ORGANIZATIONAL VARIATIONS IN WOMEN SCIENTISTS’ REPRESENTATION IN ACADEMIA*

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Using a nationally representative sample of college faculty from a wide array of institutions and science disciplines, this study investigates links between organizational conditions and women’s representation on college faculties. Hypotheses derive from competing explanations for the sharp differences found in women’s and men’s career outcomes in academia: institutionalized discrimination that protects men’s dominant group privileges, statistical discrimination based on expectations of gender differences in academic preparation and scholarship, variations in the female doctoral labor supply by science discipline and locality, political restraints on discrimination and pressure for equal employment opportunity. A multivariate analysis examines organizational conditions associated with women’s likelihood of holding faculty appointments at different tenure levels. Results indicate that although the female doctoral labor supply and political constraints are powerful factors in the representation of women faculty, selective organizational contexts play a substantial role as well. Although we find little evidence that insulation from competition or segmented faculty labor markets strongly influence the gender composition of science faculties, women are more often found in entry-level positions where institutionalized discrimination may be checked by unionization and proportionally sizable constituencies of women administrators and students. Consistent with statistical discrimination, women scientists and engineers are poorly represented at the entry level in research-oriented institutions and are more scarce in tenured positions within highly prestigious departments and institutions with very selective admissions. These organizational influences on women’s faculty representation hold even after controlling for gender differences in the prestige of academic credentials, level of work experience, and marital and child-rearing responsibilities.

INTRODUCTION

As research on women’s status within academia has broadened beyond studies of gender differences in educational and occupational attainments at the individual level, organizational arenas have emerged as influential factors. They are responsible for the hiring and promotion decisions that shape both individual careers and the composition of scholarly disciplines as well. A handful of studies have employed comparative organizational data to link women’s sparse representation and typically inferior faculty status to the institutional structure of the academy, and women’s place within it (Astin & Bayer, 1972; Bach & Perrucci, 1984; Kulis & Miller-Loessi, 1992a, 1992b; Perrucci, 1986; Szafran, 1984). Although they are not entirely consistent, they suggest that the severity of gender inequities

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in appointments, rank, tenure, and salary are related to a host of organizational characteristics, such as size, prestige, financial resources, and dependence on federal funds. Although limited to selected samples of institutions, particular disciplines, and/or somewhat distant time periods, these studies shift the focus of explanations from individuals to organizations. This study follows in this tradition and attempts to advance it in three ways: by framing expected organizational influences within competing theoretical accounts of how gender inequities at work are generated and maintained, by carefully adjusting for variations in the labor supply of female doctoral recipients across a wide array of science disciplines, and by controlling for other potential macro level influences on hiring decisions in academia.

There is no shortage of explanations for various "gender gaps" in academia: gender differences in educational attainment, career patterns, and family constraints (Astin & Bayer, 1979; Astin & Davis, 1985; Hamovitch & Morganstern, 1977); variations across scholarly fields in academic "cultures," in sex composition, and in the labor supply of doctoral-level women (Bellas, 1994; Ehrenberg, 1991; Keller, 1985; Lomperis, 1990); organizational and departmental structures, and their interest group politics (Perrucci, 1986; Szafran, 1984); and external geographic (Marwell, Rosenberg, & Spilerman, 1979) and political constraints (Salancik, 1979). The relative contribution of each of these factors has remained uncertain, however, in large measure because of difficulty in obtaining representative samples of both faculty and academic institutions, and resulting inability to examine issues simultaneously at different levels of analysis. This study examines key factors at each of the possibly relevant levels-individual, departmental, organizational, metropolitan, state, regional, and national—and how they operate together. Using data from a large representative sample of doctoral-level faculty, and matched characteristics of their 4-year postsecondary employers, hypotheses about the links between institutional structures and the sex composition of the faculty are derived and tested. Specifically, the study gauges the effects of organizational factors on the likelihood that women hold a sample of faculty appointments, after adjusting for disciplinary differences in the supply of female doctoral recipients, possible geographic constraints on academic careers, external political influences on hiring within academic institutions, and individual level differences in academic credentials, work experience and family responsibilities.

**ORGANIZATIONAL BARRIERS TO GENDER EQUITY IN ACADEMIA**

Many of the factors thought to contribute to persisting gender disparities in academia can be organized within the framework of theories from sociology and economics about the sources of workplace discrimination: organizational contexts that support "institutionalized discrimination" to preserve men's organizational and professional advantages, and conditions that prompt employers to engage in "statistical discrimination" against women.

**Institutionalized Discrimination**

There is a large literature contending that gender inequities are rooted both in official and informal administrative and collegial practices in academia: men's tendency to control faculty search processes, criteria, screening, and interviewing; their domination of nomi-
nation and insider information networks; and the heightened scrutiny and extreme evaluations that academic women experience when they enter departments as tokens, solos, and outsiders (e.g., Aisenberg & Harrington, 1988; Epstein, 1991; Keller, 1977). These accounts of the workings of academia align with sociological theories of "institutionalized discrimination" (Feagin & Feagin, 1978; Tomaskovic-Devey, 1993), which contend that dominant groups engage in continuous efforts to maintain their privileged organizational positions. These privileges are codified within workplace norms (Alvarez & Lutterman, 1979), recruitment procedures (Reskin & Hartmann, 1985), the division of labor (Bielby & Baron, 1984), and informal networks of information and decision-making (Feagin & Eckberg, 1982). Those who try to ascend the organizational hierarchy face increasingly elaborate screening to see if they are socially similar to those in dominant positions (Kanter, 1977). This account of gender discrimination assumes that men maintain their privileges by restricting women from jobs with the highest levels of skill, authority, status, and remuneration. In academic settings, this would culminate in the widespread exclusion of women from tenured faculty jobs. Though institutionalized discrimination may be increasingly subtle and difficult to detect or measure (Jenkins, 1986), there are organizational conditions under which it is more or less likely to emerge. Organizations vary (1) in their ability to absorb possible economic inefficiencies associated with discrimination, (2) in the presence of segmented labor markets that direct men and women into different types of jobs, (3) in the degree of formalization of employment practices, and (4) in the presence of internal constituencies of women that may help curb discrimination (Figure 1).

Neoclassical economists have argued that gender discrimination in hiring and promotion is not rational because it inflates wage costs by restricting the organization's supply of labor (Becker, 1971). In this view, market pressures should extinguish such discrimination over time as savvy firms tap the underutilized, generally less costly labor pool of women. But firms may vary widely in ability to absorb these costs of discriminating, depending on the degree of competition they face. The incentive to control costs by not excluding women workers becomes more acute when the job category accounts for the firm's heaviest labor costs (Tomaskovic-Devey, 1993), or the firm is very labor intensive (Cohn, 1985), two conditions that aptly describe the case of faculty salary costs in colleges and universities. It is quite difficult, however, to gauge the nature and degree of competition in academia. Institutions compete for students, faculty, research grants, government funding, prestige, and other resources. Positions of competitive advantage or disadvantage cannot be captured with simple institutional classifications (e.g., public versus private), and measures of profitability are problematic in this sector. Because the most salient facets of competition may differ widely in various corners of academia, we investigate two general conditions where institutions enjoy relative protection from, or exposure to, greater competition. Relatively large endowments help immunize institutions against competitive forces (DiNitto, Martin, & Harrison, 1982) net of other related factors (e.g., auspices, governmental sources of revenue). These relatively unencumbered or "slack" financial resources (Child, 1972) would enable institutions to better absorb the higher labor costs that discrimination might impose. Ample endowments may thus insulate decision makers from the negative consequences of indulging their "tastes" for discriminating against women scholars in faculty appointments, particularly for tenured jobs where labor costs are highest. In addition, institutions that operate in locales where there are many other colleges or universities may face more competition for the local labor supply, for students, and for
institutional recognition. Even if the faculty labor force is drawn largely from national markets, institutions with more local competitors may still face heightened pressure to control labor costs, increasing the likelihood that women faculty will be actively recruited and equitably evaluated.

Colleges and universities may also promote institutionalized discrimination by establishing two very different faculty labor markets and pointing men and women in opposite directions. One is a highly desirable primary employment sector featuring tenurable appointments with clearly established career ladders, ample benefits, and more generous...
salaries. The more chaotic secondary employment sector features little or no job security, few benefits, and low pay, often in part-time faculty positions. In a highly segmented faculty labor market, the secondary sector is relatively sizable. This sector may generate more employment opportunities for women, but at the expense of less security, smaller rewards, and the absence of regular career advancement (Rosenblum & Rosenblum, 1990). Segmented labor markets can protect the privileges of those in the primary sector—primarily men—by restricting women's access to promotion opportunities. Another form of segmentation may result when tenured appointments predominate and the resident faculty is "tenured in." The gender imbalance in favor of men is most pronounced among those who have tenured jobs. The proportion of faculty with tenure may then be an indication of the motivation and opportunity of men to restrict those privileges to themselves. Widespread tenure limits opportunities to hire, and if there is little turnover, historical gender inequities will tend to remain frozen in place. On the other hand, depending on recruitment goals, it might also increase institutional pressure to equitably consider female applicants when scarce new appointments are made.

In yet another way, the faculty labor market may be segmented by department because the rate of faculty growth or contraction varies across disciplines. In part this is a reflection of historical changes in the supply and demand for expertise in various scholarly fields. Departmental differences in the level of demand for faculty may be important both in determining opportunities to appoint women faculty, and the level of resistance to doing so. Studies of occupational crowding suggest that resistance to integration is lowered when demand for labor is high and departments are growing (Baron & Newman, 1989). Expanding industrial firms have been found to hire more women (Sheperd & Levin, 1973). It has also been suggested that women's faculty gains have been most appreciable in rapidly growing disciplines (Rossiter, 1978). Faculty expansion, of course, does not guarantee increased opportunities for women, but may simply increase jobs for men. In academic settings, the impact of numerous new faculty appointments may depend on their distribution across the primary and secondary sectors of faculty employment. Faculty expansion might increase women's share of entry-level or nontenure-track appointments without redressing gender gaps in tenure and promotion. Nevertheless, departmental faculty expansion may help to neutralize political resistance to women's increasing representation. Unlike processes of normal faculty turnover, an expanding "pie" allows women to be hired without lessening the numerical or proportional dominance of men. In contrast, attempts to alter the sex composition when faculty numbers are stagnant or contracting directly threatens men's status advantages, and may intensify tendencies to engage in or tolerate institutionalized forms of discrimination.

One well-documented structural constraint on discrimination is formalized personnel practices, which are closely associated with larger organizational size. Large institutions tend to develop more highly formalized personnel policies that limit biases in hiring and promotion (Pfeffer, 1977), and they have somewhat less segregation of men and women into different jobs (Tomaskovic-Devey, 1993). Colleges with written personnel procedures tend to recruit and promote more women (Abramson, 1975). The bivariate relationship between size and women's status in the academy is clouded by links between size and other salient organizational characteristics. For example, large academic organizations tend to be prestigious and research oriented (Blau, 1973), and tend to have larger discretionary financial resources like endowments (Kimberly, 1976). Holding these related factors constant, larger colleges and universities can be expected to have less gender bias in hiring
and promotion.’ More formalized personnel procedures might also be found in larger
departments, which, in academia is often the critical arena for hiring decisions.\textsuperscript{2} Formalized
practices may not eradicate cultural stereotypes about gender roles or effectively block all
efforts to protect men’s organizational privileges. Formalization can, however, systematize
search, screening and interviewing processes, define evaluative criteria in personnel deci-
sions, curtail the impact of insider information and nomination networks, and prohibit
extraordinary scrutiny of female candidates.

Collective bargaining agreements also encourage more formalized personnel prac-
tices by restricting employers' discretion and regularizing hiring, promotion, seniority, and
remuneration processes (Cohen & Pfeffer, 1986). Unions may provide a vehicle for women
to press for more equitable treatment, and an avenue for appeal in instances of felt
discrimination. But because the key union objective in pressing for formalization is to
protect employees from arbitrary decision-making rather than to curb discrimination
specifically, collective bargaining has a mixed record in improving workplace opportunities
for women, including in academia (Szafran, 1982). There are reported cases where unions
actually encourage the use of insider networks in personnel actions (Finlay, 1983), and
others where they help to decrease salary inequities (Baron & Newman, 1990). Moreover,
unions typically represent the interests of established long-term employees in primary
sector jobs, which, in academia, are overwhelmingly held by males. For women in academia,
the impact of unions will likely be conditioned by the job categories encompassed, by job
tenure, and women’s influence and tenure within the union.

The presence of numerically significant female constituencies or interests within
the institution represents a final set of constraints on institutionalized discrimination.
Women's placement within decision-making structures and more informal influence
networks has important implications for their recruitment and representation. Women in
top administrative positions influence personnel decisions directly by establishing crite-
ria for recruitment and promotion, and by monitoring their implementation at lower
levels (Kenen & Kenen, 1978). Workplace integration has proceeded more rapidly in
firms with higher proportions of women or minorities in leadership positions (Baron,
Mittman, & Newman, 1991) with some evidence of a similar link in academia (Szafran,
1984). It has been suggested that female administrators are more sensitive to discrimi-
natory criteria, more vigilant in curbing biases in hiring and promotion, and more
effective in transforming organizational culture such that gender bias is minimized
among all decision makers (Perrucci, 1986). The student sex ratio may also be an
important factor when administrators seek to anticipate the concerns of sizable internal

\textsuperscript{1} Organizational size has been examined repeatedly in studies of noneducational firms, but the results have
been divided among those finding a positive relationship between size and more equitable personnel practices
(Lyle & Ross, 1973), virtually no relationship (Shepherd & Levin, 1973), a curvilinear effect (Bielby & Baron,
1984; Tomaskovic-Devey, 1993), and an inverse relationship (Baron & Bielby, 1982). All postsecondary
institutions, however, are considerably larger than the firms of intermediate size (around 100 employees) where
curvilinear effects have been found to pivot.

\textsuperscript{2} Size effects at the departmental level may operate quite differently than for the organization as a whole.
The absolute size of the departmental faculty can affect its demand for labor. All else being equal, larger
departmental faculties have more job vacancies, creating relatively more plentiful opportunities to integrate
women. There is some evidence that this relationship may not be monotonic. Larger departments may recruit more
women faculty in absolute number, but not beyond some threshold that still leaves women severely underrepresented
proportionally (Kulis & Miller-Loessi, 1992a).
constituencies of female "customers." When women are proportionally more dominant in the student body, they are more likely to engage in direct student intervention on behalf of faculty women's interests (Carter, 1981). A more indirect form of influence may be even more powerful as administrators tailor personnel goals and procedures to satisfy the expectations of a predominantly female student body. Here administrators may perceive more acute needs to sensitize the institutional climate to gender issues, among other things by providing role models of academically successful women faculty. The establishment of a women's studies program on campus could signify an important threshold of institutional recognition of those needs and concerns, while creating a base to exercise influence within the administrative structure. The political clout of these programs appears to vary widely (Bach & Perrucci, 1984), in part depending on their relationships to traditional departments and disciplines, and the status of their joint or affiliated appointments. To some degree then, women's studies programs may contribute to the segmentation of the faculty along gender lines.

Statistical Discrimination

Employers engage in statistical discrimination when they mistakenly impute aggregate characteristics of gender (or racial) groups to individual applicants and employees. It is said to be motivated by concerns about economic efficiency rather than the protection of group privileges or the exercise of discriminatory tastes. Instead of assessing a particular individual's level of educational achievement, labor productivity, and commitment to work, employers find it is more cost effective or expedient to substitute expectations based on group averages or variances (Bielby & Baron, 1986). Although the logic may be faulty, the economic rationale for statistical discrimination (Becker, 1971) applies mostly to situations where training and salary costs are high, and individual assessments of skill levels and future productivity are difficult, unreliable, and/or expensive. Statistical discrimination against women in academia may be based on employers' presumptions about the quality of their education or training, and their level of work commitment. Some of these expectations are reflections of historical developments in U.S. higher education that segregated women into particular types of institutions and jobs. The growing dominance of the research over the teaching institution contributed to women's declining academic employment after the first part of this century (Graham, 1978). Since then, women have remained disproportionately oriented toward teaching rather than research careers in academia, and they have been especially underrepresented in research institutions (Cole, 1979). This pattern of segregation contributed to women's isolation from research funding networks, and is one explanation for well-established gender gaps in research productivity, with women publishing less in science disciplines (Cole, 1979; Fox, 1983), and reaching peak productivity later (Thibault, 1987). The legacy of women's relative exclusion from research-oriented institutions casts a long shadow on their status in academia. Women are also relative outsiders to informal prestige circles (Caplow & McGee, 1958), including the "invisible colleges" of informal scholar networks that sponsor or promote careers and give access to the "insider" information necessary for academic success (Crane, 1972). Recognition within these prestige networks is a powerful institutional resource and reward within the academy, and a major factor in scholarly appointments (Blau, 1973). Women's status in the academy is also related to another component of institutional prestige, the quality of the undergraduate program. Women's
level of faculty representation is inversely related to the selectivity of undergraduate admissions (Bach & Perrucci, 1984; Tolbert, 1986).

If statistical discrimination is aimed at minimizing expensive search, training, and labor costs in jobs where skills are most difficult to assess, it can be expected to arise when academic institutions face acute pressure to select candidates with extraordinary ability, when nearly all applicants are highly credentialed, and when indicators of future performance are unreliable or ambiguous. Based on expectations that women will be less capable of enhancing institutional prestige, research eminence, and success in recruiting top scholars and students, statistical discrimination might be expected to influence personnel actions more acutely in institutions that are highly research-oriented, in those with the most selective admissions, and in the departments with the most prestigious scholarly reputations. Expectations that women will typically be less promising faculty candidates for these appointments may continue to be influential despite mounting evidence that they are inaccurate or outmoded (Smelser & Content, 1980).)

### Labor Supply Constraints

Doctoral credentials are required for most faculty positions in 4-year institutions, and for all of the faculty in this study. Women's level of faculty representation is at least somewhat dependent on women's share of doctoral recipients, which varies widely among various academic disciplines and subdisciplines (Lomperis, 1990). Some science fields now have near parity in numbers of male and female doctoral recipients (e.g., psychology), but in most the external labor market supply of women is small enough to impose significant constraints on the recruitment of women faculty. In the mid-1980s, doctorates awarded to women in science and engineering were concentrated in the life sciences and psychology, whereas engineering and the physical sciences garnered a relatively larger share of men's doctorates (National Science Foundation, 1990). At the national level, these gender differences in the supply of new doctoral recipients markedly influence the composition of new faculty, and account for much of the variation among disciplines in the recruitment and representation of women (Ehrenberg, 1991).

Other labor supply constraints with gender implications appear at the regional or local levels. For reasons that are intertwined with family and gender role dynamics, the geographic mobility of women within academic labor markets appears to be more restricted than that of their male counterparts (Marwell, Rosenberg, & Spilerman, 1979). Because gender norms give precedence to husbands' over wives' careers, and women tend to marry older men with more established careers, academic women may be at higher risk than academic men of becoming geographically rooted. To accommodate the constraints of their dual-career families more readily, women in academia may be drawn disproportionately to employment settings where their husbands find plentiful job opportunities, such as large metropolitan areas (Rosenfeld, 1984). According to this logic, the postsecondary institutions most likely to recruit women will be located in large metropolitan areas.

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3 For example, gender gaps among those with doctorates have narrowed in the recruitment of students for top-ranked graduate departments, in academic and standardized test performance, in time to complete the doctorate, in likelihood of undertaking a postdoctoral appointment, and even in measures of scientific productivity, particularly among new cohorts of faculty (Cole and Zuckerman, 19987).
External Political Constraints

In addition to certain internal organizational factors in colleges and universities, a number of external political pressures have been recognized as helping to curb discrimination. Among the many external publics that may be important, governmental bodies are likely to be potent and recognizable influences in an institution's decision-making. Public sponsorship by state governments exposes the institution to outside accountability, in the form of additional affirmative action reporting, civil service regulation, regular audits, and greater public access to personnel records than in institutions under independent or religious auspices. Postsecondary institutions also vary in their degree of reliance on federal sources of revenues, which is linked to greater institutional vigilance in complying with Equal Employment Opportunity laws, and the development of explicit procedures to prevent gender discrimination in hiring and promotion (Salancik, 1979). These sources of external pressure have been linked to faster integration of women and minorities in the workplace (Baron, Mittman, & Newman, 1991; Beller, 1984) and can be expected to improve the representation of women faculty. Of course, the effect of public accountability on gender equity in employment depends on how aggressively federal and state governments promote and enforce equal employment opportunity policies in particular historical periods. The data for this study come at the end of a period, the 1980s, when the federal commitment to these goals was being questioned (Perrucci, 1986). At the state level, the political "climate" can be gauged by examining the passage of legislation to secure women's legal and political protections (Blair & Savage, 1984), and, more crudely, through the sex composition of state legislatures.

Gender Differences in Human Capital and Family Constraints

Individual differences in job-related knowledge and expertise offer another alternative to organizational explanations for gender gaps in faculty recruitment and representation. Differences between men and women in "human capital" investments—levels of education, work experience, and on-the-job training—might result in differences in scholarly productivity, thereby influencing chances of securing academic appointments and promotions (Becker, 1975). For faculty appointments, where candidates tend to have identical educational attainment levels, the prestige of the institution or department granting the doctoral degree is an important device for matching applicants to the expectations of the job, and it subsequently influences other career outcomes. In addition, because women entered some disciplines in substantial numbers only relatively recently, we would expect to see appreciable differences in the amount of relevant work experience for men and women.

Work interruptions due to family responsibilities are also potential sources of these gender differences in work experience, which may account for some gender differences in academic career outcomes. A substantial body of research has investigated the role of marital and child-rearing responsibilities as aids or hindrances to progress within an academic career (Astin & Bayer, 1979; Astin & Davis, 1985; Bellas, 1992; Cole & Zuckerman, 1987; Hamovitch & Morganstern, 1977). Although the results are not in complete agreement, the bulk of the research shows that marriage and children are beneficial to the careers of men, but are net liabilities for academic
For recent cohorts of academic women, however, there is emerging evidence that marriage may be advantageous to one’s career if it involves marriage to another academic (Astin & Milem, 1997). Because of the potential impact of family responsibilities on academic careers it is important to control for marital status and child-rearing demands in models that attempt to detect statistical discrimination processes, which are based on assumptions of gender differences in human capital investments and resulting workplace competencies. It would be desirable to also control directly for differences in the quality and quantity of scholarly publishing, particularly when examining the sex composition of faculty who receive tenure, but those types of data are not available in this study.

METHODS

The data analyzed in this study merge questionnaire responses from college faculty in the U.S. with an array of characteristics of their employers and their fields of study. Individual respondents are drawn from the 1989 Survey of Doctoral Recipients (SDR). This representative survey of the doctoral-level labor force in the U.S. is conducted biennially by the National Research Council (NRC) for the National Science Foundation and other federal agencies. The SDR contains detailed profiles of the academic careers of doctorate holders with large over-samples of women from all disciplines. This study employs a SDR subsample consisting only of faculty members in 4-year colleges or universities in 11 natural science, social science, and engineering disciplines. Although the SDR is not deliberately stratified by type of postsecondary employer, the respondents work in a large heterogeneous array of colleges and universities. The sample includes 10,367 faculty members (before attrition due to missing values) from a large cross-section of all U.S. baccalaureate granting institutions. Over three-quarters of all 4-year colleges and universities are represented, encompassing 1071 out of the universe of 1378 institutions enumerated by the Carnegie Foundation for the Advancement of Teaching (1987). Most of the represented institutions (78%) have multiple faculty respondents, some as many as 73.

The individual level SDR data are matched to numerous sources of information about their employers and their scholarly fields. Most of the organizational level data...
come from national data bases: annual or biennial surveys of the finances, personnel, enrollment and other characteristics of postsecondary institutions, collected by the National Center for Education Statistics through the Integrated Postsecondary Education Data System (IPEDS); National Science Foundation surveys of federal support to colleges and universities; the annual NRC's Survey of Earned Doctorates (SED), which charts the gender composition of new doctoral recipients in finely detailed disciplinary fields; and Equal Employment Opportunity (EEO-6) reports filed by virtually all colleges on the gender composition of their employees. Additional institutional data are extracted from published sources (e.g., Carnegie Foundation [1987] classifications [Research I, II, etc.]; guides to faculty collective bargaining (Douglas, 1990), and women's studies programs (Stafford, 1990); the American Council on Education (1987) and Peterson's Guides (1990) ratings of the selectivity of undergraduate admissions; and U.S. Bureau of the Census data on the size of the local population. Wherever data were available for multiple years in the mid- to late 1980s, indicators have been constructed as averages over several years.

The organization-level data are used to produce several types of indicators. Financial data generate measures of the percentage of annual revenues derived from endowed sources, and from federal sources. Faculty composition for the entire institution produces indicators of labor segmentation-the percentage of faculty positions held at the rank of instructor or lecturer-and the percentage holding tenured appointments. The proportional representation of women among administrators and students is measured from EEO-6 reports on the percent female among those heading administrative and departmental units, and IPEDS data on undergraduate student enrollment. Organizational size is gauged with a factor score based on the number of students, faculty, and library holdings. A factor score for research orientation is constructed from information on the institution's Carnegie classification (Research I versus others), research expenditures per faculty member, and external grant revenues as a fraction of total budget. Admissions selectivity is based on factor analysis of freshman SAT/ACT scores, the percentage of applicants admitted, and the enrollment rate among those accepted for admission.6 Dummy variables indicate the presence on campus of a women's studies program, a faculty collective bargaining arrangement, sponsorship under public (state or federal government), religious, or other independent private auspices. Two measures are included at the level of the respondent's department: the faculty growth rate (decennial percent change in the number of faculty) and departmental prestige, as indicated by the NRC's rating of the department's scholarly reputation (Jones, Lindzey, & Coggeshall, 1982). There are three measures based on the institution's geographic locale, defined as its Metropolitan Statistical Area or county (for non-MSAs): (1) the size of the 1990 population, (2) the number of local competitors, a count of all 4-year postsecondary

6 The factor loadings indicate that more "selective" institutions accept a smaller percentage of their applicants for admission, and a higher percentage of those accepted for admission actually enroll. The indicators of size, research, and selectivity are all positively correlated, but three distinct factors were extracted with oblique rotation. In reality, many eminent research institutions tend to be large, and to a lesser degree, selective in admissions as well. But one advantage of the large array of institutions represented in the SDR is that we can produce statistical estimates of the separate impact of these three related but distinguishable institutional characteristics. Research orientation is highly correlated with a number of other characteristics as well, such as departmental scholarly reputation, federal revenues, and endowments. In multivariate analyses, we conducted extensive diagnostic tests to ensure that results were not artifacts of multicollinearity.
institutions in the same MSA/county or within 25 miles of its boundaries, and (3) a factor score representing the state political climate for women based on National Organization for Women rankings, the percent female among state legislators in multiple years, and ratings based on the passage of state legislation favoring women's legal and political rights (Blair & Savage, 1984).

To address the possibility that gender differences in academic credentials and human capital investments, rather than institutional forces, account for gender patterns in faculty appointments, two individual level control variables are introduced, a rating of the scholarly reputation of the department from which the faculty member received the doctorate (Jones, Lindzey, & Coggeshall, 1982), and the number of years of accumulated postdoctoral work experience. The role of family constraints in shaping the gender composition of the faculty is modeled with variables indicating the respondents' current marital status, and the number of preschool and older dependent children currently living with them. Also linked to the individual respondents is a measure of the female doctoral labor supply within their own science discipline or subdiscipline, based on the gender composition of doctoral recipients with identical specializations in the prior 12 years.' Descriptive statistics and operational definitions of independent variables appear in Appendix A.

When properly weighted, the individual level data comprise a representative sample of 4-year college faculty holding doctorates in science and engineering. In multivariate analyses employing logistic regression, we use organizational characteristics to predict the odds that the occupants of these faculty positions are women, while controlling for other relevant factors. The unit of analysis is the individual level. Whereas studies of organizational influences on gender segregation more commonly examine the organization's overall gender composition (i.e., percent female), rather than individual appointments, we use organizational and macro-level variables to make predictions at the individual level for both theoretical and methodological reasons. First, the theories under examination, institutional discrimination and statistical discrimination, assume that factors measured at the organizational level influence particular faculty appointments and subsequent retention, thereby shaping the overall gender composition of the faculty. Second, we avoid some methodological complications by measuring all of our organizational and departmental variables as global characteristics, rather than as contextual measures composed by aggregating our individual level data. Third, to relate our outcome measure more closely to the organizational-level predictors, we have adjusted the weights so that they are inversely proportional to the number of respondents from that college or university. For the vast majority of institutions that have multiple respondents, the adjusted weights transform the outcome to reflect the overall faculty gender composition of the institution and prevent artifacts due to variations in organization size. Fourth, and most importantly, by making predictions about specific faculty

*Based on the 1976 through 1988 waves of the Survey of Earned Doctorates, the measures calculate the percent female among doctoral recipients within each faculty member's scientific discipline or subdiscipline. The 12-year average smooths out huge variations in disciplines where small numbers of female doctoral recipients emerge in any one year, and it extends the labor supply estimate temporally so that it applies to more than the most recent entrants into academia. Because women's representation within some disciplines varies appreciably within single disciplines, especially the biological sciences and psychology, subdiscipline breakdowns of the doctoral labor supply were calculated (e.g., for chemical engineering, microbiology, organic chemistry, atmospheric science, astronomy, clinical psychology, etc.).
positions, our approach enables us to control precisely for the female doctoral labor supply in the particular science disciplines or subdisciplines within which the appointment occurred. To clarify how organizational characteristics influence women's faculty representation, some logistic regressions are performed on subgroups of faculty according to their tenure status.

RESULTS

Figure 2 displays bivariate relationships between the key organizational predictors and women's proportional representation on science and engineering faculties. After sorting the faculty into groups by dichotomizing or dichotomizing each predictor, the chart compares women's representation (percent female) within each of the resulting groups. Although some of the differences are slight-variations of only one or two percentage points—due to the large number of respondents, all of the differences are statistically significant. More importantly, nearly all of the relationships are in the expected direction. Women comprise a higher fraction of the faculty in less well-endowed institutions and those with more local competitors; where more of the faculty are nontenure-track and tenure is less prevalent; in small institutions, small departments, and unionized settings; where women comprise more of the top administrators and undergraduates, and where women's studies programs are formally established; and in nonresearch-oriented and less selective institutions, and less reputable departments. The only relationship running contrary to expectations is that women are somewhat better represented in contracting than in growing departments, although this is one of the instances where differences among groups are the smallest. This, and several of the other bivariate relationships are attributable to intervening factors, such as research orientation and women's share of the doctoral labor supply.

A multivariate test (Table 1) clarifies these mediating relationships after adjusting for interrelationships among the predictors, which are entered in conceptual blocks, beginning with external labor market and political constraints. Succeeding blocks add the hypothesized organizational enablers or curbs on institutionalized discrimination and factors associated with statistical discrimination, and finally variables measuring individual human capital investments and family constraints. The model is then estimated separately for groups of nontenure-track, tenure-track, and tenured faculty. For faculty as a whole, each block of variables makes a significant additional contribution to explanatory power. The sizable differences among science and engineering disciplines and subdisciplines in the female doctoral labor supply is a particularly powerful and consistent constraint on women's faculty representation. With each 1% rise in women's representation among doctoral

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9The ranges for continuous predictors have been divided into two or three groups, with approximately equal numbers of cases in each group. Break points for two variables (endowment resources and the percentage of faculty holding tenure) have been adjusted because of somewhat skewed distributions. Nevertheless, there are at least 1311 unweighted cases in every group. SDR respondents have been sorted into these groups according to the characteristics of their employers, and the percent female for each group is presented.

9Variations among science disciplines in the supply of female doctoral recipients are implicated in the effects of departmental growth and departmental size, both of which vary systematically by discipline. The inhospitable climate for women in research-oriented institutions is also responsible for the unexpected negative effect of institutional size: eminent research centers tend to be quite large.
Figure 2. Faculty percent female by institutional and departmental characteristics.

recipients, the odds that faculty appointments will be held by women increase by more than 5%. Women faculty are also more likely to be found in institutions located amid large population centers, and in states with more favorable legislative climates for women. For the faculty as a whole, however, institutional sponsorship (public, religious, or private) and reliance on federal sources of funding do not consistently influence whether women occupy faculty positions. Although religious institutions are statistically indistinguishable from other private schools, depending on which other variables are controlled, public institutions
<table>
<thead>
<tr>
<th>Variable</th>
<th>B (SPPO)</th>
<th>B (g)</th>
<th>B (SPPO)</th>
<th>B (g)</th>
<th>F (SPPO)</th>
<th>F (g)</th>
<th>F (SPPO)</th>
<th>F (g)</th>
<th>B (SPPO)</th>
<th>B (g)</th>
<th>B (SPPO)</th>
<th>B (g)</th>
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<tr>
<td>Tertile unemployed</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tertile employed</td>
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<td></td>
<td></td>
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<tr>
<td>Tertile self-</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
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<td>Tertile spouse</td>
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<td>0.05</td>
<td>0.04</td>
<td>0.05</td>
<td>0.04</td>
<td>0.05</td>
<td>0.04</td>
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<td>0.04</td>
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<td>Tertile children</td>
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<td>Tertile friends</td>
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<td>0.11</td>
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<td>0.11</td>
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</tbody>
</table>

Table 1: Logistic Regression Predicting Odds of Female Faculty Appointment
appear both more and less likely than private institutions to have women faculty. The reason for this instability, as discussed below, is that the type of institutional sponsorship and the degree of federal dependence impact the gender composition of tenured and untenured faculty in different ways.

Turning to the organizational predictors of women's presence among the faculty as a whole, we find that many of the organizational conditions that were expected to encourage or shield the operation of institutionalized discrimination show the expected relationships. The odds that women hold appointments are slightly higher when institutions have more local competitors, when more of the faculty are segmented into nontenure-track jobs, in growing departments, unionized settings, and those where women administrators, women students, and women's studies programs are more in evidence. Heavily tenured faculties are less likely to have women hold appointments, as expected, but the small effect becomes insignificant when human capital and family constraints variables are controlled. The same shift occurs with considering the effects of size. Unexpectedly, both large departments and large institutions appear to have lower odds of appointing women faculty, but these small effects are statistically insignificant when all the variables in the model are controlled. Only one of the institutionalized discrimination factors operates consistently counter to expectations as organizational and individual level factors are entered in succession: women faculty are more likely to be found holding positions in well-endowed institutions.

Two of the three variables linked to statistical discrimination-admissions selectivity and departmental prestige-appear to discourage women's faculty appointments, but only after controlling for the human capital and family constraints variables. Research orientation is not a statistically significant predictor for faculty as a whole. Finally, the human capital effects generally confirm the view of women academics as having less work experience than men, but also indicate that women faculty tend overall to hold doctoral credentials from more prestigious departments. Further, although women faculty are less likely than their male counterparts to be married and with school age children at home, they are more likely to have responsibilities for preschool children.

An investigation into the reasons that several of the organizational effects in Table 1 reversed direction when individual level variables were entered into the model revealed that the measure of work experience was pivotal. This suggested the possibility that at least some of the organizational effects differ for faculty at different career stages. Accordingly, the last three equations in Table 1 reestimate the model for faculty with different tenure statuses. It is important to examine these groups separately because the results for all faculty combined tend to reflect the experiences of tenured faculty, who are more numerous than those on the tenure-track and those holding nontenurable positions. Except for the expected positive effect of the female doctoral supply and an unexpected negative effect of public sponsorship, all of the external labor market and political predictors operate differently depending on a faculty member's tenure status. Women are more likely to hold tenured appointments in large population centers, in religious rather than nonsectarian private institutions, as well as in states with favorable political climates, but the opposite holds for women in nontenure-track and tenure-track appointments. Greater dependence on federal revenues is associated with a greater presence of women in tenure-track and tenured positions, but lower odds that women hold nontenure-track appointments.

Most of the organizational predictors are likewise patterned by tenure status. The measures of competition have the strongest and most consistent impact on untenured jobs.
Large endowments and numerous local competitors both increase the odds that women hold non-tenure-track and tenure-track appointments, but not among the tenured faculty. Segmented labor markets also affect women's representation in all the tenure groups, although often in an unexpected direction. Women are more likely to hold tenured and tenure-track appointments in institutions where high proportions of the faculty are instructors or lecturers and where tenure is more prevalent, but they are less likely to hold non-tenure-track appointments under these conditions. Women tend more often to secure tenure-track appointments in departments with higher growth rates, but faculty expansion is associated with a somewhat sparser presence of women in non-tenure-track and tenured jobs. A possible confounding factor here is that high departmental growth rates are closely linked to certain science fields, and women are less well represented in some of the most rapidly growing fields, such as computer science. But the analysis controls for women's level of representation among doctoral recipients, which also identifies particular disciplines. In analyses not presented here dummy variables for science discipline were added to the model, but did not change the small effects of departmental growth on women's representation.

The indirect measures of formalization create another mixed pattern of effects. The odds that women hold non-tenure-track and tenure-track appointments are very much higher when the faculty is unionized, but unionization lowers the odds that women hold tenured jobs. Although size has no relationship to women's representation off the tenure-track, larger institutions and larger departments are less likely to appoint women to tenure-track jobs. Larger departments, however, do have women holding tenured appointments more often. These effects are not due to possible collinearity between the two measures of size, organizational and departmental, and the direction of the effects remains the same if the other variable is removed from the analysis.

Female constituencies play a more consistently positive role in women's faculty representation. With one exception—the small inverse relationship between women's representation among administrators and tenure-track faculty—women are more likely to hold faculty positions at all tenure levels when there are proportionally more women administrators and students, and when women's studies programs are established. But the impact of women's studies programs appears to impact women's representation in nontenure-track positions much more than at other levels. The indirect measures of statistical discrimination processes are also somewhat mixed in their relationship to the gender of faculty. Untenured women, both those on and off the tenure-track, are less well represented in research oriented schools. Also, as expected women are less likely to hold tenured appointments in highly selective institutions and in more prestigious departments, but they are more likely to have tenure-track jobs under these two conditions.

Finally, it is noteworthy that although tenured, tenure-track, and untenured women all have less work experience, they tend to have more prestigious doctoral credentials than their male counterparts. Consistent with theories about the more constraining impact of family and child-rearing responsibilities for women, women faculty are generally less likely to be married or to have children at home than are male faculty. The one exception here is actually a negative case that can be viewed as underscoring the family constraints argument. Among nontenure-track faculty, women are more likely than men to have preschool children, perhaps because these types of appointments permit more flexible part-time schedules that accommodate child care duties.
DISCUSSION

By matching two large databases, one with individual faculty data and another with the characteristics of their employers, we arrive at a vantage point from which organizational barriers to the recruitment and promotion of women scholars can be assessed in comparative context. But our view of all the processes that shape academic careers at the individual, organizational, and academic discipline level is partially obstructed by sample limitations: restriction to science and engineering doctoral recipients, to those holding faculty appointments, and to a cross-sectional slice of careers in an employment sector where the impact of gender has been changing markedly for more recent cohorts (see e.g., Cole & Zuckerman, 1987). By focusing exclusively on science and engineering faculty, we risk overlooking some institutional factors that may be responsible for women's better overall representation in other fields (e.g., humanities, education, nursing, social work) where organizational dynamics may shape careers in ways that differ from those we have found. Still, there is enormous variation to explain in the representation of women across the science and engineering disciplines, from physics and engineering, where less than 10% of doctoral recipients and faculty are women, to psychology, where women are approaching numerical parity with men in many specialities. Moreover, the debate about whether gender differences in faculty status are due principally to the infusion of prevailing "gender assumptions" in organizational and institutional forces or to individual differences in scholarly merit and gender role socialization is nowhere more sharply drawn than in science (Cole, 1979; Ferber, 1988; Keller, 1985; Knorr-Centina, 1981; Reskin, 1980).

We proposed four ways that institutional discrimination might be exacerbated or moderated by organizational characteristics-exposure to competition, segmented internal labor markets, formalization, and female constituencies—but results are more consistent with the latter two than the first two. Although the measures of formalization are indirect, one is quite strongly related to better odds that women hold faculty appointments: unionized settings. The effect of unionization differs by tenure status, strongly promoting women's presence at entry levels but dampening their representation among the tenured faculty. The odds that untenured faculty jobs will be held by women are roughly tripled when the faculty is unionized. Because of its potential to serve powerful established interests, unionization may be more instrumental in formalizing recruitment than promotion decisions, opening avenues for women to secure entry-level positions but failing to curb, perhaps even shielding, discrimination in tenure decisions. The much smaller effects of size at the departmental and organizational levels are partially opposing. Net of other factors, large institutions and departments are less likely to have women hold tenure-track appointments, whereas women advance somewhat more readily into tenured positions in larger departments. If large institutions and departments are subject to greater formalization, it does not appear to regularize personnel procedures in a way that markedly benefits women's faculty prospects. Perhaps the pattern of results suggests that size has less to do with formalization than with dynamics akin to tokenism (Kanter, 1977). Large institutions and departments may promote the appointment of tenure-track women in absolute although not proportional numbers. The relatively plentiful faculty lines and hiring opportunities in large organizations and departments may help ensure that some women are appointed, but their very presence in substantial numbers may dampen the impetus for more complete gender integration, leaving tenure-track women more severely underrepresented proportionally than in somewhat smaller settings. This, ironically, may enhance women's...
pects for securing tenure in large departments, by decreasing the likelihood that any one tenured appointment will upset existing power distributions.

The positive relationships between the presence of women faculty, women administrators, and women students suggest that women's presence as interest groups within the institution has important implications for their access to employment opportunities. There is generally a close correspondence to their representation in these different roles, with the odds that faculty appointments are held by women increasing by 1 or 2% when women hold an additional 1% of top administrative or undergraduate student positions. Although this is consistent with the argument that the institution's women executives and "clients" exert influence that dampens expressions of institutionalized discrimination, the results also support a reversed line of causality. Where women secure faculty positions, particularly to advanced ranks with tenure, they may obtain a greater voice in important committee and administrative deliberations that ultimately influence the selection of top administrators. These variables may all be tapping a global institutional climate favorable to women, with many facets, rather than specific checks on institutionalized discrimination. It is interesting that the presence of women administrators is associated with an increase in women's occupancy of nontenure-track and tenured faculty jobs, but not those that are tenure-track. This may be a reflection of the relative ease or difficulty with which administrators can influence various types of appointments. Administrators may influence the gender composition most readily for those off the tenure track by authorizing more of these positions, which go disproportionately to women. And they may typically exercise more influence over procedures and the final outcome of tenure deliberations than over recruitment for tenure-track hires, where the departmental faculty generally have the largest say.

The role of women's studies programs in women's faculty representation is similarly complicated. Schools with women's studies programs are more than twice as likely to have women occupy their nontenure-track positions than schools without such programs. For tenured and tenure-track positions, however, women's studies programs have little or no impact on women's representation. Perhaps the contributions that women's studies programs make in establishing an administrative power base for women are undercut by segmenting the female faculty labor force. Although we cannot determine whether the women scientists in our sample are affiliated with women's studies programs, the results raise the possibility that these programs create opportunities to attract women scholars to the institution without offering them access to the tenure-track or substantially aiding efforts to ensure their promotion. Tenure processes may be complicated if women's studies programs are staffed predominantly through joint appointments with traditional departments. Another possibility is that women's studies programs are, in part, a response to deep gender inequities with the institution, rather than their trigger. These programs may be established in some institutions where women are severely underrepresented overall, perhaps to help ameliorate a faculty gender imbalance.

The direct measures of internal labor market segmentation provide little support for the contention that this is an avenue to protect male privileges and shield institutionalized discrimination by directing women into different types of employment. The fraction of faculty positions allocated to secondary sector instructor and lecturer ranks is positively related to women's faculty presence both in tenure-track and tenured positions. This runs counter to the contention that institutions rely on women to staff untenurable teaching posts while barring their entry into the primary sector of tenured employment. In fact, women's presence in tenured jobs is slightly elevated in institutions where tenure is most pervasive,
a situation where the opportunity and incentive to exclude women would seem to be quite strong. Further, women are less, not more likely to be found in nontenure-track jobs when the faculty is heavily "tenured in." Widespread tenure does not appear to place constraints on hiring that intensify or freeze past patterns of gender discrimination in place. There is some mixed evidence that women's faculty appointments meet less resistance when male dominance is not threatened by zero-sum redistribution. Departments with expanding faculties are marginally more likely to have women hold tenure-track appointments, but are also slightly less likely to have women represented in tenured jobs and those off the tenure-track. As a measure of hiring opportunities, departmental faculty expansion may reflect the rate at which past patterns of exclusion can be remedied through entry-level appointments, but it does not appear to improve women's representation in tenured jobs.

There is also little evidence that institutionalized discrimination is promoted or shielded when institutions are insulated from competition by sizable endowments or few local competitors. In decisions where it might be most costly to allow dominant interests to indulge their "tastes" for discrimination-tenured positions-institutions facing more competition are not more likely to appoint women. Schools exposed to numerous local competitors do have slightly better odds that women hold untenured positions on and off the tenure-track, but so do schools protected from competition by hefty endowments. The several assumptions behind this line of reasoning may all be flawed: that stiffer competition neutralizes discrimination in order to expand the labor pool and lower salary costs, particularly in tenured jobs where the costs are greatest. There is thus little evidence that "tastes for discrimination" against women are more likely to be exercised at competitively well-positioned institutions that can best afford to absorb the costs of engaging in discrimination. Colleges that do face intense competitive pressures also have alternatives besides economizing by offering women somewhat less well-paid tenure-track or tenured appointments. They may more readily cut costs by relying on nontenure-track and part-time positions to meet instructional demands, as is increasingly typical in the academic labor market.

The findings that relate to statistical discrimination reveal some sizable effects in the expected direction. Consistent with prior studies (National Research Council, 1979), we find that research-oriented settings discourage women's presence in tenure-track and nontenure-track positions. Even after adjusting for possible gender differences in the prestige of a faculty member's doctoral credentials and relevant work experience, research-oriented campuses appear to pose quite daunting obstacles for women attempting to secure entry-level employment. After adjusting for the factor score metric, the most research orientation schools are only about half as likely to have women hold their tenure-track positions as the least research oriented schools. For the other two measures related to statistical discrimination-selective admissions and departmental prestige-these obstacles to women's presence emerge at the tenured level. For tenure-track appointments, however, women actually enjoy enhanced odds of securing job in the most selective schools and departments with the most eminent reputations. With cross-sectional data we cannot determine whether the differential impact on tenure-track and tenured jobs indicates that women face a revolving door in these types of institutions, or perhaps a recent change in recruiting patterns that has affected tenure-track recruitment but not yet the composition of the tenured faculty.

We should note that, in contrast to the somewhat mixed pattern of organizational and departmental influences on women's faculty representation, external labor market and political constraints are generally more powerful factors, particularly the impact of the
female doctoral labor supply within each subdiscipline. Most of the other constraints operate in the ways we anticipated, but only for tenured faculty positions. Women are more likely to hold tenured positions in institutions that depend more on federal revenues, and those set amid large cities and states with favorable legislative climates for women. It is surprising that the opposite holds for women in entry-level faculty jobs. It seems logical that political pressures for greater gender equity and accountability would influence entry-level recruitment more readily than tenure decisions. Although the data examined here cannot verify any trends over time, perhaps the results are a reflection of weakening political pressure for gender equity in the 1980s, slowing or reversing earlier efforts to increase women's faculty representation through enhanced recruiting efforts focused on entry-level jobs. It is also noteworthy that, after adjusting for the impact of their greater dependence on federal sources of revenues, public institutions are actually less likely to appoint women at all levels than are private, nonreligious schools.

Because many of the measures in this study are indirect, the precise organizational dynamics at work behind the changing gender composition of academic science can only be suggested here. The institutions where women are more likely to secure faculty appointments are undoubtedly determined by a complex mix of individual opportunities and choices across a long educational and occupational pipeline. By focusing on the institutional locations of current faculty women we have advanced close to the end of the pipeline, and do not exhaustively model the succession of institutional forces that may deflect them from successful undergraduate, graduate, and faculty careers, or direct them into nonacademic jobs. Longitudinal studies of the career histories of women and men who embark on doctoral programs would help in gauging the extent to which the sex composition of the faculty results from individual choices of specialties, graduate schools, type of postdoctoral employment (academic, government, industry), the differential impact of family constraints on men's and women's academic careers, the attractions of particular employers and their locations, or the organizational contexts examined here. Because individual career options and choices both shape, and are shaped by organizational and external political factors, the relationships among the relevant micro- and macro-level forces will require further study. Still, there are no evident reasons to contend that the disciplinary, employment sector, and temporal restrictions of our sample are responsible for the systematic organizational variations in women's faculty presence that our results reveal. They supply ample evidence that certain organizational contexts play a substantial role in shaping the sex composition of postsecondary faculties. Although some indicators show contradictory results, patterns in women's faculty representation are consistent in differing degrees with the operation of institutionalized discrimination and statistical discrimination processes. Differences in results by tenure status also suggest that the impact of organizational contexts changes as women advance in an academic career, and/or that the experiences of more recent cohorts differ from those of their predecessors.

REFERENCES


## APPENDIX A: DESCRIPTIVE STATISTICS AND OPERATIONAL MEASURES FOR ORGANIZATIONAL VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>Measurement</th>
<th>Source</th>
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<tr>
<td>Female doctoral supply</td>
<td>24.75</td>
<td>51.40</td>
<td>Percent female among doctoral recipients in respondent's discipline or subdiscipline, 1976-1988 average</td>
<td>SED</td>
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<td>Local population</td>
<td>6.07</td>
<td>1.56</td>
<td>Natural log of 1990 population of SMSA, or of the county if a non-MSA</td>
<td>U.S. Census Bureau</td>
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<td>Public institution</td>
<td>0.44</td>
<td>0.47</td>
<td>Dummy variable: under state or local government auspices: Yes = 1; No = 0</td>
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<td>Religious institution</td>
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<td>0.31</td>
<td>Dummy variable: under religious auspices: Yes = 1; No = 0</td>
<td>IPEDS</td>
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<td>Federal revenues</td>
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<td>7.36</td>
<td>Percentage of annual revenues derived from federal government</td>
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<td>State legislative climate</td>
<td>0.16</td>
<td>1.00</td>
<td>Factor score based on percent female among state legislators and passage of legislation favoring women's legal employment rights</td>
<td>Blair and Savage, (1984)</td>
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<tr>
<td>Endowments</td>
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<td>4.82</td>
<td>Percentage of revenues derived from endowed sources</td>
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<td>Local competitors</td>
<td>10.00</td>
<td>14.70</td>
<td>Number of 4-year colleges/universities within the surrounding Standard Metropolitan Statistical Area or county, or 25 miles from its boundaries</td>
<td>ACAC, (1967)</td>
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<td>Faculty segmentation</td>
<td>8.55</td>
<td>5.31</td>
<td>Percent of institution's faculty holding instructor or lecturer positions</td>
<td>IPEDS</td>
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<td>Pervasiveness of tenure</td>
<td>58.72</td>
<td>10.48</td>
<td>Percentage of faculty who hold tenure</td>
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<td>Department growth</td>
<td>33.41</td>
<td>77.65</td>
<td>Percent change in number of faculty in same discipline over 10 years</td>
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<td>Institution size</td>
<td>0.14</td>
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<td>Factor score loading on the number of students, faculty, and library volumes</td>
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<td>Departmental size</td>
<td>13.74</td>
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<td>Number of faculty in same discipline within the institution</td>
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<td>Unionization</td>
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<td>0.44</td>
<td>Any faculty collective bargaining agreement: Yes = 1; No = 0</td>
<td>Douglas, (1992)</td>
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<td>Women administrators</td>
<td>34.58</td>
<td>13.85</td>
<td>Percent female among top executive/administrative/managerial jobs</td>
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<td>Women students</td>
<td>53.83</td>
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<td>Percent female among undergraduate students</td>
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<td>Research orientation</td>
<td>0.28</td>
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<td>Program formally established = 1; otherwise = 0</td>
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<td>Admissions selectivity</td>
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<td>Factor score loading on mean freshman SAT/ACT scores, percentage of applicants accepted for admission, enrollment rate among those admitted</td>
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<td>Department prestige</td>
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<td>Scholarly reputation rating of respondent's current department</td>
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<td>Work experience</td>
<td>15.63</td>
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<td>Number of years of postdoctoral professional experience</td>
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<td>Prestige of doctorate</td>
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<td>Scholarly reputation of department granting respondent's doctorate</td>
<td>Jones et al., 1982</td>
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<td>Currently married</td>
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<td>1.49</td>
<td>Currently married = 1; otherwise = 0</td>
<td>SDR</td>
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<td>Children under 6</td>
<td>0.24</td>
<td>2.12</td>
<td>Respondent's number of children at home under 6 years of age</td>
<td>SDR</td>
</tr>
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<td>Children 6-18</td>
<td>0.49</td>
<td>3.13</td>
<td>Respondent's number of children at home ages 6-18</td>
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