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## Widening the Lens on Gender and Tenure: Looking Beyond the Academic Labor Market

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*Women's tenure rates are widely and justifiably considered critical indicators of women's status within academia. In this article, however, we question the meaning of this indicator. We find that Ph.D. career path data show women's likelihood of getting tenure is equal to or better than men's in fields dominated by men. Most literature on gender and tenure focuses on family/work balance and academic climate issues, but a review of common labor market explanations in relation to Ph.D. career path data suggests that we need to view the academic labor market as just one segment of the broader labor market. In conclusion, we argue that understanding women's tenure status requires "widening the lens" to include the role of labor market alternatives to academic careers.*

**Keywords:** gender equity / non-academic labor market / Ph.D. careers / tenure

The 2002 *Summary Report of the Survey of Earned Doctorates* marks a milestone in doctoral education; for the first time, doctorates awarded to U.S. citizens went to more women than to men. Although the percentage represented a very slight majority (51%), it follows a 30-year upward trend of women's doctoral education attainment. Further, among U.S. citizens, women seem to be maintaining their majority (Hoffer et al. 2003, 2004). With women now earning doctoral degrees in relatively equal numbers to men, can we anticipate nearly equal tenure achievement for this new cohort of doctorate holders in the following decade? What are the odds that women Ph.D. recipients will achieve tenure in proportion to their Ph.D. attainment? And most importantly, if they do achieve tenure in proportion to their share of Ph.D.s awarded, would this mean the achievement of gender equity in the career paths of Ph.D.s?

In our work with career path data from Nerad and Cerny's *PhDs—Ten Years Later* (Nerad and Cerny 1997; Nerad, Aanerud, and Cerny 2004), a national study of Ph.D. recipients in six fields (biochemistry, computer science, electrical engineering, English, mathematics, and political science), we noticed an intriguing pattern that led us to question the meaning of tenure outcomes as a measure of gender equity in Ph.D. careers. Nerad and Cerny's data show that women who get Ph.D.s in fields with strong non-academic labor markets have chances of getting tenure that are equal to or better than the chances of their male counterparts. (These are fields in which women are a minority of Ph.D.s and of faculty, but among the

women who *do* get Ph.D.s in these fields, tenure chances are good.) In fields in which most Ph.D.s work in academia, men have better chances of getting tenure than women do. Using Nerad and Cerny's data, we show in this paper that among Ph.D. holders women's tenure odds increase relative to men's when non-academic labor markets offer attractive alternatives to the academic labor market. We conclude that accounting for the non-academic labor markets in specific fields helps us assess women's chances of gaining tenure in those fields and also advances our understanding of the impact of non-academic career options on academic career paths.

We begin by placing our discussion of tenure parity and career path analysis in the context of surveys of highly educated women. In doing so, we seek to draw attention to the important work of career path analysis as well as to establish a gap in the literature concerning non-academic labor markets for Ph.D.s. We then turn to our primary discussion that examines the impact of non-academic labor markets for academic tenure achievement.

## The "Discovery" of Women's Careers: Historical Context

Eli Ginzberg's *Life Styles of Educated Women* (1966) broke new ground by recognizing the value of studying the educational outcomes of women graduate students and marking those outcomes as different from those of men. Of the 311 respondents in his study, only 34, or 11 percent, did not pursue paid employment after degree completion.<sup>1</sup> Most of the 36 percent who reported that their expectations for family and career while in school were not met attributed their unrealized expectations to the challenge of balancing family and career. As one lawyer wrote: "I did not anticipate while at school that I would abandon my profession to stay at home with my children" (139).

Many wrote quite explicitly of working in the paid labor force and maintaining all of the unpaid labor involved with keeping a house and home running smoothly. A social worker wrote, "My husband's devotion to his career has involved a certain unwillingness (which he would deny) to relieve me of some houseworking responsibilities" (121). Another woman called for not only a "new attitude towards women" and "dignifying the job of running a home" but also argued that "[we] need to teach our young men that marriage is a partnership and if they marry a career gal they both must cope with domestic responsibilities" (158). This last comment speaks to the "double day" or "double duty" phenomenon that nearly all women of all race and class backgrounds who work in the paid labor market have faced (Hochschild 1975, 1989; Jones and Shorter-Gooden 2003).

Ginzberg's analysis of factors related to career success prefigured what would become key concepts in studies of women and tenure, such as

department or institution “climate” and ability to work part-time while on the tenure clock. When asked to comment on obstacles encountered or assistance received as a result of gender while in school or during one’s career, 40 percent reported some level of discrimination. Moreover, as might be expected, career advancement was correlated with continual employment, which for women is often correlated with the number of children in a family. “With every increase in family size, there is a decrease in continuous participation in work” (81). Another respondent’s career expectation was not met due to a two-career household in which her mobility was limited: “Income-wise: not as I expected . . . because my husband’s interests keep me tied to a place where salaries are low” (139).

In 1969 Helen Astin provided the next major study, *The Woman Doctorate in America: Origins, Career, and Family*, which surveyed women from 108 U.S. institutions who completed doctorates between 1957 and 1958. Out of 1,979 women, 1,547 (79%) completed the full questionnaire. Astin’s study, not specifically on tenure but on more general educational outcomes and careers of women Ph.D. recipients, focused on career choice, development, and achievements. Like Ginzberg’s, Astin’s research laid the groundwork for future studies that focus on the differential impact of marriage and children on highly educated men and women.<sup>2</sup> Astin’s discussion of tenure is based on the 70 percent of respondents who were employed in four-year colleges or universities. Just over 50 percent were tenured at the time of survey (1965–66). Women in education and the arts and humanities had the highest tenure representation, while women in the natural sciences showed the lowest. Astin concludes with a brief discussion of career development obstacles and identifies balancing family with career obligations as the most significant obstacle. Like Ginzberg, Astin found the expectation of maintaining the household fell to women. Finding adequate help with home labor was the most cited reason for women’s problems developing their careers.<sup>3</sup> Many wrote of difficulty gaining their husband’s support for working outside the house rather than doing at-home childcare. Astin, like Ginzberg, cited career disruptions for women following a husband’s career. “When the husband moves from one location to another to take a new job,” Astin writes, “the wife must move too, of course, but often timing of such a move is unfortunate with respect to her own career development” (102). The difficulty balancing domestic and career obligations was compounded by employer-based discrimination. Twenty-five percent of respondents reported prejudices against hiring a woman, 40 percent reported gender-based salary differences, and 33 percent said that they experienced discrimination in tenure, seniority, and promotion. In addition, university policies often made no adjustments for women academics who were also mothers.

Ginzberg and Astin set the research agenda for scholars in the ensuing decades. Laura Morlock’s (1973) meta-analysis of 30 studies on the status

of women in fourteen academic disciplines conducted between 1969 and 1972 included an analysis of doctorate holders and tenure rates. The studies reviewed show that women had lower status than male colleagues in all disciplines by every measure used, including the proportions of women holding tenure, although the size of the tenure gap between men and women varied by discipline. Morlock summarized her results in a measure of gender parity based on the gap between men and women in holding full professorships and in salary. Perhaps most surprisingly, the women with Ph.D.s in physics were closest to gender tenure parity and also least likely to perceive sex-based discrimination as a negative factor in their own careers. That is, according to Morlock's measure, in the predominantly male field of physics, the few women who earned Ph.D.s and pursued academic careers had better chances of receiving tenure and getting paid on par with their male counterparts than did women in other fields.<sup>4</sup>

Subsequent studies document a range of changes in the lives of highly educated women, including the number of women attaining doctoral degrees, entering into tenure-track or non-tenure-track faculty positions, attaining tenure, balancing family responsibilities with career growth, and institutional policy changes such as dual-career hiring programs and flexible tenure clock programs. The agenda uniting these works is their analysis of the barriers to career advancement of women in the academy, with "advancement" being defined as tenure achievement. While these are important discussions to continue, accounts that focus on family factors ignore differences in discipline-specific labor markets that also might affect gender (in)equity in tenure. Simultaneously, explanations that foreground discriminatory labor market processes tend to focus exclusively on academic labor markets (Solmon 1978). Both perspectives leave out consideration of the larger labor market context for Ph.D. recipients. We turn now to the impact of that larger labor market on Ph.D. career paths, particularly tenure.

## **Beyond the Academic Labor Market**

Investigation of the larger labor market in which Ph.D.s seek employment is a critical and little studied factor in the larger discussion of women and tenure. The idea that the attractiveness of alternatives to faculty employment for Ph.D.s, and further, that differences in these alternatives by field might shape gender inequity in tenure outcomes, has received scant if any attention in studies of women and tenure (Kulis, Sicotte, and Collins 2002; Kulis and Sicotte 2000). However, classic labor market economics predicts that the higher the demand (in this case, the more alternatives) for a specific kind of non-substitutable human capital (e.g., a field-specific Ph.D.), the higher will be the returns to that capital (salary, job security, tenure

rates). Further, the higher the demand for the field-specific Ph.D., the less other labor-specific characteristics (such as gender) will have an observable impact on outcomes (Thurow 1975; Ehrenberg and Smith 1991). Given this reasoning, we expect disciplinary differences in labor market alternatives to faculty work to be related to differential rates of gender equity in tenure achievement. In other words, we suggest that for people with Ph.D.s, the more attractive the alternatives to tenure are in a given field, the smaller the gap among doctorate holders between men's and women's likelihood of gaining tenure.<sup>5</sup> This does not mean that women will hold a greater share of the tenured positions in fields with attractive alternatives to academic employment. Instead, it means that among women with Ph.D.s, we would expect to find a higher rate of women achieving tenure in those fields that have attractive alternatives to academic employment than in those fields lacking such alternatives.

This analysis uses the *PhDs—Ten Years Later* survey, a unique dataset providing information on the career paths of a national sample of Ph.D. holders from six disciplines, to investigate whether the availability of attractive career options for doctorate holders in a specific field is associated with a lessening of the difference between men's and women's tenure odds. The difference between men's and women's likelihood of attaining tenure in a given field is measured by a variable constructed here and labeled the "gender tenure ratio." The gender tenure ratio is a field-specific odds ratio. It compares men's to women's likelihood of gaining tenure in a given field. The closer the gender tenure ratio is to one, the smaller the difference among doctorate holders in men's and women's odds of attaining tenure in a field. A gender tenure ratio above one indicates women's odds of gaining tenure are higher than men's; conversely, a gender tenure ratio below one indicates men's odds are greater. Comparing the gender tenure ratios across fields illustrates relative differences in gender equity in tenure despite field-specific differences in the proportion of women and rates of tenure achievement.

## Model and Propositions

For each of the six fields in the dataset (biochemistry, computer science, electrical engineering, English, math, and political science), we examine the association between the gender tenure ratio and four separate indicators of the attractiveness of the labor market outside of the university for doctorate holders. The four indicators of the attractiveness of career alternatives to academic tenure we use are: (1) the percentage of respondents whose career goal upon finishing the Ph.D. was to become a professor; (2) the proportion of respondents working in non-tenure track positions; (3) the gender salary equity in academia in comparison to gender salary

equity in other sectors: and (4) the mean wage rate of men who worked in research jobs outside of academia.<sup>6</sup> Although the proportion of women in a field does not represent the attractiveness of non-academic careers for doctorate recipients in a given field, the proportion of women in a field is systematically related to the other indicators (Bellas 1997; Smart 1991), and so we include the proportion of women as an indicator in our model as a control variable.

Figure 1 illustrates our hypotheses about the relationships among the four indicators, the control variable, and the gender tenure ratio. Explanation of each of the indicators and the predicted relationship follows.

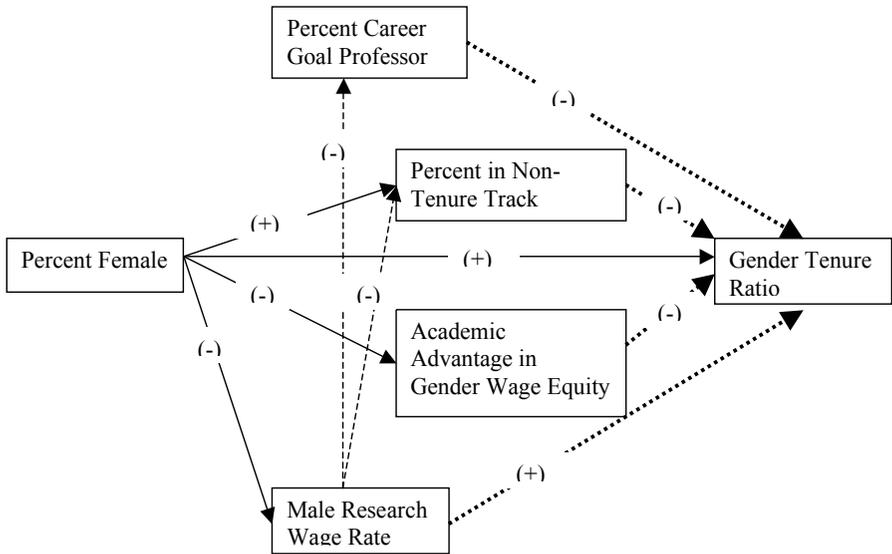


Fig. 1. Model of Impact on the Gender Tenure Ratio.

### Percent Career Goal Professor (or Percent Who Wanted to be a Professor)

We interpret the percentage of respondents who reported a career goal of working as a professor as a measure of attractiveness of careers outside academia because a higher proportion of respondents indicating preference for academic careers indicates lower attractiveness of job opportunities in other sectors. Since we expect women’s tenure odds to increase when non-academic alternatives in a given field are more attractive, then fewer non-academic alternatives, (e.g., higher proportions of respondents wanting to be professors) should be associated with lower gender tenure odds for women.

## Percent in Non-Tenure-Track

Non-tenure-track faculty positions are generally regarded as less attractive within academia than are tenure-track or tenured positions. The American Association of University Professors (AAUP) documents the numerous disadvantages that non-tenure-track faculty face relative to tenured and tenure-track faculty, including lack of research support, fewer resources, less representation on governance structures, higher teaching loads, and lower salaries (Committee on the Education and Employment of Women in Science and Engineering 1979, 1981; AAUP 1996). A large job market for non-tenure-track faculty is a manifestation of lack of availability of attractive alternatives to tenured faculty positions. The more attractive the alternatives to tenure, the less likely Ph.D. recipients would be to settle for unattractive offers from academic institutions. Therefore, the proportion of respondents employed in non-tenure-track faculty positions is an indicator of the attractiveness of academia over work in business, government, and nonprofit sectors for Ph.D. recipients in a given field. Further, fields with higher proportions of non-tenure-track positions indicate that non-academic alternatives are perceived as less attractive to graduates. Our measure of the extent of non-tenure-track employment in a field is the average proportion of respondents working in non-tenure-track positions for each year of the first ten years after earning the Ph.D. We expect that in fields with higher proportions of non-tenure-track jobs, the gender tenure ratio will be lower, i.e., men will have greater likelihood of obtaining tenure than women.

## Academic Advantage in Gender Wage Equity

Women earn less than men in both academic and non-academic sectors (U.S. Department of Labor 2004; Bellas 1994); this finding is reflected in the *PhDs—Ten Years Later* sample as well (Nerad and Cerny 1997). However, the gender gap may be smaller in academia than in other sectors. We refer to this as the “academic equity advantage.” We measure this by field with a ratio comparing the gender salary gap in tenured positions to the salary gap in non-academic occupations. Values above one indicate a smaller gender gap in salaries among tenured professors than among those in non-academic occupations; values below one indicate a larger gap in academia than outside academia. If the “academic advantage” ratio in a given field equaled one, this would indicate that the gap between men’s and women’s salaries was the same in academic and non-academic sectors.

## Male Research Wage Rate

The average salary of men employed in a research field in business, government, or nonprofit sectors indicates attractiveness of work outside academia because these kinds of jobs are the primary alternative to faculty jobs for graduates of doctoral programs. The indicator is limited to income in research positions because incomes in other much smaller categories of employment outside academia vary greatly while research incomes vary much less. Thus, the mean income in research positions in business, government, and nonprofit sectors is a reasonable indicator of market rates outside academia for doctorates in each field. Therefore, we expect that in fields with higher research salaries, the gender tenure ratio will be higher, i.e., women's odds of obtaining tenure increase relative to men's.

Bold dotted arrows in the Figure 1 summarize the expected relationship between each of the four indicators defined above and the gender tenure ratio. Dashed lines indicate expected systematic relationships between the attractiveness variables. Higher male research wages should be associated with lower proportions wanting to become professors and working in non-tenure-track positions because in fields with attractive alternatives to academic jobs, the non-tenure track labor market should not develop.

As indicated by solid lines in Figure 1, we expect that the proportion of females in a field will be negatively associated with the male wage rate and the academic advantage in gender wage equity but positively associated with the proportion of non-tenure-track jobs in a field. We also expect the percent female will have a direct impact on the gender tenure ratio, with higher proportions of women associated with lower gender tenure ratios, i.e., with a decline in women's tenure odds relative to men's. This does not necessarily mean that the proportion of tenured positions held by women will be smaller than that held by men. It means that the more women getting Ph.D.s in a field, the better men's tenure odds should be compared to women's among doctorate holders in that field.

## Method

The *PhDs—Ten Years Later* survey sampled doctorate recipients from 61 participating universities who earned their degrees between 1983 and 1986 in the six fields of biochemistry (bc), computer science (cs), electrical engineering (ee), English (eg), mathematics (mm), and political science (ps). In these six fields, 10,395 doctorates were awarded across all Ph.D.-granting institutions during the sample time frame; 57 percent of these doctorates were awarded by sampled institutions. Sixty-two percent of those surveyed responded, with a slightly higher rate of 65 percent among permanent

residents and U.S. citizens. This yielded 3,667 respondents, including 2,959 citizens or permanent residents. Respondents by field range from 282 in computer science to 767 in English. Table 1 illustrates the sample by field, including the variation in the representation of women across the fields surveyed, from a low of 4.3 percent in electrical engineering to more than half of the sample in English. All analyses exclude those who were on temporary student visas at the time of the receipt of the Ph.D. These respondents face a unique set of issues and their career paths are different from those of citizens and permanent residents (Gupta 2004).

**Table 1**  
Respondents by Field of Study and Gender

	bc	cs	ee	eg	mm	ps
<b>Total Respondents</b>						
Men	430	248	314	350	418	337
Women	175	34	14	417	104	118
Total	605	282	328	767	522	455
<b>Representation within field</b>						
Men	71.1%	87.9%	95.7%	45.6%	80.1%	74.1%
Women	28.9%	12.1%	4.3%	54.4%	19.9%	25.9%

The *PhDs—Ten Years Later* survey was administered from 1995 to 1997. Although respondents retrospectively reconstructed their career paths and evaluated their graduate training, the types of information collected in this survey can be recalled retrospectively with reasonable consistency (Dex 1995; see Note 7). Survey findings provide career information for ten to fifteen years after degree completion for each respondent. *PhDs—Ten Years Later* gathered extensive information on respondents' career goals, expectations, experiences, and outcomes for each of its six fields. It also surveyed all Ph.D. recipients, not only those with academic careers. Consequently, it provides data useful for creating field-specific indicators of the gender gap in the likelihood of obtaining tenure, as well as several indicators of the attractiveness of non-academic alternatives.

Table 2 displays tenure achievement by field and by gender. The differences in tenure achievement by field are apparent from the last row: 55.4 percent of all English Ph.D.s achieve tenure, while 21.6 percent of all Ph.D.s in electrical engineering achieve tenure. Interestingly, although women represent 4.3 percent of electrical engineering Ph.D.s (not indicated in Table 2), their rate of tenure achievement is high (42.9 percent) relative to their male colleagues.

**Table 2**  
Tenure Achievement by Field of Study and Gender

	bc	cs	ee	eg	mm	Ps
<b>Ever Tenured (n)</b>						
Men	81	82	65	218	230	185
Women	32	14	6	207	51	54
Total	113	96	71	425	281	239
<b>Ever Tenured (%)</b>						
Men	18.8%	33.1%	20.7%	62.3%	55.0%	54.9%
Women	18.3%	41.2%	42.9%	49.6%	49.0%	45.8%
Total	18.7%	34.0%	21.6%	55.4%	53.8%	52.5%

**Measures**

As described earlier in the section titled “Beyond the Academic Labor Market,” the outcome variable used in this analysis is the “gender tenure ratio.” This is an odds ratio that compares women’s to men’s likelihood of attaining tenure in a given field. The difference between a gender tenure ratio and one represents the percent difference in the odds of obtaining tenure for women compared to men. Table 3 summarizes the gender tenure ratio and each of the other measures in the model by field. The gender tenure ratio varies from a low of 0.60 in English to a high of 2.87 in electrical engineering. This means that among doctorate holders, women’s odds of attaining tenure in English are 40 percent smaller than men’s odds, while in electrical engineering, women’s odds of attaining tenure are 187 percent greater than men’s.

**Table 3**  
Field level characteristics—in order of increasing Gender Tenure Ratio

	eg	ps	mm	bc	cs	ee
1. Gender Tenure Ratio	0.60	0.69	0.79	0.96	1.42	2.87
2. Percent Want to be Professor	80.6	72.0	54.0	32.2	45.1	25.2
3. Male Annual Research Salary	\$60,477	\$67,120	\$76,303	\$71,638	\$87,604	\$88,071
4. Percent in Non-Tenure-Track Positions	16.6	7.1	4.9	6.4	1.9	1.8
5. Academic Equity Advantage	1.51	1.10	1.07	0.93	–	–
6. Percentage Female	54.4	25.9	19.9	28.9	12.1	4.3

Note: for computer science (cs) and electrical engineering (ee) there are not enough cases to calculate academic equity advantage.

The proportion of respondents wanting to become professors ranges from 80.6 percent in English to 25.2 percent in electrical engineering. The average annual salaries reported for research jobs outside of academia range from \$60,447 in English to \$88,071 in electrical engineering (earnings were reported for years between 1995 and 1997). The percent of respondents in non-tenure-track faculty positions varies from 16.6 percent in English to 1.8 percent in electrical engineering. Although men earn more than women in all fields and sectors, the academic equity advantage varies from 1.51 in English to 0.93 in biochemistry. It is not calculated for computer science and electrical engineering due to small numbers of women. The 1.51 figure for English indicates that the gender gap in pay for Ph.D.s with academic tenure is 50 percent smaller than among English Ph.D.s working in business, government, and nonprofit sectors. In contrast, in biochemistry, the gap between men's and women's salaries is 7 percent greater in academic tenured positions than among those working in research positions in other sectors. The proportion of women by field in the *PhD—Ten Years Later* sample varies from a high of 54.4 percent in English to a low of 4.3 percent in electrical engineering (1997).

Table 4 presents the core of our analysis: the matrix of bivariate correlations reflecting the relationships proposed in Figure 1.<sup>7</sup> Correlations range from a low of 0.78, between the proportion in a field wanting to be a professor and the percent who are women in the field, to a high of 0.99, between the proportion in non-tenure-track positions and men's non-academic research salaries. As proposed in Figure 1, the variables are strongly correlated with each other and reflect directions of association consistent with the model. All but one of the proposed correlations is statistically significant. The one exception is the gender tenure ratio with the "academic gender equity advantage." This relationship is highly correlated (-0.93) although not significant (likely due to the limitation of only four fields for which we could calculate this variable). We did not conjecture about the relationships between the "academic gender equity advantage" and the other indicators; these correlations are also high but not statistically significant.

The findings displayed in Table 4 provide support for our argument that the gender tenure ratio improves as alternatives to academic tenure become more attractive. As expected, we found that in fields (1) with a smaller proportion of respondents wanting to become a professor; (2) with a smaller proportion of non-tenure-track jobs; (3) with less gender inequality in incomes in academia (relative to outside of academia); and (4) with higher salaries among men in non-academic research jobs, women's tenure odds are equal to or better than men's. Our analysis is limited to an examination of bivariate associations. Typically, a model such as the one we have proposed is evaluated in a multivariate analysis using techniques such as linear regression. However, given that our data present us with only six

cases, we do not have sufficient degrees of freedom to support a multivariate analysis. Therefore, we recommend that readers interpret our findings as suggestive and encourage future research with data with a sufficient number of cases to perform regression (or some extension thereof).

**Table 4**  
Bivariate Correlations

	(1)	(2)	(3)	(4)	(5)
Gender Tenure Ratio (1)					
Percent Want to be Professor (2)	-.83 (*)				
Average Annual Percent in Non-Tenure Track Positions (3)	-.87 (*)	.78			
Academic Equity Advantage (4)	-.93	.89	.88		
Male Annual Salary in Non-Academic Research (5)	.87 (*)	-.81	-.99 (**)	-.81	
Percentage of Respondents Who Are Female (6)	-.93 (**)	.78	.95(**)	.81	-.93(**)

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

Note: Correlations for academic equity advantage are based on four cases only.

## Discussion

The systematic relationships between the gender tenure ratio and field-level characteristics apparent in the career path data analyzed here lead us to consider the role of field-specific labor markets in shaping processes of gender inequality in academia. In what follows, we briefly review five labor market theories that might explain women's lower tenure rates. Although we cannot adjudicate between these competing theories with the data in this paper, we argue that the approaches that would explain our findings best view the academic labor market as part of a larger labor market for Ph.D.s.

On the other hand, three theories try to explain our findings as the outcome of the processes purely internal to academic labor markets. The "threat" theory states that women are discriminated against in labor markets in which there are so many of them that they begin to threaten men's monopoly on good jobs (Reskin, McBrier, and Kmec 1999). According to this theory, in academic fields with few women (like physics in Morlock's 1973 study), the women would be treated as equals by the men. The visible result of the lack of discriminatory and exclusionary behavior

by men would be that men and women would have the same likelihood of getting tenure in that field. There would still be very few women in faculty positions, but among those few women who did get a Ph.D. in the field, there would be the same likelihood of obtaining tenure as among male counterparts. The "threat" theory does not fit our findings, which show that in fields with few women, women have a greater likelihood of getting tenure.

The "discrimination avoidance" theory (Ehrenberg and Smith 1991) assumes that some employers discriminate against women or make life uncomfortable for them and some do not. In this perspective, if there are few women in a field, they have the luxury of avoiding the "bad" employers and working for the employers that welcome women. The visible result of this process would be that men and women in the field have the same tenure likelihood, but that women are "clumped" together at some institutions and absent at others. For example, there would be some electrical engineer/computer science departments with clusters of women and many with no women. Obviously, it would require department-level data in order to evaluate this explanation and we cannot do that with the analysis presented here.

The "exceptional woman" thesis would explain women's greater tenure odds in male-dominated fields as the outcome of characteristics of individual women. It might be that the few women who persist long enough to get a tenure-track job in male-dominated fields are exceptional on some dimension that matters in the field. Maybe they are exceptionally well educated, smarter, more ambitious and competitive, or much better at networking than the average Ph.D. in the field. Again, our data cannot evaluate this theory. To do so would require individual level information on a variety of personal dimensions in addition to career path data.

While each of these approaches has something to offer, widening our lens to understand the academic labor market for Ph.D. recipients as part of a larger context engages different explanations. Our data suggest that the gender tenure ratio is more favorable for women as the number and attractiveness of alternatives to tenure-track and tenured positions increases. In other words, the more robust the labor market in a given field for Ph.D. recipients outside of academe, the more improved are women's chances relative to men's chances of attaining academic tenure in that field. This phenomenon also can be explained in different ways. Two widely held alternatives are the "competition produces meritocracy" perspective and the contrasting idea of "gender segmented labor markets."

According to the theory of competition producing meritocracy, competition for research labor should drive salaries higher and make promotion processes more objective, e.g., more gender blind, in both academic and non-academic labor markets (Thurow 1975; Ehrenberg and Smith 1991). The competition for qualified labor provides employers with incentives

to consider all qualified candidates regardless of traditional preferences for men. This theory predicts an *even* gender tenure ratio for women relative to men in fields with robust non-academic labor markets. Our data are not consistent with this theory, because we found that women actually had better chances of getting tenure than men in fields with strong non-academic markets for researchers.

However, if men and women with Ph.D.s are viewed as different labor inputs, then the labor market for Ph.D.s would be segmented by gender.<sup>8</sup> If women with Ph.D.s are seen as being a scarce resource (for which a man is not easily substituted) and they are valued, they will be “bid up” in the labor market such that women in fields with many alternatives to tenure would experience a favorable promotion ratio relative to men in their fields, including a favorable gender tenure ratio. Further, this view suggests that women also would have a higher likelihood of promotion in occupational ladders outside of academia.

In a gender segmented labor market in which women *are not* valued as a scarce resource, men get the first choice of the best jobs. This notion, known as “gender queuing,” imagines job candidates waiting in line and the men always stand at the front of the line; hence, men will get the first choice. The theory suggests that in fields in which industry competes with the academy for Ph.D. holders, ladder faculty jobs serve as the gender queue for all research positions in that field. It presumes that men will choose the best jobs among the non-academic and the academic options (Reskin and Roos 1990; Thurow 1975).<sup>9</sup> In other words, according to a “gender queuing” explanation, in fields with good alternative labor options, the industry jobs go to the supposedly “more qualified” men at the front of the line. Women are then disproportionately left behind in the academic jobs, which in these fields are typically viewed as lower status than industry jobs. If gender queuing is occurring, we would expect that proportionally more men than women would reject tenure-track positions for industry. Further, we expect that in those fields with fewer industry options, more women would be located in the lower rank and lower prestige academic jobs, “queuing” up for the available tenure-track jobs.

It is impossible to tell from our data whether women in academic fields with robust non-academic labor markets are being treated as scarce and valuable resources by academic employers or whether the most desirable jobs in these fields are actually outside of academia. However, the pattern of correlations reported in this paper between tenure and non-academic labor markets is probably best explained by segmented labor market theory. This approach views academic labor markets as part of a larger labor market offering alternatives to faculty jobs, and they predict different gender tenure ratios in fields with different alternatives to academic employment. Further, we suggest that understanding tenure-track

positions as part of a larger labor market, including non-academic alternatives, shows that the desirability of academic tenured positions varies in relation to the alternatives. Measuring gender equity for academic tenure in English does not mean the same thing as measuring gender equity for academic tenure in electrical engineering. It is possible that a strong non-academic labor market may actually decrease the desirability of academic tenured positions, so that in these fields we cannot see academic tenure as the *sine qua non* of career success. As such, we must be cautious about interpreting women's favorable gender tenure ratio in fields with strong alternatives to academic tenure as indicating academic gender equity.

### **When Tenure is Second Place: Understanding the Meaning of Tenure for Gender Equity**

We began by reviewing the existing literature relevant to the question of gender parity and tenure. Most of the extant literature emphasizes the fact that women typically enact labor-intensive roles at home (in doing housework, childbearing, childrearing, and general caretaking), and this unequal and highly gendered labor, exogenous to the tenure decision, impacts women's ability to compete for tenure on a level playing field. We acknowledge the importance of this claim in any review of women and tenure. Further, we wish to point out that studies of women and tenure to date have not considered another factor which is typically also considered exogenous to the tenure decision, the non-academic labor market.

By not acknowledging that a large proportion of Ph.D.s have credible, even attractive, alternatives to pursuing tenure, we have missed an important dynamic influencing the gender tenure ratio. This is a serious oversight and one to which we hope our paper will draw attention and help to correct. We have used data from a national study, *PhDs—Ten Years Later*, to look at field-level differences in the gender odds ratio of tenure. Our investigation is highly suggestive that fields with more robust labor market alternatives also have a gender tenure ratio that favors women. Further, we found that the higher proportion of women in a given field and the fewer labor market alternatives to tenure-track and tenure positions, the more the gender tenure ratio favors men. In proposing several post-hoc explanations of our findings, we mean to suggest the question of gender equity in tenure is complex and to encourage researchers in this area to account for the larger labor market's influence on the gender tenure ratio. Given the 30-year upward trend of women's doctoral education attainment, we stress that tenure and gender equity analysis is not complete without an understanding of the actual career paths of Ph.D. recipients and the labor market beyond the academy.

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## Notes

1. Ginzberg did not analyze tenure attainment as an outcome variable, in part because most of the women in his sample did not hold faculty positions. Instead, his analysis rated women's career success as high, good, fair, or poor.
2. Both studies show that highly educated women tend to be married to highly educated men. About half (51%) of the women in Astin's (1969) study were married to men with Ph.D.s and another 12 percent were married to men with professional degrees (M.D., J.D., D.D.S.). The *PhDs—Ten Years Later* survey conducted by Maresi Nerad and Joseph Cerny found that about 60 percent of women Ph.D. recipients were married to men with Ph.D.s, M.D.s, or J.D.s. In contrast, only 19 percent of the men surveyed were married to women with similar education attainment.
3. Although Astin discusses the difficulty the "professional woman" faces in advancing her career, she fails to analyze class biases that inform the way in which "domestic help" is understood. Astin pits women against each other when she writes of women in her survey having a difficult time "finding competent help" (1969, 101). While Ginzberg's findings include entries that stress the need for men and women to share in household and domestic duties, Astin's study seems to reinscribe traditional gender roles in the domestic sphere. In a decidedly myopic discussion, Astin writes that recent immigration legislation makes it much more difficult for domestic workers to immigrate to the United States and that this "penalize[s] the woman who wishes to take outside employment" (101). Attentiveness to the vulnerability, low pay, and few if any benefits that have consistently marked the labor of women who work as domestics so other women can have careers is not taken up by Astin.
4. This finding of Morlock's is especially relevant to our thesis as the physical sciences have historically had a very strong non-academic market; however, women Ph.D. holders in physics were more highly represented in the academic labor market than in the non-academic market. At the time of the National Research Council's report, *Careers of PhD's: Academic versus Nonacademic* (1968), which follows Ph.D. cohorts from 1935–1960, 38 percent of the Ph.D.s in the physical sciences were always in non-academic employment with 16 percent moving from academic to non-academic. Thirty-three percent of the Ph.D.s in the physical sciences were always in academic employment with 13 percent moving from non-academic to academic.

5. Throughout the article, women's likelihood and men's likelihood applies to Ph.D. recipients' (men's or women's) likelihood.
6. Survey respondents were asked to state their career goal at the beginning and at the end of their graduate education. We are drawing from the end of graduate education data. Given that the survey collects information recalled retrospectively, one might suspect that respondents remember their goals to fit their actual career path. However, studies of retrospective surveys indicate that data collected retrospectively offer reasonable accuracy (Dex 1995).
7. We applied standard transformations to each of the variables from Table 2 such that their underlying distributions better conformed to the normality assumptions and, therefore, are more conducive to basic statistical analyses. We applied a natural log to all ratios, we transformed all percentage into ratios and applied a natural log, and finally, we applied the natural log to the annual wage rate.
8. Gender segmentation of the labor market for Ph.D.s could be facilitated by a policy of differentiation by gender such as affirmative action, a cultural value of diversity, or a general belief in essentialized gender differences.
9. Placement at the head of the line may be entirely separate from actual qualifications; in fact, it may depend more on non-job relevant characteristics such as gender, race/ethnicity, or pedigree.

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