MALE FLIGHT FROM COMPUTER WORK: A NEW LOOK AT OCCUPATIONAL RESEGREGATION AND GHETTOIZATION*

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We develop and test six hypotheses regarding resegregation and ghettoization in computer work, a feminizing occupation. We analyze panel data from the National Science Foundation's Survey of Natural and Social Scientists and Engineers (SSE) on 6,162 computer specialists interviewed in 1982, 1984, 1986, and 1989. The results indicate that while the proportion of computer workers who are women has been increasing, the pattern of men's departures from the field does not support hypotheses synthesized from the literature on the processes of resegregation or ghettoization. Specifically, in computer work neither declines in relative earnings for men nor the entrance of women per se prompts the exit of male computer workers. We discuss the implications of these findings for our understanding of resegregation and ghettoization.

Does the sustained entry of significant numbers of women into an occupation precipitate a decline in status of that occupation? Does feminization inevitably result in occupational resegregation? Once the process of feminization has commenced, is ghettoization—the emergence of a highly internally stratified occupation—the only alternative to resegregation? We address these questions by examining one feminizing occupation—computer work.

Social scientists have vigorously debated the significance of recent changes in the economic status of women, and their observations point to both continuity and change. For example, although the sex gap in earnings has narrowed in the last decade, women working in full-time, full-year jobs still earn, on average, only 75 percent as much as their male counterparts. Moreover, about half of the narrowing of the gap has resulted from a decline in men's real earnings rather than from an increase in women's real earnings (Institute for Women's Policy Research 1993).

Analysts have also drawn differing conclusions from the decline in the sex segregation of occupations in the last two decades: After remaining steady for most of the century, the proportion of employed women who would have had to change their occupations in order to be distributed in the same manner as men declined by roughly 18 percent during the 1970s and 1980s. Specifically, the index of dissimilarity by sex across detailed census occupational categories declined from 67 in 1970 to 55 in 1990.[1] Women's entry into prominent male-dominated fields such as law and medicine has been especially widely heralded. Yet, for every woman who works as a lawyer there are 170 women clerical workers, 50 women sales clerks, 20 waitresses, and 15 female nurse's aides (Jacobs 1989a; Jacobsen 1994; U.S. Bureau of Labor Statistics 1989). Women are still a long way from achieving integration with men at the workplace.

The resegregation thesis is one of the most intriguing interpretations of recent changes in women's occupational standing. It holds that

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[1] These indices reflect the relative size of each occupation and are not size standardized. For a summary of segregation research, see Reskin (1993).

women's entry into previously male-dominated occupations is not a stable outcome, but rather represents one phase in a process that generally ends in the re-establishment of sex-segregated work roles. Reskin and Roos (1990; hereafter Reskin and Roos) present the most developed analysis of the resegregation process. They examine 14 cases in which, in the 1970s, women made significant inroads into previously male-dominated occupations; 11 cases are presented in their book, *Job Queues, Gender Queues.*[2] These case studies draw on a variety of historical, institutional, and documentary materials, as well as analyses of aggregated data on earnings trends for these occupations.

Reskin and Roos find a common pattern—that a shortage of male employees prompts employers to recruit women. The shortage of men is typically due to a decline in the status of the occupation, but is sometimes compounded by a rapid increase in demand. In some cases, the impetus for the initial departure of men from an occupation is a technological shift that lowers skill levels and earnings in the field. Reskin and Roos also find that women are often concentrated in the least desirable niches in these occupations—niches with lower pay, fewer required skills, less autonomy, and limited promotion opportunities. Thus, their analysis suggests that women's entry into previously male-dominated occupations frequently does not yield the degree of economic progress for women that we might expect.

Reskin and Roos's work, along with studies by a number of other scholars in this area (Strober 1984; Cohn 1985; Davies 1982), raises the question of whether it is possible for women to successfully integrate a single occupation, let alone the labor force as a whole. These studies outline two processes—resegregation, where an occupation reverses from male-dominated to female-dominated, and ghettoization, where women become concentrated in low-status specialties within the occupation. In this paper we examine these two processes in the context of computer work, a feminizing occupation. We use individual-level panel data that allow us to see who stayed, who left, and why. This study represents the first test of the resegregation/ghettoization hypotheses with microlevel data. We repeat our analysis for two computer specialties—systems analysis, a specialty studied by Reskin and Roos, and computer programming, historically the computer specialty with the greatest female representation.

We begin by outlining the logic underlying the processes of resegregation and ghettoization. We then develop six hypotheses regarding these processes. In some cases, these hypotheses flow rather directly from previous research in this area. In others, we draw out previously unarticulated implications of the literature to develop empirical tests. Using data from a variety of sources, we test these hypotheses by analyzing the career moves of computer workers during the 1980s.

[2] The 11 occupations include book editors, pharmacists, public relations specialists, bank managers, systems analysts, insurance sales occupations, real estate salespersons, insurance adjusters and examiners, bartenders, bakers, and typesetters and compositors. Reskin and Roos also draw on case studies of accountants and auditors, broadcast and print reporters, and bus drivers.

FEMINIZATION AND RESEGREGATION

We define a *feminizing occupation* as one in which the representation of women is increasing. At first, feminization in a previously male-dominated field results in the occupation moving closer to parity with women's representation in the labor force as a whole—moving toward greater integration. If the representation of women continues to increase, surpassing the labor force average, we refer to the occupation as "resegregating"—becoming significantly more skewed in favor of women. Thus far, our usage follows Reskin and Roos's, who refer to an occupation as resegregated "when an entire occupation or a major occupational specialty switches from a predominantly male to a predominantly female labor force" (1990:71).

The term "resegregating," however, has implications not only for women's representation, but also for the relative economic standing of men and women. As we define the term, resegregation implies that a newly feminized occupation is not as economically attractive as had previously been the case. This devaluation can occur before or during the process of feminization. In contrast, movement toward real economic integration implies that an occupation maintains or even increases its economic attractiveness.

Combining these ideas produces a profile of a *resegregating occupation* that is characterized by two trends that run counter to gender equality:

(1) Women, initially an under-represented minority, continue to gain in number until the occupation becomes significantly skewed in favor of women rather than men.

(2) The economic standing of the occupation relative to the labor force declines.

The decline in status sometimes precedes women's entry, as Reskin and Roos find, or it may coincide with and follow women's entry, as others have suggested (Strober 1984).

What forces cause resegregation? One hypothesis is that men flee an occupation when they see the status of the occupation declining. This argument is central to Reskin and Roos's discussion of the queuing process that facilitates the feminization of previously male-dominated occupations:

> Most of the occupations or specialties we studied experienced a shortage of male workers during the 1970s not because they grew dramatically but because their rewards or working conditions deteriorated relative to other occupations for which male workers qualified, making them less attractive to male workers. (p. 42)

The status of the occupation might decline for many reasons, including technological change, organizational change, the rise of competition, the decline of union power, and other factors.

This perspective maintains that an occupation is frequently already in decline before women enter it in large numbers. The decline in its status prompts some men working in the occupation to leave and discourages other men from entering the occupation. The departure of large numbers of male incumbents from an occupation—which we refer to as "male flight"—plays a significant role in the resegregation process by magnifying the need for a new pool of workers. Employers, seeking to fill empty employment slots, recruit women. While many factors are related to the decline in the desirability of an occupation to men, a leading cause is the decline in earnings. Reskin and Roos maintain that "a primary reason the occupations we studied failed to draw or retain enough men was that their earnings declined during the 1970s, relative to those of the male labor force as a whole" (p. 44).

A second hypothesis is that feminization itself can contribute to male flight from an occupation: Men may flee in response to women's entry because of deteriorating earnings, the stigma associated with doing "women's work," or both. First, feminization results in decreased earnings, which produces the economic motivation for male flight, as described above. A number of students of gender stratification have argued that feminization per se tempts employers to reduce wages. Strober (1984), for example, maintains that "once an occupation becomes a female occupation, employers will often lower its wage rate" (p. 149). Studies of comparable worth have demonstrated a tendency for female-dominated jobs and occupations to be paid less than male-dominated positions with similar educational requirements, job demands, and working conditions (England 1992; Jacobs and Steinberg 1990). Men may flee in response to women's entry because they anticipate that earnings will decline as feminization proceeds. Second, feminization may result in male flight because of the social stigma associated with working with women. Strober (1984) is unambiguous about this: "But men are reluctant to enter female occupations, primarily because of their low wages but also because they fear ridicule by other men and aspersions on their masculinity if they do" (p. 150).

Male flight is only one part—albeit an important part—of the resegregation process. It is logically possible for an occupation to become resegregated through a process of cohort replacement. Men already in an occupation might stay, while prospective entrants might choose other pursuits. Such a process would require several decades. However, none of the literature to date describes occupational resegregation as relying solely, or even principally, on cohort change. Moreover, the factors that deter young men from entering an occupation are presumably the same factors that prompt older men to leave it, although the two groups might not be equally susceptible to these factors.

The process of occupational resegregation is analogous to the process of invasion and succession that underlies residential segregation (Reskin and Roos 1990:314; Massey and Denton 1993). In both cases, the dominant group fears the loss of social status and economic position they believe will result from the growing presence of a socially devalued group. For white homeowners, the fear is that the arrival of blacks will lower property values and result in a decline in the standing of a neighborhood. The question addressed here is whether the same process contributes to the flight of men from feminizing occupations.

GHETTOIZATION VERSUS INTEGRATION

Reskin and Roos's research is often associated with the notion of occupational resegregation, but in fact, the outcome in 9 of the 11 cases they discuss in their book was ghettoization rather than resegregation. Reskin and Roos define ghettoization as occurring "when women and men in the same occupational title typically perform different jobs" (p. 71). The disparate placement of men and women within an occupation results in women not achieving parity with men. For example, in the case of bakers, women mostly work in supermarkets baking prepackaged dough, while men continue to monopolize the more skilled positions in bakeries.

In some ways, the ghettoization of an occupation is the specialty-specific counterpart of occupational resegregation. In other words, in this case, it is a specialty, rather than the occupation as a whole, that undergoes resegregation. While in principle the growth of an already feminized subspecialty can account for the ghettoization of an occupation, typically some specialties will become increasingly feminized, while others will see women enter in large numbers for the first time. We expect that the same processes that operate in explaining the feminization of an occupation account for the feminization of a specialty within an occupation.

Reskin and Roos note that ghettoization draws on differentiation in rewards between occupational specialties—differentiation that predated women's entry. However, they do not specify whether the inequality in rewards between specialties within an occupation grows or declines following women's entry. We maintain that this difference is theoretically important. If internal stratification increases as an occupation feminizes, then women's opportunities are undercut just when they are poised to seize them. On the other hand, if internal stratification declines as women enter, then the entry of women coincides with a reduction in existing sex stratification within an occupation. In the latter case, women not only grow in numbers, but at the same time receive rewards closer to those received by their male counterparts.

Our view stresses the trend in the status of women in the occupation during the period of feminization. In contrast, Reskin and Roos define ghettoization by contrasting it with a standard of genuine integration, which characterizes an occupation as truly integrated only if women "integrated all specialties within a desegregating occupation and if they found work in all industries in which the occupation is located and all establishments that employ occupational incumbents" (p. 71).

While we agree with Reskin and Roos on the objective of complete equality, we believe ghettoization should be assessed in terms of trends, rather than against this absolute standard. It is useful to distinguish cases where ghettoization is becoming more severe as a result of the entrance of large numbers of women from cases in which ghettoization is becoming more attenuated over time. We are not aware of any occupation in which women have achieved complete integration or complete economic equality. Nevertheless, we can differentiate occupations that are moving toward equality from those that are becoming more unequal. Thus, we focus on trends rather than on static measures because we want to assess the direction of change. This approach enables us to use the level of inequality in an occupation prior to the significant entry of women as a baseline for assessing change. In this way we can assess both the causes and consequences of increasing numbers of women in an occupation.

In our view, the following characteristics identify a *ghettoizing occupation*:

(1) Women's representation in an occupation is not becoming so skewed that the entire occupation is becoming significantly female-dominated.

(2) Women are increasingly concentrated in a limited number of specialties within the occupation, and these specialties may be becoming dominated by women. (An indicator of this trend is that the level of sex segregation within the occupation is increasing.)

(3) The female-dominated specialties are lower in status than other specialties in the occupation, and their status is not increasing relative to the status of other specialties. (One important indicator of relative status is relative salary, but other indicators, such as authority, prestige, skills, and promotion opportunities, are also relevant.)

(4) The sex gap in earnings within the occupation is constant or growing.

An *integrating occupation* implies several egalitarian trends, contrasting sharply with the trends described by resegregation and ghettoization:

(1) Women's representation is moving toward parity.

(2) Women are increasingly evenly distributed across industries and specialties within an occupation. In other words, the index of segregation is constant or decreasing. (This trend is just the opposite of ghettoization.)

(3) The sex gap in earnings within the occupation is narrowing.

(4) The economic standing of the occupation relative to the labor force as a whole is holding steady or improving.

In an integrating occupation, women are moving in the direction of economic parity within the occupation, which has the net effect of improving women's earnings relative to men in the labor force as a whole. The movement may be too slow for many reformers and may never be completely realized, but these criteria can distinguish trends in occupations.

HYPOTHESES

Resegregation

The first premise of the resegregation thesis is that a decline in the status of an occupation results in an exodus of men. We focus here on earnings—one prominent indicator of occupational status. The term "favorability ratio" refers to the ratio of earnings in an occupation to earnings in alternative occupations in the labor force. Our first hypothesis is:

H_1: When men's earnings decline relative to alternative occupations in the labor force, men's exit rates from an occupation increase. Conversely, an increase in this favorability ratio reduces men's occupational exit rates.

A more general interpretation of queuing theory suggests a related hypothesis for both male and female exits. The exit rates for both men and women should depend on the changes in the favorability ratios for each—their earnings in a given occupation compared to their relevant alternatives in the labor force. For example, if the attractiveness of an occupation improves greatly in comparison to women's alternatives, while its attractiveness relative to men's alternatives remain unchanged, we would expect women's exit rates to decline relative to men's. If men's prospects in an occupation decline while women's remain unchanged, men's exit rates would be expected to increase. Note that for male flight to contribute significantly to resegregation, men's exits must exceed women's exits. Thus, our second hypothesis states:

H_2: The male-female differential in exits parallels the difference in an occupation's attractiveness to men and women, relative to men's and women's occupational alternatives. (Men's exits exceed women's when their favorability ratio declines faster than women's favorability ratio.)

Our third hypothesis draws on the notion that women's entry per se prompts male flight.

H_3: The more women enter an occupation, the more men leave. (The greater the proportion of women entering, the greater the proportion of men leaving.)

These hypotheses on resegregation are not sufficient to completely characterize career transitions because occupational exits take many forms: career switches out of computer work, moves into management, job losses (exits to unemployment), and exits from the labor force. The male flight prediction refers to overall attrition, yet there may be substantial sex differences in each specific exit process. These may reinforce one another, or they may cancel each other out. Consequently, we test the male flight thesis on aggregate exits as well as on each separate type of exit.

Ghettoization

As noted above, the causal mechanisms responsible for ghettoization at the specialty level parallel those that produce resegregation at the occupational level. In other words, the process of male flight and female entry also pertains to those low-status specialties within an occupation that women are more likely to enter. Thus, our first three hypotheses regarding ghettoization are the same as resegregation Hypotheses 1, 2, and 3, except that we apply them to specialties within an occupation.

We propose three additional hypotheses for ghettoization. They involve the relative statuses of male-dominated and female-dominated specialties and how these statuses change with the feminization of an occupation. Ghettoization implies that women are increasingly represented in those segments of an occupation that have low and declining status. We rely principally on income to define status, although we examine data on specific work activities as well. Sex segregation may also take a number of different forms, including segregation by specialty, industry, or work activity. Our fourth and fifth hypotheses are thus:

H_4: As an occupation feminizes, women's representation increases in the low-status specialties, industries, and work activities within that occupation.

H_5: Sustained entry of women into an occupation increases sex segregation within that occupation.

If, as Hypothesis 4 proposes, women generally enter low-status specialties in an occupation, then the gender gap in earnings within an occupation would increase as men increasingly monopolize the high-status specialties and leave the low-status ones for women. The growing segregation posited by Hypothesis 5 would also lead to increased earnings inequality between men and women. Our sixth hypothesis thus states:

H_6: Ghettoization results in an increase in gender inequality in earnings and/or other rewards within an occupation.

THE FEMINIZATION OF COMPUTER WORK

We test our hypotheses using computer work as a case study. Currently, 32 percent of men and 43 percent of women in the labor force use a computer at work (U.S. Bureau of the Census 1991a), but by our definition, not all of these are "computer workers." Following Hughes's (1971) dictum that function defines occupation, we use the Association for Computing Machinery's definition of "computer professional": A computer worker is someone whose main function is to support *other* people's use of computer systems (Denning 1991). On this basis, we include computer programmers, systems analysts, and nonacademic computer scientists. We also include computer and systems engineers, for reasons given below.

Computer work represents a good test case of the hypotheses listed above for two principal reasons. First, it is a rapidly feminizing occupation. Women have become increasingly represented in computer work since at least 1971 (as we will see below in Figure 1)—women comprised 36 percent of computer workers in 1991, up from 15 percent in 1971. Thus, computer work is a recently feminizing occupation that allows us to investigate its feminization processes. Second, leading analysts (Donato 1990; Strober and Arnold 1987) have claimed that computer work is a case conforming to the model. A reanalysis of such a case is an appropriate test of the perspective that resegregation and ghettoization are the outcomes of feminization.

The case study of systems analysts in the Reskin and Roos book attributes women's increasing representation in computer work to a number of factors, including the expansion of employer demand for computer workers (Donato 1990). Nonetheless, Donato argues that declining earnings relative to the labor force as a whole during the 1970s dampened men's interest in this area and helped pave the way for women's entry:

> Women's greater representation in systems analysis . . . also resulted from a shortage of men able to meet the growing demand for computer specialists. Women's entry was spurred by sex stereotypes about male and female workers and by changes in the nature of the occupation and its technology that appear related to declining occupational rewards. Men responded to the last of these by leaving the computer field, thus helping to accelerate the demand for women workers. (Donato 1990:181)

Thus, Donato posits that declining earnings contributed to male flight for this particular specialty. She concludes that in the 1970s systems analysis did not become a resegregated, female-dominated occupation, but rather that women became ghettoized in low-status industries with fewer economic and prestige rewards. "As women increasingly entered the field, they tended to be segregated into lower-paid specialties, while men monopolized the higher-paid jobs" (Donato 1990:182).

Strober and Arnold (1987), other leading analysts of gender and occupational resegregation, also consider the case of computer work and include a much wider array of computer specialties than did Donato. They show that men predominate in high-status specialties, such as electrical engineering, while women are concentrated in low-status occupations, such as data entry. They find a significant sex gap in wages, with women earning about 70 percent of their male counterparts. They also show that men and women are unequally distributed across industries—women are more likely to be employed in end-user industries than in computer manufacturing. Strober and Arnold's results are clearly consistent with a finding of ghettoization, as Reskin and Roos use this term. They conclude: "High tech may produce integrated circuits, but it does not necessarily produce an integrated work force or eliminate the female/male earnings differential" (1987:172). However, their analyses are not specifically set up to test hypotheses regarding the resegregation and ghettoization processes. For example, they do not explore whether earnings declines precipitated the entry of women into such fields as computer programming and systems analysis. Further, their data do not allow them to test whether male flight is associated with women's entry.

Three other studies provide additional documentation of gender inequality across computer specialties (Glenn and Tolbert 1987; Donato and Roos 1987; Kraft and Dubnoff 1983), although Arnold (1988) was unable to detect substantial gender inequality among recent computer science graduates of a California community college. Thus, there is substantial evidence for the existence of gender inequality in computer work. The question addressed here is not whether gender inequality exists, but whether the changes occurring conform to the resegregation and ghettoization processes.

Several other considerations make computer work an especially interesting case. First, computer work is a relatively new field, having come into existence during World War II (Kraft 1977). That computer work is a new field makes it appealing for the study of gender stereotyping because it does not have a long history of being labeled "men's work" or "women's work." While the "newness" of computer work may limit the generalizability of this case study, gender stereotyping in computer work borrows heavily from its occupational progenitor, electrical engineering. The experiences of women in computer work may thus be directly relevant for understanding women's progress in a variety of technically-oriented, male-dominated professions, such as engineering, biotechnology, architecture, and finance.

Second, due to the large and growing number of computer workers, it is an important case in its own right. Employing one out of every four scientists (National Science Foundation 1988), two of its specialties—computer programming and systems analysis—make computer work the third fastest growing occupation in the United States in the 1990s (Silvestri and Lukasiewicz 1992).

Finally, computer work is simultaneously characterized by growth in demand and obsolescence of skills. Technology has changed constantly throughout the 50 years of computer work's existence. Computer workers have been required to thoroughly reskill through at least three major paradigm shifts, as well as partially reskill because of frequent changes in software, hardware, and programming philosophies (Abbott 1988). Employers and employees are both faced with continually changing sets of required skills—skills that are different, not necessarily lesser: Studies conducted in the 1980s (Kuhn 1989; Orlikowski 1988; Tarallo 1987) refute earlier claims of deskilling in computer work (Kraft 1977; Greenbaum 1979). In this fast-changing occupation, therefore, the number of jobs requiring new skills is rapidly growing at the same time as the number of jobs requiring old skills is shrinking.

Under Reskin and Roos's queueing approach, employers rank men ahead of women for jobs in traditionally male occupations. In rapidly growing occupations, employers cannot find enough men to fill open positions and turn to women; in occupations with declining economic rewards, men leave jobs for alternatives in the labor force, opening the way for women. We argue that computer work meets both of these criteria: As computer jobs that require new skills open up, there should be an insufficient number of men to fill them. As the number of computer jobs that require old skills decrease, the earnings of men in those jobs should drop relative to their alternatives in the labor force. If the queueing model advanced by Reskin and Roos applies, we should see male flight from the "old-skill" computer jobs at the same time that we should see too few men available for the "new-skill" computer jobs.

DATA AND METHODS

We marshall data from a variety of sources. Data on trends in the sex composition of computer specialties are drawn from the U.S. Bureau of Labor Statistics (1976–1992), which also provided data on the earnings of computer workers and the civilian labor force. Data on degrees received in computer science and engineering are from Vetter (1991, 1992) and the U.S. Department of Education (1992).

Our analysis examines microlevel data from the National Science Foundation's Survey of Natural and Social Scientists and Engineers (SSE). The SSE data set contains career histories of 46,049 scientists and engineers who were sampled as part of the 1980 Census and surveyed again in 1982, 1984, 1986, and 1989 (U.S. Bureau of the Census 1991b). NSF stratified the sample to ensure sufficient numbers of women, computer specialists, and engineers. They defined scientists and engineers as individuals having a scientific, engineering, or related occupation, having four or more years of college (two, if engineering), and being in the experienced civilian labor force or "labor reserve" (National Science Foundation 1984).[3]

We view computer work as a single occupation, because it is one occupation from a functional standpoint (Hughes 1971) and from the standpoint of computer workers themselves (Denning 1991). One indicator of this internal coherence of computer work is that it is especially difficult to demarcate specialties (Orlikowski 1988). Debons, King, Mansfield, and Shirey (1981) illustrate this difficulty when they discover over 300 job titles for computer professionals in a national survey of employers in the late 1970s. They report great difficulty in categorizing those job titles. Many computer workers' job and occupational titles are assigned to the residual category "not elsewhere classified" or its equivalent. A joint report of the Computer Science and Telecommunications Board and the Office of Scientific and Engineering Personnel of the National Research Council discusses this problem at length (Steering Committee on Human Resources in Computer Science and Technology 1993:12–19).

Combining computer workers into a single field assures that we will capture the respondent as a computer worker, even if we can't be sure which specialty he or she would have chosen. While management analysts sometimes exclude engineers (Orlikowski 1988), the many close ties between computer science and engineering lead us to include engineers who provide computer support to others (Steering Committee on Human Resources in Computer Science and Technology 1993). In fact, the field of computer science is an outgrowth of electrical engineering, and most computer science programs are in engineering schools (Kraft 1977; Abbott 1988).[4]

We include seven computer specialties or suboccupations in our analysis: computer programmer, computer systems analyst, other systems analyst, systems engineer, computer scientist, computer engineer, and other computer specialist.[5] This definition yields 6,162 respondents who declared a computer specialty in at least one of the four waves: between 3,500 and 3,900 (of whom roughly 25 percent were women) were employed in computer work in each of the four survey years.[6] The numbers of respondents in our tables depend on the specific data and employment statuses required for each analysis. For certain key analyses, we test our results on each of these seven computer specialties; we report results for two particularly interesting cases, computer systems analysts and computer programmers. We also test whether engineering specialists and computer workers with engineering degrees differ in the patterns we report here.

As is the case with all panel data, the SSE is subject to attrition from wave to wave. The successive SSE response rates in 1982, 1984, 1986, and 1989 were 71 percent, 73 percent, 87 percent, and 83 percent, respectively (U.S. Bureau of the Census 1991b). The cumulative attrition, consequently, is quite substantial. We do not think the sample attrition affects our results because we obtained virtually identical results when our analysis was restricted to the 1982 to 1984 period.

We examine four types of exits from computer work (exits overall, to a career switch, to management, and from the labor force) for men and women for each of the four survey periods. As discussed above, separating each type of exit enables us to analyze the pattern of male departures in detail.

Our multivariate analysis considers whether gender differences in exits from computer work are due to factors other than gender itself. Each transition is treated as a separate case. Exits from each of the three transition periods are pooled into a single analysis. We test whether the exit rate is constant across the three periods of analysis. We also estimate the determinants of each of the four exit types separately. The effects of independent variables are estimated in logistic regression analyses.

Control variables in the analysis include several productivity-related measures and some indicators of the social composition of computer workers. We include the respondent's age, years of experience,[7] highest degree completed (none, associate degree, bachelor's degree, master's degree, MBA degree, or professional/Ph.D. degree), and major field of study (computer science, business, engineering, math sciences, other technical field, nontechnical field). Other variables we include are the respondent's race (white, black, Asian, other),[8] marital status (married, not married), and the presence of children in the home (two measures: children under age 6 and children between ages 6 and 17). We also include measures of the seven computer specialties (noted above), and seven broad industry categories (manufacturing, professional services, finance/insurance, utilities, education, government, and other). Appendix A gives 1984 values for these variables.[9]

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[3] The SSE sample was stratified into 10 occupational groups, two of which were computer specialists and engineers. The survey also oversampled women and minorities. NSF's "labor reserve" includes people not currently in the labor force who were employed in the last five years in a scientific, engineering, or related occupation (National Science Foundation 1984).

[4] Supporting our view of computer work as a single occupation are similarities in self-reported work activities (see note 16) between computer engineers and other computer professionals. We also found high rates of mobility among seven computer specialties, including computer and systems engineering, which suggests significant overlap between these fields.

[5] We operationalized our definition of computer worker to include those SSE occupational titles for which at least one-third of the workers in each survey year gave "computer applications" or "development" as their primary work activity; we excluded individuals with Ph.D.s whose primary work activity was teaching or research in an academic setting. Under this definition, there were six computer occupations on the SSE in 1982, seven (listed in the text above) in 1984 and 1986, and nine in 1989. For consistency, the six in 1982 were expanded to seven by estimating the number of computer engineers in 1982 from 1984 data. (All electrical engineers in 1982 who were computer engineers in 1984 and whose job data did not change from 1982 to 1984 were classified as computer engineers in 1982.) "Systems analysts, except computer systems or data processing" were included as "other systems analysts," their name notwithstanding, because they met our functional criteria and had high rates of mobility to and from the other six specialties. Unfortunately, the SSE retained only four of the seven titles in 1989, which limits our full use of the data.

[6] The self-reported specialty data were solicited by providing respondents with a list of titles from which to choose. Since respondents chose their own labels, coding errors undoubtedly inflated our estimates of mobility. However, we have no reason to believe that gender differences in coding errors occurred.

[7] In our multivariate analyses we include both age and experience. Despite the relatively high correlation between these measures, this is not a problem. Highly correlated independent variables used for control purposes only should both be included to make the specification as correct as possible. As long as one doesn't interpret the coefficients, there is no reason to be concerned about their multicollinearity (Hanushek and Jackson 1977:88).

[8] "Other" includes self-identified Hispanics, regardless of race; American Indians or Alaskan natives; and self-identified "other." White, black, and Asian are residual categories constructed after the removal of the "other" group.

[9] As described in note 5, 1984 and 1986 were the only two SSE survey years with consistent computer occupations. Appendix A presents data for 1984 to facilitate the interpretation of the results.

Table 1. Labor Force Earnings Ratios: Computer Workers From the SSE, 1982 to 1989

	Computer Men to Male Labor Force[a]				Computer Women to Female Labor Force[b]			
Earnings Ratio	1982	1984	1986	1989	1982	1984	1986	1989
Labor force earnings[c]	1.74	1.80	1.66	1.84	2.46	2.54	2.39	2.49
Labor force earnings to education[d]	1.30	1.35	1.25	1.39	1.95	2.02	1.80	1.99
Reference earnings[e]	20,336	22,643	25,296	28,291	12,013	13,666	15,425	18,253
Reference years of education[f]	12.7	12.8	12.8	12.8	12.7	12.7	12.8	12.8
Number of cases	2,671	2,689	2,631	2,532	822	792	748	688

[a] Ratios directly correspond to those in Table 2.2, page 45, of Reskin and Roos.

[b] Ratios directly correspond to those in Table 2.4, page 62, of Reskin and Roos.

[c] Ratio of mean earnings of full-time respondents on the SSE to reference earnings in table.

[d] Numerators are mean earnings divided by median years of education of full-time respondents on the SSE; denominators are reference earnings divided by reference years of education.

[e] Mean earnings of male or female full-time wage and salary workers 16 and older (BLS, unpublished data).

[f] Median years of education for male or female members of civilian labor force 16 and older (BLS, unpublished data). 1988 values used for 1989 due to change of method by BLS.

RESULTS

Resegregation

Earnings comparisons. We begin our analysis by comparing the earnings of computer workers to earnings in the labor force as a whole, following the procedure employed by Reskin and Roos. In Table 1, we compare earnings for full-time SSE computer specialists by sex to their counterparts across the labor force.[10] We also present ratios for earnings per year of education (the ratio of two ratios, as the name suggests), again following Reskin and Roos. For all survey years, male computer specialists earned well above the average male in the labor force (1.74 times as much in 1982, 1.84 times as much in 1989). Thus, women's entry into computer work did not coincide with a decline in men's earnings. The earnings advantage has remained; but the advantage is lower when earnings per year of education is the measure employed.

These data do not support the notion of declining attractiveness that Donato (1990) claims has contributed to the feminization of systems analysis. Men may not have had an economic impetus to flee computer work, either prior to or in response to women's entry. Nevertheless, yearly fluctuations in the economic advantage of men in computer work enable us to test whether changes in men's *relative economic status* are related to their flight from computer work. The earnings ratio for men during the period studied ranged from a high of 1.84 to a low of 1.66. Female computer specialists boasted an even higher earnings ratio compared to the female labor force (2.46 in 1982, 2.49 in 1989). The education-adjusted ratios also remained higher for women than for men. On strictly economic grounds, then, one would expect computer work to be quite attractive to women workers.[11]

[10] Reskin and Roos theorize about both full- and part-time workers, but calculate deterioration based on full-time workers. We've followed their approach. Part-time work is rare among computer workers for at least two reasons—required skills are constantly changing and such work is a "kiss of death" in moves to management (Wright 1991). In 1982, 1984, and 1986, respectively, part-time workers made up .4 percent, .9 percent, and 1.2 percent of the SSE men and 6.6 percent, 9.0 percent, and 10.1 percent of the women.

[11] The year-to-year and male-to-female patterns in Table 1 pertain for six of the seven specialties. The exception is other systems analysts (see note 5), a specialty declining in numbers during this period for both men and women.

Table 2. Comparison of Exit Rates and Earnings Ratios: Computer Workers From the SSE, 1982 to 1989

	1982–1984		1984–1986		1986–1989	
Variable	Men	Women	Men	Women	Men	Women
Change in earnings ratio	.06	.08	–.14	–.15	18*	.10*
Predicted change in exit rates (Hypothesis 1)	—	—	[+ +]	—	[– –]	—
Predicted change in exit rates (Hypothesis 2)	—	—	[+ +]	[+ +]	[– –]	[– –]
Overall exit rate (percent)	27.6*	21.4*	27.2*	23.0*	32.4*	25.9*
Change in exit rate (percent)	—	—	–.4	1.6	5.2†	2.9†
Number of cases	2,358	772	2,449	799	2,432	750

* Male-female difference significant at $p < .05$.

† Time-trend difference significant at $p < .10$.

[+ +] Exit rate increases.

[– –] Exit rate decreases.

While the economic status of computer work did not change dramatically during the 1980s, the proportion of women continually increased. Women's representation among computer workers grew 3.8 percentage points between 1982 and 1984, 2.1 percentage points between 1984 and 1986, and .4 percentage points between 1986 and 1989.[12] Women's representation increased for each of the three time periods examined. Hypotheses 1 and 2 predict that changes in relative earnings drive exits from computer work; Hypothesis 3 predicts that feminization also drives male exits. While the earnings stimulus is limited to year-to-year variability rather than a sustained decline, the feminization impetus is clearly present throughout this period.

Exit rates. Table 2 compares data on exit rates for men and women. Overall, in each of the three periods examined, men were more likely to leave computer work than were women. This finding is consistent with the notion of resegregation: Disproportionate male attrition reinforces the tendency of an occupation to become female-dominated, while disproportionate female attrition inhibits the feminization of an occupation.

Table 2 also shows year-to-year fluctuations in exit rates and earnings ratios for men and women. This analysis focuses on Hypotheses 1 and 2, which posit a connection between earnings and exits for men and women. The results for men's exits oppose the predictions of Hypothesis 1, which holds that a decline in men's relative earnings should stimulate men's flight. Men's exit rates declined, while their relative earnings declined as well (1984 to 1986); men's exit rates increased while their relative earnings increased (1986 to 1989). If we apply the same reasoning to women, we find that the 1984 to 1986 period saw a decline in relative earnings and an increase in exits. However, the final period saw both relative earnings and exits rise, the reverse of the logic that changes in the former produces opposite changes in the latter. Thus, the year-to-year changes in exits for women respond to earnings in closer accord with Hypothesis 2 than do those for men, but the fit is not particularly close for either group. Thus, Hypotheses 1 and 2, which connect earnings decline and occupational attrition, do not hold up well.

Table 3 presents the exit rates and entry rates for men and women for each period by type of exit: exits from the labor force, career switches (moves to noncomputer, nonmanagement jobs), moves into management, and moves to

[12] These figures are obtained from the U.S. Bureau of Labor Statistics (1976–1992) and do not include engineers. When computer workers and electrical engineers are considered jointly, the increases are 2.6, 1.6 and 1.6 percentage points for the three time intervals, respectively.

Table 3. Percentages of Men and Women Entering and Exiting Computer Work: Computer Workers From the SSE, 1982 to 1989

Computer Work Exits/Entrances	1982–1984 Men	1982–1984 Women	1982–1984 Men – Women	1984–1986 Men	1984–1986 Women	1984–1986 Men – Women	1986–1989 Men	1986–1989 Women	1986–1989 Men – Women
Exits (Percent)									
From the labor force	1.0	5.3	-4.3^{**}	1.8	3.5	-1.7^{*}	3.9	4.3	−.4
To a career switch	16.2	7.5	8.7^{**}	14.9	8.3	6.6^{**}	17.1	8.7	8.4^{**}
To management	9.6	8.2	1.5	9.6	8.9	.7	9.8	10.7	−.8
To unemployment	.8	.4	.4	.9	2.4	-1.5^{**}	1.6	2.3	−.7
Total percent exiting computer work	27.6	21.4	6.2^{**}	27.2	23.0	4.2^{*}	32.4	25.9	6.5^{**}
Number of cases	2,358	772	—	2,449	799	—	2,432	750	—
Entrances (Percent)									
To the labor force	.3	1.8	-1.5^{**}	.3	2.3	-2.0^{**}	.3	2.7	-2.4^{**}
From a career switch	20.2	13.1	7.0^{**}	17.9	9.7	8.2^{**}	18.6	9.7	8.9^{**}
From management	6.5	2.9	3.7^{**}	6.5	6.0	.5	8.7	7.0	1.8
From unemployment	.9	1.0	−.1	.6	.3	.4	.9	.9	.0
Total percent entering computer work	27.9	18.8	9.1^{**}	25.3	18.3	7.0^{**}	28.5	20.2	8.3^{**}
Number of cases	2,449	799	—	2,432	750	—	2,362	703	—

$^{*}p < .05$ $^{**}p < .01$ (two-tailed tests)

Note: Numbers may not add due to rounding errors.

unemployment. The salient results from Table 3 regarding exits are:

(1) In all three periods, exits from computer work were substantial, with between one-fourth and one-third of computer workers leaving the field.

(2) In all three periods, men left computer work more often than did women.

(3) In all three periods, women left the labor force more often than did men. (Two of these differences are statistically significant.)

(4) Men made more career switches (moves to noncomputer, nonmanagement positions) than did women.

(5) Moves to management did not differ by sex.

(6) In all three periods, few computer specialists were unemployed, and, with one small exception, no gender gap in unemployment was evident.

Our findings regarding the low unemployment levels for computer workers are consistent with other studies of the computer field. With the tremendous demand for computer people, there was little unemployment during this period for either men or women (National Science Foundation 1988). There are several possible explanations for the lack of a gender gap in moves into management. First, some evidence suggests that, in general, women are catching up to men in management (Jacobs 1992). Other analysis of the SSE data (Wright 1992) indicates that there is significant mobility between management and computer work in both directions. A computer worker's move to management does not necessarily mean a promotion, nor are promotions in computer work solely the province of people who accept management occupational titles (Eskow 1990). Finally, while both men and women may have managerial titles, women may well be moving into management positions with less status and authority than those held by men (Kraft and Dubnoff 1983; Reskin and Ross 1992).

Gender differences are evident in two types of exit: Women leave the labor force more often than do men, while men switch to fields outside computer work more often than do women. Women's disproportionate exit from the labor force is consistent with the age composition of women in the SSE pool: 85 percent of the female SSE sample in 1986 was between ages 21 and 45—the childbearing and early childrearing years during which women are more likely to leave the labor force than are men. Men, in contrast, tend not to leave the labor force until retirement; 70 percent of the male SSE sample in the same year were in the same age group.

For career switches (moves to nonmanagement, noncomputer occupations), men's exit rates were higher than women's. These moves may have significant implications for gender inequality: Previous research (Wright 1990) suggests that lateral career switches out of computer work may well lead to subsequent promotional advantages.

The substantial turnover of computer workers facilitates the relatively rapid feminization of the field, because it generates new employment opportunities for women. However, many of those who leave computer work do return; thus, a more complete analysis requires understanding both exits and entries. One estimate suggests that in 1986, 39 percent of entering computer scientists and systems analysts had previous computer experience (Carey 1989). Net exit rates take both entrances and exits into account. The SSE data are not ideally suited for a complete analysis of new entrants, because the population is restricted to individuals who were already scientific and technical specialists in 1980. An analysis of entrances from this population is useful, however, for comparison to exits into the same population.

We analyzed the entry into computer work by scientific and technical workers from the SSE panel. The second panel of Table 3 shows the rates of entry from each of four employment statuses for the three time intervals considered. The entrants shown were from the larger SSE panel: Any 1980 scientist or engineer entering computer work was included, whether or not he or she had previously worked as a computer professional. In each period, men entered computer work from other fields at a higher rate than women. Men were more likely to switch careers into computer work and to enter from managerial positions, while women were more likely to enter if they had previously left the labor force. Combining exits and entries in Table 3, the net outflow for men was smaller than for women in each survey period, despite the lower attrition of women in computer work. (In one period, 1982 to 1984, the exits and entrances for men were about the same.) The feminization of computer work, thus, appears to have been aided by the relatively high turnover of computer workers, but proceeded despite the greater net turnover of women. The large and growing number of women did not deter male scientists, engineers, and other technical workers from entering computer specialties.

Exits and earnings. To further examine the exit differences presented in Table 3, we used logistic regression to explore the variability in each type of move: We estimated the odds of exiting computer work between survey waves (two-year or three-year intervals).[13] We estimated models that combined all exits into a single analysis and others that treated each exit type separately.

A series of logistic regression models were estimated for all exits from computer work, in which controls for background, education, period, occupation, and industry were gradually added (see Table 4). In the initial model, the variable "male" was entered into the equation by itself and had a positive coefficient. This indicates that, before other factors are taken into account, the odds of men's exiting computer work exceeds those of women. This is consistent with the results in Table 3 and appears to support the resegregation perspective, in that men exit computer work more than women.

The most striking result in Table 4, however, is that as additional variables were added to the model, the male coefficient quickly changed sign and became statistically significant in the opposite direction. In other words, once relevant controls are introduced, men are *less* likely than women to leave computer work. Background variables (age and experience), education, and computer specialty all contributed to the reversal. The principal finding sup-

[13] To test for period effects as suggested by Allison (1992), regressions were run on a file of separate records for computer workers in 1982, computer workers in 1982 who stayed through 1984, and computer workers in 1982 who stayed through 1984 and 1986.

Table 4. Logistic Regression Coefficients for All Exits From Computer Work on Selected Variables: Computer Workers From the SSE, 1982 to 1989 (N = 7,558)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Male	.16*	.02	−.13	−.16*	−.21**	−.21**	−.21**
BACKGROUND							
Race							
White	—	—	—	—	—	—	—
Black	—	−.23	−.18	−.18	−.20	−.20	−.20
Asian	—	−.26*	−.34**	−.34**	−.28*	−.28*	−.28*
Other	—	.34*	.29	.28	.23	.23	.23
Married	—	.26**	.23**	.23**	.21**	.20**	.20**
Children < age 6 at home	—	−.07	−.06	−.04	−.03	−.03	−.03
Children ages 6–17 at home	—	−.09	−.07	−.08	−.06	−.06	−.06
Age	—	.01	.01	.01	.01*	.01*	.01*
Years of experience	—	.02*	.01	.01	.00	.00	.00
EDUCATION							
Degree							
None	—	—	.23	.21	.10	.10	.10
Associate	—	—	.61***	.58**	.45*	.44*	.44*
Bachelor's	—	—	—	—	—	—	—
Master's	—	—	.08	.07	−.06	−.05	−.05
M.B.A.	—	—	.34*	.33*	.24	.24	.24
Professional/Ph.D.	—	—	.25*	.24*	.11	.11	.11
Major							
Computer science	—	—	—	—	—	—	—
Business	—	—	.41**	.39**	.33*	.33*	.33*
Engineering	—	—	1.09***	1.05***	.68***	.67***	.67***
Math sciences	—	—	.26*	.24*	.16	.16	.16
Other technical	—	—	.45***	.43***	.32**	.33**	.33**
Nontechnical	—	—	.53***	.50***	.45***	.46***	.46***
PERIOD							
1982–1984	—	—	—	.29***	.19*	.18*	.18*
1984–1986	—	—	—	−.21**	−.25**	−.26**	−.26**
1986–1989	—	—	—	—	—	—	—
SPECIALTY							
Computer programmer	—	—	—	—	−.90***	−.90***	−.90***
Computer systems analyst	—	—	—	—	−.66***	−.66***	−.66***
Other systems analyst	—	—	—	—	.77***	.77***	.77***
Systems engineer	—	—	—	—	.53***	.52***	.52***
Computer scientist	—	—	—	—	−.41**	−.41**	−.41**
Computer engineer	—	—	—	—	.23	.23	.23
Other computer specialist	—	—	—	—	—	—	—
INDUSTRY							
Manufacturing	—	—	—	—	—	−.05	−.05
Professional services	—	—	—	—	—	−.03	−.03
Finance/insurance	—	—	—	—	—	−.08	−.08
Utilities	—	—	—	—	—	.05	.05
Education	—	—	—	—	—	−.08	−.08
Government	—	—	—	—	—	−.14	−.14
Other industry	—	—	—	—	—	—	—
Labor force earnings ratio	—	—	—	—	—	—	−.00
−2 log likelihood	7946.45	7848.69	7667.46	7612.24	7342.33	7340.20	7340.18
Chi-square	6.23*	103.98***	285.22***	340.44***	610.35***	612.48***	612.49***
Degrees of freedom	1	9	19	21	27	33	34
Percent concordant pairs	20.3	56.1	62.9	64.0	68.4	68.5	68.5

*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

porting the resegregation perspective was the excess male attrition from computer work. Yet this finding does not hold after the introduction of simple, relevant controls in our multivariate analysis.

The earnings variable in the analysis in Table 4 was individual earnings in a given year divided by the average male labor force earnings in the same year. This variable consistently failed to predict exits. In other words, there appears to be no support for the notion that either men or women were more likely to leave computer work when their earnings declined relative to the rest of the labor force.

We were so surprised and puzzled by this result that we examined a total of 43 alternative measures of the relative economic status of computer specialists. We followed the same pattern of individual earnings compared to yearly aggregates, varying the aggregates. We considered four alternative reference groups: all technical workers, all computer workers, all those sharing one's specialty, and all technical workers in one's industry. We adjusted for education following the procedure we used in Table 1. We changed the five reference groups to be sex-specific and adjusted for education again.

We then constructed four additional earnings measures: the female-to-male earnings ratio at the specialty level, the female-to-male earnings ratio at the industry level, the individual's earnings (with no specified reference group), and the individual's earnings trajectory in the preceding interval. Finally, we reanalyzed each of the male and sex-specific earnings ratios with lagged earnings data, using the earnings ratios from the previous interval on the grounds that it may take men some time to react to the trend in earnings. Values for the subset of these measures that reflect male reference groups in the same interval are shown in Appendix A. Results (not shown) indicate that none of these measures reliably predicts male exits from computer work. In other words, when other relevant influences on exit rates are accounted for, exits are not predicted by year-to-year fluctuations in the earnings of computer specialists using earnings measures relative to any of a wide range of reference groups.

These results run counter to Hypotheses 1 and 2. They contradict Hypothesis 1 because they indicate that male attrition is not determined by earnings changes. They contradict Hypothesis 2 because they indicate male attrition is less likely than female attrition when individual attributes are controlled (Hypothesis 2 holds that the difference between male and female exits should reflect earnings differences alone).

Our focus here is not on the effects of the control variables themselves, but rather, controlling for other factors, whether there is an excess or deficit in male exit rates relative to women. Nevertheless, the coefficients for the control variables in Table 4 shed interesting light on the process of attrition from computer work. Persistence in computer work declines with experience, a result consistent with the high turnover rate discussed above. Attrition varies little across industry, but varies substantially across specialty: Programmers are more likely to persist, and systems engineers are more likely to leave. Those with computer science degrees are more likely to persist in computer work than those with degrees in other fields, such as business or engineering. Differences in persistence across educational levels diminish markedly once specialties are controlled. Asians are more likely to persist in computer work than their white counterparts, perhaps due to the greater difficulties Asians experience in obtaining promotions (Tang 1991).

Because women's representation in computer work leveled off after 1986, we wanted to examine whether the determinants of attrition changed during this period. The analyses presented in Table 4 indicate that there are indeed period effects. Computer workers were most likely to exit in 1982 to 1984 and least likely to exit in 1984 to 1986. However, there were no significant period interaction effects. In other words, we could not reject the null hypothesis that the effects of earnings and other key variables on attrition were constant during the periods considered.

Economic factors likely account for the period effects in Table 4. While the 1982 to 1984 period included the recession that peaked at the end of 1982, overall it was a time of decreasing layoffs and increasing consumer confidence as measured by initial claims for unemployment insurance and the Conference Board's index, respectively. These trends reversed in the 1984 to 1986 period: It was a time of increasing layoffs and decreasing consumer confidence as measured by the same indicators. Both periods had high rates of unemployment

Table 5. Logistic Regression Coefficients for Three Types of Exits From Computer Work on Selected Variables: Computer Workers From the SSE, 1982 to 1989

Variable	Career Switches: Model 1	Career Switches: Model 7	Labor Force Exits: Model 1	Labor Force Exits: Model 7	Moves to Management: Model 1	Moves to Management: Model 7
Male	.71***	.27*	–.80***	–1.85***	.02	–.24*
BACKGROUND						
Race						
White	—	—	—	—	—	—
Black	—	.07	—	.17	—	–.75**
Asian	—	–.18	—	–.09	—	–.34*
Other	—	.25	—	–1.49	—	.21
Married	—	.11	—	1.21***	—	.22
Children under age 6 at home	—	–.13	—	.10	—	–.03
Children ages 6–17 at home	—	–.02	—	–1.45***	—	.28**
Age	—	.02*	—	.11***	—	–.03**
Years of experience	—	–.01	—	.02	—	–.00
EDUCATION						
Degree						
None	—	–.02	—	–.29	—	.29
Associate	—	.46*	—	.40	—	.27
Bachelor's	—	—	—	—	—	—
Master's	—	–.07	—	–.33	—	.05
M.B.A.	—	–.08	—	–.14	—	.45*
Professional/Ph.D.	—	.23	—	–.43	—	.03
Major						
Computer science	—	—	—	—	—	—
Business	—	.38	—	.01	—	.39*
Engineering	—	1.06***	—	.01	—	.28
Math sciences	—	.21	—	.31	—	.11
Other technical	—	.52**	—	.12	—	.27
Nontechnical	—	.67***	—	–.13	—	.38*
PERIOD						
1982–1984	—	.64***	—	–.22	—	–.05
1984–1986	—	–.07	—	–.67**	—	–.29*
1986–1989	—	—	—	—	—	—
SPECIALTY						
Computer programmer	—	–.79***	—	.11	—	–1.28***
Computer systems analyst	—	–.99***	—	.09	—	–.62***
Other systems analyst	—	1.14***	—	.79	—	.53
Systems engineer	—	1.11***	—	.44	—	–.22
Computer scientist	—	–.10	—	–1.37*	—	–.71***
Computer engineer	—	.70***	—	.05	—	–.38
Other computer specialist	—	—	—	—	—	—
INDUSTRY						
Manufacturing	—	–.08	—	.17	—	–.05
Professional services	—	–.05	—	–.00	—	–.03
Finance/insurance	—	–1.05***	—	.53	—	.09
Utilities	—	–.06	—	.20	—	.29
Education	—	–.03	—	–.80	—	–.03
Government	—	–.23	—	.11	—	.03
Other industry	—	—	—	—	—	—
Labor force earnings ratio	—	–.01***	—	–.00**	—	.01***
–2 log likelihood	4578.64	3773.11	1595.79	1226.25	4250.36	3969.71
Chi-square	49.91***	855.44***	25.96***	395.50***	.06	280.71***
Degrees of freedom	1	34	1	34	1	34
Percent concordant pairs	22.5	79.2	32.7	86.9	19.6	68.7
Number of cases	6,637	6,637	6,080	6,080	6,553	6,553

*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

Table 6. Logistic Regression Coefficients for the Effect of Percent Female on Men's Exits From Computer Work: Computer Workers From the SSE, 1982 to 1989

Percent Female	Exits From Computer Work[a]	Exits From the the Labor Force[a]	Exits to a Career Switch[a]	Exits to Management[a]
Specialty	.01 (.03)	—[b]	.00 (.04)	.06 (.04)
Industry	–.03 (.03)	—[b]	–.05 (.05)	–.07 (.05)
Number of cases	5,607	4,438	4,964	4,821

[a] None of the coefficients was significant at $p < .05$ (two-tailed tests).

[b] Men's exits were so few that the regressions did not converge.

Note: Numbers in parentheses are standard errors.

compared to the 1986 to 1989 period (Haver Analytics). These factors are all likely to affect individuals' assessments of the risks of leaving computer work—in different ways to different destinations.

Table 5 repeats the analysis presented in Table 4 for career switches (exits to nonmanagement, noncomputer work), exits from the labor force, and moves to management. This table reveals the reasons for the reversal of the male exit advantage: In each case, the male coefficient is smaller in the controlled analysis (Model 7) than is observed in the zero-order relationship (Model 1). The addition of control variables to the analysis reduces men's advantage in the case of career switches, reinforces women's advantage in the case of exits from the labor force, or turns men's advantage (which was not statistically significant) into a disadvantage for moves into management.

The majority of men's advantage in career switches out of computer work is due to differences in specialty and background characteristics, such as major field of study. Once these differences are controlled, only a small male advantage persists. We see that women's advantage in exits from the labor force increases when controls are imposed. No significant gender difference in moves into management is evident until the earnings ratio measure is introduced; this analysis indicates that high earners, who are disproportionately men, are more likely to become managers, but are less likely to switch careers or leave the labor force.

These results illuminate the processes that underlie the combined exit results in Table 4. Specifically, for men the higher rate of exits from computer work reverses when controls are imposed, because education, experience, and specialty account for most of the male excess in career switches and at the same time enhance women's advantage in exits from the labor force.[14]

Sex composition effects. Table 6 presents a summary of the effect of sex composition on male exits. This analysis is designed to test Hypothesis 3—whether the growing presence of women in computer work prompts men to leave the occupation. The regressions included men only and controlled for all variables in Model 7 (except the variable "male") presented in Tables 4 and 5. Two measures of percent female were considered separately: specialty percent female and industry percent female. The

[14] We tested a number of interaction terms to determine if the effects of earnings on exits in Tables 4 and 5 differed by gender. These terms were not significant when control variables were included in the analysis. We also tested whether the marital status effect differed by gender. With the exception of exits from the labor force, where married women were more likely to leave than married men, the gender interaction term was not significant once other variables in the model were controlled. We also looked for different engineering effects by gender, given engineering's overwhelmingly male representation. We ran models with interaction terms between engineering majors and gender, and again between gender and the two engineering specialties (computer engineers and systems engineers). These interaction terms were not significant for any exit type when all control variables were included, with the exception that male systems engineers were more likely to move into management and therefore also to exit computer work.

Table 7. Percentages of Men and Women Exiting From Computer Systems Analysis and Computer Programming: Computer Workers From the SSE, 1982 to 1986

	1982–1984			1984–1986		
Type of Exit	Men	Women	Men – Women	Men	Women	Men – Women
Percent From Computer Systems Analysis						
To other computer work	22.3	20.9	1.3	23.1	22.3	.8
From the labor force	1.2	5.2	–4.0**	1.1	3.4	–2.3*
To a career switch	4.6	3.8	.8	4.5	4.0	.5
To management	7.5	8.1	–.7	8.7	8.3	.4
To unemployment	1.0	.3	.7	.7	2.8	–2.0*
Total from computer systems analysis	36.5	38.4	–1.9	38.1	40.7	–2.6
Number of cases	831	344	—	843	327	—
Percent From Computer Programming						
To other computer work	34.6	40.6	–6.0	33.7	36.2	–2.5
From the labor force	.8	5.3	–4.5*	2.4	4.7	–2.3
To a career switch	7.6	3.0	4.6*	8.3	7.1	1.2
To management	4.2	4.5	–.3	3.6	2.4	1.2
To unemployment	.0	.0	.0	1.2	1.6	–.4
Total from computer programming	47.3	53.4	–6.1	49.2	52.0	–2.8
Number of cases	237	133	—	252	127	—

*$p < .05$ **$p < .01$ (two-tailed tests)

Note: Numbers may not add due to rounding errors.

mean values for these variables are given at the bottom of Appendix A. None of the percent female coefficients presented in Table 6 are significant, which indicates that the variation in exit rates in the observed data is not a function of the variation in the rates of entry by women into computer work. Because the tests of the effect of percent female were conducted at the specialty and industry levels, there may not have been enough variation to detect sex composition effects. On the other hand, we did not find large coefficients with large standard errors. Rather, the estimated effects were small. Hypothesis 3, which holds that feminization prompts men to leave, is not confirmed.

Ghettoization

Systems analysis and computer programming. Recall that our first three hypotheses for ghettoization at the specialty level parallel the three hypotheses for resegregation at the occupational level. We repeat our analysis for two computer specialties, computer systems analysts and computer programmers. We chose systems analysis to match Donato's (1990) case study and computer programming because it is the lowest status and has been historically the most female-dominated computer specialty. Table 7 presents exit rates by sex for these two specialties to each of five destinations. (Note that moves to other types of computer work are now added as a destination.) Men are less likely than women to leave these two specialties, a result which contradicts the premise of the resegregation perspective. The sex-specific differences for each destination conform to the patterns documented in Table 3. The differences in moves to other computer work are small and not statistically significant.

Regression analyses of overall exits from these two specialties were conducted for the 1982 to 1984 and 1984 to 1986 periods (a change in SSE coding categories made it impossible to continue the analysis through 1989). The results (not shown) generally match

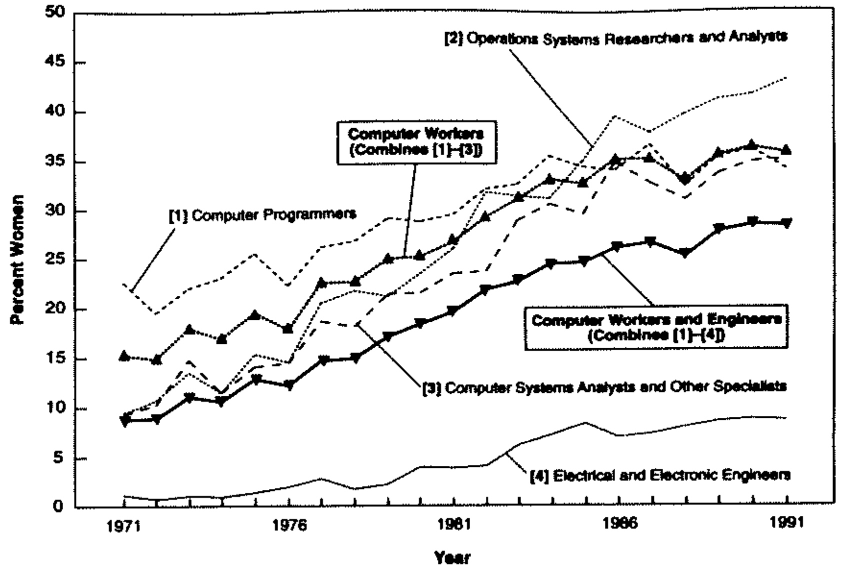

Figure 1. Women's Representation Among Computer Workers, 1971 to 1991

Source: U.S. Bureau of Labor Statistics, *Employment and Earnings*, January 1976–1992, supplemented by BLS unpublished data for 1971 to 1974. Data for Computer Systems Analysts and Other Specialists were estimated because of 1983 changes in BLS occupational groups. (For details, see note 15 below.)

the results in Table 4: The male coefficient declines as additional control variables are added, yet neither case starts with a positive male coefficient, and the male coefficient is not statistically negative in the final model. Thus, ghettoization Hypotheses 1, 2 and 3 are not supported in this analysis. In other words, when the analysis is restricted to these two specialties, men's exits are not related to earnings decline, men do not leave more than women once other factors are controlled, and men do not leave in response to women's entry.

Analyses comparable to those presented in Table 7 for the other five specialties yielded quite comparable results. Specialties vary in the *level* of turnover, with exits from other systems analysis, a declining field, being especially high. However, the specialties did not vary in terms of the gender pattern of exits described in Table 7. We also estimated regression equations predicting exits from all seven specialties. While the analyses provided some interesting details beyond what we report here, the key results regarding the effect of earnings on attrition are consistent with those found for computer systems analysis and computer programming.

Ghettoization by specialties. Figure 1 presents trends in the representation of women in computer work for six computer specialties.[15]

[15] Figure 1 was generated from annual average occupational figures obtained from data published in *Employment and Earnings* (U.S. Bureau of Labor Statistics 1976–1992) and from unpublished U.S. Bureau of Labor Statistics data for 1971–1974. The percent female for engineers in computer work was assumed to be the same as for electrical and electronic engineers. From 1971 to 1982, percent female was available for "computer specialists" (including "computer programmers," "computer systems analysts," and others not listed), "operations systems researchers and analysts," and "electrical and electronic engineers." From 1983 to 1991, percent female was available for "mathematical and computer scientists" (including "computer systems analysts and scientists," "operations systems researchers and analysts," and others not listed), "computer programmers," and "electrical and elec-

The percentage of women in computer work (excluding engineers) rose from 15 percent to 35 percent between 1971 and 1986. When electrical and electronic engineers are included, women's representation is somewhat lower, but the time trend remains the same. The rate of increase has varied by specialty. While women's share of computer programming jobs increased from 23 percent in 1971 to 34 percent in 1991, women's representation among operations systems researchers and analysts increased even faster during the same period, jumping from 9 percent to 43 percent.

The three additional hypotheses specific to ghettoization also receive little support in this analysis. First, the greatest number of women in computer work have not entered the lowest status computer specialties (Hypothesis 4). Of the four computer specialties shown in Figure 1, computer programming is the lowest paid specialty. Yet women's representation among computer systems analysts and operations systems analysts, the second- and third-highest paid specialties, respectively, grew much faster during the 1970s and 1980s than women's representation among programmers. On the other hand, women have made only modest inroads into electrical engineering, the highest paid specialty of the four fields included in the U.S. Bureau of Labor Statistics (1976–1992) data.

Another test of Hypothesis 4 analyzes data on work activities from the SSE survey. For the 15 work activities listed in the SSE, women were indeed most represented in the lowest-paid areas.[16] For example, women were underrepresented in management and consulting (the highest paid) and were overrepresented in teaching and training (the lowest paid). The Spearman rank-order correlation of activity earning level and women's representation in 1982 was –.46. However, women's representation in the lowest-paid work activities did not increase over the years studied. The change in women's representation between 1982 and 1989 was unrelated to the earnings in the activity (r = .02). Thus, the ghettoization of women across work activities neither grew nor shrank as women's representation in the field increased. Thus, Hypothesis 4, which holds that the growth in women's representation will be concentrated in the lowest-paid fields within an occupation, is not confirmed in either the specialty or the work activity analyses.

Hypothesis 5 posits that the process of ghettoization generates an increase in sex segregation across specialties when large numbers of women enter a field. Jacobs (1989b) showed that this was not the case for law or medicine, and we find that it is no more true for computer work. The degree of sex segregation across computer specialties, as measured by the index of dissimilarity, declined somewhat during the 1970s and 1980s: Using data from the U.S. Bureau of Labor Statistics, as measured across the four specialties in Figure 1 (computer programmers, operations systems researchers and analysts, computer systems analysts and other specialists, and electrical and electronic engineers), the index of dissimilarity declined from 61.5 in 1971 to 47.7 in 1981 to 41.8 in 1991. As measured across three computer specialties (excluding engineers), the index declined from 25.5 in 1971 to 6.1 in 1981 to 4.3 in 1991. We conducted the same analysis for Strober and Arnold's (1987) wider set of computer specialties and found much the same result: Between 1970 and 1980 the degree of sex segregation across occupations declined from 59.1 in 1970 to 47.2 in 1980 (calculated from Strober and Arnold 1987:145, table 1).

We expected similar results, although with less of a trend, in our analysis of the SSE data, because the population in the SSE is restricted to experienced computer workers and our analysis was limited to just a four-year period (because of a change in categories). The level of sex segregation as measured across seven SSE specialties increased less than one percent, rising from 18.0 in 1982 to 18.6 in 1986, although this increase was not statistically significant. Using the U.S. Census Bureau's (1991b) grouping of computer specialties (excluding engineers and other systems analysts) the index declined from 7.2 in 1982 to 4.6 in 1986. Occupational sex segregation across industries and work activities also declined slightly for the SSE panel.[17] In all three sets of data we analyzed, the entry of women did not result in an increase in ghettoization, but rather there was either no change or a modest decline in sex segregation across specialties. Thus, Hypothesis 5—feminization is associated with increased segregation across fields—receives little support from our analysis.

Finally, Hypothesis 6 predicts that ghettoization within an occupation results in an increased gap in earnings between men and women. In 1989 women computer workers earned 88 percent of the salaries of their male counterparts, and the gap between men and women narrowed slightly during the 1980s for all computer workers and also for each of the seven specialties examined between 1982 and 1986. In 1982 women computer specialists working full-time earned 84 percent as much as their male counterparts. This fraction rose to 85 percent in 1984 and 88 percent in 1986, where it remained through 1989 (cf. Donato and Roos 1987; Glenn and Tolbert 1987). The sex gap in earnings also narrowed in all seven SSE industry groups between 1982 and 1986—the years with comparable occupational and industry data. Results of regression analyses of the SSE data (not shown) indicate that more than half of the sex gap in earnings is due to identifiable human capital differences, and the unexplained sex gap in wages has declined over time. Thus, Hypothesis 6—feminization results in an increased gender gap in earnings—is also not supported in this case study.

DISCUSSION

We have examined in detail several hypotheses culled from the literature on the processes of occupational resegregation and ghettoization. Our results are not consistent with the predictions of these hypotheses. The data indicate that during a period of rapid feminization of computer work, the earnings of computer specialists did not decline relative to the labor force as a whole. Men left computer work more often than did women, but they were also more likely than women to enter computer work from other technical fields. Men were more likely to exit computer work for related lines of work, while women were more likely to leave the labor force entirely. When relevant factors were controlled, men were less likely to leave computer work than were women. Thus, the mid-career attrition of men did not contribute to the feminization of computer work; on the contrary, women were more likely to leave computer work than men with similar characteristics.

Moreover, the particular mechanisms held to be responsible for men leaving computer work do not account for the variation in male exit rates. The variation in men's earnings relative to their peers in the labor force was not a reliable predictor of men's attrition. This finding is inconsistent with the prediction that declines in earnings are responsible for male flight from feminizing occupations. Nor did feminization per se provoke male flight. In those specialties where women's entry was most pronounced, male exits were not statistically different than in other specialties.

The disproportionate attrition of women from computer work is paralleled by a decline in the proportion of women pursuing bachelor's degrees in fields leading to careers in computer work. The proportions of women receiving bachelor's degrees in computer and information science, computer engineering, and electrical engineering have been declining since the mid-1980s. The proportions of all college graduates in these majors have been falling for both men and women, but the decline has been steeper among women. Women's representation among computer and information science degree recipients grew from 14 percent in 1971 to 37 percent in 1984, and then fell back to 29 percent in 1991.[18]

tronic engineers." The transition between the 1970 and 1980 Census categories was made by forming a new category of "computer systems analysts and other specialists," calculating its percent female in 1971 to 1982 from the difference between "computer specialists" and "computer programmers," and in 1983 to 1991 from the difference between "mathematical and computer scientists" and "operations systems researchers and analysts."

[16] Listed in order of numbers of workers in 1984, the primary work activities applicable to SSE computer workers were: computer applications; product, process, and technical development; management or administration of other than research and development; consulting; management or administration of research and development; design of equipment, processes, and models; operations—production, maintenance, construction, installation; applied research; report and technical writing; quality control, testing, evaluation, or inspection; teaching and training; distribution and sales; statistical work; basic research; and other.

[17] During the four survey years, the index of dissimilarity (D) across the seven industry groups decreased from 13.3 to 15.6 to 10.7 to 9.4; across the 15 work activities, D declined from 18.1 to 16.8 to 16.8 to 16.3.

[18] This analysis is based on Tables 6-38, 7-5, 7-15, and 7-16 in Vetter (1991) and Table 7-11 in

For both men and women, much of the low level of interest in computer science has been ascribed to inadequate steering and marketing early in the educational pipeline (Steering Committee on Human Resources in Computer Science and Technology 1993; Committee on Women in Science and Engineering 1991; Rochester 1988). Jacobs (1994) finds that the decline in women's share of computer science degrees is not the by-product of their greater attraction to alternative male-dominated fields such as business or engineering. Factors inhibiting women's interest may include the avoidance of math in high school, a lack of role models, hostile work environments, and frequent unplanned overtime in computer work that conflicts with family responsibilities (Pearl et al. 1990; Leveson 1989).

While college degree recipients in computer fields are not the only source of entrants into computer work (Carey 1991), they nevertheless are a major pool that can be readily identified. The college degree data do not indicate disproportionate male flight on the part of prospective entrants. Indeed, just the reverse is true: Men have been less likely than women to desert computer majors in college. If the computer field is perceived as less attractive by prospective entrants, it appears that women, rather than men, are more likely to have been affected. The presence of women among computer professionals does not seem to generate male flight among new entrants or among those currently employed.

Computer work does not appear likely to become resegregated, that is, to become a low-wage female-dominated occupation, in light of the declining proportions of women among new college graduates receiving computer science and engineering degrees. However, ghettoization is also not an accurate characterization of computer work, given the narrowing gender gap in earnings and the increasing dispersion of women across specialties. We conclude that during the 1980s computer work was in the process of integrating by gender. Based on the data at hand, however, we cannot say whether this process will continue until complete gender integration is achieved.

There are a number of reasons for being cautious about generalizing from these results to the process of resegregation in other occupations. First, despite the fact that we have analyzed the careers of over 6,000 computer professionals, our research represents only a single case study. Moreover, the case of computer work may not be an ideal test case of what happens when women enter an occupation, because earnings did not decline prior to feminization as is presumed by the perspective from which we drew our hypotheses. Third, the time intervals examined may be too short to induce the anticipated response. Fourth, perhaps the resegregation process only operates at some "tipping" point, and computer work, which was 36 percent female in 1991, is not close enough to that point to produce the expected male flight. Finally, computer work is a relatively new field, and as a result stereotypes about the appropriate gender of its occupants may not have had the time to take root. On the other hand, computer science is a close cousin to electrical engineering, a field rather inhospitable to women (McIlwee and Robinson 1992). The masculine connotations of technical and scientific work have been borrowed by computer science (Frenkel 1990). In that sense, gender stereotypes in computer work are not new, but rather are newly applied versions of longer-standing images. In the end, however, only further research can determine whether other test cases of the process of resegregation will confirm the results obtained here for computer work.

In this study we present no data on perceptions. We think it would be useful for future studies to gather such data in concert with the kind of exit and entrance data we analyze here. Women's perceptions of barriers to opportunities, men's perceptions of changes in the status of their occupations, and attitudinal data on men's resistance to women's entry would help us better understand changes in the gender composition of occupations.

In our analysis, we took several steps to maximize the connection between our tests and the resegregation/ghettoization hypotheses we developed. We considered both narrow and general interpretations of the basic hypothesis. We considered two occupational specialties to increase our chances of finding a group whose experiences conformed to our predictions. If any computer specialty had "tipped," we thought, it would be computer programming—the lowest-status, most female-dominated specialty. Yet we found less support in this case than for computer work as a whole. Similarly, we focused on the case of systems analysts to reanalyze one of Reskin and Roos's case studies. Again, the results were even weaker for systems analysts than they were for all of computer work.

Studies of other occupations that have experienced resegregation, such as school teachers, bank tellers, and telephone operators, corroborate certain elements of the resegregation perspective (Strober 1984; Cohn 1985; Davies 1982). Additional contrary evidence, however, has been offered by Jacobs (1989b), who examined the extent of internal segregation in medicine and law in response to dramatic increases in women's representation in these high-status fields. In both cases, he found that women's entry coincided with declines in the extent of sex segregation across fields within these professions. In another study, Jacobs (1992) maintained that while women's representation in management positions over the last 20 years has more than doubled (women were 18 percent of managers in 1970 and 40 percent in 1988), the earnings gap between male and female managers has narrowed, while a gender gap in authority has remained little changed. In medicine, law, management, and now computer work, a dramatic rise in the numbers of female participants has not resulted in a decline in the status of the occupation or in increasing differentiation within the field.

Although more studies of particular cases are undoubtedly needed, our findings pose the question, "Are integrated occupations possible?" Computer work is an occupation with gradually increasing numbers of women, in which men are not fleeing in response to women's entry. Imagine neighborhoods in which blacks entered and whites did not leave: At least for a time, there would be movement toward integration.

We do not claim that computer work is perfectly egalitarian in gender terms, or that there is no discrimination against women in the profession. We simply suggest that, if this case is a reliable guide, women's entry into an occupation does not necessarily follow or provoke a sustained flight of men, and women's entry does not necessarily cause or increase the ghettoization of women in the least desirable specialties within that occupation.

Vetter (1992), supplemented by data from the U.S. Department of Education (1992 and unpublished data for 1991).

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Appendix A. Mean Values of Logistic Regression Variables: Computer Workers From the SSE, 1984

Variable	Men (N = 2,449)	Women (N = 799)	Men and Women (N = 3,248)
DEPENDENT VARIABLES[a]			
Exits from computer work	.272	.230	.262
Exits from the labor force	.018	.035	.022
Exits to a career switch	.149	.083	.133
Exits to management	.096	.089	.094
Stay in computer work	.728	.770	.739
INDEPENDENT VARIABLES[b]			
Male	1.000	.000	.754
Background			
Race			
[White][c]	.831	.830	.831
Black	.043	.055	.046
Asian	.099	.081	.095
Other	.027	.034	.028
Marital Status			
Married	.821	.640	.776
[Not married][c]	.179	.360	.224
Children at Home			
Yes, < age 6	.266	.237	.259
[No, < age 6][c]	.734	.763	.741
Yes, ages 6–17	.443	.225	.389
[No, ages 6–17][c]	.557	.775	.611
Age	41.0	36.2	39.8
Years of experience	16.7	12.1	15.6

(Appendix continued on next page)

(Continued from previous page)

Variable	Men (N = 2,449)	Women (N = 799)	Men and Women (N = 3,248)
INDEPENDENT VARIABLES *(Continued)*[b]			
Education			
Degree			
None	.053	.073	.058
Associate	.032	.015	.028
[Bachelor's][c]	.454	.502	.466
Master's	.301	.287	.298
M.B.A.	.073	.086	.076
Professional/ Ph.D.	.088	.040	.076
Major			
[Computer science][c]	.172	.242	.189
Business	.162	.141	.157
Engineering	.297	.074	.242
Math sciences	.143	.228	.164
Other technical	.148	.176	.155
Nontechnical	.078	.139	.093
Period			
1982–1984	.000	.000	.000
1984–1986	1.000	1.000	1.000
[1986–1989][c]	.000	.000	.000
Specialty			
Computer programmer	.103	.159	.117
Computer systems analyst	.344	.409	.360
Other systems analyst	.025	.020	.024
Systems engineer	.178	.069	.151
Computer scientist	.051	.046	.050
Computer engineer	.110	.045	.094
[Other computer specialist][c]	.189	.252	.204
Industry			
Manufacturing	.455	.339	.426
Professional services	.121	.080	.111
Finance/insurance	.057	.103	.068
Utilities	.053	.078	.059
Education	.030	.059	.037
Government	.077	.104	.083
[Other industry][c]	.208	.238	.216
Relative Favorability[d]			
Earnings ratio[e]			
Labor force	1.79[f]	1.49[f]	1.72
Technical worker	.99	.83	.95
Computer worker	1.00	.83	.96
Computer specialty	1.00	.85	.96
Industry	.98	.82	.95
Earnings to education ratio[e]			
Labor force	1.33[f]	1.13[f]	1.28
Technical worker	.98	.83	.94
Computer worker	.98	.83	.95
Computer specialty	.98	.85	.95
Industry	.94	.81	.91
Female-to-male earnings ratio			
Computer specialty	.85	.85	.85
Industry	.78	.78	.78
Absolute earnings			
Earnings	40,618[f]	33,789[f]	38,938
Earnings trajectory	1.25	1.30	1.26
Percent female			
Computer specialty	21.8	25.0	22.6
Industry	13.9	15.6	14.4

[a] Dependent variable values reflect exits in the interval following the survey year, 1984 to 1986. Shown are the exit proportions that correspond to Table 3. Per Allison (1992), omitted in the regressions were respondents exiting to other destinations and respondents not meeting the criteria in note 13.

[b] Independent variable values reflect values in the survey year, 1984, with the exception of earnings trajectory, which is earnings in the survey year, 1984, divided by those in the previous survey year, 1982.

[c] Variables in brackets indicate omitted categories.

[d] Ratios were entered in regressions as percentages to see small coefficient values, but are shown as proportions for comparison to Table 1.

[e] Shown are the ratio values with average earnings from male reference groups in the same interval. As described in the text, identical analyses were performed with earnings from sex-specific reference groups in the same interval, male reference groups from the previous interval, and sex-specific reference groups from the previous interval.

[f] Values for earnings for 1984 are lower than those used in Table 1 because regressions include part-time workers per the argument in note 10.

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