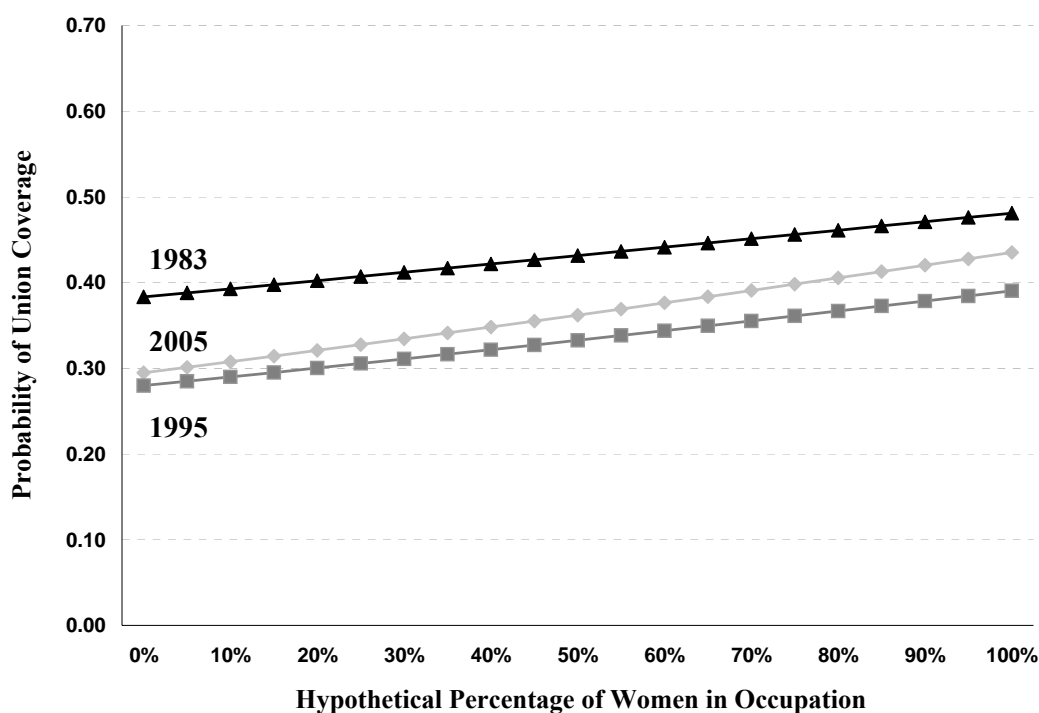
Table 4.2 continued

2003	Reduced Model		Full Model	
	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.394** (0.040)	0.674	-0.280 (0.175)	0.756
Percent Female in Occupation	0.001 (0.001)	1.001	0.006** (0.001)	1.006
Average Years of Employee Tenure			-0.080** (0.012)	0.923
Median Education Level in Occupation			0.050** (0.010)	1.051
Percent Part-Time in Occupation			-0.023** (0.002)	0.978
Average Establishment Size			0.000* (0.000)	1.000
Historically Less-Unionized Industries			-0.441** (0.035)	0.643
Historically Less-Unionized Occupations			-0.027 (0.041)	0.973
2005	$\hat{\beta}$	Exp $\hat{\beta}$	$\hat{\beta}$	Exp $\hat{\beta}$
Intercept	-0.444** (0.001)	0.641	-0.605** (0.172)	0.546
Percent Female in Occupation	0.001* (0.001)	1.001	0.006** (0.001)	1.006
Average Years of Employee Tenure			-0.076** (0.011)	0.927
Median Education Level in Occupation			0.069** (0.010)	1.072
Percent Part-Time in Occupation			-0.022** (0.002)	0.979
Average Establishment Size			0.000* (0.000)	1.000
Historically Less-Unionized Industries			-0.364** (0.036)	0.695
Historically Less-Unionized Occupations			-0.127** (0.040)	0.881

* p < 0.05 ** p < 0.01

more than 10 percentage points. The effect of occupational percent female is slightly sharper in 2005; here, increasing the share of women in the occupation increases the likelihood of union coverage from about 29 to about 44 percent. Again, it should be noted that choosing a particular occupation and industry is nothing more than a heuristic device to illustrate the “pure” effect of the share of women in an occupation on the likelihood of union coverage. The fixed values of the control variables could also have been chosen without reference to an actual occupation or industry.²⁴

Figure 4.2: Predicted Probability of Union Coverage In Sample Occupation: Librarians Working in Elementary or Secondary Schools



²⁴ Note that Figures 4.1 and 4.2 should not be visually compared because they have different ranges on the vertical axes. Note also that Figure A.2 in the Appendix shows the probability of union coverage at varying levels of occupational percent female, but with the *sample means* of the control variables as the fixed values rather than values that represent an actual occupation and industry.

Moving on now to a discussion of the control variable effects, average tenure levels in one's industry has a negative impact on the likelihood of union coverage, and this effect remains fairly stable throughout the time period covered in the analysis. Note that the effect of industry tenure levels operates differently in the public and private sectors; whereas in the private sector, longer tenure levels were associated with higher likelihood of union coverage, the public sector the effect is reversed.

The effect of occupational education level on the likelihood of union coverage is inconsistent across all the years in the analysis. Again, it is interesting to note that where lower median levels of education in occupations consistently *increased* the likelihood of union coverage in the private sector in the earliest years of the analysis, the opposite is the case from 1983 through 1991 in the public sector—demonstrating, again, the different nature and orientation of public sector unions. The effect of part-time workers in occupations reveals another interesting public/private difference: individuals working in occupations with a greater share of part-time workers were more likely to have union coverage in the private sector; in the public sector, the likelihood of union coverage decreases with the percentage of part-time workers in an occupation. A one-point increase in the percentage of part-time workers in one's occupation decreases the odds of union coverage by 0.981 in 1983 (and this result does not vary substantially over the years). Like the private sector, the zero-order relationship between occupational percent part-time and union coverage is negative. The difference is that in the public sector, the coefficient is less sensitive to the inclusion of additional covariates. Working in an occupation with a greater proportion of full-time workers increases the likelihood of

having union coverage, regardless of the percentage of women or other occupational or industrial characteristics.

The average establishment size in one's industry has virtually no effect on union coverage in the private sector: the effect of average establishment size on the odds of union membership is exactly 1.0 in 1983 through 2005.

Perhaps somewhat surprisingly given the other public sector findings, working in an industry that historically has had low levels of union membership still decreases the likelihood of union coverage in the public sector. On the other hand, the effect of the historical level of unionization in *occupations* in the public sector has a changing effect over time, though by and large, the effect is generally modest and negative across most years. Given that individuals working in female-dominated occupations have a higher likelihood of union coverage than those in male-dominated occupations, one might conclude that public sector unions are simply entirely different animals from private sector unions and that working in a sector that has a history of higher unionization rates would not make one more likely to have union coverage in the public sector. The findings indicate that this is not quite accurate. Even public sector employees working in historically unionized occupations (including blue-collar occupational groups such as precision production/craft/repair, machine operators, and transportation/material moving occupations) are, in general, just slightly more likely to have union coverage than public sector employees working in historically non-unionized occupations, such as professional or service fields). And public sector employees working in historically unionized industries (including mining, construction, manufacturing, and transportation) are, as a

group, slightly more likely to have union coverage than those working in traditionally non-unionized industries such as educational, social, or health services.

Overall, the findings from the private and public sector logistic regression models provide a preliminary description of the relationship between occupational sex composition and union coverage, controlling on other occupational and industrial characteristics that previous literature suggests is related to union organizing. These models offered interesting findings. The first is that, consistent with my arguments from Chapter 2, in the private sector, a higher concentration of women in an occupation reduces the likelihood of union coverage for those in the occupation—over and above other labor market sector variables. The results indicate that this negative relationship between percent female and union coverage may have waned slightly in recent years, although at this point, it is not possible to tell whether this change is due to the shift in the outlook and organizing strategies of the AFL-CIO or because of the declines in union coverage among traditionally unionized, male-dominated occupations. Secondly, the findings indicate that patterns of union coverage are very different in the private and public sectors. For example, in addition to the percentage of women, occupational education levels and percentage of part-time workers have opposite effects on the likelihood of union coverage in the private and public sectors, suggesting that public sector unions are qualitatively different than their private sector counterparts.

Cross-Tabulated Frequencies: Occupational Sex Composition, Labor Market Sector, and Union Coverage

The logistic regression findings described the simple additive effects of occupational sex composition and the six labor market sector variables on union coverage. The next set of descriptive findings show rates of union coverage by

occupational sex composition and each labor market sector variable. Although these results—basic cross-tabulations—are computationally simpler, I include them after the logistic regression results because they are more complex in a conceptual sense, revealing whether or not the relationship between occupational sex composition and union coverage depends on whether one works in a labor market sector that is regarded as easier-to-organize, and more compatible with traditional modes of unionism, or harder-to-organize and less compatible with traditional modes of unionism. The union-compatible sectors include occupations and industries that historically had high levels of union membership; “full-time” occupations (those with less than one-third of employees working part-time); “high school” occupations (those with a median education level of high school or less); industries with relatively long tenure levels; and industries with relatively large establishment sizes. The so-called hard-to-organize sectors include occupations and industries that were historically less organized; “part-time” occupations (those with at least one-third of employees working part-time); occupations with median education levels of more than high school; industries with relatively short tenure levels; and industries with relatively small average establishment sizes. Tables 4.3 and 4.4 display, respectively, the private and public sector weighted union coverage rates by occupational sex composition and each of the six labor market sector variables individually. I include the first and last years of the analysis (1983 and 2005) to investigate whether patterns have changed over time. To simplify the discussion, I refer to occupations in the “25% or Less Female” category as male-dominated and “75% or More Female” category as female-dominated.

Private Sector Results

Table 4.3 shows private sector union coverage rates by occupational sex composition levels and each of the six labor market sector variables. The findings reveal several broad patterns. First, in every labor market sector that is regarded as “compatible” with unionization (including the historically more-unionized occupations and industries; occupations that are primarily full-time and/or require relatively low levels of education; industries with large establishments and long tenure levels), employees working in male-dominated occupations are substantially more likely than those working in female-dominated occupations to have union coverage. And those disparities change little between 1983 and 2005, even as overall rates of union coverage drop sharply. The second broad pattern is that working in a labor market sector that is “incompatible” with unionization does indeed make one less likely to have union coverage—but employees in four out of these six sectors *still* get a boost in union coverage if they work in male-dominated occupations in 1983. Some (though not all) of the disparity in union coverage rates between male- and female-dominated occupations wane by 2005, but it appears that the leveling is due more to losses in union coverage in male-dominated fields than gains in female-dominated fields. These general trends are consistent with my theoretical arguments, and reveal that occupational sex composition has had a clear impact union coverage, *both* in sectors that are compatible with traditional modes of union organizing, *and* in sectors that are not.

Consider first the top panel of Table 4.3, which shows union coverage rates by occupational sex composition in historically more- versus historically less-unionized occupations. Among those working in historically more-unionized occupations in 1983,

36 percent of those whose occupations were also male-dominated had union coverage, compared to just 28 percent of those whose occupations were female-dominated.²⁵ By 2005, overall union coverage rates had dropped in this sector, but employees in male-dominated occupations were still far more likely to have union coverage than employees in female-dominated occupations. Among those employees working in historically less-unionized occupations, we see a different pattern: there is little disparity in union coverage rates between male- and female-dominated occupations; indeed, employees in female-dominated occupations were slightly *more* likely to be covered by a union contract than those in male-dominated occupations, both in 1983 and in 2005.

The historically more- versus less-unionized industry sectors are shown in the second panel of Table 4.3. Here, we see that among those working in historically more-unionized industries, being employed in a male-dominated occupation makes one far more likely to have union coverage than being employed in a female-dominated occupation (37.9 versus 23.6 percent, respectively). Again, by 2005 union coverage rates across the board had dropped, but employees in male-dominated occupations were still much more likely to have union coverage. In the historically less-unionized industries, discrepancies between male- and female-dominated occupations were smaller but still evident. Here, an estimated 12 percent of employees in male-dominated occupations had union coverage in 1983, compared to 8.6 percent in female-dominated occupations. By 2005, this difference had narrowed: 7.6 percent of those in male-dominated occupations had coverage, compared to 6.6 percent in female-dominated occupations.

²⁵ Examples of female-dominated occupations in this group include dressmakers and textile sewing machine operators.

Table 4.3: Rates of Union Coverage, by Occupational Sex Composition and Labor Market Sector Variable, Private Sector, 1983 and 2005

	Union Compatible Sectors		“Hard-to-Organize” Sectors	
	Historically More-Unionized Occupations		Historically Less-Unionized Occupations	
	1983	2005	1983	2005
25% or Less Female	36.0%	16.9%	9.6%	5.9%
26% to 50% Female	42.7%	19.8%	9.3%	4.9%
51% to 75% Female	32.9%	14.3%	8.4%	4.5%
76% or More Female	28.1%	7.7%	10.4%	6.9%
	Historically More-Unionized Industries		Historically Less-Unionized Industries	
	1983	2005	1983	2005
25% or Less Female	37.9%	17.9%	12.0%	7.6%
26% to 50% Female	27.3%	14.3%	7.1%	4.9%
51% to 75% Female	30.5%	9.9%	7.2%	4.4%
76% or More Female	23.6%	9.7%	8.6%	6.6%
	Occupations with Less than 1/3 Part-Time Workers		Occupations with 1/3 or More Part-Time Workers	
	1983	2005	1983	2005
25% or Less Female	28.3%	13.6%	20.1%	5.6%
26% to 50% Female	15.3%	7.2%	16.4%	8.3%
51% to 75% Female	17.8%	6.2%	6.4%	2.9%
76% or More Female	12.4%	8.4%	9.3%	5.1%
	Occupations with Median Education Level of High School or Less		Occupations with Median Education Level of More than High School	
	1983	2005	1983	2005
25% or Less Female	32.4%	15.0%	8.2%	8.3%
26% to 50% Female	24.7%	13.5%	6.8%	3.6%
51% to 75% Female	16.0%	6.2%	9.3%	4.7%
76% + Female	10.6%	5.8%	18.0%	7.6%
	Industries with Average or Above-Average Tenure Levels		Industries with Below-Average Tenure Levels	
	1983	2005	1983	2005
25% or Less Female	35.9%	18.5%	19.0%	9.7%
26% to 50% Female	26.0%	10.3%	7.5%	5.1%
51% to 75% Female	28.4%	7.5%	7.0%	4.0%
76% or More Female	22.2%	10.9%	6.8%	5.2%
	Industries with Average Establishment Size More than 25		Industries with Average Establishment Size Less than 25	
	1983	2005	1983	2005
25% or Less Female	36.5%	19.0%	21.6%	10.4%
26% to 50% Female	23.2%	12.4%	8.5%	4.2%
51% to 75% Female	21.5%	9.3%	6.9%	3.0%
76% + Female	17.9%	12.4%	6.0%	2.7%

We see similar patterns across levels of the full-time/part-time occupation variable. Among those working in full-time occupations, employees in male-dominated fields are more than twice as likely than those in female-dominated fields to have union coverage in 1983; union coverage rates in the two groups are 28.3 and 12.4 percent, respectively. In 2005, the now familiar pattern holds: overall union coverage rates dropped, but the discrepancies between employees in male- and female-dominated occupations remained (though were slightly smaller by 2005). Among those employees in part-time occupations in 1983, union coverage rates are far higher for those working in male-dominated occupations (20.1 percent) compared to female-dominated occupations (9.3 percent). Here, though, the difference in union coverage rates between male- and female-dominated part-time occupations disappears by 2005. However, it is clear that this is because union coverage plunged in part-time male-dominated occupations, dropping from 20.1 to 5.6 percent over the twenty year time period; but fell only from 9.3 to 5.1 percent among part-time female-dominated occupations.

There is an interesting—though not unexpected—finding regarding occupational education levels. Working in a “high school” occupation increases the likelihood of union coverage among those in male-dominated fields, in both 1983 and 2005. But in 1983, among occupations requiring *more* than a high school diploma, employees in female-dominated fields were more likely to have union coverage. Union coverage rates in these occupations were 8.2 percent in male-dominated occupations, and more than double that—18.0 percent—in female-dominated occupations. This finding hints at the different forms of unionism in male- and female-dominated fields, and suggests that unionism in female-dominated fields is not incompatible with higher levels of education and/or skill.

Union coverage rates across levels of the industry tenure variable show the familiar pattern: in the sector that would be regarded as more compatible with union organizing (industries with longer tenure levels) union coverage rates are substantially higher in male-dominated compared to female-dominated occupations at both time points. And, here again, in the sector that is regarded as less compatible with union organizing (industries with shorter tenure levels) union coverage rates are *still* much higher for those working in male-dominated occupations.

Finally, we see that the same pattern holds for the last labor market sector variable—industry establishment size (shown in the bottom panel of Table 4.3). The literature cited in Chapter 2 suggests that the typical mode of union organizing is tailored to large establishments, and indeed, rates of union coverage are generally much higher in industries with larger establishment sizes (more than 25 employees). Yet once again, we see that holding establishment size constant, union coverage rates vary by occupational sex composition: employees in male-dominated occupations are more than twice as likely to have union coverage than those in female-dominated occupations in 1983. The discrepancy is smaller by 2005, but noticeable nonetheless. Finally, we see the same discrepancies in industries with relatively small establishments. More than one-fifth—21.6 percent—of employees in male-dominated occupations working in industries with small establishments had union coverage, compared to just six percent of employees in female-dominated occupations. By 2005, the discrepancy was just as pronounced: 10.4 percent compared to 2.7 percent.

To summarize, the private sector findings in Table 4.3 are generally quite consistent with my theoretical arguments. By and large, they indicate that union

coverage rates are indeed lower in the so-called hard-to-organize sectors; they also suggest, however, that even in those sectors, employees in male-dominated occupations are generally more likely to have union coverage than employees in female-dominated occupations. The findings also indicate that although the disparity in union coverage between male- and female-dominated occupations has slightly diminished over time in some of the sectors, this is due primarily to decreases in union coverage in male-dominated occupations, rather than gains in female-dominated occupations.

Public Sector Results

Patterns of union coverage are quite different in the public sector, as shown in Table 4.4 below. Not surprisingly, union coverage rates are far higher in the public sector across the board—and generally have held fairly steady over the past two decades. By and large, the findings indicate that among sectors that are “compatible” with union organizing, employees in male-dominated occupations generally have far higher rates of union coverage than those in female-dominated occupations. Yet in most of the sectors that are regarded as less-compatible with unionism, employees in *female*-dominated occupations are organized at higher rates. This suggests that two types of unionism coexist in the public sector: the traditional male-dominated brand typical of historically organized sectors, and the more female-friendly brand found in the sectors that have not historically been organized.

Among the historically more-unionized occupations, for example (see the top panel of Table 4.4), there are very large disparities in union coverage between male and female-dominated fields. Nearly one half (48.1 percent) of employees in male-dominated fields had union coverage in 1983, compared to just 34.8 percent of employees in female-

dominated fields. By 2005, the discrepancy was much larger: 43.3 percent were union covered in male-dominated occupations, compared to just six percent in female-dominated occupations. Among the historically less-unionized occupations, however, occupational sex composition had almost no bearing on union coverage rates. Compared to male-dominated fields, employees in female-dominated fields were slightly less likely to have union coverage in 1983 and slightly more likely to have union coverage in 2005.

Among those working in industries that historically were historically highly organized, employees in male-dominated occupations were much more likely to have union coverage in 1983, but by 2005 there was almost no difference in union coverage rates among male- and female-dominated occupations. And, among the historically less-unionized industries, employees in female-dominated occupations are slightly more likely to have union coverage than those in male-dominated occupations (46.7 versus 43.2 percent in 1983, and 45.2 versus 43.2 percent in 2005).

Consider now the full-time/part-time occupation variable, shown in the middle of Table 4.4. There were only very small differences in union coverage rates between male- and female-dominated occupations that were full-time: in 1983, there was virtually no difference in union coverage rates between male- and female-dominated occupations, and in 2005 those working in female-dominated full-time occupations were slightly more likely than those in male-dominated full-time occupations to have union coverage (49.2 versus 43.5 percent). And in part-time occupations, employees who worked in female-dominated fields were slightly more likely to have union coverage than those in male-dominated occupations in both 1983 and 2005.

The occupational education variable shows interesting findings. Among “high school” occupations, not surprisingly, those employed in a male-dominated occupation were far more likely to have union coverage than those in a female-dominated occupation (54.2 percent and 34.6 percent, respectively) in 1983. Again the difference had narrowed somewhat by 2005, primarily because union coverage rates among those in male-dominated, high-school occupations dropped by almost 20 percentage points during this time period. On the other hand, among those who worked in occupations requiring more than a high school degree, those in female-dominated occupations were far more likely to have union coverage than those in male-dominated occupations in 1983 (64.5 percent versus 37.0 percent). By 2005, this discrepancy had disappeared. While it is tempting to view the changes between 1983 and 2005 as entirely substantive shifts, due to losses in union coverage in male-dominated occupations (in the case of high school occupations) or female-dominated occupations (in the case of higher-education occupations) this is not necessarily the case. Recall that the CPS changed its measurement of educational attainment in 1992, which caused an abrupt increase in occupations that were classified as having a median education level of more than a high school diploma. Therefore, many of the occupations that were classified in the “high school” category in 1983 would be classified in the “more than high school” category in 2005, and the group of occupations requiring more than a high school degree in 1983 is not a one-to-one match with the occupations in 2005. The temporal shifts in occupational union coverage rates between 1983 and 2005 must therefore be viewed with an eye toward these changes.

In terms of industry tenure levels, once again we see that among employees who work in industries with relatively long tenure levels, being employed in a male-

dominated occupation makes one much more likely to have union coverage in both 1983 and 2005. Yet among those working in industries with shorter tenure levels, one was more likely to have union coverage in a female-dominated occupation—again both in 1983 and 2005 (though the difference was far more pronounced in 2005 than in 1983).

Finally, with respect to establishment size, differences between male- and female-dominated occupations within establishment size sectors were slight. Among those working in industries with relatively large establishment sizes, union coverage rates did not vary much between male- or female-dominated occupations, either in 1983 or 2005. In industries with smaller establishment sizes, people in male-dominated occupations were unionized at substantially higher rates than people in female-dominated occupations in 1983—but again this difference had narrowed by 2005.

To summarize the public sector results, these findings clearly show that union coverage rates are higher across the board in the public sector, even in the so-called hard-to-organize sectors. This suggests that arguments about the relationship between economic restructuring and union decline must, at a minimum, distinguish between the public and private sectors: the economic restructuring arguments clearly do not fit the facts in the public sector as well as they do in the private sector. And in terms of my arguments about the relationship between occupational sex composition and union coverage, the findings in Table 4.4 indicate that the relationship works differently in the public sector as well. Among those people who work in the sectors that are thought to be less compatible with union organizing, those employed in female-dominated occupations are generally slightly more likely to have union coverage than those in male-dominated occupations—which was not the case in the private sector.

Table 4.4: Rates of Union Coverage, by Occupational Sex Composition and Labor Market Sector Variable, Public Sector, 1983 and 2005

	Union Compatible Sectors		“Hard-to-Organize” Sectors	
	Historically More-Unionized Occupations		Historically Less-Unionized Occupations	
	1983	2005	1983	2005
25% or Less Female	48.1%	43.3%	48.0%	43.5%
26% to 50% Female	46.0%	45.9%	36.4%	33.4%
51% to 75% Female	25.0%	22.8%	50.9%	37.6%
76% or More Female	34.8%	6.0%	46.6%	45.2%
	Historically More-Unionized Industries		Historically Less-Unionized Industries	
	1983	2005	1983	2005
25% or Less Female	58.4%	44.4%	43.2%	43.2%
26% to 50% Female	65.8%	63.1%	31.7%	28.0%
51% to 75% Female	45.7%	41.0%	50.4%	37.3%
76% or More Female	43.8%	42.1%	46.7%	45.2%
	Occupations with Less than 1/3 Part-Time Workers		Occupations with 1/3 or More Part-Time Workers	
	1983	2005	1983	2005
25% or Less Female	48.8%	43.5%	31.3%	30.8%
26% to 50% Female	36.5%	34.5%	38.6%	33.3%
51% to 75% Female	54.4%	39.4%	29.0%	23.1%
76% or More Female	48.7%	49.2%	37.5%	33.8%
	Occupations with Median Education Level of High School or Less		Occupations with Median Education Level of More than High School	
	1983	2005	1983	2005
25% or Less Female	54.2%	37.5%	37.0%	48.2%
26% to 50% Female	48.4%	43.6%	28.9%	30.0%
51% to 75% Female	30.6%	23.4%	57.3%	39.3%
76% + Female	34.6%	27.2%	64.5%	47.8%
	Industries with Average or Above-Average Tenure Levels		Industries with Below-Average Tenure Levels	
	1983	2005	1983	2005
25% or Less Female	53.2%	48.3%	34.4%	32.6%
26% to 50% Female	41.5%	39.5%	33.0%	27.6%
51% to 75% Female	35.5%	28.5%	56.3%	43.3%
76% or More Female	35.6%	31.3%	52.9%	50.7%
	Industries with Average Establishment Size More than 25		Industries with Average Establishment Size Less than 25	
	1983	2005	1983	2005
25% or Less Female	49.1%	44.3%	37.3%	31.7%
26% to 50% Female	37.5%	35.1%	33.0%	23.8%
51% to 75% Female	51.0%	38.1%	21.7%	23.3%
76% + Female	47.3%	45.7%	24.0%	28.5%

Discussion and Summary of Descriptive Findings

The descriptive findings presented in this chapter begin to tell the story of occupational sex composition and union coverage in the private and public sectors. The story thus far suggests the following: first, occupational sex composition is indeed associated with union coverage over and above other labor market characteristics. In the private sector, being employed in an occupation with a higher percentage of women reduces the likelihood of union coverage, all else equal. The logistic regression findings indicate that the simple additive relationship between occupational sex composition and union coverage has changed little over the two decades included in the analysis, waning only slightly since about 1999. The findings in the second section provide a more nuanced look at whether the relationship between sex composition and union coverage varies depending on whether one works in a sector that is “compatible” or “incompatible” with the traditional mode of unionism. These findings indicate that in the earliest year of the analysis, by and large, working in a female-dominated occupation reduces the likelihood of union coverage *regardless of whether one works in a sector that is compatible or incompatible with union organizing*. Two exceptions to this are in historically less-unionized occupations and occupations requiring relatively high levels of education. In the former, the sex composition of one’s occupation has no effect on the likelihood of union coverage; in the latter, those in female-dominated occupations are more likely to have union coverage than those in male-dominated occupations. The analysis does suggest, however, that in many of the hard-to-organize sectors, the disparity in union coverage between male- and female-dominated occupations has decreased between 1983 and 2005. The results indicate that the leveling is not due to increased

union coverage in female-dominated occupations, but because of decreased union coverage in male-dominated occupations in these sectors.

In the public sector, the story is quite different. All else equal, working in a female-dominated occupation makes one more likely to have union coverage, a trend that is fairly stable across the twenty years included in the analysis. On the other hand, unlike patterns in the private sector, the relationship between occupational percent female and union coverage depends on the type of sector in which one is employed. In sectors that are more compatible with traditional unionism, employees are generally far more likely to have union coverage if they work in a male-dominated occupation. In most (though not all) sectors that are *less* compatible with unionism, employees are more likely to have union coverage if they work in a female-dominated occupations. This interaction effect appears sharpest across different levels of education: “high-school” occupations have much larger rates of union coverage if they are male-dominated, and higher-education occupations have much larger rates of union coverage if they are female-dominated.

In summary, the private sector findings thus far are quite consistent with my theoretical arguments in Chapter 2, while the public sector findings suggest that patterns of union coverage vis-à-vis occupational sex composition are more nuanced. One challenge in discussing and interpreting the results, however, is that the larger narrative about occupational sex composition and union coverage quickly can quickly get lost in the particulars of the six different labor market sectors. Complicating this issue is that in reality, employment does not happen in one labor market dimension; rather, one’s specific location in the market is a combination of all six (or more) sectors. The combination of these factors drives the likelihood of union coverage, but we now know

that occupational sex composition influences union coverage as well. Therefore, to understand the contribution of occupational sex composition to union decline, the more general question becomes: what would union coverage rates be in various sectors if occupations those sectors were not disproportionately male or female? The purging analysis in the next chapter provides a direct answer to this question.

CHAPTER 5: PURGING MODEL RESULTS

The previous chapter provided an initial descriptive look at the relationship between occupational sex composition and union coverage net of the labor market sector characteristics that are thought to influence union coverage. The results in that chapter indicated that there is an association between occupational sex composition and union coverage, that the association differs appreciably between the public and private sectors. This chapter presents the analyses which directly answer the main research question laid out in Chapter 2: *to what extent is labor's difficulty in penetrating the hard-to-organize sectors of the economy directly attributable to the **sex composition of occupations** in those sectors?* Again, I cannot control for all of the possible factors that influence unions' ability to garner new members—such as employer resistance to organizing campaigns, changes in labor laws, shifts in the political landscape, or business migration. Rather, my discussion at the end of Chapter 2 supports my assertion that these alternative influences should have little bearing on the statistical relationship between occupational sex composition and union coverage over time. Therefore, if there *is* an observable statistical relationship between sex composition and union coverage over and above the effect of labor market sector characteristics, I interpret this as a “status composition effect”—that is, an effect due to the residue of historical processes of social closure.

This chapter is devoted to discussing the findings from the purging models described in Chapter 3. The results allow me to show what union coverage rates across various labor market sectors *would have been* had the sectors been an equal mix of male- and female-dominated occupations (in other words, if sector characteristics were unrelated to occupational sex composition). The first section of this chapter presents

results from purging models in which each of the six sector variables were included in models individually. I devote considerable space to discussing these results, because they tell the basic story of the relationship among sex composition, union coverage, and each individual sector variable individually—including whether and how of these relationships is affected by CPS methodological changes. The latter half of this chapter presents the results from the full purging sector models, in which five of the sector variables are combined into one group variable, as described in Chapter 3.²⁶

Private-Sector Results: Individual Sector Purging Models

Tables 5.1 through 5.6 show the results from the individual private-sector purging models. Each of the tables shows the observed rates, the purged rates, and the arithmetic differences between the two (with jackknife standard errors provided in parentheses below the estimates). The observed rates are the actual rates of union coverage in each sector; the adjusted rates are those with the marginal interaction between occupational sex composition and each labor market sector variable removed, as shown in equation (2) above. In the parlance of experimental design, the purged quantities are the union coverage rates that would exist if male- and female-dominated occupations could be randomly assigned to labor market sectors. The difference between the purged and observed rates represent the “pure” effect of occupational sex composition on union coverage rates.

Recall from the discussion in Chapter 3 that I could not conduct precise significance tests for the difference between observed and purged rates; rather, I calculated 95-percent confidence intervals around the two quantities. If the confidence

²⁶ As noted in Chapter 3, I do not include the establishment size variable in the full purging model results because my analyses from the individual-variable purging models show no apparent association between occupational percent female and establishment size.

intervals showed no overlap, the *difference* in Tables 5.1 through 5.6 is presented in boldface type to indicate statistical significance. It is important to keep in mind, however, that differences that are not shown in boldface are not *necessarily* statistically non-significant. Because the covariance for the two quantities is almost certainly positive, and because this quantity would have been subtracted from the denominator of the formula in an actual significance test, there may be some differences whose confidence intervals overlapped in my analysis which a more precise test would have detected as statistically significant. Nevertheless, to keep the discussion as clear as possible, I regard these differences as statistically non-significant.

Observed and Purged Rates in Historically More- and Less-Unionized Occupations

Table 5.1 shows the observed and purged union coverage rates in occupations that are historically more-unionized and those that are historically less-unionized. Here, the purged rates are those under the counterfactual scenario where historically more-unionized occupations are not disproportionately male-dominated. The results, by and large, are not consistent with the arguments in Chapter 2, which suggested that union coverage rates would have been *larger* if the hard-to-organize sector (in this case, historically less-unionized occupations) were not female-dominated. This would have resulted in positive differences between observed and purged rates. Here, the differences are (with the exceptions of two years) not statistically different from zero. In 1989 and 2001, the differences are statistically significant, but are negative. On the other hand, the columns on the right-hand side of Table 5.1 are slightly more compelling, and indicate that if historically more-unionized occupations were not primarily *male-dominated*, rates of union coverage would decrease by a little over one percentage point. This does

Table 5.1: Observed and Purged Union Coverage Rates in Historically More-Unionized vs. Historically Less-Unionized Occupations, Private Sector, 1983-2005

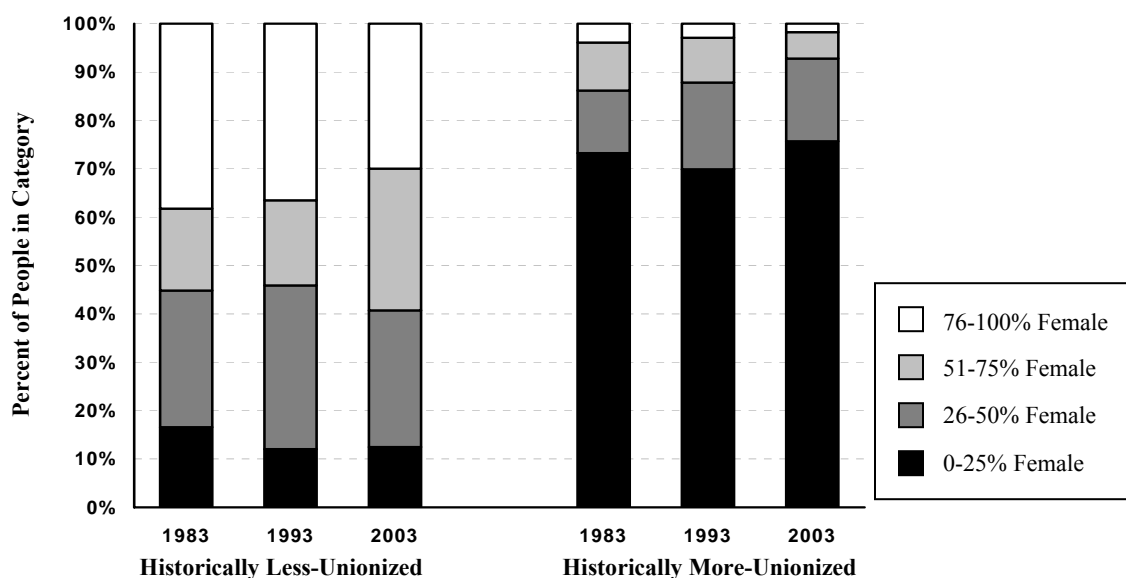
	Historically Less-Unionized Occupations				Historically More-Unionized Occupations			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	95,542	9.63% (0.10)	9.46% (0.12)	-0.17%	47,557	36.25% (0.22)	35.89% (0.27)	-0.36%
1985	97,318	8.28% (0.09)	7.94% (0.11)	-0.34%	48,157	32.28% (0.21)	32.40% (0.27)	0.12%
1987	99,637	7.45% (0.08)	7.12% (0.10)	-0.33%	47,643	29.68% (0.21)	28.92% (0.26)	-0.76%
1989	97,813	6.93% (0.08)	6.52% (0.10)	-0.41%	46,138	28.02% (0.21)	27.57% (0.27)	-0.45%
1991	100,638	7.05% (0.08)	6.74% (0.10)	-0.31%	44,508	26.76% (0.21)	25.85% (0.26)	-0.91%
1993	98,757	6.83% (0.08)	6.49% (0.10)	-0.34%	42,008	25.12% (0.21)	23.64% (0.26)	-1.48%
1995	99,922	6.27% (0.08)	5.97% (0.10)	-0.30%	41,952	23.26% (0.21)	22.09% (0.26)	-1.17%
1997	92,374	5.98% (0.08)	5.93% (0.11)	-0.05%	38,018	21.97% (0.21)	20.36% (0.27)	-1.61%
1999	96,049	5.81% (0.08)	5.96% (0.11)	0.15%	37,949	21.35% (0.21)	19.93% (0.27)	-1.42%
2001	110,439	5.85% (0.07)	5.50% (0.09)	-0.35%	39,780	20.40% (0.20)	18.80% (0.25)	-1.60%
2003	112,946	5.63% (0.07)	5.33% (0.09)	-0.30%	38,754	18.92% (0.20)	17.29% (0.24)	-1.63%
2005	111,302	5.50% (0.07)	5.45% (0.10)	-0.05%	38,839	17.08% (0.19)	16.46% (0.25)	-0.62%

Numbers in parentheses are jackknifed standard errors.

indicate support for my conceptual arguments, though not exactly in the way anticipated: though it appears historically less-unionized occupations do not have lower rates of union coverage because of their sex composition, historically more-unionized occupations *do* have slightly higher rates of union coverage because of their sex composition.

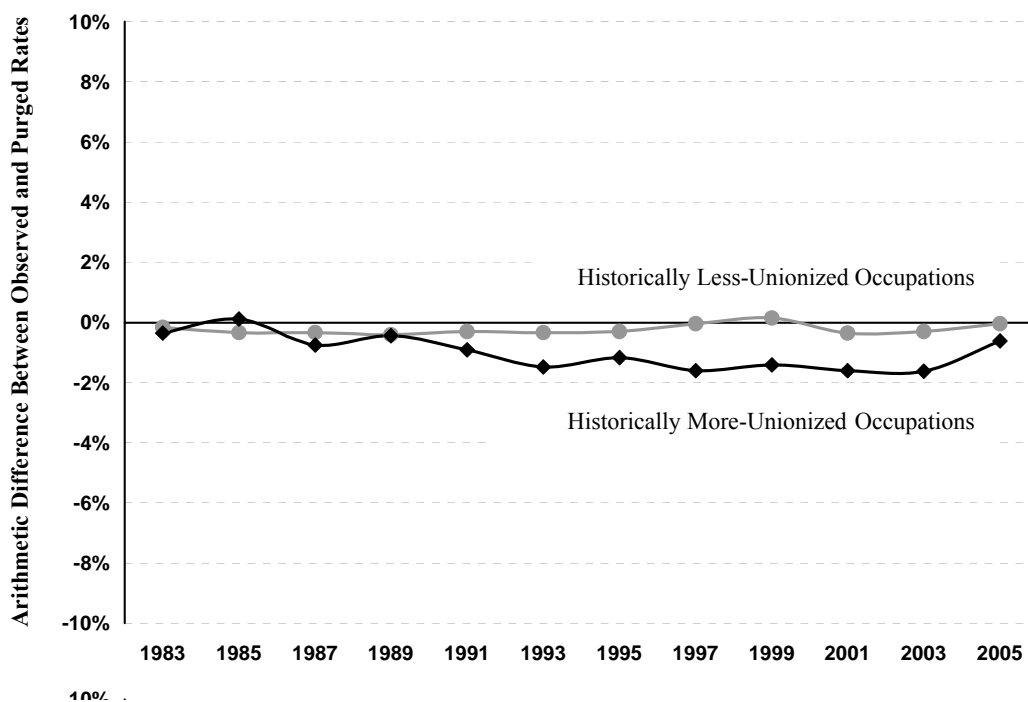
Thus far, the discussion has assumed—but not demonstrated—an association between occupational sex composition and the historical levels of unionization in occupations. Figure 5.1 presents the occupational sex composition of individuals employed in historically less-unionized and historically more-unionized occupations in 1983, 1993, and 2003. As shown, the vast majority of people working in historically more-unionized occupations are in disproportionately male occupations; at all three time points, more than 70 percent of people in historically more-unionized occupations worked in occupations that were 0-25 percent female. The historically less-unionized occupations is somewhat more even in terms of the sex composition mix. This might help to account for the rather underwhelming findings in Table 5.1: the group of occupations that are historically less-unionized large and fairly diverse. Breaking this group down into finer groups of occupations which are distinguished by other characteristics—as I do in the set of full purging models later in this chapter—might reveal different patterns.

Figure 5.1: Occupational Percent Female by Type of Occupation, Private Sector



To provide a visual picture of trends over time, Figure 5.2 displays the arithmetic difference between observed and purged rates over the 20 years included in the analysis. Here, we see that the difference between observed and purged rates is slightly larger in absolute value between 1991 and 2003, but there is no evidence of a major change over time. Union coverage in historically less-unionized occupations would drop consistently by approximately one percent, if employment were not disproportionately in male-dominated occupations.

**Figure 5.2: Private Sector Purging Results:
Difference Between Observed and Purged Union Coverage Rates
if Occupational Sex Composition were Independent of Historical
Levels of Union Membership in Occupations**



Observed and Purged Rates in Historically More- and Less-Unionized Industries

Table 5.2 shows observed and purged results, but here the labor market sector variable of interest is historically less- and more-unionized industries. Differences between observed and purged rates again are not striking in the historically less-unionized industries—but again, this may be because this group of industries has a fairly diverse mix employment with respect to occupational sex composition (see Figure 5.3). On the other hand, union coverage rates among those working in historically more-unionized industries would be significantly lower, by about two percentage points, if the sex composition of occupations in that sector was not disproportionately male-dominated. Again this indicates that historically more-unionized industries get a “bump up” in union coverage because of the sex composition of occupations in that sector. Figure 5.4 plots the arithmetic differences between observed and purged rates over time, and shows a remarkably stable pattern from 1983 through 2005.

Observed and Purged Rates in “Part-Time” and “Full-Time” Occupations

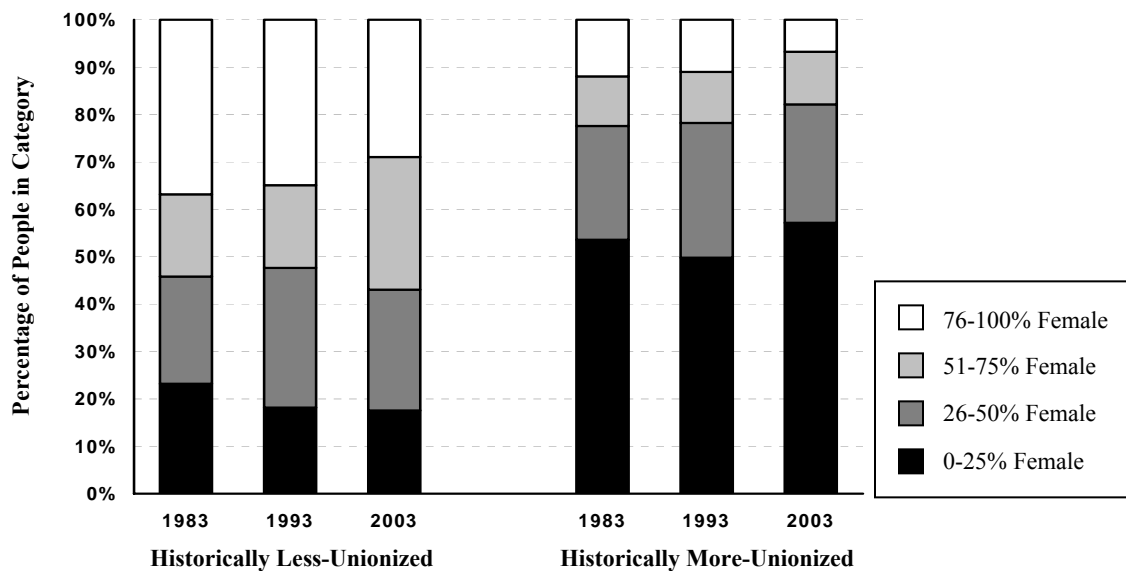
Table 5.3 shows the results from the purging models with occupational percent part-time as the group variable. Here, the results look a bit more consistent with the arguments presented in Chapter 2, and suggest that, for the first and last several years in the analysis, union coverage rates in “part-time” occupations (those where at least one-third of employees work part-time) would be significantly higher if employment in these occupations were not also disproportionately female-dominated (see Figure 5.5, which indicates that the overwhelming majority of people working in part-time occupations also work in occupations that are more than 50 percent female). Although the difference is statistically significant, it is not terribly impressive in a substantive sense. The increase

Table 5.2: Observed and Purged Union Coverage Rates in Historically Less-Unionized vs. Historically More-Unionized Industries, Private Sector, 1983-2005

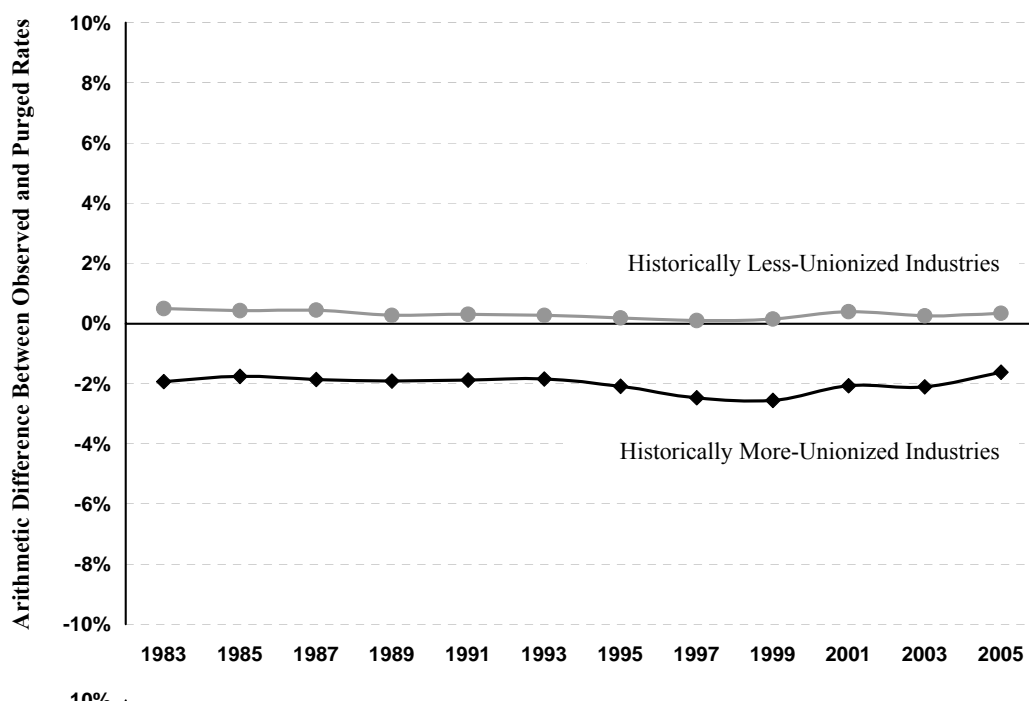
Historically Less-Unionized Industries					Historically More-Unionized Industries			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	85,618	8.80% (0.10)	9.30% (0.11)	0.50%	57,481	32.89% (0.20)	30.96% (0.20)	-1.93%
1985	86,573	7.55% (0.09)	7.98% (0.10)	0.43%	58,622	29.09% (0.19)	27.33% (0.19)	-1.76%
1987	90,135	7.04% (0.09)	7.48% (0.10)	0.44%	57,145	26.63% (0.18)	24.77% (0.19)	-1.86%
1989	88,969	6.48% (0.08)	6.75% (0.09)	0.27%	55,000	25.36% (0.19)	23.45% (0.19)	-1.91%
1991	92,114	6.63% (0.08)	6.93% (0.09)	0.30%	53,049	24.31% (0.19)	22.42% (0.19)	-1.89%
1993	91,300	6.43% (0.08)	6.70% (0.09)	0.27%	49,465	23.11% (0.19)	21.26% (0.19)	-1.85%
1995	92,618	6.25% (0.08)	6.43% (0.09)	0.18%	49,256	20.79% (0.18)	18.70% (0.19)	-2.09%
1997	85,405	5.86% (0.08)	5.95% (0.09)	0.09%	44,987	19.71% (0.19)	17.23% (0.19)	-2.48%
1999	89,258	5.65% (0.08)	5.80% (0.09)	0.15%	44,741	19.31% (0.19)	16.76% (0.19)	-2.55%
2001	105,527	6.25% (0.07)	6.64% (0.09)	0.39%	44,552	17.92% (0.18)	15.85% (0.18)	-2.07%
2003	109,283	5.89% (0.07)	6.14% (0.08)	0.25%	42,417	17.09% (0.18)	14.98% (0.18)	-2.11%
2005	108,331	5.72% (0.07)	6.05% (0.09)	0.33%	41,810	15.67% (0.18)	14.04% (0.18)	-1.63%

Numbers in parentheses are jackknifed standard errors.

Figure 5.3: Occupational Percent Female by Type of Industry, Private Sector



**Figure 5.4: Private Sector Purging Results:
Difference Between Observed And Purged Union Coverage Rates
if Occupational Sex Composition were Independent of Historical
Levels of Union Membership in Industries**



that would result from an even mix of male- and female-dominated occupations in this category hovers between one and two percent for most years in the analysis. On the other hand, the difference between observed and purged rates in “full-time” occupations (those where less than one-third of employees work part-time) is slightly more meaningful: if these occupations were not predominantly male, union coverage rates would fall by over

Table 5.3: Observed and Purged Union Coverage Rates in Part-Time vs. Full-Time Occupations, Private Sector, 1983-2005

	Less than One-Third of Employees in Occupation are Part-Time				One-Third or More Employees in Occupation are Part-Time			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	113,703	20.41% (0.12)	17.73% (0.12)	-2.68%	29,396	11.01% (0.18)	12.86% (0.23)	1.85%
1985	119,700	17.81% (0.11)	15.77% (0.12)	-2.04%	25,775	8.77% (0.18)	10.72% (0.24)	1.95%
1987	121,618	16.08% (0.11)	14.22% (0.11)	-1.86%	25,662	7.84% (0.17)	9.48% (0.22)	1.64%
1989	121,289	14.84% (0.10)	12.58% (0.10)	-2.26%	22,680	7.56% (0.18)	9.05% (0.23)	1.49%
1991	121,586	14.11% (0.10)	11.98% (0.10)	-2.13%	23,577	7.81% (0.17)	9.37% (0.23)	1.56%
1993	116,691	13.32% (0.10)	10.11% (0.10)	-3.21%	24,074	7.31% (0.17)	7.50% (0.20)	0.19%
1995	116,696	12.20% (0.10)	9.13% (0.10)	-3.07%	251,778	7.10% (0.16)	7.78% (0.23)	0.68%
1997	107,717	11.44% (0.10)	7.88% (0.10)	-3.56%	22,675	6.82% (0.17)	7.26% (0.18)	0.44%
1999	111,008	11.44% (0.10)	8.58% (0.10)	-2.86%	22,991	6.29% (0.18)	6.95% (0.18)	0.66%
2001	127,595	10.40% (0.09)	8.19% (0.09)	-2.21%	22,625	5.78% (0.16)	6.39% (0.20)	0.61%
2003	128,751	9.70% (0.08)	7.89% (0.09)	-1.81%	22,948	5.22% (0.15)	6.12% (0.20)	0.90%
2005	127,109	9.18% (0.08)	7.63% (0.09)	-1.55%	23,032	4.73% (0.14)	5.86% (0.21)	1.13%

Numbers in parentheses are jackknifed standard errors.

Figure 5.5: Occupational Percent Female by Percent Part-Time in Occupation, Private Sector

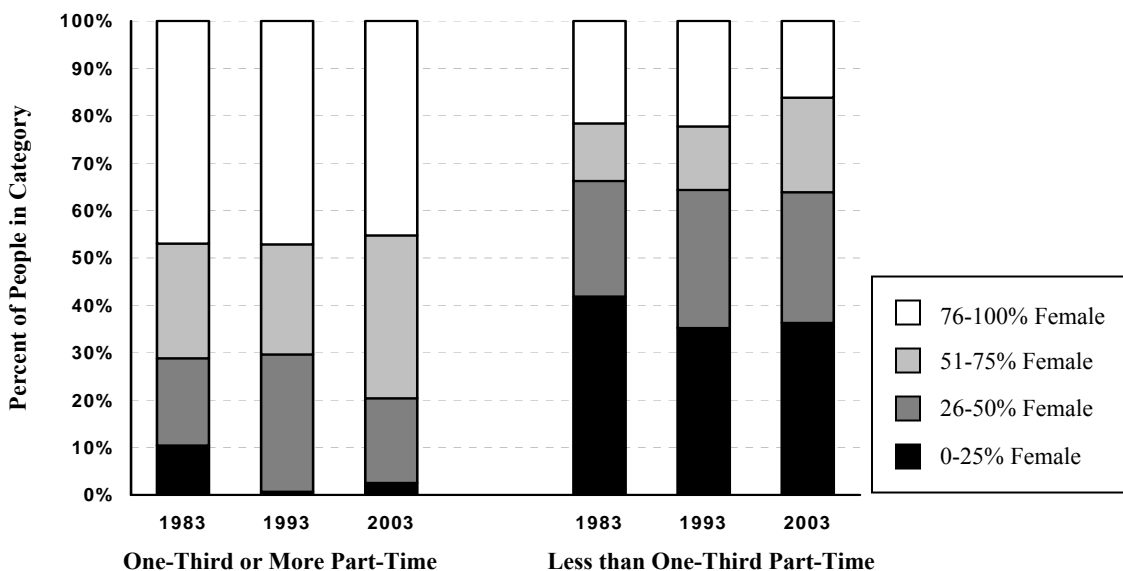
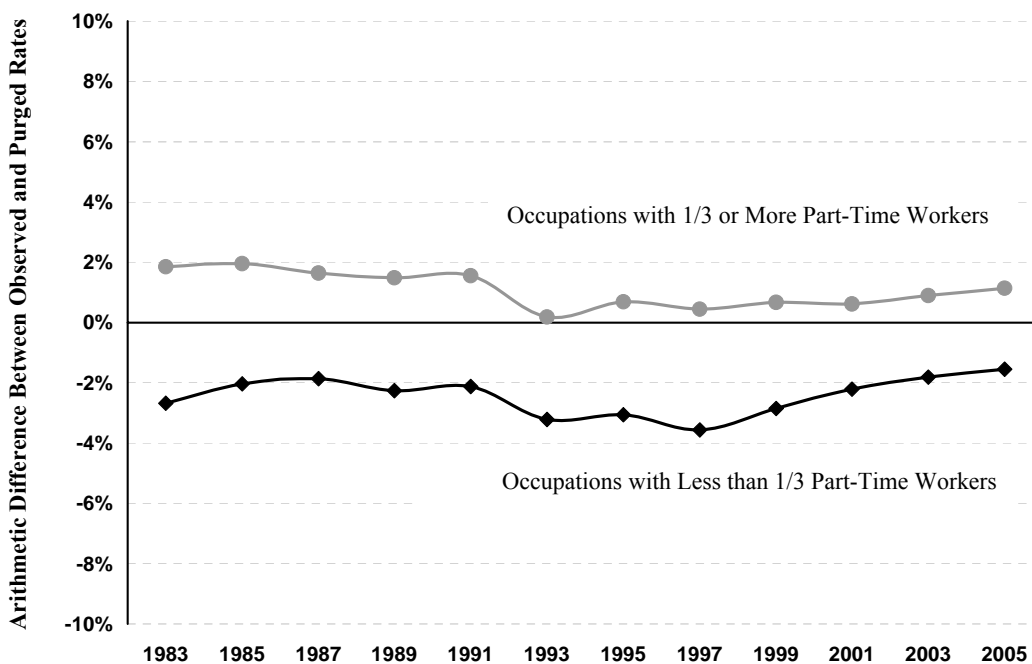


Figure 5.6: Private Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of the Percentage of Workers in an Occupation who are Part-Time



three percentage points in some years. Figure 5.6 shows the trends over time, but again does not suggest that the independent effect of sex composition on union coverage rates has waned much over time, in either part-time or full-time occupations.

Observed and Purged Rates by Occupational Education Level

The next set of results shows the findings for the purging model with occupational education level as the group variable (see Table 5.4). Here, we see that purged rates are consistently larger than observed rates among higher-education occupations, indicating that if these occupations were equally likely to be male- or female-dominated, individuals employed in them would have slightly higher rates of union coverage. Again, although the differences are statistically significant, again, they are not substantively all that remarkable. Among occupations with education levels of high school or less, there is an interesting pattern: in 1983 through 1987 the differences between purged and observed rates are positive; by 1993, they are negative. Because this shift corresponds to the 1992 change in the way the CPS measured education level, it is likely that this rather abrupt shift is related at least in part to the methodological change. As shown in Chapter 2, the percentage of people employed in high school occupations dropped substantially in 1993; it is reasonable to suspect that the remaining occupations that were coded as “high school” were more heavily male-dominated. Indeed, Figure 5.7 bears this out. In 1983, just over half of all people employed in high school occupations worked in occupations that were 50 percent or more male. By 1995, this had risen to just under 70 percent. This shifting of the association between occupational sex composition and occupational education levels, due partly to the methodological change in the CPS, is almost certainly the reason for the change. The temporal patterns are displayed in Figure 5.8.

Table 5.4: Observed and Purged Union Coverage Rates in Higher- vs. Lower-Education Occupations, Private Sector, 1983-2005

	Median Education Level in Occupation is More than a High School Diploma				Median Education Level in Occupation is a High School Diploma or Less			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	36,840	8.74% (0.15)	9.92% (0.18)	1.18%	106,259	21.85% (0.13)	23.10% (0.14)	1.25%
1985	34,440	7.44% (0.13)	8.29% (0.15)	0.85%	106,035	19.56% (0.12)	20.50% (0.14)	0.94%
1987	42,018	6.81% (0.12)	7.71% (0.15)	0.90%	105,262	17.77% (0.12)	18.35% (0.13)	0.58%
1989	48,623	6.61% (0.11)	7.37% (0.13)	0.76%	95,346	17.30% (0.12)	17.23% (0.13)	-0.07%
1991	49,641	6.44% (0.11)	7.19% (0.13)	0.75%	95,522	16.55% (0.12)	16.48% (0.13)	-0.07%
1993	66,361	6.81% (0.10)	7.30% (0.11)	0.49%	74,404	17.19% (0.14)	15.53% (0.14)	-1.66%
1995	70,119	6.25% (0.09)	6.75% (0.11)	0.50%	71,755	16.23% (0.14)	14.64% (0.14)	-1.59%
1997	65,465	5.97% (0.09)	6.98% (0.12)	1.01%	64,927	15.35% (0.14)	13.64% (0.14)	-1.71%
1999	68,860	5.97% (0.09)	7.06% (0.12)	1.09%	65,139	14.70% (0.14)	13.01% (0.14)	-1.69%
2001	74,508	6.22% (0.09)	6.64% (0.10)	0.42%	75,712	13.13% (0.12)	11.63% (0.12)	-1.50%
2003	79,648	5.69% (0.08)	6.20% (0.10)	0.51%	72,051	12.71% (0.12)	11.13% (0.12)	-1.58%
2005	78,344	5.56% (0.08)	6.08% (0.10)	0.52%	71,797	11.69% (0.12)	10.41% (0.12)	-1.28%

Numbers in parentheses are jackknifed standard errors.

Figure 5.7: Occupational Percent Female by Education Level in Occupation, Private Sector

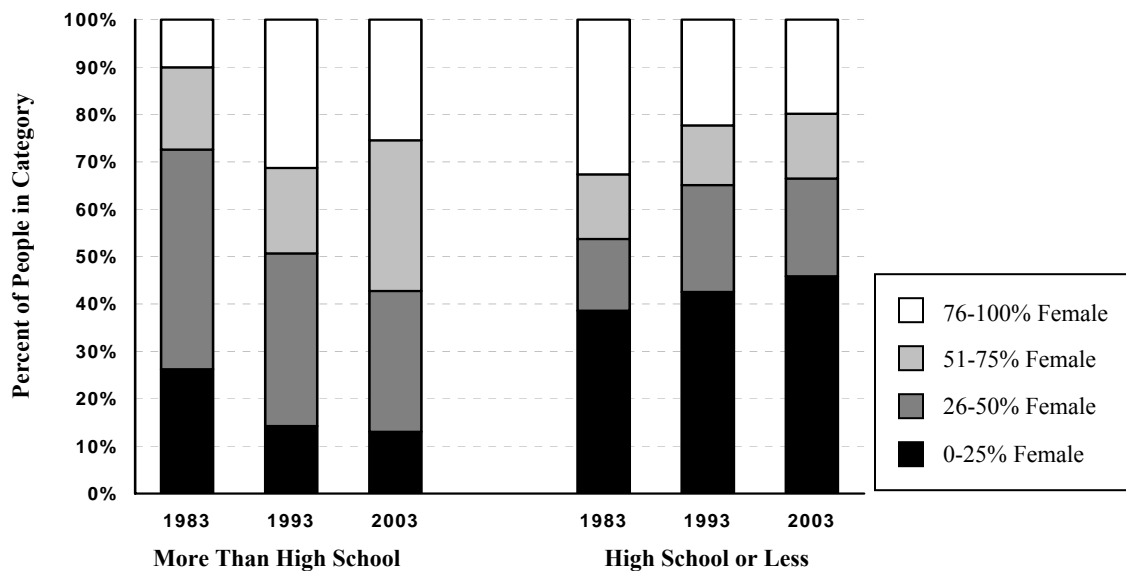
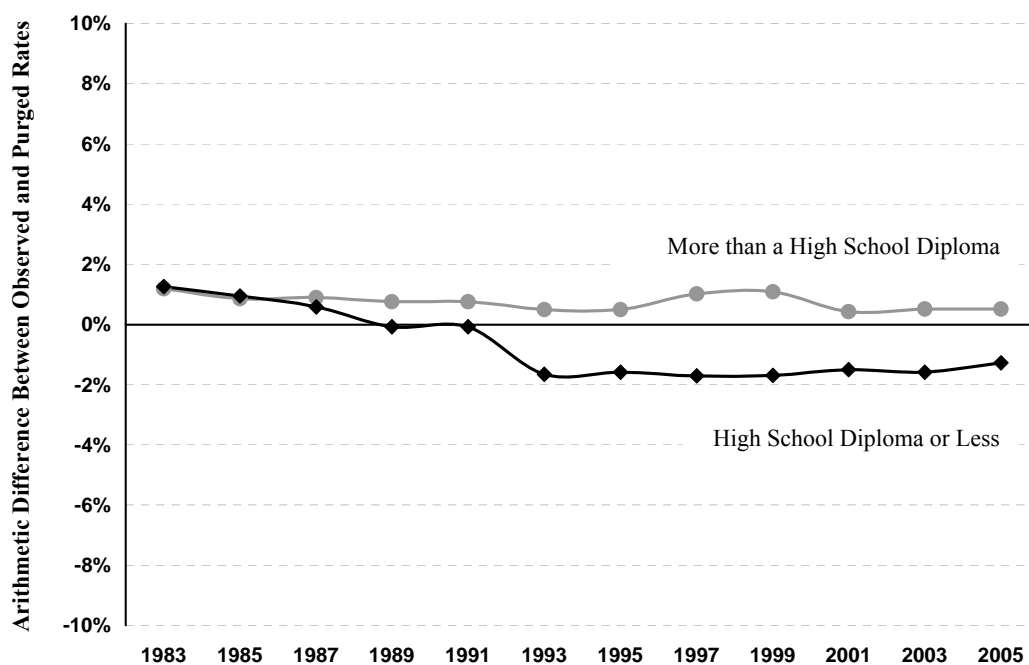


Figure 5.8: Private Sector Purging Results: Difference Between Observed and Purged Union Coverage Rates if Occupational Sex Composition were Independent of Occupational Education Level



Observed and Purged Rates by Industry Establishment Size

The next set of results, presented in Table 5.5, show the findings for the models in which average establishment size is the group variable. Here, the results indicate that the differences between the observed and purged rates of union coverage are small and statistically non-significant, both for industries with large establishments and those with small establishment. Union coverage rates are clearly higher in industries with larger establishments (see the second column of Table 5.5) but as Figure 5.9 indicates, the mix of people employed in male- and female-dominated occupations is quite similar in these two groups of industries. In other words, it does not appear that there is a strong association between the sex composition of one's occupation and the average establishment size in his/her industry. For this reason, as discussed in Chapter 3, I have opted to omit this variable from the full purging model analysis presented below.

Observed and Purged Rates by Industry Tenure Levels

The final set of single-variable purging results shows the observed and purged rates (and their differences) in industries distinguished by levels of tenure. With respect to my theoretical arguments, the pattern here is similar to the patterns in the previous five sets of results: the direction of the relationship is consistent with my arguments, but the magnitude of the relationship is small. People who work in industries with average or higher-than-average tenure levels have higher rates of union coverage—and those rates would drop slightly if the employment mix in those industries were a more even blend of male- and female-dominated occupations. As it is, people in high-tenure industries are substantially more likely to be employed in occupations that are more than 50 percent male—particularly in 1983, but even in the two later time points (see Figure 5.11).

Table 5.5: Observed and Purged Union Coverage Rates in Industries with Large Establishments vs. Industries with Small Establishments, Private Sector, 1983-2005

	Industries with Average Establishment Size 25 or Less				Industries with Average Establishment Size Greater than 25			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	79,135	25.90% (0.17)	16.19% (0.17)	0.29%	63,788	12.51% (0.12)	12.21% (0.11)	-0.30%
1985	76,855	23.42% (0.16)	23.77% (0.16)	0.35%	68,512	9.82% (0.11)	9.50% (0.10)	-0.32%
1987	79,827	21.66% (0.16)	21.95% (0.16)	0.29%	67,316	8.73% (0.10)	8.49% (0.10)	-0.24%
1989	75,848	20.95% (0.16)	21.39% (0.17)	0.44%	61,687	8.43% (0.10)	8.09% (0.10)	-0.34%
1991	78,446	20.23% (0.16)	20.62% (0.16)	0.39%	60,346	8.11% (0.10)	7.81% (0.09)	-0.30%
1993	82,631	17.89% (0.16)	18.21% (0.16)	0.32%	56,863	8.58% (0.10)	8.36% (0.09)	-0.22%
1995	83,609	16.46% (0.16)	16.70% (0.16)	0.24%	56,826	7.94% (0.09)	7.78% (0.09)	-0.16%
1997	76,183	16.54% (0.16)	16.78% (0.16)	0.24%	52,824	6.67% (0.09)	6.43% (0.09)	-0.24%
1999	83,502	15.46% (0.16)	15.51% (0.16)	0.05%	48,864	7.25% (0.09)	7.21% (0.09)	-0.04%
2001	91,980	14.82% (0.15)	14.93% (0.15)	0.11%	56,398	6.34% (0.08)	6.17% (0.08)	-0.17%
2003	94,237	14.18% (0.15)	14.29% (0.15)	0.11%	55,786	5.72% (0.08)	5.50% (0.07)	-0.22%
2005	95,067	13.37% (0.15)	13.54% (0.15)	0.17%	53,524	5.52% (0.07)	5.29% (0.07)	-0.23%

Numbers in parentheses are jackknifed standard errors.

Figure 5.9: Occupational Percent Female by Average Establishment Size in Industry, Private Sector

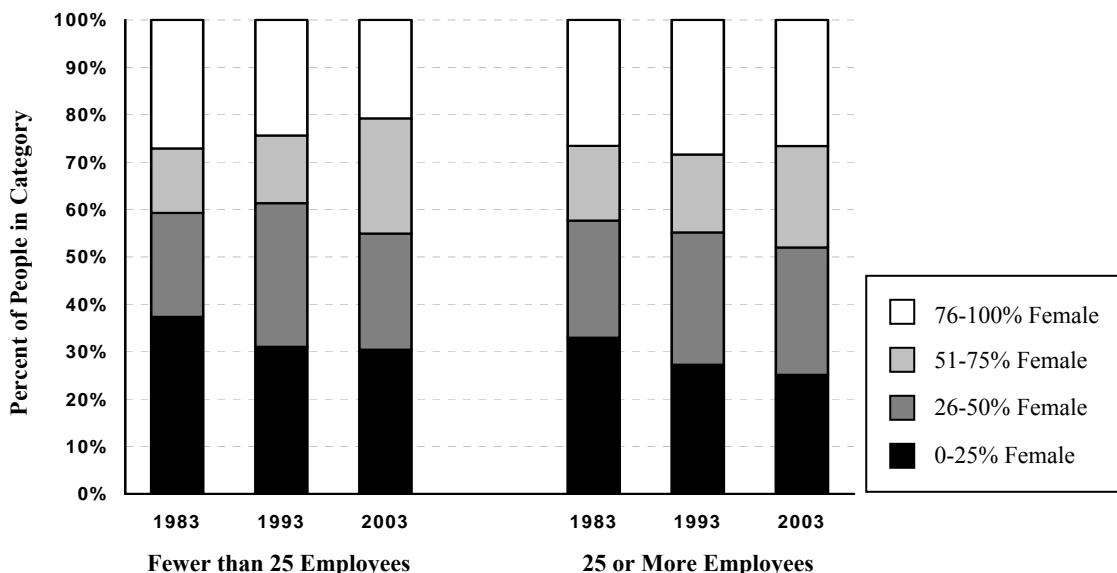


Figure 5.10: Private Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Establishment Size



Employment in lower-tenure industries is fairly evenly split between male- and female-dominated occupations, which helps to account for the relatively small observed/purged differences in this sector.

Table 5.6: Observed and Purged Union Coverage Rates in Industries with Average or Above vs. Below-Average Tenure Levels, Private Sector, 1983-2005

	Workers in Industries with Average or Above-Average Tenure				Workers in Industries with Shorter-than-Average Tenure			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	58,454	29.99% (0.19)	29.01% (0.19)	-0.98%	84,679	10.53% (0.11)	11.49% (0.12)	0.96%
1985	56,614	27.06% (0.19)	25.84% (0.19)	-1.22%	92,973	9.57% (0.10)	10.30% (0.11)	0.73%
1987	54,351	25.02% (0.19)	23.85% (0.18)	-1.17%	95,440	8.69% (0.09)	9.43% (0.10)	0.74%
1989	55,281	22.84% (0.18)	22.17% (0.18)	-0.67%	91,312	8.13% (0.09)	8.45% (0.09)	0.32%
1991	54,893	21.74% (0.18)	21.03% (0.17)	-0.71%	93,457	7.98% (0.09)	8.29% (0.09)	0.31%
1993	51,681	20.68% (0.18)	19.90% (0.17)	-0.78%	92,137	7.54% (0.09)	7.92% (0.09)	0.38%
1995	66,950	16.08% (0.14)	15.58% (0.14)	-0.50%	74,945	7.02% (0.09)	7.92% (0.10)	0.27%
1997	60,026	15.08% (0.15)	14.77% (0.14)	-0.31%	69,104	6.78% (0.10)	6.95% (0.10)	0.17%
1999	52,541	15.53% (0.16)	14.66% (0.15)	-0.87%	81,465	6.78% (0.09)	7.23% (0.10)	0.45%
2001	54,664	14.18% (0.15)	13.53% (0.15)	-0.65%	95,572	7.14% (0.08)	7.62% (0.09)	0.48%
2003	58,364	13.17% (0.14)	12.81% (0.14)	-0.36%	93,336	6.43% (0.08)	6.62% (0.08)	0.19%
2005	55,695	12.58% (0.14)	12.27% (0.14)	-0.31%	94,446	6.08% (0.08)	6.26% (0.08)	0.18%

Numbers in parentheses are jackknifed standard errors.

Figure 5.11: Occupational Percent Female by Employer Tenure Levels in Industry, Private Sector

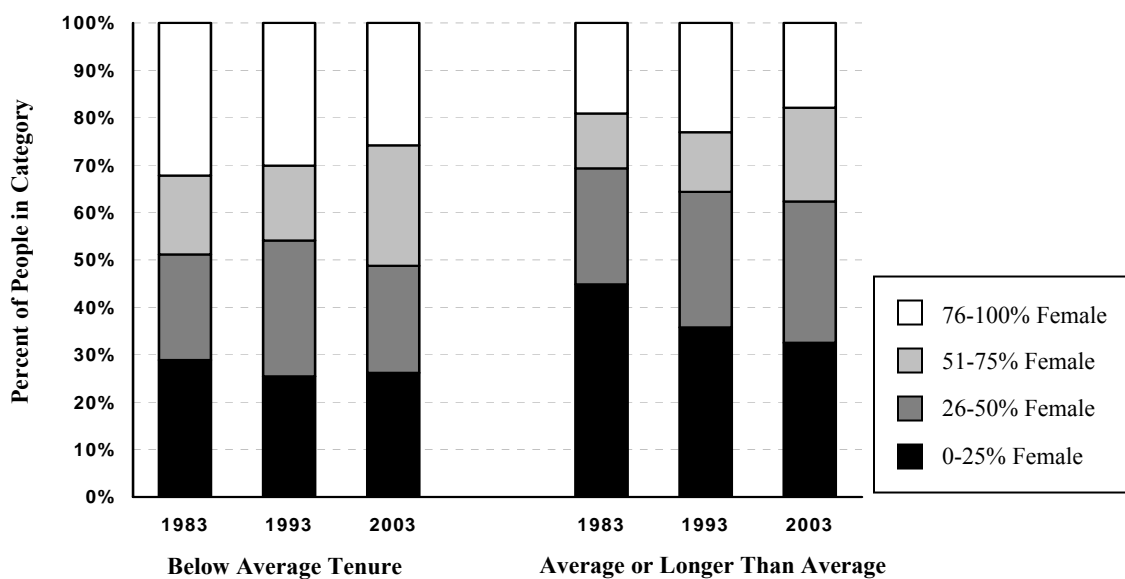
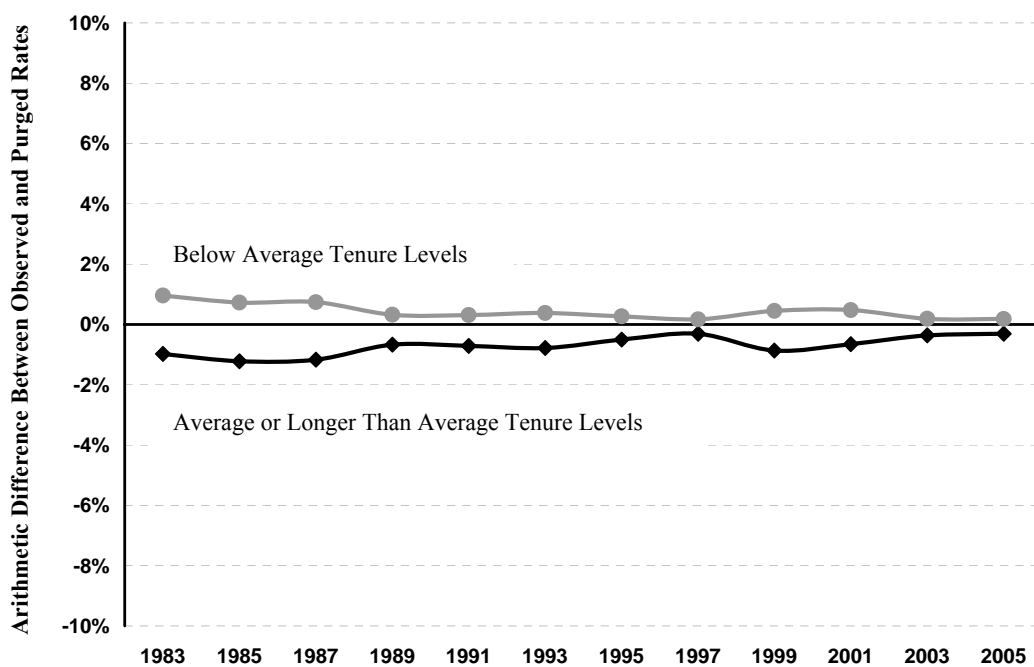


Figure 5.12: Private Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Employer Tenure



Public-Sector Results: Individual Sector Purging Models

Tables 5.7 through 5.12 display the results for the individual-variable public sector purging models. In general, whereas the private sector results showed quite stable temporal patterns, the public sector results fluctuate more over the time period included in the analysis. Additionally, public sector results show slightly fewer observed/purged differences that are statistically significant. Both of these differences are a function of the public sector sample size, which is approximately one-fifth of the private sector sample size. (In 2005, for example, the weighted private sector sample size was 150,145 and the public sector sample size was 29,003.)

Observed and Purged Rates in Historically More- and Less-Unionized Occupations

Table 5.7 shows the public sector results where group variable is the historical level of unionization in one's occupation. Although the historically more-unionized occupations in the public sector are overwhelmingly male-dominated (see Figure 5.13), the findings indicate that the differences between observed and purged rates over the years are not significantly different from zero. In the historically less-unionized occupations, the differences fluctuate from just under -1 to just over +1, but again most of these differences are not significant. These findings indicate that in the public sector, if occupational sex composition were independent of the historical levels of unionization in one's occupation, there would be no change in union coverage rates.

Observed and Purged Rates in Historically More- and Less-Unionized Industries

On the other hand, the findings in Table 5.8 tell a different story about the historical levels of unionization in one's industry. These findings show that in industries that were historically *less*-unionized, shifting the occupational sex composition to be an

Table 5.7: Observed and Purged Union Coverage Rates in Historically More-Unionized vs. Historically Less-Unionized Occupations Public Sector, 1983-2005

Historically Less-Unionized Occupations					Historically More-Unionized Occupations			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	27,225	45.34% (0.30)	45.19% (0.44)	-0.15%	3,561	46.84% (0.84)	43.97% (1.18)	-2.87%
1985	26,672	43.43% (0.30)	43.56% (0.45)	0.13%	3,415	45.13% (0.85)	42.62% (1.19)	-2.51%
1987	26,911	42.82% (0.30)	44.21% (0.44)	1.39%	3,391	43.03% (0.85)	41.95% (1.21)	-1.08%
1989	26,491	43.68% (0.30)	43.88% (0.47)	0.20%	3,015	45.27% (0.91)	42.89% (1.44)	-2.38%
1991	27,577	43.26% (43.26)	44.52% (44.5)	1.26%	3,156	46.91% (46.9)	44.14% (44.15)	-2.77%
1993	27,449	43.65% (0.30)	42.46% ² (0.44)	-1.39%	2,901	46.66% ² (0.92)	43.36% (1.15)	-3.30%
1995	25,700	43.37% (0.31)	44.58% (0.47)	1.21%	2,710	44.82% (0.96)	42.99% (1.40)	-1.83%
1997	22,391	42.12% (0.33)	43.63% (0.54)	1.51%	2,160	43.72% (1.07)	41.30% (1.71)	-2.42%
1999	23,146	41.98% (0.32)	42.77% (0.52)	0.79%	2,226	42.91% (1.05)	39.61% (1.35)	-3.30%
2001	25,781	40.99% (0.31)	40.73% (0.49)	-0.26%	2,652	45.40% (0.97)	45.46% (1.56)	0.06%
2003	26,435	41.38% (0.30)	40.55% (0.48)	-0.83%	2,695	43.01% (0.95)	38.98% (1.18)	-4.03%
2005	26,363	40.23% (0.30)	39.42% (0.49)	-0.81%	2,640	43.57% (0.97)	41.12% (1.27)	-2.45%

Numbers in parentheses are jackknifed standard errors.

Figure 5.13: Occupational Percent Female by Type of Occupation, Public Sector

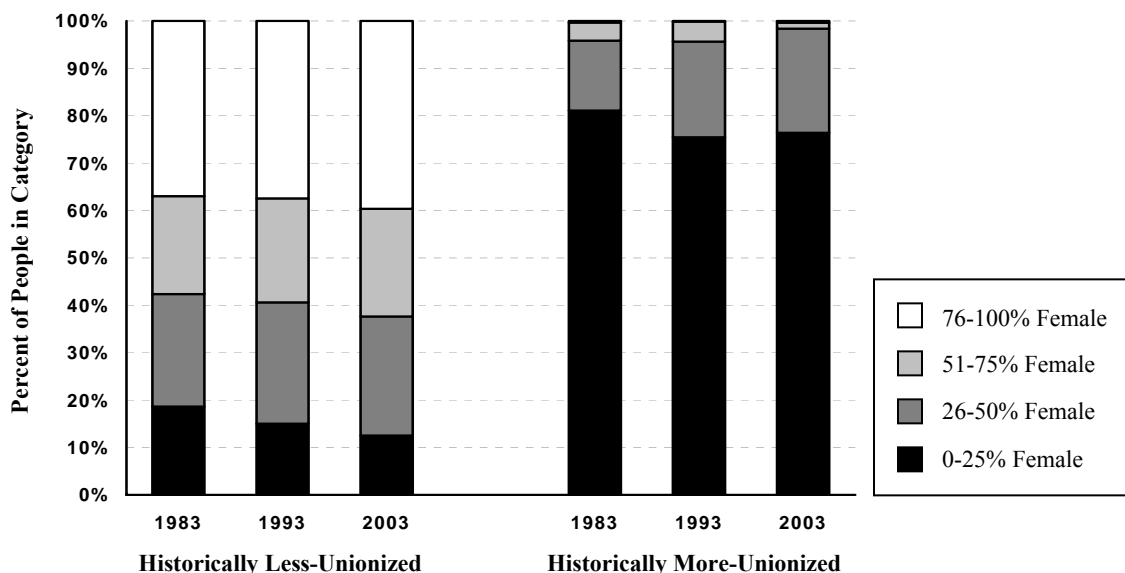
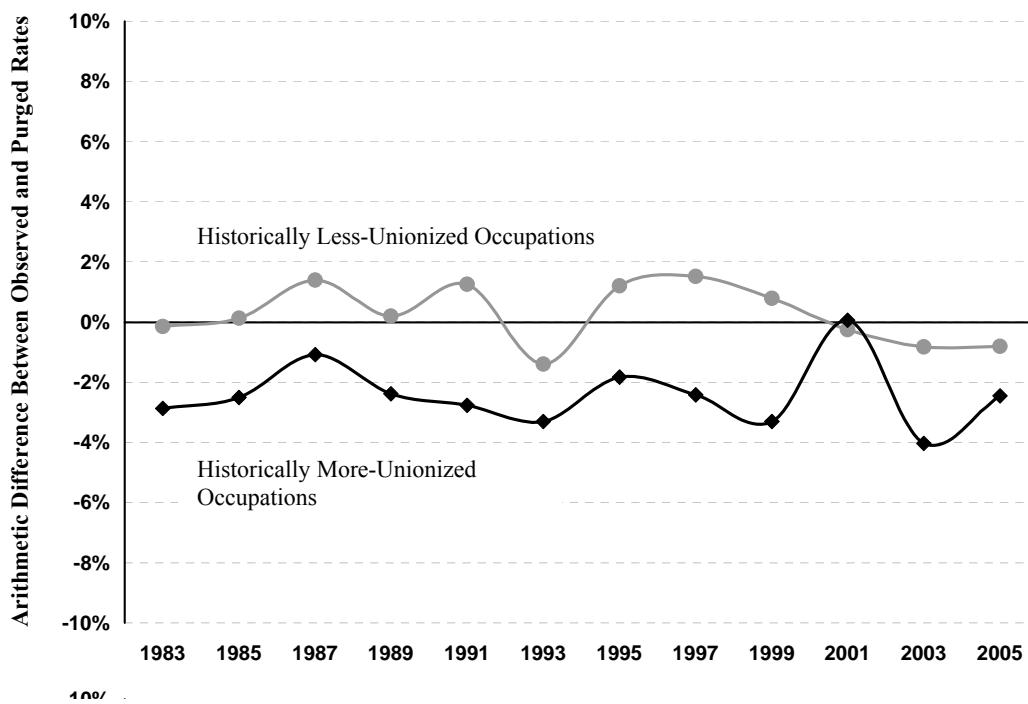


Figure 5.14: Public Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Historical Levels of Union Membership in Occupations



even mix of male- and female-dominated occupations would actually *reduce* union coverage rates significantly (though again the differences are fairly modest, substantively). This indicates that the slightly heavier concentration of female-dominated occupations in these industries (see Figure 5.15) actually have a positive impact on union coverage. Keeping in mind that the historically less-unionized industries include the health care and education services industries, among others, this is likely a reflection of the heavily female-dominated teachers' unions, and to a lesser extent, nurses' unions—though as the discussion in Chapter 4 indicated, the set of female-dominated, union-covered occupations includes clerical and other health care occupations, in addition to teachers and nurses. The temporal patterns do not suggest any apparent permanent changes in the relationship over time (see Figure 5.16).

Observed and Purged Rates in “Part-Time” and “Full-Time” Occupations

Table 5.9 shows the public sector purging model results where the percentage of part-time workers in the occupation is the group variable. Here, we see that with only one exception (the 1983 difference in “full-time” occupations) none of the differences are statistically significant—in spite of the fact that the “part-time” occupations are quite heavily female-dominated (see Figure 5.17). Again, this is a clear divergence from the patterns in the private sector, where patterns were generally consistent with my conceptual arguments. The findings are not surprising, however, in light of the preliminary results shown in Chapter 4, which indicated that in the public sector, people working in heavily female-dominated, “part-time” occupations were only slightly more likely to have union coverage than people in male-dominated “part-time” occupations.

Table 5.8: Observed and Purged Union Coverage Rates in Historically Less-Unionized vs. Historically More-Unionized Industries, Public Sector, 1983-2005

Historically Less-Unionized Industries					Historically More-Unionized Industries			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	26,746	43.46% (0.30)	41.14% (0.36)	-2.32%	4,041	59.09% (0.77)	56.64% (0.93)	-2.45%
1985	26,262	41.60% (0.30)	39.61% (0.36)	-1.99%	3,825	57.53% (0.80)	55.44% (0.95)	-2.09%
1987	26,159	40.52% (0.30)	38.99% (0.36)	-1.53%	4,143	57.53% (0.77)	55.85% (0.91)	-1.68%
1989	25,797	41.79% (0.31)	38.85% (0.35)	-2.94%	3,715	58.16% (0.81)	55.34% (0.94)	-2.82%
1991	26,924	41.54% (0.30)	39.24% (0.34)	-2.30%	3,812	58.41% (0.80)	57.10% (0.91)	-1.31%
1993	26,696	42.16% (0.30)	39.26% (0.35)	-2.90%	3,654	56.81% (0.82)	54.76% (0.96)	-2.05%
1995	25,004	41.45% (0.31)	39.58% (0.36)	-1.87%	3,405	58.60% (0.84)	56.43% (0.98)	-2.17%
1997	21,693	40.31% (0.33)	38.25% (0.40)	-2.06%	2,858	57.03% (0.93)	53.65% (1.13)	-3.38%
1999	22,380	40.37% (0.33)	38.18% (0.39)	-2.19%	2,992	54.75% (0.91)	49.91% (1.07)	-4.84%
2001	25,355	39.69% (0.31)	37.73% (0.36)	-1.96%	3,075	55.56% (0.90)	52.48% (1.04)	-3.08%
2003	25,755	39.72% (0.30)	37.25% (0.36)	-2.47%	3,057	56.78% (0.89)	54.66% (1.06)	-2.12%
2005	26,072	39.18% (0.30)	36.73% (0.36)	-2.45%	2,932	52.58% (0.92)	50.78% (1.09)	-1.80%

Numbers in parentheses are jackknifed standard errors.

Figure 5.15: Occupational Percent Female by Type of Industry, Public Sector

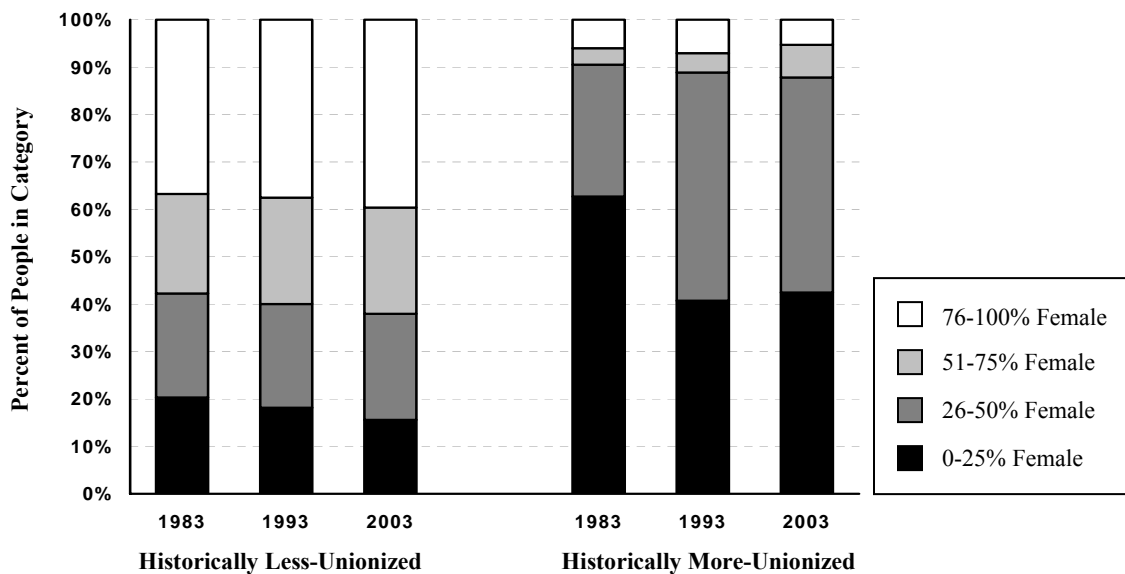
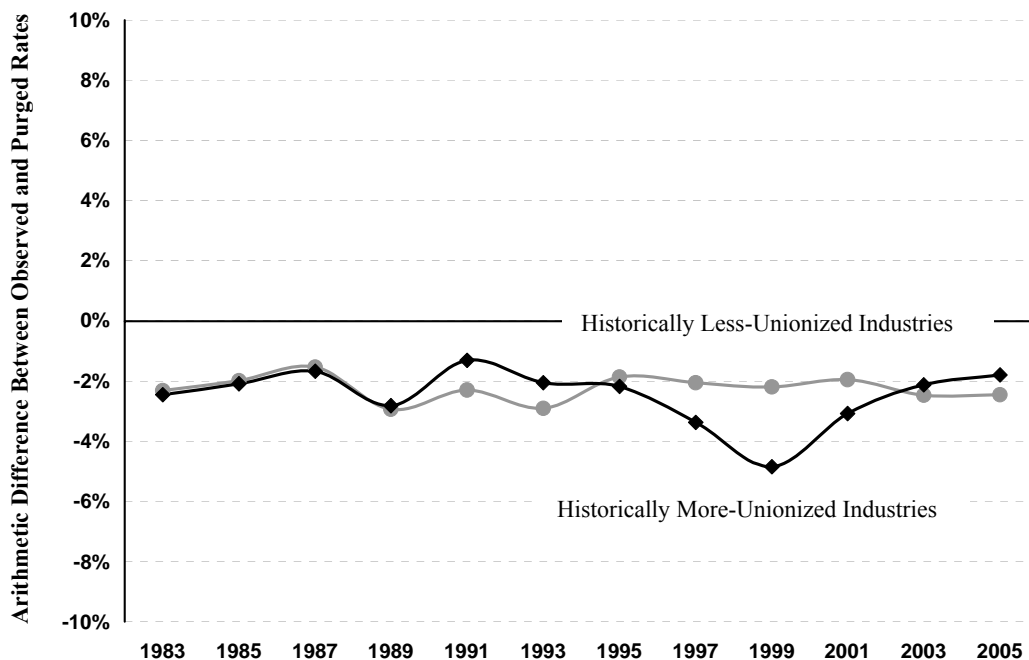


Figure 5.16: Public Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Historical Levels of Union Membership in Industries



**Table 5.9: Observed and Purged Union Coverage Rates in
“Part-Time” vs. “Full-Time” Occupations, Public Sector, 1983-2005**

	Less than One-Third of Employees in Occupation are Part-time				One-Third or More Employees in Occupation are Part-Time			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	25,379	47.52% (0.31)	46.15% (0.33)	-1.37%	5,408	36.06% (0.65)	35.23% (0.69)	-0.83%
1985	26,144	45.40% (0.31)	45.56% (0.32)	-0.16%	3,943	30.61% (0.77)	30.50% (0.78)	-0.11%
1987	26,717	44.70% (0.30)	44.76% (0.32)	0.06%	3,585	28.97% (0.76)	29.27% (0.79)	0.30%
1989	25,972	45.50% (0.31)	45.67% (0.33)	0.17%	3,540	31.75% (0.78)	31.08% (0.81)	-0.67%
1991	26,903	45.21% (0.30)	44.95% (0.33)	-0.26%	3,833	32.57% (0.76)	31.49% (0.77)	-1.08%
1993	26,372	45.66% (0.31)	45.08% (0.34)	-0.58%	3,978	32.52% (0.74)	31.23% (0.77)	-1.29%
1995	24,646	45.22% (0.32)	44.38% (0.36)	-0.84%	3,764	32.35% (0.76)	31.42% (0.83)	-0.83%
1997	21,424	44.10% (0.34)	43.07% (0.39)	-1.03%	3,128	29.61% (0.82)	29.74% (0.82)	0.13%
1999	22,063	44.56% (0.35)	44.59% (0.41)	0.03%	3,309	32.98% (0.64)	31.65% (0.70)	-1.33%
2001	25,227	42.37% (0.31)	42.63% (0.34)	0.26%	3,207	33.75% (0.84)	34.14% (0.93)	0.39%
2003	25,989	42.70% (0.31)	43.13% (0.33)	0.43%	3,140	31.81% (0.83)	31.20% (0.87)	-0.61%
2005	25,892	41.43% (0.31)	41.79% (0.34)	0.36%	3,111	33.08% (0.84)	32.84% (0.92)	-0.24%

Numbers in parentheses are jackknifed standard errors.

Figure 5.17: Occupational Percent Female by Percent Part-Time in Occupation, Public Sector

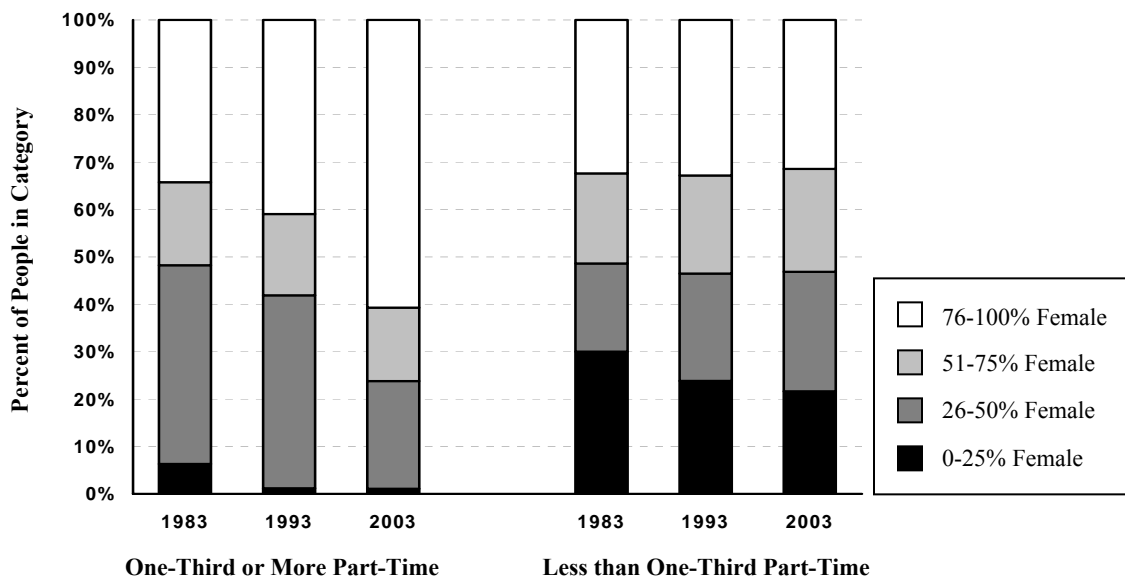
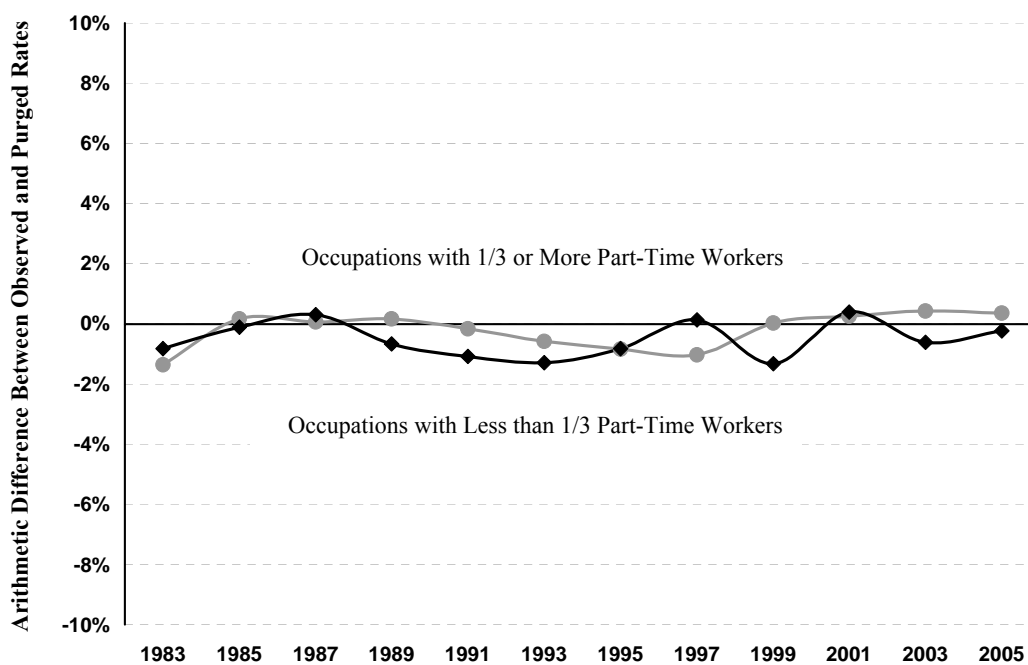


Figure 5.18: Public Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of the Percentage of Employees who are Part-Time



Thus, while being employed in an occupation that has significant numbers of part-time employees dampens one's likelihood of union coverage, being employed in *female-dominated* part-time occupations does not reduce the likelihood further. Though there are slight fluctuations in the observed/purged differences over time, as shown more clearly in Figure 5.18, these fluctuations are small, and none are statistically different from zero.

Observed and Purged Rates by Occupational Education Level

Turning now to the results from the purging model where occupational education level is the group variable, we see that among higher-education occupations, none of the differences between the observed and purged rates are statistically significant (see Table 5.10)—even though the composition of this group tends toward female-dominated occupations. On the other hand, Figure 5.19 shows that high school occupations are far more heavily male-dominated, particularly in 1995 and 2005, where fewer than 30 percent of employees in this group worked in occupations which were more than half women. Here, the observed/purged differences in Table 5.10 do suggest that the heavily male composition of occupations in this sector increases union coverage, and that if the mix were evenly split between male- and female-dominated occupations, union coverage would decrease by about three percentage points. Figure 5.20 is informative, because it clearly reveals that the change in pattern in the high school occupation sector occurred between 1991 and 1993—the exact time the CPS changed the way it measured educational attainment. It is important to be attuned to this, because *while the effect of sex composition on union coverage is real*, the abrupt *change* in this pattern is far more likely to be due to the adjustment in CPS methodology (and the new classifications of

occupations that resulted) than a sudden change in the way unions organized male-dominated, high school occupations.

Table 5.10: Observed and Purged Union Coverage Rates in Higher- vs. Lower-Education Occupations, Public Sector, 1983-2005

	Median Education Level in Occupation is More than a High School Diploma				Median Education Level in Occupation is a High School Diploma or Less			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	15,215	47.89% (0.40)	47.87% (0.41)	0.02%	15,571	43.19% (0.40)	42.21% (0.41)	-0.98%
1985	15,273	45.18% (0.39)	45.13% (0.41)	-0.05%	14,814	41.88% (0.41)	40.92% (0.42)	-0.96%
1987	15,808	44.60% (0.40)	44.70% (0.41)	0.11%	14,494	40.93% (0.41)	40.33% (0.42)	-0.60%
1989	16,467	45.98% (0.39)	46.10% (0.40)	0.12%	12,864	41.08% (0.43)	41.14% (0.45)	0.06%
1991	17,481	44.73% (0.38)	45.11% (0.39)	0.38%	13,255	42.20% (0.43)	42.56% (0.45)	0.36%
1993	22,641	45.31% (0.33)	44.30% (0.36)	-1.01%	7,709	39.93% (0.56)	37.68% (0.59)	-2.25%
1995	22,334	45.02% (0.33)	45.00% (0.37)	-0.02%	6,076	37.93% (0.62)	35.26% (0.66)	-2.67%
1997	19,258	44.14% (0.36)	44.85% (0.40)	0.71%	5,294	35.41% (0.66)	33.60% (0.70)	-1.81%
1999	20,046	44.08% (0.35)	44.32% (0.38)	0.24%	5,326	34.46% (0.65)	31.79% (0.67)	-2.67%
2001	21,635	41.71% (0.34)	40.55% (0.36)	-1.16%	6,798	40.41% (0.60)	37.06% (0.61)	-3.35%
2003	22,456	42.36% (0.33)	41.57% (0.35)	-0.79%	6,673	38.69% (0.60)	36.37% (0.62)	-2.32%
2005	22,271	41.83% (0.33)	41.16% (0.35)	-0.67%	6,732	36.28% (0.59)	33.97% (0.60)	-2.31%

Numbers in parentheses are jackknifed standard errors.

Figure 5.19: Occupational Percent Female by Education Level in Occupation, Public Sector

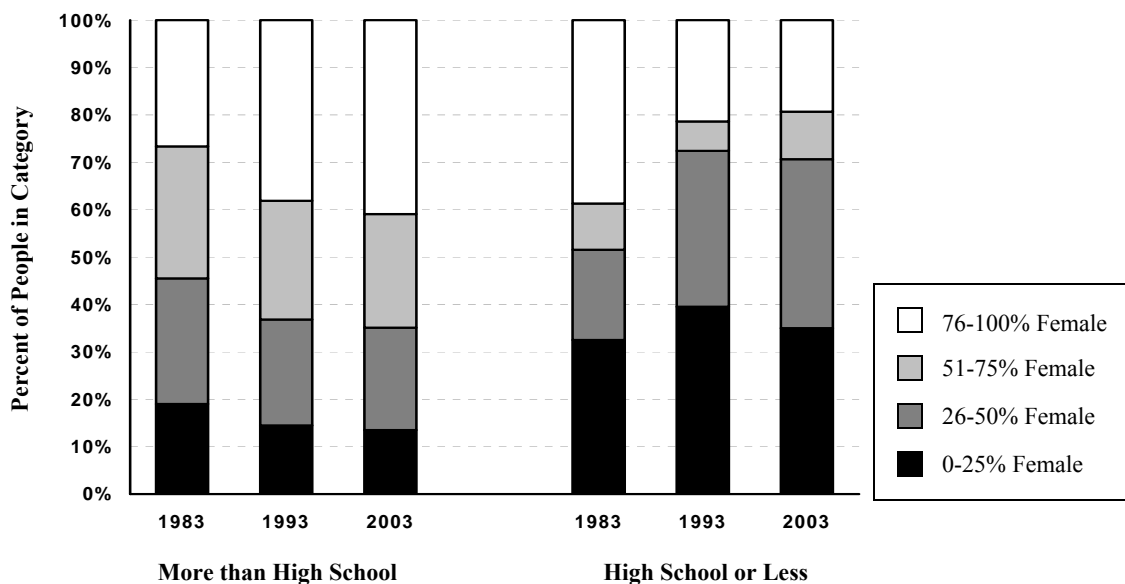
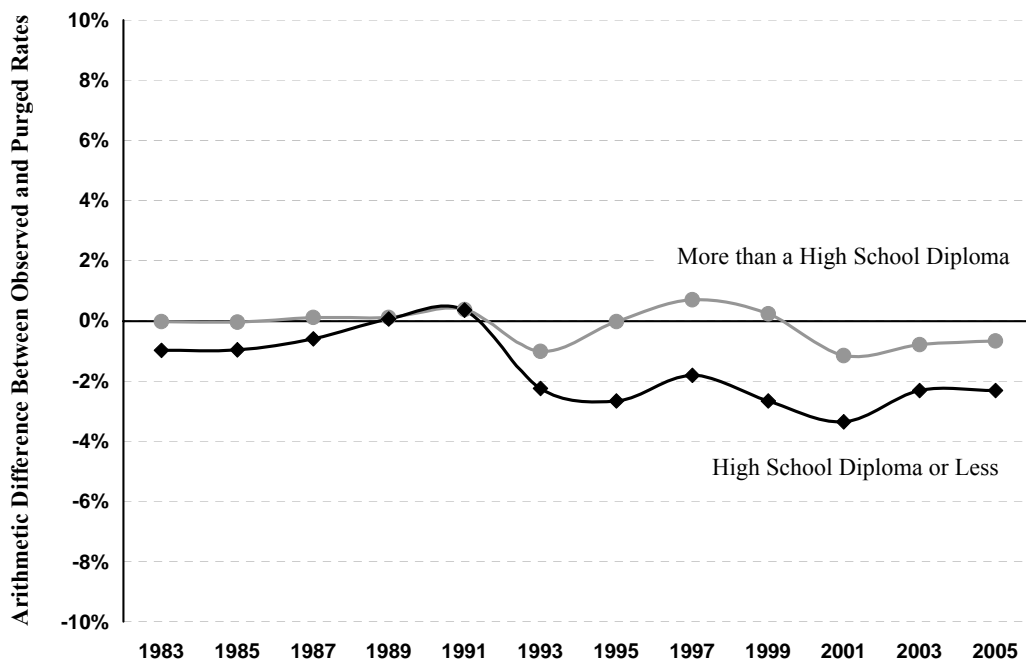


Figure 5.20: Public Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Occupational Education Level



Observed and Purged Rates by Industry Establishment Size

Table 5.11 shows the results of the purging models with average establishment size in one's industry as the group variable. There are no significant differences between the actual rates of union coverage and the purged rates under the condition that average establishment size is independent of occupational sex composition. In the private sector, there was a similar lack of effect—but in that case it may have been due to the fact that occupational sex composition *was* apparently independent of average establishment size. That is not the case in the public sector. Figure 5.21 shows that among those individuals working in industries that have small average establishment sizes, around 70 percent were employed in occupations that were at least 50 percent male. In industries with relatively large average establishments, employees were slightly more heavily concentrated in female-dominated occupations. Nevertheless, the results here indicate that shifting the sex composition across these sectors so that occupational sex composition was orthogonal to average establishment size would have no bearing on union coverage rates. And, as shown in Figure 5.22, this pattern is unchanging over time.

Because I omit the establishment size variable from the set of full purging models in the private sector, I also omit it in the set of models in the public sector. While Figure 5.21 suggests that occupational sex composition is *not* completely independent of establishment size in the public sector, omitting the variable allows for comparability between the two sets of results. Doing so is also practical, given the methodological considerations laid out in Chapter 3. Eliminating one variable from the full set of purging models reduces the number of labor market sectors from 64 to 32, reducing the number of zero-cells in the underlying table, and making for a less cumbersome discussion.

Table 5.11: Observed and Purged Union Coverage Rates in Industries with Large Establishments vs. Industries with Small Establishments, Public Sector, 1983-2005

	Industries with Average Establishment Size 25 or Less				Industries with Average Establishment Size Greater than 25			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	1,457	46.26% (0.29)	45.76% (0.31)	-0.50%	29,239	32.17% (1.22)	30.63% (1.22)	-1.54%
1985	1,357	44.45% (0.29)	44.10% (0.31)	-0.35%	28,525	27.04% (1.21)	25.59% (1.21)	-1.45%
1987	1,418	43.32% (0.30)	43.05% (0.31)	-0.27%	28,021	30.39% (1.22)	29.36% (1.22)	-1.03%
1989	1,264	44.57% (0.30)	44.10% (0.32)	-0.47%	27,346	27.85% (1.26)	26.79% (1.28)	-1.06%
1991	1,412	44.33% (0.29)	43.95% (0.31)	-0.38%	28,542	29.11% (1.21)	28.99% (1.24)	-0.12%
1993	1,229	44.68% (0.29)	44.19% (0.31)	-0.49%	28,506	26.04% (1.25)	25.49% (1.27)	-0.55%
1995	1,101	44.28% (0.30)	44.36% (0.32)	0.08%	27,061	29.43% (1.37)	28.55% (1.41)	-0.88%
1997	1,677	43.27% (0.33)	43.26% (0.34)	-0.01%	22,643	30.73% (1.13)	30.42% (1.14)	-0.31%
1999	1,774	43.33% (0.32)	43.21% (0.33)	-0.12%	23,336	28.52% (1.07)	28.04% (1.08)	-0.48%
2001	1,414	42.02% (0.30)	41.90% (0.31)	-0.12%	26,592	31.31% (1.23)	30.52% (1.24)	-0.79%
2003	1,332	42.26% (0.30)	41.81% (0.31)	-0.45%	27,478	27.38% (1.22)	26.85% (1.24)	-0.53%
2005	1,346	41.24% (0.30)	40.83% (0.31)	-0.41%	27,330	27.27% (1.21)	26.97% (1.25)	-0.31%

Numbers in parentheses are jackknifed standard errors.

Figure 5.21: Occupational Percent Female by Average Establishment Size in Industry, Public Sector

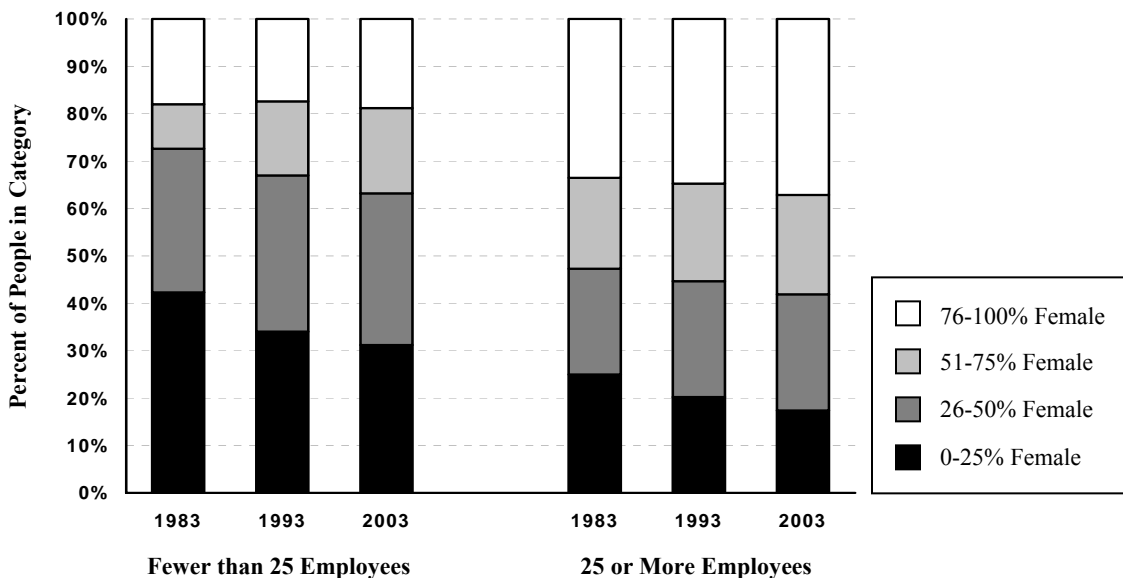
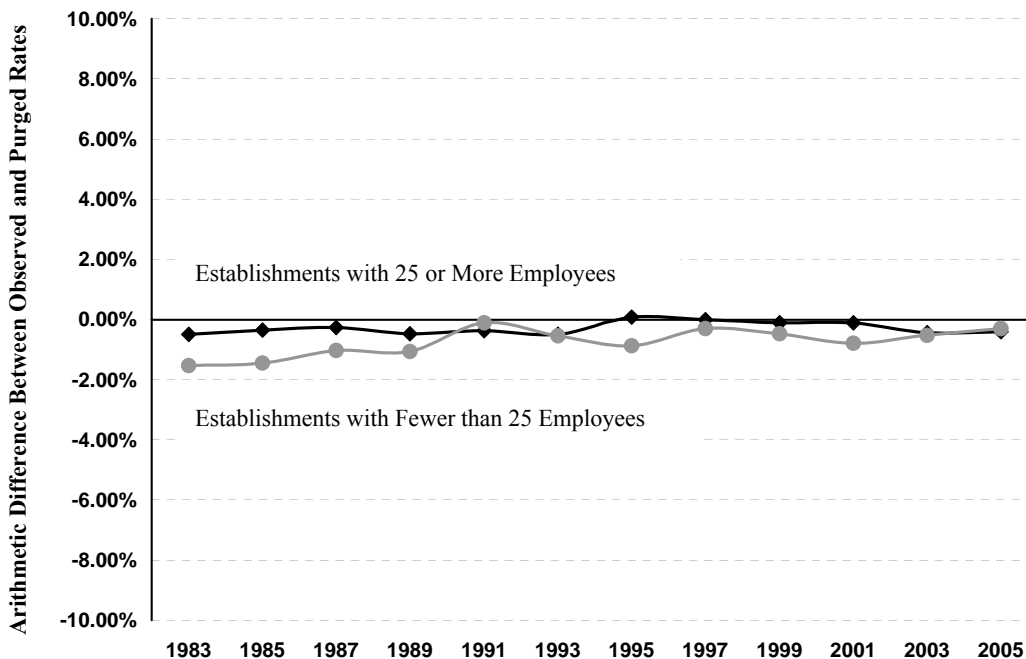


Figure 5.22: Public Sector Purging Results: Difference Between Observe And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Establishment Size



Observed and Purged Rates by Industry Tenure Levels

The final set of individual variable purging results is presented in Table 5.12, which shows the observed and purged union coverage rates for individuals working in industries with relatively long and relatively short tenure levels. Here, the results are interesting and present something of a puzzle. In both longer-tenure and shorter-tenure industries, the difference between observed and purged rates of union coverage are consistently negative, indicating that shifting the occupational sex composition of these sectors would reduce union coverage rates. Thus, in public sector industries with shorter-than-average tenure, workers are more likely to be covered by a union contract in part *because* of the sex composition of their occupations. Again, this may be because educational and health care services are part of the shorter-than-average tenure group, and female-dominated occupations in these industries—teachers and nurses, for example—are heavily unionized. On the other hand, union coverage rates would also decrease in industries with longer tenure levels if the occupational mix was evenly male- and female-dominated, but this effect fluctuates over time. The fluctuations can be seen clearly in Figure 5.24. The abrupt change in effect in 1995 and 1997 compared to earlier and later years is due to changes in the way the different two-digit industries were classified across the years. Recall from Chapter 3 that coding for both 1995 and 1997 is based on published BLS data from February, 1996. During that year, the heavily female-dominated Educational Service industry had exactly *average* tenure levels, but in earlier and later years had below-average tenure levels. Therefore, this major industry group was coded in the “average or above average” category in 1995 and 1997, but in the “below average” category for earlier and later years. This change almost certainly

accounts for the inconsistent patterns in the 1995 and 1997 purging model findings compared to the other years in the analysis (and the vacillation in Figure 5.24).

Table 5.12: Observed and Purged Union Coverage Rates in Industries with Average or Above vs. Below-Average Tenure Levels, Public Sector, 1983-2005

	Workers in Industries with Average or Above-Average Tenure				Workers in Industries with Shorter-than-Average Tenure			
	Weighted N	Observed Rate	Purged Rate	Difference	Weighted N	Observed Rate	Purged Rate	Difference
1983	14,511	43.96% (0.41)	41.31% (0.43)	-2.65%	16,288	46.88% (0.39)	44.17% (0.41)	-2.71%
1985	14,344	41.89% (0.42)	39.19% (0.43)	-2.70%	16,301	45.14% (0.39)	42.51% (0.41)	-2.63%
1987	14,500	42.15% (0.41)	39.23% (0.43)	-2.92%	16,143	43.47% (0.39)	41.01% (0.41)	-2.46%
1989	14,155	41.82% (0.42)	39.72% (0.43)	-2.10%	15,663	45.69% (0.40)	42.95% (0.41)	-2.74%
1991	14,724	42.61% (0.41)	40.31% (0.43)	-2.30%	16,486	44.55% (0.39)	41.87% (0.40)	-2.68%
1993	14,232	42.58% (0.42)	40.50% (0.43)	-2.08%	16,545	45.08% (0.39)	42.46% (0.40)	-2.62%
1995	25,054	45.20% (0.31)	45.79% (0.32)	0.59%	3,358	30.82% (0.80)	30.28% (0.80)	-0.54%
1997	21,618	44.25% (0.34)	44.53% (0.34)	0.28%	2,933	27.57% (0.83)	26.83% (0.81)	-0.74%
1999	11,498	40.25% (0.46)	37.34% (0.47)	-2.91%	13,874	43.57% (0.42)	41.29% (0.44)	-2.28%
2001	12,730	40.38% (0.43)	37.97% (0.45)	-2.41%	15,708	42.23% (0.39)	39.78% (0.41)	-2.45%
2003	12,955	39.68% (0.43)	37.49% (0.44)	-2.19%	16,174	43.00% (0.39)	40.43% (0.40)	-2.57%
2005	13,178	38.21% (0.42)	35.97% (0.43)	-2.24%	15,825	42.47% (0.39)	39.67% (0.40)	-2.80%

Numbers in parentheses are jackknifed standard errors.

Figure 5.23: Occupational Percent Female by Employer Tenure Levels in Industry, Public Sector

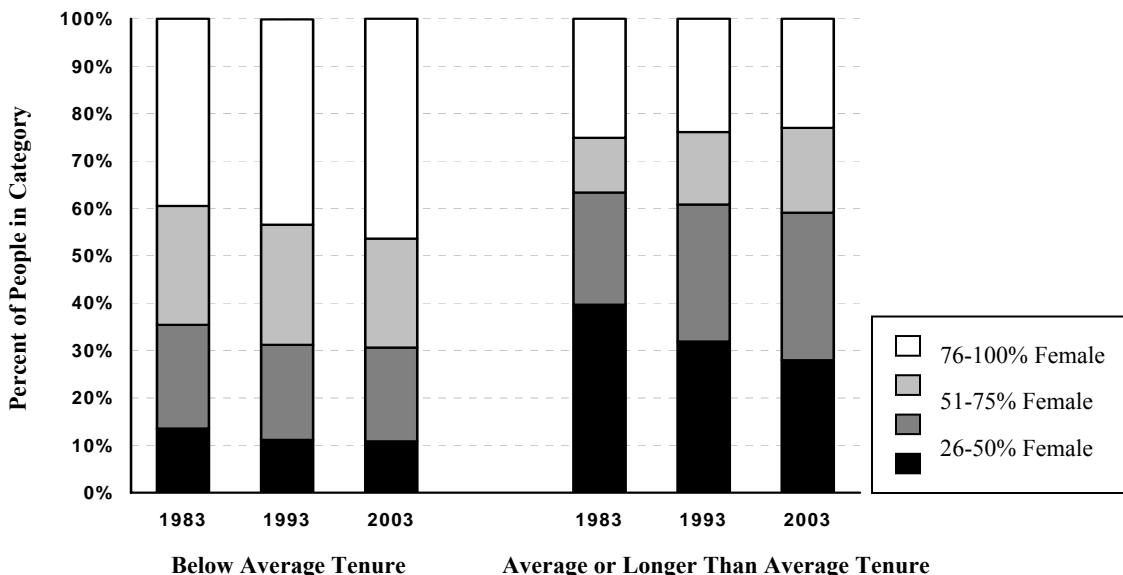
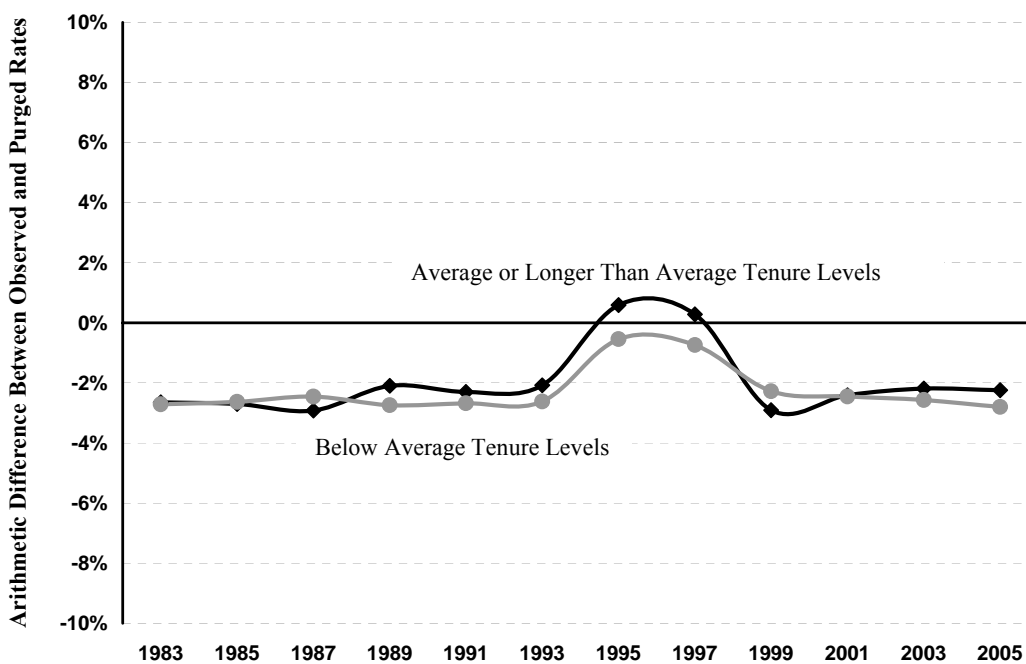


Figure 5.24: Public Sector Purging Results: Difference Between Observed And Purged Union Coverage Rates if Occupational Sex Composition were Independent of Employer Tenure



Summary of Individual-Variable Purging Model Results

Several general points can be gleaned from the purging model results presented thus far. First, taken together, the findings suggest that processes of unionization—and how they relate to occupational sex composition—operate quite differently in the public and private sectors. The private sector results provide modest support for my theoretical arguments. In the case of several of the group variables, had the segments that are generally considered “hard to organize” (such as occupations that have a high proportion of part-time workers) not *also* disproportionately female-dominated, rates of union coverage would have been higher, though the increases would have been small. Conversely, had the sectors that are “easier” to organize (such as occupations with a low proportion of part-time workers), not *also* been mainly male-dominated, rates of union coverage would have decreased. Again, such decreases would have been modest; in no cases were the differences between observed union coverage rates and purged rates greater in absolute value than five percent.

The public sector results showed different patterns. In virtually *no* “hard-to-organize” sector would shifting the sex composition toward more male-dominated occupations have increased union coverage rates. Indeed, in the case of some of the labor market sector variables, the opposite was true. Consider, for instance, industries with historically low levels of unionization, which have a slightly heavier share of female-dominated occupations. Had the occupational mix of these industries been equally male- and female-dominated occupations, union coverage would have *decreased* by a small amount. At the same time, however, some of the easier-to-organize sectors appeared to *benefit* from having a high concentration of male-dominated occupations. For instance,

had the occupational mix of industries with long tenure levels *not* been male-dominated, union coverage rates would have decreased. In general then these results suggest that, with respect to sex composition, two models of union organizing operate in the public sector: the conventional model, which organizes along traditional occupational, industrial, and demographic lines—and the female-friendly model, which would include teacher and health care unions, and which actually appears to capitalize on the heavy concentration of women within certain labor market sectors.

The next set of results from the full purging models include all the individual group variables, except establishment size, combined into one group variable with 32 possible categories. This analysis permits us to examine union coverage rates in much more finely differentiated labor market segments. Rather than simply looking at rates in historically less- vs. historically more-unionized occupations, for example, the results show observed and purged rates in historically more-unionized occupations with high percentage of part-time workers, less education, in historically more-unionized industries with high levels of employer tenure.

Private Sector Full Purging Model Results, 1983, 1993, and 2003

Figures 5.25 through 5.28 plot the arithmetic differences between the observed and purged rates in five labor market sectors. For the full purging model results, I limit the discussion to three time points: 1983, 1993, and 2003. I do so for two reasons. First, both the visual presentation and the discussion of results becomes unwieldy with 12 different time points, and the additional insights gained by including all 12 years are minimal. Second, some of the fluctuations across the 12 years reflect methodological and coding changes, as opposed to substantive trends. These fluctuations unnecessarily

complicate the bigger picture. I have already discussed the methodological issues and the way they have affected the appearance of temporal trends, both in Chapter 2 and in preceding results sections. In the remaining discussion of the full purging model results, I continue to interpret trends and changes with an eye toward these methodological issues.

To keep the visual representation clear, the results are presented in four groups which differ in terms of how compatible they are with traditional modes of union organizing. These groups include, first, the sector which is likely most compatible with traditional union organizing: occupations and industries that have historically been highly organized. The next two sectors include: (1) occupations with historically *high* levels of organization and industries with historically *low* levels; and (2) occupations with historically *low* levels of organization and industries with historically *high* levels. Last is the sector that is regarded as the hardest-to-organize along traditional lines: occupations and industries with historically low levels of organization. These four figures provide an overview of the results, revealing certain dissimilarities among the four groups and offering a broad look at temporal trends.

It is important to stress, however, that these figures omit some important information. First, they plot *all* purged/observed differences, regardless of whether or not the differences are statistically significant. Many of them are not. Additionally, they provide no information on the sex composition of the sectors, which is important for interpreting the results. Therefore, my discussion of the results frequently references the more detailed information provided in Table 5.13, which appears at the end of this section. As with the earlier sets of results, statistically significant differences are presented in boldface type. Information on the sex composition of each sector is shown

in the column labeled “Percent Female”; this provides the median value of occupational percent female for all occupations in the particular sector. That is, half of the occupations in the sector have a higher proportion of women, and half have a lower proportion of the median value of percent female.

Finally, before moving on to a discussion of the results, it is important to reiterate that the occupational and industrial composition of sectors is not necessarily stable over time. It is tempting to think that a particular 3-digit occupation and industry combination—such as retail sales clerk working in a shoe store—would be found in the same labor market sector throughout all 20 years of the analysis. However, occupational and industrial characteristics change over the years; therefore, the classifications of occupations and industries into labor market sectors also sometimes changed. It is well known, for example, that educational requirements in occupations have increased over time. Therefore, for any given 3-digit occupation, the median education level might have increased from “high school or less” to “more than high school” over the time period included in the analysis. This would mean that that individual occupation would be classified in a “high school or less” sector at one point in time, and in a “more than high school” sector at a later time period. Similar shifts are possible for the percentage of women or part-timers in an occupation, or the tenure levels in an industry. To aid in the interpretation below, I provide specific examples of common occupations within sectors. However, it should be clear that the same occupations might be in a different sector at a different point in time. What remain stable are the *characteristics of the sector*, but not the specific occupations or industries within the sector.

Historically More-Unionized Occupations in Historically More-Unionized Industries

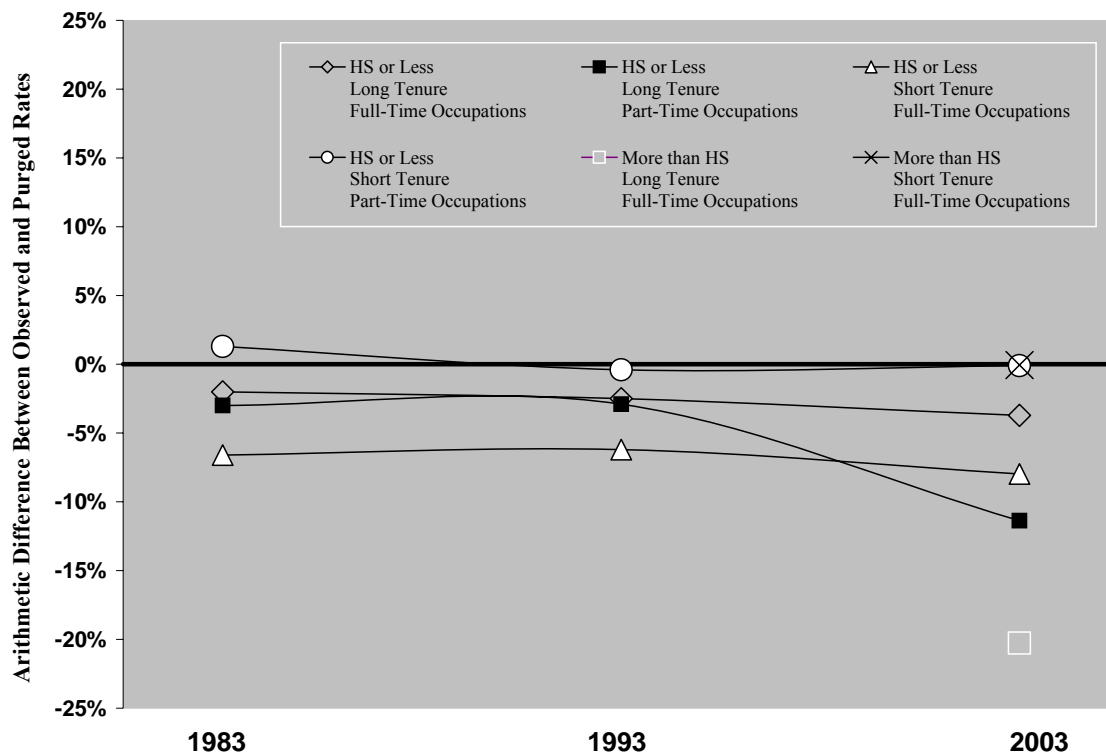
Representing the segment of the labor market that is likely *most* suited to traditional blue-collar unionism, Figure 5.25 and the corresponding panels in Table 5.13 show occupations in industries that have historically been highly unionized. Within that, the six different symbols in Figure 5.25 represent different combinations of occupational education levels, occupational part-time levels, and industry tenure levels. For example, the white triangle in Figure 5.25 represents the sector that includes historically more-unionized occupations and industries, occupations with a median education level of high school or less, where less than one-third of employees work part-time, in industries with relatively short tenure levels. Looking at the corresponding row in Table 5.13 (top panel of the table, third row from the top), we can see that this sector was comprised of 8,779 employees and was heavily male-dominated in 1983 (half of the occupations in the sector had less than 2.0 percent women, and half had more than that).

Note that in 1983, four out of the eight possible sectors had a sample size of zero. This meant that no one worked in that sector in that year. In terms of variable coding, it meant that no one in the CPS-MORG sample had the combination of industry and occupation characteristics which would have put them into that level of the group variable. When the sample size was zero for a particular value of the group variable, that value simply did not exist. Sectors (group levels) with a sample size of zero in any given year were not included in the analysis for that year.²⁷

²⁷ This is slightly different from the small cell size issue discussed in Chapter 3 above. When group levels had a sample size of zero, they could be omitted from the analysis altogether. It was only when the group size was *greater* than zero, but the *cross-classification* of the composition, group, and dependent variables produced cell sizes below 1.5, that the sparse data problems described in Chapter 3 came into play.

The findings in Figure 5.25 tell a fairly straightforward story. Since these sectors are overwhelmingly comprised of male-dominated occupations (see Table 5.13), and since the differences between observed and purged union coverage rates in these sectors are mostly negative, the findings can be generally interpreted in the following way: had these sectors *not* been male-dominated—had they been comprised of an equal mix of male- and female-dominated occupations—union coverage rates would have dropped, precipitously in some cases, in this group of sectors. It is important to note that not all of the observed/purged differences in Figure 5.25 are statistically significant. This is partly a function of the sample size in these sectors. For example, in the sector that includes part-time, high school occupations in industries with relatively long tenure (the black square in Figure 5.25), we see by the corresponding row in Table 5.13 that fewer than

Figure 5.25: Difference Between Observed and Purged Union Coverage Rates in Historically More-Unionized Occupations and Industries, Private Sector



600 people worked in this sector in any given year; thus even though the observed/purged difference was fairly large (particularly in 2003), there was not enough power to detect statistical significance.

Consider, however, the sets of differences that are statistically significant. First is the sector represented by the grey diamond in Figure 5.25. This was a large sector, comprised of tens of thousands of employees and more than 150 different 3-digit occupations. Most of these occupations were heavily male-dominated. Specific examples of detailed occupations in this sector included truck drivers; assemblers and fabricators; and various types of production machine operators. The findings indicate that *changing nothing about these occupations but their sex composition to reflect an even mix of men and women*, union coverage rates would have dropped by 2.0, 2.5, and 3.7 percentage points in 1983, 1993, and 2003 respectively.

Next is the sector represented by the white triangle in Figure 5.25, which includes employees in full-time, high school occupations in industries with relatively short tenure levels. We see here that across all three years of the analysis, this group was heavily comprised of male-dominated occupations, and that changing nothing but the sex composition of occupations in the sector to reflect an even mix of male- and female-dominated occupations, rates of union coverage would have dropped by over six percentage points.

Finally, consider the sector that includes full-time occupations requiring more than a high school degree in industries with long tenure (the white outlined square in Figure 5.25). My analysis of the data indicated that only one occupation happened to fall into this sector in 2003: aircraft pilots and flight engineers. In 2003, this occupation was

less than five percent female. Thus, the findings suggest that had aircraft pilots and flight engineers been comprised of an equal mix of men and women, union coverage rates in this occupation would have decreased by over 20 percentage points in 2003.

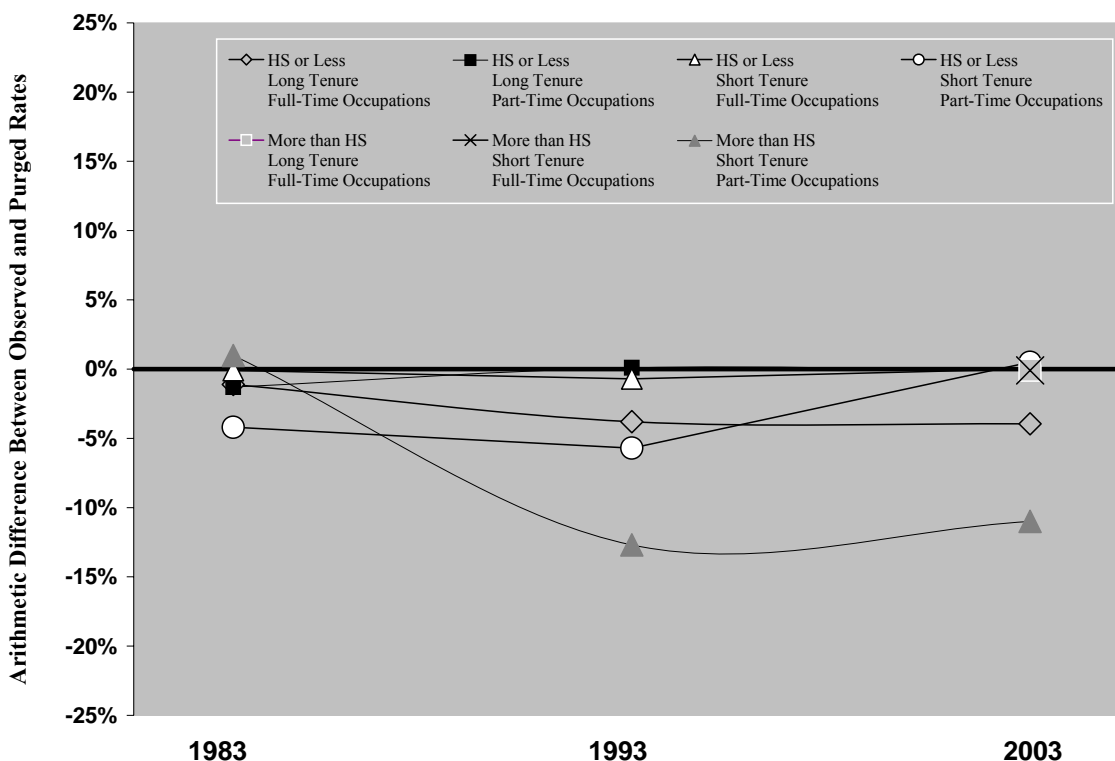
These findings do suggest an association between sex composition and union coverage that is consistent with my hypotheses. That is, union coverage is higher in male-dominated sectors in part *because* of those sectors are male-dominated, and not entirely because these sectors are easier to organize because their other characteristics make them more compatible with traditional unionism. However, the change in this association over time is not consistent with what one might expect. Because of the increased emphasis on organizing new types of workers after 1995, we might have expected to see larger negative differences in the earliest years of the analysis, with smaller differences in the later years as unions tried to broaden their organizing tactics. Instead, we see the opposite. Even as unions lost ground in the traditionally male-dominated sectors of the labor market over the last 20 years, the discrepancies in union coverage between male- and female-dominated occupations grew, suggesting that the labor movement as a whole was more successful in retaining its core membership in the traditionally organized, male-dominated sectors than it was in expanding into the relatively unorganized female-dominated sector.

Historically More-Unionized Occupations in Historically Less-Unionized Industries

Next, Figure 5.26 plots the observed/purged union coverage rates in historically more-unionized occupations and historically less-unionized industries. By and large, this set of labor market sectors is small in comparison to the set above, as the combination of more-unionized occupations in less-unionized industries is less common. Generally,

however, occupations in these sectors are still heavily male-dominated, as shown in Table 5.13. Here, the only observed/purged difference that is statistically significant is the difference in the sector with part-time occupations requiring more than high school, in

Figure 5.26: Difference Between Observed and Purged Union Coverage Rates in Historically More-Unionized Occupations and Historically Less-Unionized Industries, Private Sector



industries with relatively short tenure levels. This sector is represented by the dark grey triangle in Figure 5.26, and the 1993 observed/purged difference is statistically significant. (Though the magnitude of the difference is comparable in 2003, the size of this group drops from 1,620 in 1993 to 1,139 in 2003, reducing the efficiency of the estimates). This sector is comprised primarily of repairer/installer occupations, such as computer, automated teller, and office machine repairers; aircraft mechanics and service

technicians; and precision instrument and equipment repairers. Again the findings indicate that had all the characteristics of this sector been unchanged, *except the sex composition of these occupations*, union coverage rates in the sector would have dropped by more than ten percentage points. And because the observed/purged differences increased in 1993 (and remained large in magnitude in 2003) the interpretation is the same as above: the association between occupational sex composition and union coverage in this sector got *stronger*, not weaker, over time suggesting that unions put more resources into retaining membership in male-dominated occupations than seeking to expand membership in female-dominated occupations.

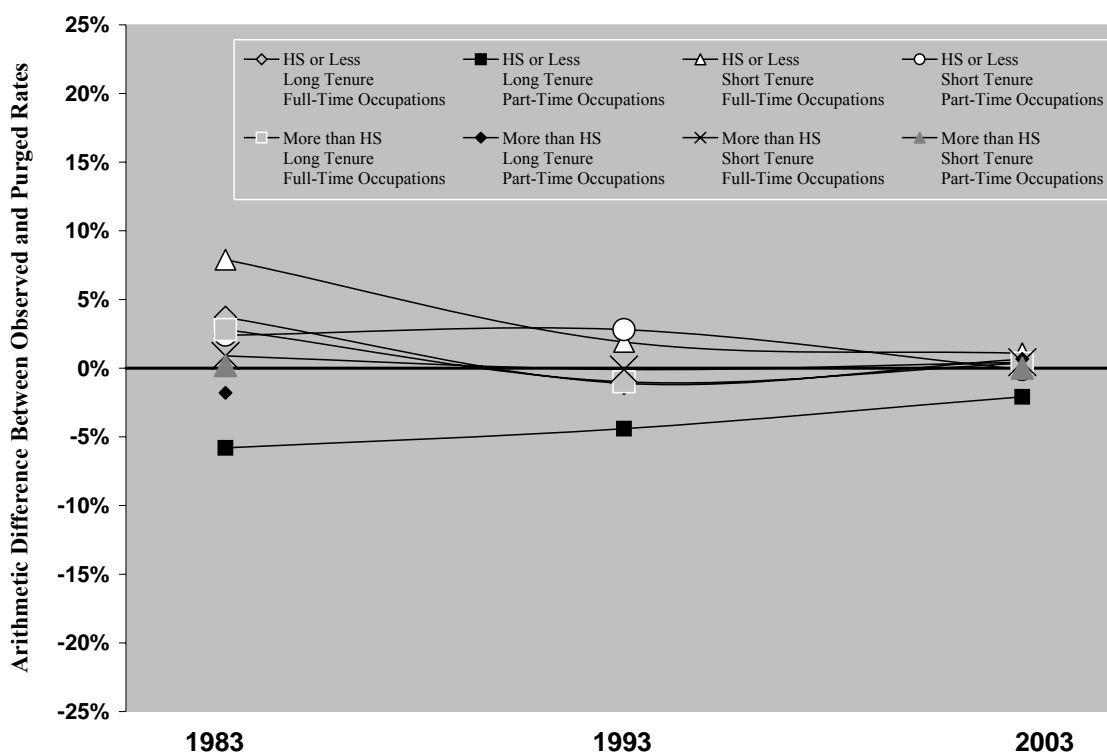
Historically Less-Unionized Occupations in Historically More-Unionized Industries

The next group of sectors, represented in Figure 5.27, includes occupations that are historically less-unionized in industries that are historically more-unionized. Specific occupation/industry combinations in this sector include, for example, an electrical engineer working for a telephone company, or an accountant working for a chemical manufacturer. What is interesting about the general pattern in Figure 5.27 is that, unlike the first two groups—both of which were comprised of the historically more-unionized occupations and both of which suggested *increasing* disparities in union coverage between male- and female-dominated occupations over time—this group, at first glance, appears to show *decreasing* disparities over time.

This interpretation is not entirely appropriate, however, as a glance at the more detailed information in Table 5.13 reveals. First, the data in Table 5.13 shows that the majority of observed/purged differences in this group are not statistically significant. Although the differences are fairly large, particularly in 1983, the samples in most of

these sectors are relatively small, again decreasing the precision of the estimates, particularly in the later years of the analysis. There are two exceptions to this: the sectors that includes people working in full-time, high school occupations, in industries with either short (represented by the white triangle) or long (represented by the grey diamond) tenure. These occupations were heavily female-dominated in 1983, and the difference between the observed and purged rates was positive and relatively—a finding that is consistent with my theoretical arguments.

Figure 5.27: Difference Between Observed and Purged Union Coverage Rates in Historically Less-Unionized Occupations and Historically More-Unionized Industries, Private Sector



However, a glance at the “percent female” column in Table 5.13 over the three time points indicates an interesting shift in the sex composition of occupations in these sectors. In 1983, all the sectors were fairly sex-segregated; that is, the group of

occupations in each sector was either largely male or largely female. By 1993, the sex composition of occupations in the sector had become more even. This shifting sex composition is probably due partly to a true equalizing of the sex mix of occupations in these sectors, as women entered the labor force in large numbers between 1983 and 2003. But it is certainly also partly to methodological and coding changes over the three time points, which had the effect of reassigning occupations into sectors, as mentioned at the beginning of the discussion on purging model results. To understand how this might affect the occupational sex composition in a sector, consider the occupation of secretary. In 1983, this was a “full-time” occupation with a median education level of high school, and therefore, depending on which industry she was employed, an individual secretary would have either been classified in the *High School or Less / Short Tenure / Full-Time* or the *High School or Less / Long Tenure / Full Time* sector. Indeed, in the *High School or Less / Short Tenure / Full-Time* sector, secretary was the most common occupation and comprised just over one-third of the people in this sector in 1983. By 1993, the occupation of secretary was still a “full-time” occupation, but now it had a median education level of more than high school. Therefore, the individual secretary would have either been classified in the *More than High School / Short Tenure / Full-Time* or the *More than High School / Long Tenure / Full Time* sector, causing the sex mix of both the *High School* and the *More than High School* sectors to shift between 1983 and 1993. Because the sex composition of these sectors changed over the three time points, the shrinking observed/purged differences is likely not due to more equal-opportunity organizing, but due instead to the more even mix of sexes in these sectors.

Even taking into account these methodological considerations, the two statistically significant differences among these groups provide clear support for my hypotheses. As noted above, they are the observed/purged differences among those working in full-time, high school occupations in industries with both long and short levels in 1983. As shown in Table 5.13, the occupations in both sectors were largely female-dominated in 1983. (Here again, secretary and similar clerical job titles comprised the largest share of occupations in these groups in 1983.) The positive difference between observed and purged union coverage rates in these sectors indicates that holding constant all the other characteristics, had the sex composition of these occupations not been overwhelmingly female, rates of union coverage in these sectors would have increased by 3.7 in long-tenure industries and 7.9 percentage points in short-tenure industries.

Historically Less-Unionized Occupations in Historically Less-Unionized Industries

Finally, I turn to Figure 5.28, which plots the differences between observed and purged union coverage rates in the sector that is the *least* compatible with traditional modes of organizing: historically less-unionized occupations in historically less-unionized industries. Of the four groups, this sector is the largest, and not surprisingly, it is the one with the most growth between 1983 and 2003: the overall weighted sample size in this sector was 81,061 in 1983; 93,048 in 1993; and 104,624 in 2003. Table 5.13 also indicates that of the four sets, this group of sectors has the heaviest concentration of female-dominated occupations.

In general, the trends in Figure 5.28 provide very little support for the argument that union membership was lower in these sectors because they were female-dominated.

In 2003, one sector in this group does have statistically significant observed/purged differences: the sector including part-time occupations with median education levels above high school in industries with relatively short tenure levels (represented by the grey triangle in Figure 5.28). This single sector comprised the largest share of employment in 2003, and included a diverse group of detailed occupations. The most common occupations in this sector were retail salespersons; supervisors of retail salespersons; bookkeeping, accounting, and auditing clerks; customer service representatives; and secretaries/administrative assistants. Together, these five occupations made up over one-third of the total employment in this group. The findings indicate that an estimated 1.1 percent of non-unionized employees in this sector would have had union coverage had it been an even mix of male- and female-dominated occupations.

To summarize the private sector results: overall, the findings provide support for my arguments, though in some unexpected ways. They indicate that the largest disparities in union coverage between male- and female-dominated occupations—that is, the largest status composition effects—showed up in the sectors that were *more* consistent with traditional modes of union organizing. Union coverage rates were higher in these sectors in part *because* occupations in these sectors were male-dominated and not just because the sectors were more consistent with traditional union organizing. Moreover, the status composition effect in the unionized sector increased, rather than decreased over time, suggesting that as unions lost ground in these sectors, they concentrated efforts on maintaining membership in the male-dominated fields rather than branching out into female-dominated fields in these sectors. In the sectors of the labor market that were less compatible with unionism, there was also some support for my

Table 5.13: Full Purging Model Results, Private Sector: 1983, 1993, and 2003

1983					
More-Unionized Occupations & More-Unionized Industries	Group N	Percent Female*	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	26,416	14.9%	45.0% (0.5)	43.0% (0.6)	-2.0%
High School or Less Long Tenure Part-Time	509	47.5%	46.1% (3.4)	43.1% (3.9)	-3.0%
High School or Less Short Tenure Full-Time	8,779	2.0%	33.6% (0.8)	27.0% (2.6)	-6.6%
High School or Less Short Tenure Part-Time	33	26.8%	16.9% (7.1)	18.2% (8.0)	1.3%
More than High School Long Tenure Full-Time	0	-----	-----	-----	-----
More than High School Long Tenure Part-Time	0	-----	-----	-----	-----
More than High School Short Tenure Full-Time	0	-----	-----	-----	-----
More than High School Short Tenure Part-Time	0	-----	-----	-----	-----
More-Unionized Occupations & Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	2,282	6.9%	25.3% (1.4)	24.2% (3.3)	-1.1%
High School or Less Long Tenure Part-time	70	21.5%	20.2% (6.1)	18.9% (7.5)	-1.3%
High School or Less Short Tenure Full-Time	6,982	6.9%	15.1% (0.7)	14.9% (1.4)	-0.1%
High School or Less Short Tenure Part-Time	2,205	21.5%	21.3% (1.4)	17.1% (2.7)	-4.2%
More than High School Long Tenure Full-Time	0	-----	-----	-----	-----
More than High School Long Tenure Part-time	0	-----	-----	-----	-----
More than High School Short Tenure Full-Time	0	-----	-----	-----	-----
More than High School Short Tenure Part-Time	295	11.3%	14.9% (3.1)	15.9% (5.7)	1.0%

* This column shows the median percentage of women in all occupations in the sector. Thus, half of the occupations in the sector have a higher share of women than the value shown and half have a lower share. The table continues on the next page.

Table 5.13 continued

1983 continued					
Less-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	6,494	80.8%	27.2% (0.9)	30.9% (1.2)	3.7%
High School or Less Long Tenure Part-time	901	28.8%	40.0% (2.5)	34.2% (4.8)	-5.8%
High School or Less Short Tenure Full-Time	1,381	90.8%	8.2% (1.2)	16.1% (2.9)	7.9%
High School or Less Short Tenure Part-Time	321	26.6%	13.3% (2.8)	15.7% (6.4)	2.4%
More than High School Long Tenure Full-Time	4,476	23.2%	9.7% (0.7)	12.4% (2.6)	2.8%
More than High School Long Tenure Part-time	49	64.6%	22.5% (7.1)	20.7% (11.1)	-1.8%
More than High School Short Tenure Full-Time	876	32.4%	8.5% (1.5)	9.4% (2.7)	0.9%
More than High School Short Tenure Part-Time	1	64.6%	19.5% (10.0)	19.7% (11.7)	0.2%
Less-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	4,583	89.1%	12.1% (0.8)	10.6% (1.4)	-1.5%
High School or Less Long Tenure Part-time	768	60.8%	19.4% (2.2)	19.4% (3.6)	-0.0%
High School or Less Short Tenure Full-Time	21,401	82.5%	6.1% (0.3)	7.0% (0.4)	0.9%
High School or Less Short Tenure Part-Time	23,159	77.9%	7.4% (0.3)	6.7% (0.5)	-0.7%
More than High School Long Tenure Full-Time	1,104	34.5%	7.4% (1.2)	7.8% (1.3)	0.5%
More than High School Long Tenure Part-time	33	64.6%	13.9% (6.5)	18.0% (11.1)	4.1%
More than High School Short Tenure Full-Time	7,570	38.1%	6.4% (0.4)	7.7% (0.6)	1.3%
More than High School Short Tenure Part-Time	22,443	28.4%	9.4% (0.3)	10.1% (0.4)	0.7%

This table continues on the next page.

Table 5.13 continued

1993					
More-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	22,020	18.5%	31.1% (0.3)	28.6% (0.4)	-2.5%
High School or Less Long Tenure Part-time	348	47.4%	25.8% (2.2)	22.9% (3.0)	-2.9%
High School or Less Short Tenure Full-Time	7,229	1.7%	23.6% (0.5)	17.4% (1.6)	-6.2%
High School or Less Short Tenure Part-Time	13	27.7%	11.0% (3.7)	10.5% (3.8)	-0.4%
More than High School Long Tenure Full-Time	0	----	----	----	----
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	0	----	----	----	----
More than High School Short Tenure Part-Time	0	----	----	----	----
More-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	223	6.0%	20.4% (2.5)	16.7% (3.2)	-3.8%
High School or Less Long Tenure Part-time	3	95.7%	12.7% (4.3)	12.8% (4.9)	0.1%
High School or Less Short Tenure Full-Time	9,374	5.8%	12.8% (0.4)	12.1% (1.0)	-0.7%
High School or Less Short Tenure Part-Time	1,879	27.7%	18.9% (0.9)	13.2% (2.2)	-5.7%
More than High School Long Tenure Full-Time	0	----	----	----	----
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	0	----	----	----	----
More than High School Short Tenure Part-Time	1,620	11.5%	26.7% (1.1)	14.0% (1.8)	-12.7%

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Table 5.13 continued

1993 continued					
Less-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	2,425	32.4%	28.7% (0.9)	27.6% (1.0)	-1.1%
High School or Less Long Tenure Part-time	115	47.1%	31.2% (3.5)	26.8% (3.8)	-4.4%
High School or Less Short Tenure Full-Time	255	44.2%	14.0% (2.0)	15.9% (2.3)	1.9%
High School or Less Short Tenure Part-Time	124	35.3%	5.0% (1.6)	7.8% (2.8)	2.8%
More than High School Long Tenure Full-Time	4,440	30.2%	8.1% (0.4)	7.1% (0.8)	-1.0%
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	702	50.4%	8.3% (1.0)	8.2% (1.5)	-0.1
More than High School Short Tenure Part-Time	0	----	----	----	----
Less-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	1,504	83.1%	12.2% (0.8)	8.4% (1.2)	-3.8%
High School or Less Long Tenure Part-time	187	47.0%	10.2% (2.0)	10.6% (2.7)	0.4%
High School or Less Short Tenure Full-Time	12,106	44.2%	6.4% (0.2)	6.7% (0.3)	0.3%
High School or Less Short Tenure Part-Time	18,336	80.0%	5.4% (0.2)	5.8% (1.6)	0.5%
More than High School Long Tenure Full-Time	2,957	47.0%	4.0% (0.4)	5.2% (0.5)	1.2%
More than High School Long Tenure Part-time	2	41.3%	12.9% (4.3)	12.7% (4.8)	-0.3%
More than High School Short Tenure Full-Time	8,994	48.9%	5.2% (0.2)	4.7% (0.2)	-0.6%
More than High School Short Tenure Part-Time	48,962	62.2%	6.5% (0.1)	5.9% (0.1)	-0.6%

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Table 5.13 continued

2003					
More-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	17,695	17.3%	22.6% (0.5)	18.9% (0.6)	-3.7%
High School or Less Long Tenure Part-time	319	48.1%	29.6% (3.6)	18.2% (4.5)	-11.4%
High School or Less Short Tenure Full-Time	8,315	2.4%	19.3% (0.7)	11.3% (3.0)	-8.0%
High School or Less Short Tenure Part-Time	6	16.1%	9.3% (5.0)	9.2% (5.2)	-0.1%
More than High School Long Tenure Full-Time	155	4.9%	47.9% (5.2)	27.6% (4.8)	-20.3%
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	1	4.9%	9.9% (5.3)	9.8% (5.6)	-0.1%
More than High School Short Tenure Part-Time	0	----	----	----	----
More-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	2,284	6.3%	15.9% (1.2)	12.0% (1.7)	-4.0%
High School or Less Long Tenure Part-time	21	16.1%	7.8% (4.3)	7.8% (4.4)	-0.1%
High School or Less Short Tenure Full-Time	8,460	7.1%	9.3% (0.5)	9.3% (0.8)	0.0%
High School or Less Short Tenure Part-Time	352	16.1%	9.7% (2.3)	10.2% (2.8)	0.5%
More than High School Long Tenure Full-Time	3	4.9%	9.8% (5.2)	9.7% (5.5)	-0.1%
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	6	4.9%	9.4% (5.1)	9.3% (5.3)	-0.1%
More than High School Short Tenure Part-Time	1,139	13.3%	26.3% (2.0)	15.3% (3.9)	-11.0%

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Table 5.13 continued

2003 continued					
Less-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	1,803	33.2%	19.0% (1.4)	19.6% (1.6)	0.7%
High School or Less Long Tenure Part-time	157	76.4%	11.3% (3.3)	9.2% (4.2)	-2.1%
High School or Less Short Tenure Full-Time	159	42.3%	8.3% (2.8)	9.4% (3.3)	1.1%
High School or Less Short Tenure Part-Time	22	63.0%	9.9% (4.7)	9.8% (5.3)	-0.1%
More than High School Long Tenure Full-Time	5,582	35.0%	3.7% (0.4)	4.0% (1.0)	0.4%
More than High School Long Tenure Part-time	56	66.5%	8.8% (3.9)	9.5% (5.2)	0.7%
More than High School Short Tenure Full-Time	540	35.0%	5.5% (1.4)	5.9% (2.2)	0.4%
More than High School Short Tenure Part-Time	2	66.5%	9.8% (5.2)	9.8% (5.7)	0.0%
Less-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	2,089	83.2%	11.9% (1.1)	9.9% (1.4)	-1.9%
High School or Less Long Tenure Part-time	558	76.4%	12.4% (2.1)	9.9% (3.9)	-2.5%
High School or Less Short Tenure Full-Time	15,627	42.3%	5.4% (0.3)	5.0% (0.3)	-0.4%
High School or Less Short Tenure Part-Time	14,185	76.4%	5.0% (0.3)	3.9% (0.5)	-1.1%
More than High School Long Tenure Full-Time	9,534	52.6%	7.6% (0.4)	6.2% (0.4)	-1.4%
More than High School Long Tenure Part-time	59	66.5%	10.1% (4.1)	10.0% (5.3)	0.0%
More than High School Short Tenure Full-Time	16,760	48.0%	5.2% (0.3)	4.7% (0.3)	-0.5%
More than High School Short Tenure Part-Time	45,812	57.7%	5.0% (0.2)	6.1% (0.3)	1.1%

hypotheses: union coverage rates in two sectors of these sectors would have been slightly higher had the occupations in these sectors not been female-dominated. This provides some support for my argument that a modest—but not inconsequential—part of private sector union decline is due to missed organizing opportunities in the expanding, female-dominated sectors of the economy.

Public Sector Full Purging Model Results, 1983, 1993, and 2003

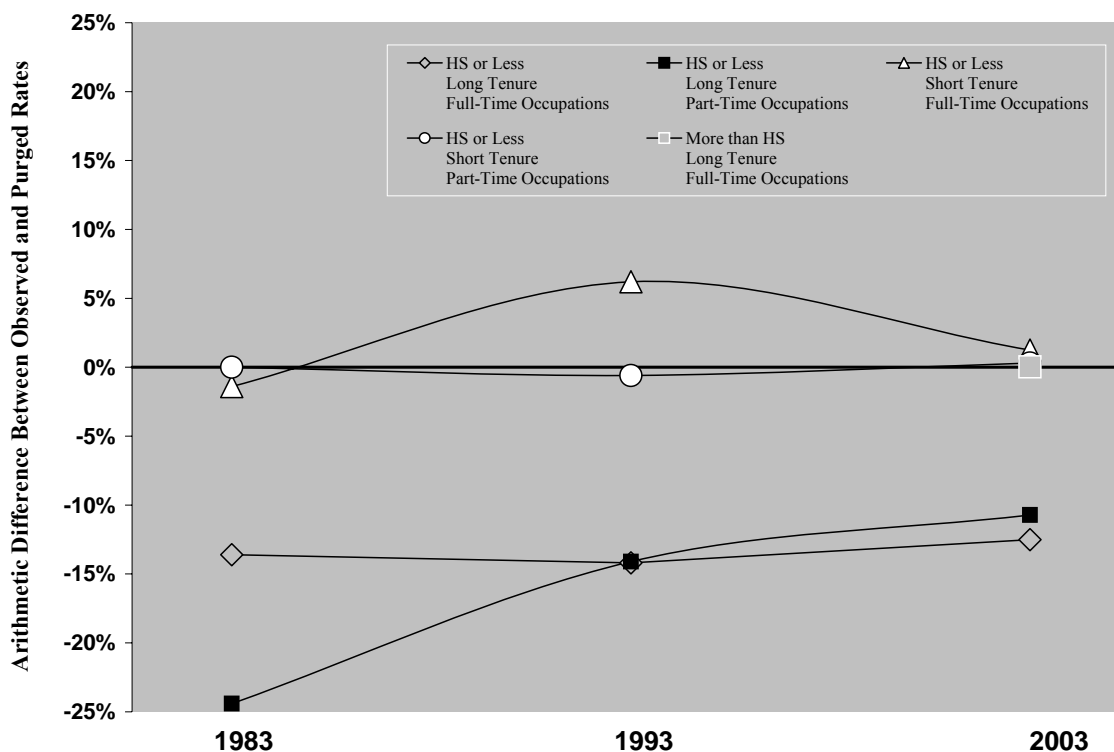
Before discussing the specifics of the public sector findings, it is important to reiterate a point noted above: because the public sector comprises less than one-fifth of all employment in the U.S., the public sector groups in this analysis were far smaller than private sector groups. Therefore, while public sector findings appear more dramatic across the board, some of the large observed/purged differences in the public sector were statistically non-significant.

Historically More-Unionized Occupations in Historically More-Unionized Industries

Figure 5.29 plots observed/purged differences in union coverage in the most union-compatible sector: historically more-unionized occupations in historically more-unionized industries. As the corresponding entries in Table 5.14 (included at the end of this section) show, a small share of public sector employees worked in occupations and industries that were historically heavily unionized. The total weighted sample size in this group of sectors was 1,745, 1,330, and 1,164 in 1983, 1993, and 2003 respectively. Thus, while the large observed/purged differences in two of the sectors might be regarded as evidence of a sizeable status composition effect (favoring union coverage in male-dominated occupations), the fact that these differences are based on relatively small sample sizes and are statistically non-significant warns against making unreserved

statements to that effect. Indeed, just one of the observed/purged differences in this sector is statistically significant—the difference represented by the grey diamond in 1993. This group includes people working in full-time, high school occupations in industries with long tenure levels. Here, Table 5.14 does indicate that this sector is heavily comprised of male-dominated occupations, so this finding is consistent with my theoretical arguments and suggests that *even among certain public sector unions, there has been a bias against organizing in female-dominated occupations*. Had this sector been evenly comprised of male- and female-dominated occupations, union coverage rates would have dropped by over 14 percentage points.

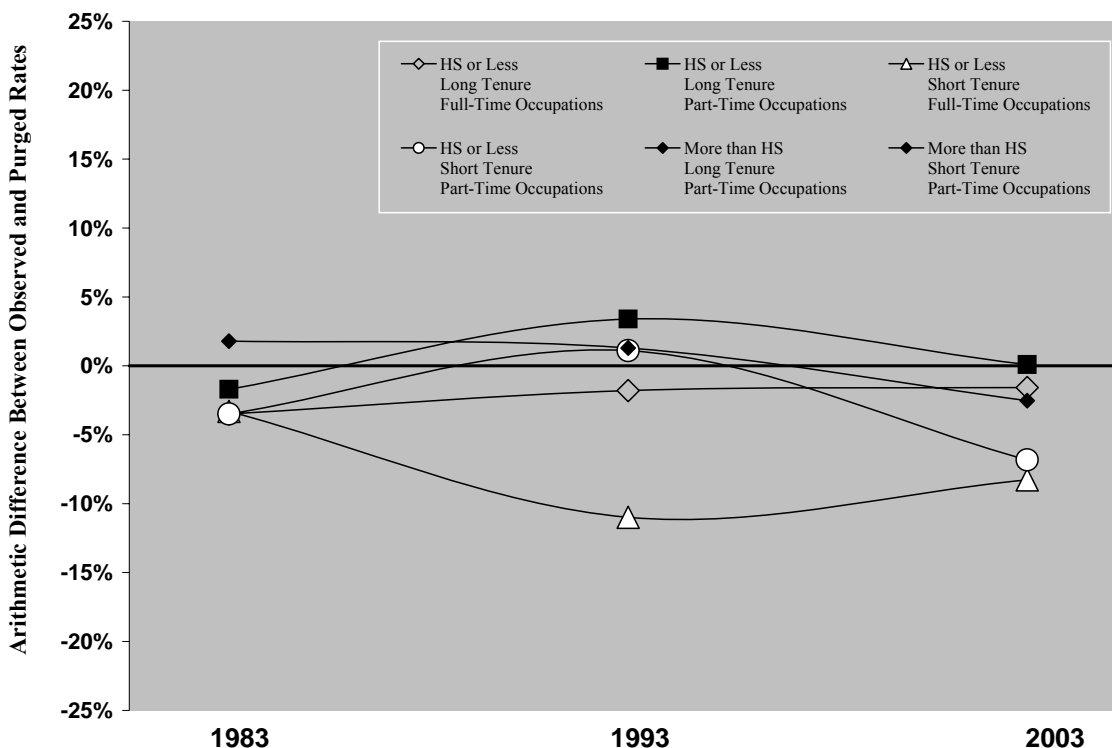
Figure 5.29: Difference Between Observed and Purged Union Coverage Rates in Historically More-Unionized Occupations and Industries, Public Sector



Historically More-Unionized Occupations in Historically Less-Unionized Industries

Similar caveats about sample size must be issued for the sector including more-unionized occupations in less-unionized industries. The set of detailed occupations in this group is fairly diverse, but some common ones are bus drivers, laborers (except construction), laundering and dry cleaning machine operators, and electricians. Again, the trends in Figure 5.30 hint that union coverage is higher in these occupations because they are heavily male-dominated. The observed/purged differences are especially large in the sector that includes high school, part-time occupations in industries with relatively short tenure levels (represented by the white triangle). However, the standard errors are large and none of the differences in this group of sectors are statistically significant.

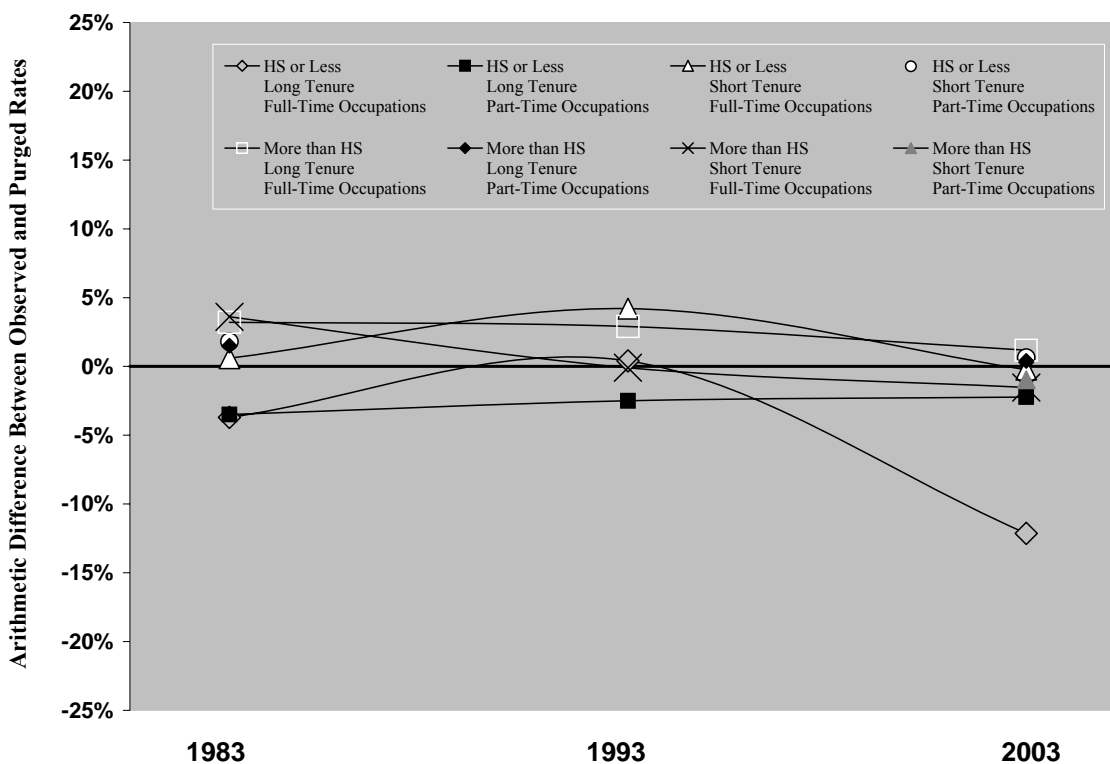
Figure 5.30: Difference Between Observed and Purged Union Coverage Rates in Historically More-Unionized Occupations and Historically Less-Unionized Industries, Public Sector



Historically Less-Unionized Occupations in Historically More-Unionized Industries

Once again, none of the observed/purged differences are significant in the sector that includes less-unionized occupations in more-unionized industries. The observed/purged differences in this group are plotted in Figure 5.31. As shown in the corresponding panels in Table 5.14, again, the individual sectors in this group are quite small—many are comprised of less than 100 employees.

Figure 5.31: Difference Between Observed and Purged Union Coverage Rates in Historically Less-Unionized Occupations and Historically More-Unionized Industries, Public Sector



There is one finding in this sector that deserves investigation—the abrupt shift in observed/purged differences among full-time, high school occupations in industries with relatively long tenure levels (represented by the grey diamond in Figure 5.31). In this

sector, the observed/purged difference drops suddenly, from +0.4 percentage points in 1993 to -12.1 percentage points in 2003. Since neither of these differences is statistically significant, the abrupt shift might be dismissed as being within the bounds of sampling error. However, an examination of the detailed occupations that comprised this group in 1993 and 2003 tells a different story. In 1993, this sector was comprised of a variety of different occupations, including meter readers, stock and inventory clerks, general office clerks, and janitors and cleaners. No one occupation made up the bulk of employment in this sector. However, in 2003, the heavily unionized occupation of postal service mail carriers made up nearly 80 percent of employment in this sector. This occupation was coded as having a median education level of *more than high school* in 1993, but a median education level of *high school or less* in 2003. Therefore, this male-dominated occupation switched categories and changed the union coverage rates in that sector, accounting for the abrupt shift. This illustrates how moving a single occupation moving from one sector to another can create the appearance of temporal changes, and underscores the importance of drawing careful conclusions about temporal trends.

Historically Less-Unionized Occupations in Historically Less-Unionized Industries

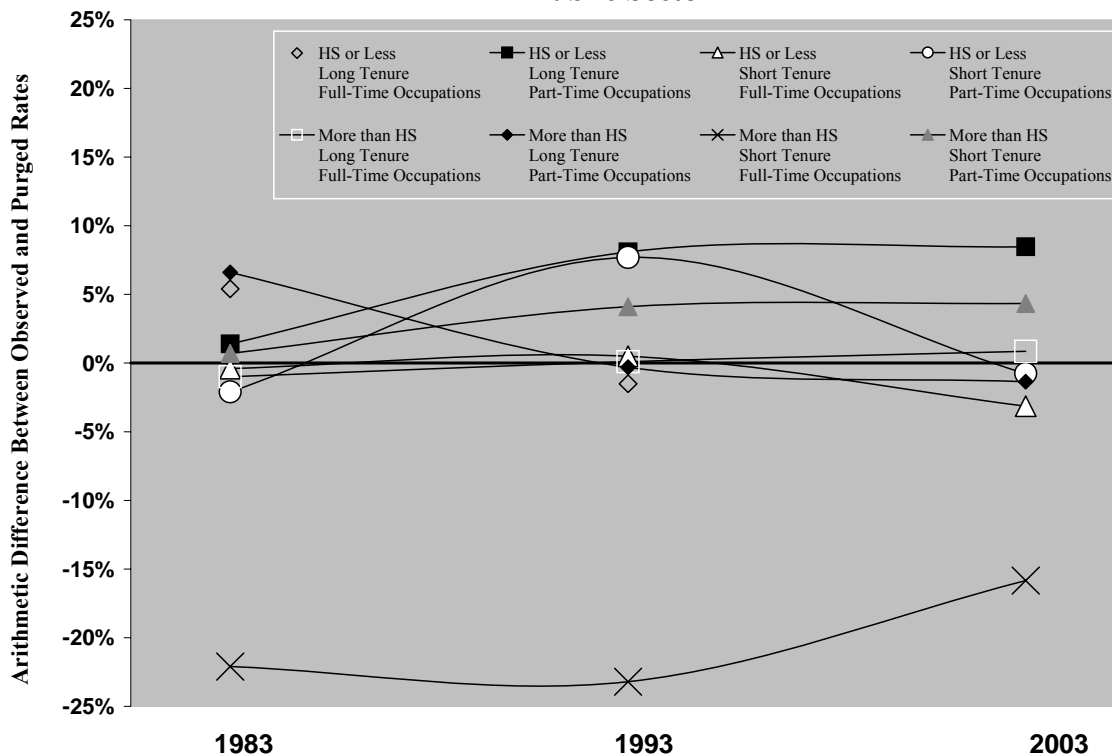
I turn now to the final set of full purging models—those that include the sectors that are regarded as least compatible with traditional modes of union organizing. Of all the four groups in the public sector, this one comprises the largest share of employment. Total sample sizes this group (summing over all eight individual sectors) were around 25,000 in all three years.

In this group of sectors, we see patterns that diverge considerably from those in the findings among private employees. Consider first the sector which includes full-time

occupations with median education levels of more than high school in industries with relatively short tenure levels. This sector is represented by the black X in Figure 5.32.

As shown in the corresponding panels of Table 5.14, this sector is fairly heavily female-

Figure 5.32: Difference Between Observed and Purged Union Coverage Rates in Historically Less-Unionized Occupations and Industries, Public Sector



dominated (increasingly so in later years). My examination of the detailed occupations that comprised this group indicated that in all three years, this group was made up of several hundred fairly diverse occupations, including the somewhat more male-dominated fields such as legislators, education administrators, engineers, and computer systems analysts; as well as heavily female-dominated fields including teaching occupations, librarians, social workers, and counselors. There was no notable shifting of

occupations in and out of this sector across the three time points that would affect trends. Thus, the interpretation here is clear: part of the reason that union coverage rates are higher in these sectors is because they are female-dominated. Under the counterfactual scenario that occupations in this sector were not female-dominated, union coverage rates would drop significantly—by more than 20 percentage points in 1983 and 1993. One might argue that this is mainly a “teachers’ union” effect. And certainly, teachers’ unions are a big part of the story, as they comprise approximately three-quarters of the employment in the heavily unionized occupations in this sector. However, it is worth pointing out that heavily unionized occupations in this group also include registered nurses, counselors, psychologists, speech-language pathologists, librarians, library technicians, and social and community service managers. This suggests it is not just a single occupation that is driving the finding, and that there is something more general about the female composition of occupations that make conditions more favorable for union organizing—and which unions, for their part, have found a way to exploit.

Another individual sector shows interesting, and statistically significant, findings in this group. This is the sector that includes part-time occupations with median education levels more than high school in industries with relatively short tenure. The group is represented by the grey triangle in Figure 5.32. Although again this sector includes a large and diverse group of detailed occupations, the largest single occupations in the sector are: secretaries and administrative assistants; teachers assistants; and protective service occupations such as fire fighters; bailiffs, correctional officers, and jailers; and police and sheriff’s patrol officers. The positive observed/purged difference indicates that had occupations in this sector not been predominantly female, and instead

been an even mix of male- and female-dominated occupations, union coverage rates would have increased by just over four percent in 1993 and 2003. The two divergent findings in this group of sectors continues to build the story about unionism in the public sector. With respect to occupational sex composition, it does appear that certain public sector unions have adapted to organizing female-dominated occupations in ways that private sector unions have not. Yet the findings also clearly suggest a status composition effect—an organizing bias toward certain types of male-dominated occupations—exists in the public sector as well. Together, these findings hint at the notion that there are two distinct types of unionism in the public sector vis-à-vis occupational sex composition.

To summarize the public sector findings: the ability to draw general conclusions from this analysis is hampered by relatively small sample sizes in the first three groups of sectors. Since the bulk of employment in the public sector is in historically less-unionized industries and occupations, the bulk of the analytical sample resides there as well. And while the patterns in the union-compatible sectors appear to suggest a bias in union organizing, favoring male-dominated occupations, the estimates are simply not precise enough to support such a conclusion. Findings in the sector that is least compatible with traditional modes of union organizing do suggest that that, with respect to occupational sex composition, two forms of unionism exist—the form that favors male-dominated fields, and the form that has learned to organize on new, female-dominated occupational terrain.

Table 5.14: Full Purging Model Results, Public Sector: 1983, 1993 and 2003

1983					
More-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	948	4.1%	58.2% (2.5)	44.6% (6.3)	-13.6%
High School or Less Long Tenure Part-time	103	47.5%	82.4% (5.6)	58.0% (18.0)	-24.4%
High School or Less Short Tenure Full-Time	692	2.1%	41.2% (2.9)	39.8% (11.6)	-1.4%
High School or Less Short Tenure Part-Time	2	5.5%	50.0% (19.7)	50.0% (24.7)	0.0%
More than High School Long Tenure Full-Time	0	-----	-----	-----	-----
More than High School Long Tenure Part-time	0	-----	-----	-----	-----
More than High School Short Tenure Full-Time	0	-----	-----	-----	-----
More than High School Short Tenure Part-Time	0	-----	-----	-----	-----
More-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	838	4.7%	45.4% (2.7)	41.9% (8.2)	-3.5%
High School or Less Long Tenure Part-time	24	47.5%	46.3% (12.6)	44.7% (13.6)	-1.7%
High School or Less Short Tenure Full-Time	583	4.7%	36.8% (3.1)	33.5% (7.2)	-3.3%
High School or Less Short Tenure Part-Time	358	47.5%	37.6% (4.0)	34.1% (8.1)	-3.5%
More than High School Long Tenure Full-Time	0	-----	-----	-----	-----
More than High School Long Tenure Part-time	0	-----	-----	-----	-----
More than High School Short Tenure Full-Time	0	-----	-----	-----	-----
More than High School Short Tenure Part-Time	19	11.3%	36.1% (13.0)	37.9% (15.6)	1.8%

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Table 5.14, continued

1983 continued					
Less-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	1,468	39.4%	77.8% (1.7)	74.2% (2.4)	-3.7%
High School or Less Long Tenure Part-time	112	28.8%	57.8% (7.0)	54.3% (10.5)	-3.5%
High School or Less Short Tenure Full-Time	101	30.2%	36.2% (7.1)	36.8% (10.1)	0.6%
High School or Less Short Tenure Part-Time	32	6.1%	33.3% (11.0)	35.1% (12.9)	1.8%
More than High School Long Tenure Full-Time	150	10.0%	39.4% (6.1)	42.6% (7.8)	3.2%
More than High School Long Tenure Part-time	1	64.6%	47.1% (20.3)	48.5% (28.5)	1.5%
More than High School Short Tenure Full-Time	111	15.7%	29.9% (6.5)	33.5% (10.8)	3.6%
More than High School Short Tenure Part-Time	0	----	----	----	----
Less-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	4,330	80.8%	41.3% (1.2)	46.8% (1.9)	5.4%
High School or Less Long Tenure Part-time	758	50.6%	33.9% (2.7)	35.3% (3.6)	1.4%
High School or Less Short Tenure Full-Time	2,304	90.8%	34.2% (1.6)	33.8% (3.3)	-0.4%
High School or Less Short Tenure Part-Time	2,927	50.6%	33.5% (1.4)	31.4% (2.9)	-2.1%
More than High School Long Tenure Full-Time	2,671	40.8%	27.7% (1.4)	26.7% (1.8)	-1.0%
More than High School Long Tenure Part-time	50	64.6%	40.3% (9.6)	46.9% (25.5)	6.6%
More than High School Short Tenure Full-Time	7,073	53.4%	63.1% (0.9)	41.0% (1.8)	-22.1%
More than High School Short Tenure Part-Time	5,144	36.7%	38.4% (1.1)	39.1% (1.2)	0.7%

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Table 5.14, continued

1993					
More-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	657	4.7%	56.3% (1.9)	42.1% (5.9)	-14.2%
High School or Less Long Tenure Part-time	153	47.4%	72.8% (3.4)	58.7% (13.2)	-14.1%
High School or Less Short Tenure Full-Time	519	2.4%	41.3% (2.2)	47.6% (10.0)	6.2%
High School or Less Short Tenure Part-Time	1	47.4%	47.1% (12.9)	46.5% (16.2)	-0.6%
More than High School Long Tenure Full-Time	0	-----	-----	-----	-----
More than High School Long Tenure Part-time	0	-----	-----	-----	-----
More than High School Short Tenure Full-Time	0	-----	-----	-----	-----
More than High School Short Tenure Part-Time	0	-----	-----	-----	-----
More-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	536	4.7%	46.4% (2.2)	44.6% (6.3)	-1.8%
High School or Less Long Tenure Part-time	16	47.4%	37.5% (8.8)	40.9% (18.0)	3.4%
High School or Less Short Tenure Full-Time	496	4.7%	38.6% (2.2)	27.6% (4.6)	-11.0%
High School or Less Short Tenure Part-Time	363	47.4%	38.5% (2.5)	39.6% (11.8)	1.1%
More than High School Long Tenure Full-Time	0	-----	-----	-----	-----
More than High School Long Tenure Part-time	0	-----	-----	-----	-----
More than High School Short Tenure Full-Time	0	-----	-----	-----	-----
More than High School Short Tenure Part-Time	222	8.2%	42.7% (3.3)	44.0% (12.8)	1.3%

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Table 5.14, continued

1993 continued					
Less-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	181	32.4%	47.5% (3.6)	47.9% (3.6)	0.4%
High School or Less Long Tenure Part-time	29	80.0%	51.1% (7.6)	48.7% (16.6)	-2.5%
High School or Less Short Tenure Full-Time	43	18.5%	28.8% (6.0)	33.1% (8.3)	4.2%
High School or Less Short Tenure Part-Time	0	----	----	----	----
More than High School Long Tenure Full-Time	160	26.8%	37.6% (3.7)	40.5% (5.1)	2.9%
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	105	15.3%	36.7% (4.4)	36.6% (6.3)	-0.1%
More than High School Short Tenure Part-Time	0	----	----	----	----
Less-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	1,658	44.2%	44.0% (1.2)	42.6% (1.5)	-1.5%
High School or Less Long Tenure Part-time	206	77.1%	37.3% (3.3)	45.4% (11.0)	8.1%
High School or Less Short Tenure Full-Time	1,770	32.4%	36.4% (1.2)	37.0% (1.4)	0.5%
High School or Less Short Tenure Part-Time	1,210	47.1%	23.7% (1.2)	31.4% (10.7)	7.7%
More than High School Long Tenure Full-Time	3,448	46.2%	26.9% (0.8)	27.0% (1.1)	0.1%
More than High School Long Tenure Part-time	2	41.3%	44.4% (12.4)	44.1% (15.4)	-0.3%
More than High School Short Tenure Full-Time	7,588	69.4%	59.1% (0.6)	36.0% (1.3)	-23.2%
More than High School Short Tenure Part-Time	11,410	64.9%	41.9% (0.5)	46.0% (0.6)	4.1%

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Table 5.14, continued

2003					
More-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	534	4.9%	51.1% (3.4)	38.6% (9.8)	-12.5%
High School or Less Long Tenure Part-time	138	48.2%	65.0% (6.1)	54.3% (15.8)	-10.7%
High School or Less Short Tenure Full-Time	484	2.7%	44.6% (3.5)	45.9% (13.2)	1.2%
High School or Less Short Tenure Part-Time	5	16.1%	37.5% (16.3)	37.8% (19.7)	0.3%
More than High School Long Tenure Full-Time	3	4.9%	40.9% (17.4)	40.9% (20.7)	0.0%
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	0	----	----	----	----
More than High School Short Tenure Part-Time	0	----	----	----	----
More-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	455	4.7%	37.8% (3.5)	36.2% (7.9)	-1.6%
High School or Less Long Tenure Part-time	12	48.2%	45.2% (14.6)	45.3% (16.8)	0.1%
High School or Less Short Tenure Full-Time	457	4.9%	32.6% (3.4)	24.4% (5.9)	-8.3%
High School or Less Short Tenure Part-Time	314	48.2%	37.7% (4.2)	30.8% (11.0)	-6.8%
More than High School Long Tenure Full-Time	1	4.9%	38.1% (17.6)	37.8% (21.1)	-0.3%
More than High School Long Tenure Part-time	0	----	----	----	----
More than High School Short Tenure Full-Time	0	----	----	----	----
More than High School Short Tenure Part-Time	291	9.1%	43.9% (4.5)	41.3% (17.4)	-2.5%

This table continues on the next page.

Table 5.14, continued

2003 continued					
Less-Unionized Occupations in More-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	608	37.3%	73.5% (2.8)	61.3% (5.7)	-12.1%
High School or Less Long Tenure Part-time	32	76.4%	41.2% (11.1)	39.0% (20.4)	-2.2%
High School or Less Short Tenure Full-Time	23	8.8%	34.2% (12.0)	33.9% (14.0)	-0.2%
High School or Less Short Tenure Part-Time	1	65.3%	38.1% (17.6)	38.7% (22.0)	0.6%
More than High School Long Tenure Full-Time	229	35.0%	36.6% (4.9)	37.8% (7.8)	1.2%
More than High School Long Tenure Part-time	3	66.5%	39.1% (16.8)	39.5% (21.7)	0.4%
More than High School Short Tenure Full-Time	112	11.7%	40.0% (6.8)	38.5% (9.9)	-1.5%
More than High School Short Tenure Part-Time	1	66.5%	42.9% (17.9)	41.9% (22.2)	-1.0%
Less-Unionized Occupations in Less-Unionized Industries	Group N	Percent Female	Observed Rate	Purged Rate	Diff.
High School or Less Long Tenure Full-Time	886	58.4%	32.3% (2.5)	31.6% (2.7)	-0.7%
High School or Less Long Tenure Part-time	210	86.6%	28.2% (4.7)	36.7% (12.7)	8.5%
High School or Less Short Tenure Full-Time	1,675	33.2%	33.6% (1.8)	30.4% (2.0)	-3.1%
High School or Less Short Tenure Part-Time	838	66.2%	21.9% (2.2)	21.1% (5.4)	-0.8%
More than High School Long Tenure Full-Time	3,734	41.1%	26.6% (1.1)	27.5% (1.3)	0.9%
More than High School Long Tenure Part-time	48	66.5%	41.8% (9.7)	40.4% (21.0)	-1.4%
More than High School Short Tenure Full-Time	8,829	79.0%	51.6% (0.8)	35.8% (1.8)	-15.8%
More than High School Short Tenure Part-Time	9,205	69.4%	40.0% (0.8)	44.4% (1.1)	4.3%

Summary of Purging Model Results

The purging model results provided a way to observe union coverage rates under the counterfactual scenario that occupational sex composition was uncorrelated with other characteristics of labor market sectors. By and large, the findings provided support for my theoretical arguments about the relationship between union coverage and occupational sex composition. In the private sector, the results showed that union coverage rates would have been significantly *lower* in some of the sectors that are more compatible with traditional union organizing had those sectors not been male-dominated. And union coverage would have been *higher* in some of the hard-to-organize sectors had those sectors not been heavily comprised of female-dominated occupations. These findings are consistent with the notion of a status composition effect—observed residue of past exclusion of women. Findings from the public sector told a different story: there were no significant differences between observed and purged union coverage rates in the (male-dominated) sectors that were more compatible with union organizing. But in the so-called hard-to-organize segments of the labor market, one sector had significantly *higher* rates of union coverage because of the high concentration of female-dominated occupations within them, suggesting that public sector unions have been able to organize along new demographic lines.

The final chapter of this dissertation brings the discussion full circle by connecting the statistical findings back to some of the broader ideas motivating this research. Specifically, what can these findings tell us about the relationship between the growth of new, non-unionized labor market sectors and the decline of union membership and influence? To what extent must *economic* restructuring explanations for union

decline include *demographic* restructuring as a central component? And finally, what implications do these findings have for research on occupational sex segregation, and gender stratification more generally?

CHAPTER 6: DISCUSSION AND CONCLUSIONS: OCCUPATION SEX COMPOSITION AND UNION DECLINE

This research was motivated by a straightforward question: *to what extent is labor's difficulty in penetrating the hard-to-organize sectors of the economy directly attributable to the sex composition of occupations in those sectors?* I hypothesized that there would be a statistical relationship between occupational sex composition and union coverage. Further, based on historical accounts of the relationship between women and unions at various times and places over the last century, I suggested that this statistical relationship could be viewed as a status composition effect—the measurable residue of historical exclusion of women from the labor movement.

In general, the private sector findings supported my arguments. The descriptive results in Chapter 4 showed that the proportion of women in one's occupation was a modest, but significant, predictor of union coverage. Higher percentages of women decreased the likelihood of union coverage, controlling for other characteristics of the sector in which the individual was employed. Additional descriptive analyses revealed that union coverage rates were generally higher in male-dominated occupations than female-dominated occupations, *both* in the historically more-unionized, goods-producing sectors of the economy *and* in the so-called hard-to-organize and fast-growing service sectors. Additionally, where disparities in union coverage rates between male and female-dominated occupations diminished between 1983 and 2005, it was generally because of losses in union coverage among male-dominated occupations, rather than gains among female-dominated occupations.

The results from the private sector purging models in Chapter 5 also provided support for my arguments, and offered a more nuanced picture of the precise size and location of the status composition effects. The findings from the single-variable purging models showed that overall union coverage rates were indeed lower in the hard-to-organize sectors, and that the sex composition of occupations in some of those sectors was a modest part of the reason. In particular, for people working in part-time occupations and in industries with low historical levels of unionization, union coverage rates would have been higher by about one or two percentage points had these sectors not been disproportionately comprised of female-dominated occupations. Somewhat unexpectedly, status composition effects were larger in the sectors that were more compatible with traditional union organizing. Union coverage rates in some of the traditionally organized, male-dominated sectors would have been *reduced* by as much as three percentage points, for example, in historically more-unionized industries and in “full-time” occupations, had occupations in these sectors been an even mix of males and females. This disparity did not wane over time, again suggesting that the AFL-CIO’s new agenda had little impact on union organizing activities among female-dominated occupations in the traditionally unionized sectors.

The full purging model results continued the story. Again, the largest status composition effects appeared in those sectors that were most compatible with traditional union organizing. For example, in sectors comprised of male-dominated occupations such as truck drivers, production workers, installer/repairers, and aircraft pilots, union coverage rates would have been significantly higher had nothing about these sectors changed but their sex composition. That is, union coverage rates in these sectors were

higher, in part, *because* they were heavily comprised of male-dominated occupations, and not just because the characteristics of the sector made organizing easier. The results also suggested that these status composition effects did not dissipate over time, as might have been expected given the “New Voice” AFL-CIO organizing agenda launched in 1995.

Finally, in the expanding hard-to-organize sectors, the full purging models provided modest support for my arguments. In two of the hard-to-organize sectors, union coverage rates would have been slightly higher had the occupational sex composition of these sectors been an even mix of male- and female-dominated occupations. For example, in the sector that included a high proportion of clerical, secretarial and administrative occupations in 1983, the findings indicated that more than four percent of non-union covered employees in this sector would have had union coverage had the sector been an even mix of male- and female-dominated occupations.

The association between occupational sex composition and union coverage is different in the public sector. In general, the descriptive findings in Chapter 4 indicated that higher concentrations of women public sector occupations *increased* the likelihood of union coverage, all else equal. However, additional descriptive findings revealed an interesting interaction effect: among sectors that are “compatible” with union organizing, employees in male-dominated occupations generally had far higher rates of union coverage than those in female-dominated occupations. Yet in most of the sectors that are less compatible with unionism, employees in *female*-dominated occupations were organized at far higher rates, hinting at the notion that two types of unionism coexist in the public sector: the traditional male-dominated brand typical of historically organized

sectors, and the more female-friendly brand found in the sectors that have not historically been organized.

The single-variable public sector purging models presented in Chapter 5 showed similar patterns. In virtually none of the hard-to-organize sectors would shifting the sex composition toward more male-dominated occupations have increased union coverage rates. Indeed, the opposite was true in some sectors. In industries with historically low levels of unionization, for example, the slightly heavier share of female-dominated occupations appeared to boost, rather than lower, union coverage rates. Had the occupational mix of these industries been equally male- and female-dominated occupations, union coverage would have *decreased*, by substantial amounts in some cases. At the same time, however, some of the traditionally organized sectors appeared to *benefit* from having a high concentration of male-dominated occupations. For instance, had the occupational mix of industries with long tenure levels *not* been male-dominated, union coverage rates would have decreased.

The ability to draw clear and unequivocal conclusions from the full purging models was limited somewhat by small samples in the public sector. I found no statistically significant status composition effects in the sectors that were compatible with traditional union organizing. On the other hand, in the sectors that were least compatible with union organizing, there were two divergent status composition effects. One sector—which included, notably, teachers' unions—the higher proportion of women in occupations actually significantly and substantially *increased* rates of union coverage. This finding surely reflected a teachers' union effect, but also reflected higher levels of unionization among other professional, female-dominated occupations such as social

workers, registered nurses, counselors, psychologists, speech-language pathologists, librarians, library technicians, and social and community service managers. On the other hand, in another sector which included secretaries and administrative assistants; teachers assistants; and protective service occupations such as fire fighters; bailiffs, correctional officers, and jailers; and police and sheriff's patrol officers, the findings indicated that this sector had increased rates of union coverage because they were more male-dominated. These two divergent findings suggest that some public-sector unions have learned to capitalize on higher concentrations of women in certain sectors, and others remain male-dominated in approach and composition.

Limitations of the Study

Like all studies, this research has certain limitations. I have noted these at the relevant points during the discussion of the methodology and findings, but they are worth recapping here. First, alterations in the CPS methodology, slight coding differences over time, and real changes in the characteristics occupations and industries over the last two decades, have all complicated discussions about temporal trends. For example, the CPS changed the way it measured educational attainment in 1992, which caused an abrupt drop in the number of occupations classified as having a median education level of high school or less. The relationship among occupational sex composition, occupational education level, and union coverage shifted suddenly between 1991 and 1993 as a result. Similarly, coding of industry tenure levels for each year was based on a comparison of the 2-digit industry average to the overall average tenure for that year. Industries with tenure levels near the overall average could (and did) change categories over the years,

creating the appearance of fluctuations in the relationship between occupational sex composition and union membership in certain industry tenure categories.

These changes meant that a given labor market sector was likely to be comprised of different detailed occupations from year to year. And even moving a single detailed occupation or two-digit industry from one sector to another had the potential to create the appearance of a temporal change in the relationship between occupational sex composition and union coverage within the sector. My approach to this issue was to interpret temporal changes within sectors with caution and an eye toward the detailed occupational make-up of the sector over time. However, a fruitful way to build on this line of inquiry in the future would be to examine union coverage trends in unvarying groups of occupations over time, while controlling for sector characteristics that make union coverage more or less likely overall.

Another limitation of the study was the relatively small samples within certain sectors. This created both sparse data and statistical power issues. I managed the sparse data problems in two ways: (1) by adding constants to cells in a way that accounted for the marginal distribution of union coverage while increasing the sample enough to stabilize estimates; and (2) by omitting a sector variable (the industry establishment size variable) from the final purging models—which was defensible since establishment size was not closely associated with occupational sex composition. Even with these adjustments, sample sizes in some sectors were small, reducing the ability to detect statistical significance, even when observed/purged differences were large. This was a particular concern for the public sector findings since the public sector comprises only about one-fifth of employment in the U.S. One way to mitigate this problem in future

research might be to investigate the full purging models with combinations of two or three group variables, rather than all five together. The drawback to such an approach is that it would lose the detail and nuance that was possible to explore here; the advantages would be the increased sector sample sizes, and the simpler interpretation of results.

Implications for Two Research Traditions

My study brought together theories and concepts from two different research traditions: the body of work focusing on U.S. union decline, and research on occupational sex segregation. In folding together elements of these two lines of research, the findings here have implications for both.

Implications for Research on Union Decline

What do my findings offer to the body of work focused on explaining union decline? First, they suggest that if employment growth in non-unionized, hard-to-organize sectors of the economy is a primary explanation for the declining union presence in the United States labor market, the demographic composition of those sectors should be considered part of the story. Many of the growing, service-oriented economic sectors are comprised largely of female-dominated occupations, and my findings showed that in some sectors, the heavy concentration of women there reduced union coverage. For example, in 1983, approximately 3.7 percent *more* people working in one female-dominated sector (historically less-unionized, “high school”, full-time occupations in historically more-unionized industries with long tenure) would have had union coverage had that sector been an even mix of male- and female-dominated occupations. While the percentage increase is relatively modest, consider that an estimated 3,810,722 people

were employed in this sector in 1983,²⁸ so that percentage increase would have translated into 140,997 additional employees with union coverage. In a similar manner, from my findings one can extrapolate that approximately 55,390 more people would have had union coverage in the sector including full-time, high school occupations in short-tenure industries in 1983, and nearly 341,000 more people would have had union coverage in 2003 in the sector including historically less-unionized, part-time, higher-education occupations in historically less-unionized industries with lower levels of tenure, had these sectors been an even mix of male- and female-dominated occupations rather than more heavily female.

On the other hand, the findings in the male-dominated, union-compatible sectors raise different questions. It is in these sectors that the status composition effects were strongest, indicating that the few female-dominated occupations in these sectors were significantly less organized than male-dominated occupations there—and these disparities increased over time. Clearly, the stagnant production sectors are not the future of the labor movement. To stop the hemorrhaging, unions *must* expand their reach to previously unorganized sectors. But the relative lack of organization among female-dominated production occupations suggests unions may have overlooked a golden opportunity to retain membership. Since the research indicates that women are more likely than men to desire and vote for unionization, unions would have done well to invest resources in organizing these workers.

Implications for Research on Occupational Sex Segregation

The large body of research on occupational sex segregation has demonstrated that the proportion of women in an occupation is clearly related to the tangible rewards

²⁸ Based on weighted CPS estimates.

associated with it. Estimates of the adjusted wage gap between male- and female-dominated occupations is anywhere from five to 20 percent (England et al. 1994; Macpherson and Hirsch 1995; Kilbourne et al. 1995). An important goal in this research has been to theoretically and empirically disentangle the discriminatory from the non-discriminatory causes of gender differences in labor market experiences and rewards (Glass 1999; Reskin 2003). Doing so allows sociologists to make statements about how much of the gender gap in pay and other rewards is discriminatory versus how much is the result of true group differences in training and career choices.

Union membership is often included as a “job level” control variable in this research (see, e.g. England 1992; Figart and Lapidus 1996; Maume 1999; Tomaskovic-Devey 1993a, 1993b), but the relationship between union membership and occupational sex composition has been left largely unexplored. For example, Figart and Lapidus (1996) and Macpherson and Hirsch (1995) include a variable for union membership in equations predicting wages for men and women, but do not explain why or what they expect its effect to be. England (1992) likewise includes union membership as a determinant of occupational wages, and while she notes that women tend to work in occupations that are less unionized, this is not a major focus of her study (see also England et al. 2002). Similarly, by including union membership as an indicator of “job-level closure” (Tomaskovic-Devey (1993a, 1993b) implies that unions might produce or reinforce discriminatory differences between men and women; however, he does not expound on this. Some recent studies on sex segregation and market rewards omit union membership altogether (e.g., Cotter et al. 1997; Cohen and Huffman 2003).

My theoretical arguments and empirical findings provide a window into this relationship, and suggest that there are reasons to include union membership or coverage in theories and statistical models of gender stratification processes—beyond merely “soaking up” unexplained variance between men’s and women’s wages. More careful consideration of the relationship between sex composition and union membership could lead to more precise theories about gender differences in labor market outcomes. For example, Charles and Grusky (2004) suggest that the horizontal dimension of sex segregation—whereby men dominate employment in the goods-producing sectors and women dominate in the service-producing sectors—helps to explain how the expansion of the service sector has sustained occupational sex segregation. My research dovetails with these ideas by illustrating how sex disparities in unionization between *and within* these sectors has helped to reproduce gender inequality. Men in relatively low-skilled production occupations have historically been able to use the “muscle” of collective bargaining to raise wages and improve working conditions. Thus far, the vast majority of women in low-skilled positions have had no such resource—not just because they work in “hard-to-organize” sectors, but also in part because they work in occupations with other women.

APPENDIX A: SUPPLEMENTARY TABLES AND FIGURES

Table A.1: Primary Historical Documents Cited in Secondary Sources

Author and Major Arguments Cited	Summary of Primary Historical Sources Cited
<p>Kessler-Harris (1987)</p> <p>Kessler-Harris argues that the exclusion of women from unions (or, in the case of female-dominated industries, exclusion of women from <i>leadership roles</i> in the union) can be interpreted as social closure. Kessler-Harris' research suggests that this closure can be traced to labor's fear of competition from cheaper labor, and women workers' definition of themselves as "different" and in need of special protective legislation.</p>	<p>Meeting minutes from the General Executive Board of the International Ladies Garment Workers' Union (ILGWU). Various meeting minutes from 1913 through 1923.</p> <p>International Ladies' Garment Workers' Union (ILGWU) Reports and Proceedings of the 15th, 16th, and 17th Biennial Conventions.</p> <p><i>Report of the Ladies' Waistmakers' Union Local 25 to the 16th Convention of the International Ladies Garment Workers' Union</i>, Cleveland, 1922.</p> <p><u>Articles from the following:</u> <i>Advance</i> (Official journal of the Amalgamated Clothing Workers [ACW] union), 1926 and 1937. <i>American Federationist</i> (official journal of the AFL) 1929. <i>New York World</i>, 1922. <i>Justice</i>, 1920.</p>
<p>Foner (1980)</p> <p>Foner provides a comprehensive study of the relationship between women and unions from World War I to the present. For the purposes of my arguments here, I have relied primarily on Foner's documentation of the WTUL's (Women's Trade Union League) pursuit of protective legislation, and the AFL's exclusion of women during and directly after World War I.</p>	<p>Protective Legislation Arguments:</p> <p><u>Articles from the following:</u> <i>New York Times</i>, 1922 and 1923. <i>Labor</i>, 1922 and 1923. <i>Seattle Union Record</i>, 1922. <i>Life and Labor</i>, 1920. <i>Consumers' League of New York</i>, 1927.</p> <p>AFL's exclusion of women from unions and male-dominated occupations:</p> <p><u>Articles from the following:</u> <i>Trade Union Leader</i>, 1918. <i>New York Times</i>, 1918. <i>Seattle Union Record</i>, 1918. <i>Life and Labor</i>, 1919.</p> <p><i>Report of the Cleveland Railway Company for the Fiscal Year Ended December 31, 1918.</i></p> <p>Proceedings of the Biennial Convention of the NWTUL, 1919.</p>

This table continues on the next page.

Table A.1 Continued

Author and Major Arguments Cited	Summary of Primary Historical Sources Cited
<p>Kenneally (1985)</p> <p>Kenneally describes the relationship between women and unions from the antebellum years through the 1980s. I rely specifically on Kenneally's discussions of protective legislation and on the issue of equal pay in unions.</p>	<p>Protective Legislation:</p> <p>Testimony before the Congressional Committee on Industrial Relations, <i>Final Report and Testimony to the Congress</i> (64th Congress, 1st Session, 11 Volumes, Washington: GPO, 1915) Volume 1, 311-313.</p> <p>Address in Proceedings of the Fourth Biennial Convention, St. Louis, 1913, National Women's Trade Union League.</p> <p>Articles from the <i>American Federationist</i>, 1917 and 1927.</p> <p>Equal Pay and Unions:</p> <p><i>New York Times Magazine</i>, 1944. <i>Life and Labor</i>, 1944.</p>
<p>Gabin (1990)</p> <p>Gabin's work provides a discussion of the relationship between women and unions in the UAW of the CIO. Of particular interest in Gabin's research is the response of unions' position vis-à-vis sex segregation and separate job classifications by sex.</p>	<p><u>Manuscripts from the United Auto Workers' union, including:</u></p> <p>Executive Board meeting minutes from the 1930s. Grievance 1999, May 8, 1941. Shop Committee meetings, May 12 and May 19, 1941. Minutes of Local 45 Executive Board Meeting, April 29, 1939. Proceedings of the Special Convention of the International Union, United Automobile Workers of America, March 27-April 6, 1939.</p> <p>Interview with Stanley Nowak, June 2, 1960, UAW Oral History Project.</p> <p>Interview with George Addes, June 25, 1960, UAW Oral History Project.</p> <p>Articles from <i>United Auto Worker (UAW)</i> throughout the late 1930s and 1940s.</p>
<p>Stromquist (1993)</p> <p>Stromquist provides a discussion of the struggle between female and male union members in the United Packinghouse Workers of America (UPWA) in the 1960s in Iowa. This illustrates issues regarding occupational sex segregation and separate seniority systems by sex.</p>	<p>Various voluntary interviews with female and male workers, conducted by the Iowa Labor History Oral Project (ILHOP), Iowa City, Iowa.</p>

Figure A.1: Predicted Probability of Union Coverage Among Private Sector Employees Using Sample Means of Sector Variables

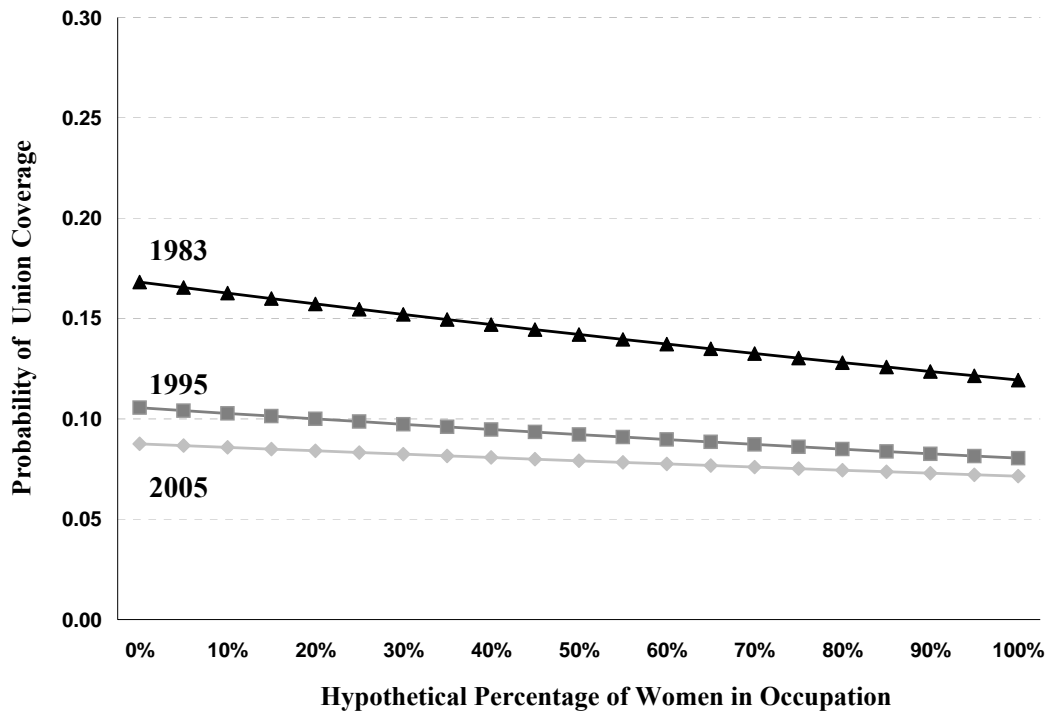
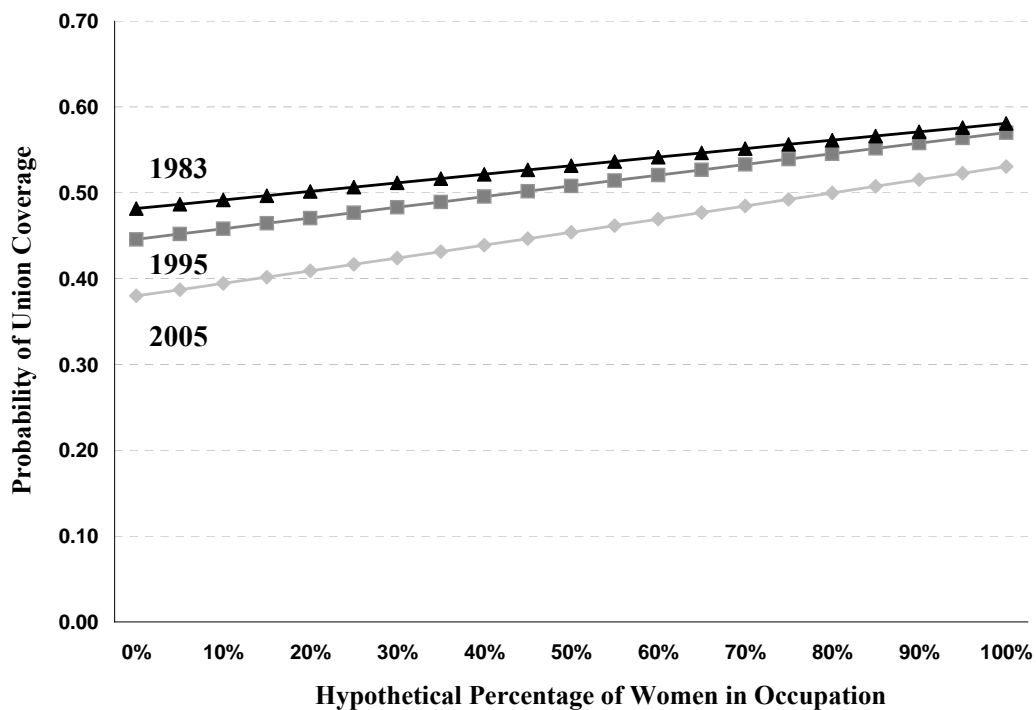


Figure A.2: Predicted Probability of Union Coverage Among Public Sector Employees Using Sample Means of Sector Variables



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