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ABSTRACT

This study identified the likelihood of new, tenure-track assistant professor obtaining tenure at a large multicampus university (the University of Missouri system). Logistic regression was used to determine whether certain faculty characteristics help to explain who received tenure. The tenure rate was based on the percentage of new assistant professors who secured tenure by the end of their sixth year. Five cohorts during 1982-1986 of new assistant professors (n=385) from four campuses were tracked, as were 195 full-time assistant professors who had been promoted to associate professor during 1983-1986. Findings indicated: more assistant professors had left the university (44 percent) than had secured tenure (39 percent) in 6 years; of four discipline areas, assistant professors in the health professions were least likely to secure tenure; gender did not help to predict whether an assistant professor received tenure; for those who left, departure was gradual over the 6-year period; and 21 percent of the associate professors were promoted to full professor by the end of their 6th year after receiving tenure. (Contains 21 references.) (SW)

Exploring Faculty Career Progression: A Retention and Tenure Perspective

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ABSTRACT

This study identified the likelihood of new, tenure-track assistant professors obtaining tenure at a large multicampus university. It also used logistic regression to determine whether certain faculty characteristics help to explain who received tenure. Five cohorts (1982-86) of new assistant professors from four campuses were tracked (N=385). Findings indicate that: 1) more assistant professors had left the university (44%) than had secured tenure (39%) in six years; 2) of four discipline areas, assistant professors in the health professions were least likely to secure tenure; 3) gender did not help to predict whether an assistant professor received tenure; and 4) for those who leave, departure is gradual over the six year period.

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This paper was presented at the Thirty-Fifth Annual Forum of the Association for Institutional Research held at the Boston Sheraton Hotel & Towers, Boston, Massacusetts, May 28-31, 1995. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Editor
AIR Forum Publications

INTRODUCTION

The academic career can be seen as a series of steps, from procuring the PhD and landing a tenure-track assistant professor appointment, to being promoted to associate professor with tenure, and for some, advancing to the rank of full professor. Bowen and Rudenstine (1992) filled a major void when they published *In Pursuit of the PhD,* a comprehensive study that focused on the likelihood of beginning doctoral students securing a PhD. Various reports provide a fairly consistent account of what the academic job market holds for newly minted PhDs (e.g., see Magner, 1994). There are also several studies on the faculty career (e.g., Schuster, Wheeler, & Associates, 1990; Baldwin & Blackburn, 1981) and even specific studies on why faculty leave (Matier, 1990). Little is known, however, about a faculty member's likelihood of advancing through the ranks of academia.

Purpose

The purpose of this study was to explore the career progression of faculty members at the University of Missouri, a four campus, land-grant university system that employs 2,200 full-time faculty members and enrolls 53,000 students. It focused on the career progression of newly-hired assistant professors as well as recently tenured associate professors. Not only was this study interested in identifying the percentage of assistant professors who received tenure, but also whether certain faculty characteristics help to explain whether a faculty member received tenure.

LITERATURE REVIEW

The Faculty Career

For most faculty members at four-year colleges and universities, the first step to securing a tenure-track faculty position is to acquire a doctoral degree. Examining a sample of 13,000 students who enrolled in PhD programs between 1967 and 1976, Bowen and Rudenstine (1992) reported that approximately 60% of the beginning doctoral students eventually secured the PhD. By discipline area, approximately 50%

finished in the humanities, 55% finished in the social sciences, and 65% finished in the natural sciences. In terms of the length of time to complete the doctorate (the year the PhD was awarded less the year the program was begun), median years to complete were 6.0 years in the natural sciences, 7.3 years in the social sciences, and 8.6 years in the humanities. The authors hypothesized that completion rates and time-to-complete rates may be closely related to disciplinary differences in program structure, prevalence of collaborative research, the need to travel and work with archives, and agreement concerning appropriate methods.

Once that the PhD is secured, in the past several years the job prospects in academe have not been favorable (Magner, 1994; Hardigg, Mulvine & Sanoff, 1995). Although few comprehensive studies have been completed, one position in economics received over 700 applications (Horwitz, 1994). The over supply of potential faculty members is especially acute in the humanities: many tenure-track English positions regularly receive 800 to 1,000 applications. The Modern Language Association noted that positions advertised in English were down 45% in 1993 as compared to four years earlier (Nelson & Berube, 1994). The job prospects for faculty, however, are expected to improve significantly beginning as early as the late 1990s (Bowen & Sosa, 1989).

For those PhD recipients that are hired in a tenure-track faculty position, the path to securing tenure can be extremely challenging. In the past two decades the faculty condition has worsened (Schuster, Wheeler, & Associates, 1990). In general, the authors suggested that the job of being a faculty member has become more difficult as working conditions have deteriorated, earnings power has faded, and the labor market has been inhospitable. In addition, faculty at many institutions have experienced conflicting expectations and shifting values. In general, institutions have been able to attract highly qualified faculty and have placed extremely high expectations on these faculty for promotion and tenure. The impact of these factors, the authors conclude, has also weaken faculty morale. Literally all institutions have been placing growing emphasis on research as a requirement of advancement (Bowen & Schuster, 1986).

According to Baldwin and Blackburn (1981), college faculty tend to go through five career stages. The first three stages are particularly pertinent to this study. Faculty members in Stage I (first three years) feel extremely busy, are unsure of departmental and institutional expectations, struggle with teaching, engage in little research, and yet are generally optimistic (Boice, 1991; Fink, 1984; Sorcinelli, 1988; Whitt, 1991). Faculty in Stage II (assistant professors with more than three years) become more confident of their skills, seek recognition through advancement, are apprehensive about securing tenure, and are more politically sophisticated. These first two stages are often considered the probationary period that precedes tenure. This period has been especially tenuous for newly hired faculty in the past decade, as the supply of new faculty in most disciplines greatly exceeds demand (see earlier discussion). Studies have reported that many assistant professors feel that their department and/or institution is taking advantage of their services because of the ease at which they can be replaced (see Eimers, 1994a, as well as others).

In Stage III, the new associate professor enjoys the peer recognition associated with tenure, becomes more involved in the institution, is concerned about his or her career plateauing, and realizes that their is little room for advancement. In Stages IV and V, as full professors, faculty sometimes question the value of the academic career, find their career at a turning point, reduce their enthusiasm for teaching and for research. As they near retirement, faculty gradually withdraw from various responsibilities, feel somewhat isolated, and set quite limited goals for the remainder of their responsibilities.

Tenure Rates

In general, what percentage of the assistant professors do stay and secure tenure? In one of the few documented studies, a large research university found that of 104 newly-hired assistant professors in thirteen hard science fields, 75 had secured tenure (72%), 21 had left early (20%), and eight had been denied tenure (8%) (Kingsburg Jones, Hoenack & Hammida, 1994). Through personal correspondence, the tenure rates at four Research I universities were 33%, 48%, 62%, and 63% (Eimers, 1994b). The wide variance among the above tenure rates, however, begs the question of whether different assumptions and/or definitions were

used in calculating these rates.

In many cases, assistant professors may choose to leave their position because they were not satisfied and/or have been attracted to another position. Studies have generally reported that most faculty leave their positions because of the internal push (their interest and desire to leave) as opposed to the external pull (Caplow & McGee, 1958; Matier, 1990). In one of the few recent studies, Matier (1990) noted that "the internal push appeared to prime individuals to give serious consideration to the external pulls available to them" (p. 58). For example, Matier concluded that even the most attractive external pulls are not likely to get a great deal of attention if the internal push is not there. This finding suggests that most faculty members will not entertain an attractive external job offer if their position and circumstances are currently meeting their needs.

Significance of Study

From a faculty member's perspective, many would argue that prospective faculty members have a right to know the likelihood of securing tenure in the department and institution they are considering for employment. From an institutional research perspective, a study such as this can earmark concerns related with the selection, integration, and career progression of faculty members. Within obvious limits, this study extends the external validity of the few studies in this area by examining the tenure rate of new faculty on four campuses hired over a five-year period. It is also one of the first studies to explore tenure rate differences among faculty affiliated with different discipline areas. Finally, this study offers a list of caveats and suggested guidelines to those institutional researchers who conduct career progression and faculty retention studies at their institution. Being aware of these caveats and guidelines should enhance the validity of their institution's findings and enable institutions—with a higher level of confidence—to compare their findings with that of other institutions.

Research Questions

This study examined the following research questions:

1. What percentage of new, tenure-track assistant professors secured tenure on or before the end of their sixth year? What characteristics help to explain whether a new assistant professor secured tenure within six years?

2. What percentage of new, tenure-track assistant professors secured tenure once they were "up for tenure" during their sixth year? What characteristics help to explain whether these assistant professors secured tenure?

3. What percentage of newly tenured associate professors were promoted to full professor over the six-year period following their promotion to associate professor? What was the retention rate for these newly tenured faculty members?

This study focuses on these questions as they apply to the University of Missouri. A public university, it consists of the University of Missouri-Columbia (UMC) a residential Research I with 1,207 full-time faculty and 22,225 students; the University of Missouri-Kansas City (UMK) an urban, commuter Doctoral I institution with 423 full-time faculty and 9,858 students; the University of Missouri-Rolla (UMR) a residential Doctoral I institution of 273 full-time faculty and 5,681 students; and the University of Missouri-St. Louis (UMS) an urban, commuter Doctoral II institution of 306 full-time faculty and 15,411 students. These campuses, despite being part of a university system, operate with significant autonomy, are loosely coupled, and approach their mission in strategically different ways. All tenure decisions are determined at the campus level.

The population for the first two research questions included all assistant professors who were hired between 1982-86 (five cohorts) with a full-time, tenure-track appointment at the University of Missouri. Generally, assistant professors are reviewed for tenure in their sixth year at the University, although in certain circumstances, they may apply for tenure before their sixth year. Similarly, in special cases assistant professors may have their probationary period extended and apply for tenure at some point beyond their sixth year at the University. If they are granted tenure, they receive a continuous contract. If they are denied tenure, they either leave at that time or receive a one-year terminal contract.

For Question 3, only full-time associate professors who had secured tenure during the years 1983-86 (four cohorts) were included. The six-year time frame was selected so that comparisons could be made between assistant professors and associate professors, and which group was more likely to advance to the next rank in during a six-year period.

DATA AND METHOD

The data for this study were extracted from the University of Missouri Personnel Files, 1982-1992. For each year during the last week of October, a frozen file was developed from official personnel records of the University. This snapshot identified such characteristics as year of hire, full- or part-time status, sex, discipline, rank, as well as a host of other characteristics for all University employees. There were two populations of faculty selected for this study. The first population consisted of all full-time, tenure-track assistant professors that were hired from 1982 through 1986 (N=385); this population was used to address questions 1 and 2. The second population included all full-time assistant professors who had been promoted to associate professor during a four-year period from 1983 through 1986 (N=195). This population was used to address Research Question 3. In order to follow each cohort for at least six years, the 1986 cohort for each population was the last cohort that could be selected.

To determine which faculty members 1) left the University prior to a tenure decision, 2) stayed at the University but were denied tenure, or 3) stayed at the University and secured tenure, all newly hired assistant professors were tracked for at least six years after they had been hired. A similar process was used when tracking the faculty members who had just advanced from assistant to associate professor. To determine the characteristics that help to explain who secured tenure and who did not, logistic regression was employed. Logistic regression is particularly useful when trying to explain or predict a dichotomous variable (Cabrera, 1994). Thus, logistic regression was ideal for identifying the characteristics that helped to explain whether a assistant professor received tenure or did not receive tenure. Similar in some ways to multiple

linear regression, logistic regression identifies the independent variables that best explain a single dependent variable. Logistic regression does not provide a "variance accounted for" measure (i.e., R^2). It does, however, identify those independent variables that help to explain or predict whether or not an assistant professor secured tenure (Cabrera, 1994). Then, given an assistant professor with certain characteristics, it can predict the likelihood of that faculty member actually securing tenure.

The independent variables included in the logistic regression equations were age of hire (Range: 24-65 years), ethnicity (Caucasian, African-American/Hispanic, and Asian), campus (UMC, UMK, UMR, and UMS), and discipline (Health Professions, Other Professions, Sciences/Mathematics, and Social Sciences/Humanities).[1] Two logistic regression models were created. In Question 1 the dependent variable was whether or not an assistant professor secured tenure before or during their sixth year of employment. In Question 2 the dependent variable was whether or not an assistant professor, once "up for tenure" in the sixth year, secured tenure or not. Table 1 includes all variables that were used in the study.

RESULTS

Research Question 1: Overall, 39% (151/385) of the new assistant professors who began between 1982-86 were promoted to associate professor and had secured tenure by the end of their sixth year (see Table 2). All other assistant professors had either left the University, had left their tenure-track position but stayed at the University, or had delayed their tenure decision beyond the sixth year. Specifically, 44% (168/385) of the new assistant professors had either left the University or moved to a non-tenure track position by the end of their sixth year, and 17% (66/385) of the assistant professors remained at the University beyond their sixth year. On a campus basis, the tenure rate was 36% at the UMR, 44% UMC, 33% at UMS, and 28% at UMK. The University's tenure rate for new assistant professors was virtually the same for males and females: 40% (115/289) and 38% (36/96) respectively. In terms of ethnicity, 19% (3/16) of the African-American or Hispanic assistant professors, 43% (134/313) of the Caucasian assistant professors, and 48% (14/29) of the

Asian assistant professors received tenure within six years of beginning at the University. All assistant professors in the study were also divided into four discipline areas: health professions (HPROF), other professions (OPROF), mathematics & sciences (M&S), and social sciences & humanities (SS&H). Forty-three percent of the assistant professors in M&S (36/83) and SS&H (29/68) received tenure, followed by the OPROF at 41% (50/122), and the HPROF at 32 %(36/112).

As might be expected, most of the assistant professors who received tenure were tenured during their sixth year of service. Nearly one in four (24%), however, was granted tenure prior to their sixth year. Excluding the first year, for newly hired assistant professors who left the University, the pattern of departure was relatively consistent: the most that left in a given year was 37 in the fifth year (9% of total) and the least was 27 in the sixth year (7% of the total) (see Table 3).

Table 4 displays the results of the logistic regression for the dependent variable WITHIN6. The Stepwise procedure was employed and the significance level for entry or exit from the model was .1. The independent variables of AA_HISP ($p < .08$) and HPROFI ($p < .04$) were the only significant predictors of WITHIN6. This result suggests that assistant professors who were African-American or Hispanic were less likely to secure tenure. Likewise, the interaction term HPROFI was a significant predictor of WITHIN6. This posits that assistant professors in the Health Professions were significantly less likely to get tenure than in the other three discipline areas—particularly as their age of hire increases. According to the logistic regression model displayed in Table 4, for instance, an assistant professor who is not in the Health Professions and is not African-American or Hispanic has a 46.5% chance of securing tenure. If that assistant professor is in the Health Professions, African-American or Hispanic, and thirty years old at the age of hire, then the likelihood of securing tenure drops to 15.3%.

Research Question 2: Of those assistant professors who stayed at the University and went through the tenure process in their sixth year, 83% (114/138) received a favorable decision (henceforth, known as the "six-year tenure rate") (see Table 2). By discipline, the six-year tenure rate for assistant professors in HPROF was 94%

(31/33), followed by the OPROF at 81% (39/48), M&S at 78% (29/37), and the SS&H at 75% (15/20).[2]

Table 5 displays the results of the logistic regression for the dependent variable YEAR6. The Stepwise procedure was employed and the significance level for entry or exit from the model was .1. For the dependent variable YEAR6, UMR ($p < .03$) and AA_HISPI ($p < .01$) were the only independent variables to enter the logistic regression equation. For the independent variable UMR, this finding suggests that assistant professors at UMR were significantly less likely to secure tenure "once they were up for tenure" in their sixth year. AA_HISPI suggests that the interaction between AA_HISP and Age of Hire are negatively associated with securing tenure during the sixth year. According to the logistic regression model displayed in Table 4, for instance, an assistant professor who is not at UMR and is not African-American or Hispanic has a 87.4% chance of securing tenure once up for tenure during the sixth year. However, if that assistant professor is employed at the UMR campus, is African-American or Hispanic, and thirty years old at the age of hire, then the likelihood of securing tenure once up for it in the sixth year, drops to 20.2%.

Research Question 3: Of the associate professors that were tenured between 1983-86, 21% (41/195) were promoted to full professor by the end of their sixth year after receiving tenure (see Table 6). In terms of attrition, by the end of their sixth year after being tenured, 11% (21/195) had left the University. The attrition rate was no more than 4% from one year to the next.

DISCUSSION

Discussion of Results

There are five significant findings of this study. First, about four of every ten new assistant professors stayed at their respective campus and secured tenure. This finding is important in its own right because tenure rates have rarely, if ever, been reported beyond a single campus and/or single cohort. This provides, within obvious limits, at least a reference point for purposes of comparison. As important, this study detailed how the tenure rates were determined.

Second, this study found that about two of every ten newly tenured associate professors had been promoted to full professor by the end of their sixth year after being tenured. Interestingly, the likelihood of being promoted from a new assistant professor to associate professor is higher than the likelihood of being promoted from an associate professor to a full professor, provided each is given six years. In terms of faculty attrition and retention, the six-year attrition rate for assistant professors was 44% in contrast to 11% for the cohort of newly-tenured associate professors. In other studies of faculty attrition, assistant professors tended to be the most mobile followed by full professors and then associate professors (Matier, 1990; Caplow & McGee, 1958). In sum, the findings of this study suggest that associate professors were unlikely to leave the institution but were also unlikely to advance to full professor during the six-year period examined.

Third, the probationary period apparently works well in helping assistant professors, as well as their department, assess their fit: four of five assistant professors who stayed through their sixth year received a favorable tenure decision. In addition, of the assistant professors that left before their formal tenure review began, no less than seven percent or more than nine percent left in any given year. Formal pre-tenure reviews typically completed during the third or fourth year evidently did not accelerate the rate of departures over this two-year period.

Fourth, African-American and Hispanic assistant professors were less likely to secure tenure at the University within six years and less likely to secure tenure once they were "up for tenure." Although the number of African-American and Hispanic assistant professors hired during this five year period was low (see Table 2), this finding is worthy of review. Was the campus and/or department expecting too much from these faculty members (e.g., encouraging them to participate in campus service which in turn kept them from their research)? Was the academic and campus climate hostile? Did they receive offers from other institutions that went unmatched by the University of Missouri? Similarly, assistant professors in the health professions were less likely to secure tenure within six years. Most of the faculty in this discipline area were employed by the medical school and did not have formal training in research (i.e., did not have a PhD); some

could even select in their third year of employment whether they wanted to move from a tenure-track appointment to a clinical, non tenure-track appointment. Furthermore, the University operates a teaching hospital, not a research hospital. It is possible that these characteristics contributed, at least in part, to the lower tenure rate for the health professions. Finally, the reasons why assistant professors at UMR were less likely to secure tenure once they were "up for tenure" should be further explored. Have tenure standards at UMR risen over the past decade? Have tenure expectations been clearly articulated to assistant professors? Does the discipline of engineering, the predominant focus at UMR, have something to do with these lower sixth-year tenure rates?

Fifth, the aspects that *did not* help to predict tenure should also be considered. In this study, there were no gender differences: the probability of securing tenure for females and for males was virtually the same. Furthermore, for the "sixth year tenure rate," there were no differences among the four discipline areas. This finding seemed surprising based on what is known about the structure of disciplines (Creswell & Roskens, 1981). That is, discipline areas such as the physical and biological sciences tend to be high in paradigmatic development (Biglan, 1973). Consequently, faculty in the physical and biological sciences tend to report a higher level of agreement on what constitutes as quality research, in contrast to other discipline areas (Carnegie Foundation for the Advancement of Teaching, 1989). If this is true, one premise suggests that it would be easier to assess the quality of research early in a scientist's career, and thus, remedies could be sought before the faculty member stood for tenure in his or her sixth year. Nevertheless, this study did not find a difference between the sixth year tenure rate for assistant professors in the sciences and mathematics as compared to faculty in the three other discipline areas. Of course, having what might be considered a more congruent definition of what constitutes quality research may make it relatively easier to deny an assistant professor in the sciences or mathematics tenure as well.

From A Policy Perspective

Is a 39% tenure rate favorable, unfavorable, or neutral? A 39% tenure rate may be considered

favorable from several perspectives, one being that this University apparently has high standards for tenure as demonstrated by the fact that only two of five new assistant professors are able to advance to this level. On the other hand, it may be view as being less than favorable, when considering the high cost of attracting, recruiting, and retaining assistant professors. Newly-hired assistant professors also "cost" the institution because they are often granted reduced teaching and advising loads, seed money to get their research underway, and relief from some committee work. One also wonders what programs are in place to retain assistant professors (e.g., mentoring, clarifying expectations, etc.)? One reason that it may be difficult to assess whether a 39% tenure rate is favorable or unfavorable is because their are not common standards shared by peer institutions.

Lessons Learned

This section highlights some of the lessons learned from examining tenure rates of assistant professors. First, as with nearly all quantitative measures, the measure can vary significantly based on the definitions and parameters that are established for the study. For example, in this study the tenure rate was based on the percentage of new assistant professors who secured tenure by the end of their sixth year. This six-year period was selected because this is the traditional period of time assistant professors have before going through the formal tenure process. However, if seven years would have been used, the tenure rate would have increased from 39% to over 45%. Second, if tenure rate comparisons are to be made with other institutions, investigators would be prudent to consider whether the institution has a medical school, as well as considering the characteristics of that medical school. Assistant professors in the health sciences at the University of Missouri were less likely to secure tenure than faculty in the other discipline areas. However, they were also allowed to switch from a tenure track to a clinical track in their third year. As a growing number of professional schools consider allowing assistant professors to switch tracks, this will certainly need to be considered when figuring tenure rates. Third, it is important to monitor how many assistant professors secure tenure prior to beginning their sixth year at their institution. Often, these faculty come to

the university with different experiences than assistant professors who take a full six years before going through the tenure process. Not surprisingly, also, their likelihood of securing tenure was relatively higher. Finally, one lesson learned from a data management perspective: If the data files are frozen each year (as in this case), it was much more efficient and effective to build a single file that combines the frozen files than trying to work with, say, seven different files, one from each year.

CONCLUSION

This study has explored faculty career progression at the University of Missouri. The findings of this study are limited insomuch as this research was completed at a single university, it did not consider the assistant professors who left the University and secured tenure at another institution, and it did not investigate the reasons that contribute to a faculty member receiving tenure or not receiving tenure. Nevertheless, this study introduced a topic rarely explored and seldom discussed. One of the most important outcomes of this proposal is that it will stimulate discussion among administrators and institutional researchers and lead to additional studies that will extend and/or enhance the literature in this area of study. Studies at other institutions, furthermore, may provide critical information to prospective faculty members who are considering employment at that institution, as well as provide information that will enhance the success of an institution's most promising and yet vulnerable assets—its new faculty.

NOTES

1. Discipline areas included the following, identified by 2-digit CIP codes: HPROF: Health professions; OPROF: Agricultural Business & Production, Education, Communications, Engineering, Public Administration, Business Management, Conservation & Renewable Resources, Home Economics, and Law; M&S: Agricultural Sciences, Biological/Life Sciences, Mathematics, Physical Sciences, and Computer Sciences; SS&H: Foreign Languages & Literature, English Language. & Literature, Religion and Philosophy, Psychology, Social Sciences/History, and Visual & Performing Arts.

2. The six-year tenure rate includes only those assistant professors who went through the tenure process during their sixth year.

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TABLE 1. Variables Included in Logistic Regression Analysis

Independent Variables

1. **SEX**	Sex (1=male, 0=female)
2. **HIREAGE**	Age of Hire (Range 24-65)
3. **SCIEN**	Science/Mathematics (1=Science/Mathematics, 0=Other Professions)
4. **SS_HUM**	Social Sciences/Humanities (1=Social Sciences/Humanities, 0=Other Professions)
5. **HPROF**	Health Professions (1=Health Professions, 0=Other Professions)
6. **UMK**	University of Missouri-Kansas City (1=UMK, 0=UMC)
7. **UMR**	University of Missouri-Rolla (1=UMR, 0=UMC)
8. **UMS**	University of Missouri-St Louis (1=UMS, 0=UMC)
9. **AA_HISP**	African-American/Hispanic (1=African-American/Hispanic, 0=Caucasian)
10. **ASIAN**	Asian (1=Asian, 0=Caucasian)
11. **SEXI**	Sex Interaction Term (Sex*Age of Hire)
12. **SCIENI**	Science/Mathematics Interaction Term (S/M*Age of Hire)
13. **SS_HUMI**	Social Sciences/Humanities Interaction Term (SS/H*Age of Hire)
14. **HPROFI**	Health Professions Interaction Term (HPROF*Age of Hire)
15. **UMKI**	University of Missouri-Kansas City Interaction Term (UMK*Age of Hire)
16. **UMRI**	University of Missouri-Rolla Interaction Term (UMR*Age of Hire)
17. **UMSI**	University of Missouri-St Louis Interaction Term (UMS*Age of Hire)
18. **AA_HISPI**	African-American/Hispanic Interaction Term (AA/H*Age of Hire)
19. **ASIANI**	Asian Interaction Term (Asian*Age of Hire)

Dependent Variables

1. **WITHIN6**	Received/Did Not Receive Tenure Within Six Years (1=Received tenure within six years of hired, 0=Did not receive tenure within six year of being hired)
2. **YEAR6**	Received/Did Not Receive Tenure "once up for tenure" in sixth year (1=During the sixth year of employment, was "up for tenure" and received it, 0=During the sixth year of employment, was "up for tenure" and *did not* received it)

TABLE 2. Composite of Newly-Hired Assistant Professors that Received Tenure: Within Six Years and In Sixth Year Only

	Total Hired 1982-86	Assistant Profs Who Received Tenure Within 6 Years		Assistant Profs "up for Tenure" in Year 6	Assistant Profs "up for tenure" Who Received Tenure in Year 6	
		Number	Percentage		Number	Percentage
Overall	385	151	39%	138	114	83%
Sex						
Female	96	36	38%	29	28	97%
Male	289	115	40%	109	86	79%
Ethnicity						
AA/Hispanic	20	3	15%	5	2	40%
Caucasian	334	134	40%	124	105	85%
Asian	31	14	45%	7	7	100%
Discipline Area						
SS&HUM	68	29	43%	20	15	75%
HPROF	112	36	32%	33	31	94%
M&S	83	36	43%	37	29	78%
OPROF	122	50	41%	48	39	81%
Campus						
UMC	236	104	44%	92	79	86%
UMK	61	17	28%	13	13	100%
UMR	36	13	36%	18	11	61%
UMS	52	17	33%	15	11	73%

TABLE 3. Flow of Tenure-Track, Assistant Professors Hired From 1982-6

	Year of Employment at the University						
	First	Second	Third	Fourth	Fifth	Sixth	Seventh
Assistant Professors Receiving Tenure:							
Number each Year	1	4	4	15	13	114	21
Cumulative Number	1	5	9	24	37	151	172
Cumulative % of Total (N=385)	<1%	1%	2%	6%	10%	39%	45%
Assistant Professors Leaving the Institution:							
Number each Year	8	33	34	29	37	27	16
Cumulative Number	8	41	75	104	141	168	184
Cumulative % of Total (N=385)	2%	11%	19%	27%	37%	44%	48%

Note: Twenty-nine assistant professors either left the university (N=15), received tenure (N=5), or were still tenure track (N=9) beyond their seventh year of employment.

TABLE 4. Stepwise Logistic Regression for the Dependent Variable WITHIN6

Criteria for Assessing Model Fit: WITHIN6

Criterion	Intercept Only	Intercept & Covariates	Chi-Square for Covariates
-2 LOG L	488.6	480	8.6 with 2 DF (p=.013)

Analysis of Maximum Likelihood Estimates: WITHIN6

Variables	DF	Parameter Estimates	Standard Error	Pr > Chi-Square	Odds Ratio
Intercept	1	-0.1377	0.1269	0.27	0.871
AA_HISP*	1	-1.1334	0.6529	0.08	0.322
HPROFI*	1	-0.0146	0.0071	0.04	

MODEL: **Logit(p) = -.1377 - 1.1334(AA_HISP) - .0146(HPROFI)**

As an example, for an African-American or Hispanic Assistant Professor in the Health Professions who is hired when he or she is 30 years old, the probability of securing tenure is 15.3%.

Logit(p) = -.1377 - 1.1334(1) - .0146(30)

$p = e^{-1.709} / 1 + e^{-1.709}$

p = .181 / 1.181 = 15.3%

If not African-American and not in HPROF:

Logit(p) = -.1377 - 1.1334(0) - .0146(0)

$p = e^{-.1377} / 1 + e^{-.1377}$

p = .871 / 1.871 = 46.5%

Analysis of Variables Not in the WITHIN6 Model

Variable	Score Chi-Square	Pr> Chi-Square
HIREAGE	0.02	0.88
SEX	0.02	0.88
SCIEN	0.18	0.66
SS_HUM	0.04	0.84
HPROF	0.12	0.71
UMK	1.76	0.18
UMR	0.49	0.48
UMS	0.64	0.42
ASIAN	0.29	0.59
SEXI	0.01	0.98
SCIENI	0.24	0.62
SS_HUMI	0.1	0.75
UMKI	0.8	0.37
UMRI	0.31	0.58
UMSI	0.71	0.4
AA_HISPI	0.64	0.42
ASIANI	0.38	0.54

*p < .10

TABLE 5. Stepwise Logistic Regression for the Dependent Variable YEAR6

Criteria for Assessing Model Fit: YEAR6

Criterion	Intercept Only	Intercept & Covariates	Chi-Square for Covariates
-2 LOG L	127.5	115.1	12.4 with 2 DF (p=.002)

Analysis of Maximum Likelihood Estimates: YEAR6

Variables	DF	Parameter Estimates	Standard Error	Pr > Chi-Square	Odds Ratio
Intercept	1	1.9424	0.2783	0.01	6.975
UMR*	1	-1.252	0.5774	0.03	0.286
AA_HISPI*	1	-0.0688	0.0271	0.01	

MODEL: **Logit(p) =1.9424 - 1.252(UMR) - .0688(AA_HISPI)**

As an example, for an African-American Assistant Professor at UMR who is hired when he or she is 30 years old, the probability of securing tenure "once up for tenure" is 20.2%.

$\text{Logit}(p) = 1.9424 - 1.252(1) - .0688(30)$

$\text{Logit}(p) = -1.3695$

$p = e^{-1.3695} / 1 + e^{-1.3695}$

$p = .2542 / 1.2542 = 20.2\%$

If not African-American and not at UMR:

$\text{Logit}(p) = 1.9424 - 1.252(0) - .0688(0)$

$\text{Logit}(p) = 1.9424$

$p = e^{1.9424} / 1 + e^{1.9424}$

$p = 6.975 / 7.975 = 87.4\%$

Analysis of Variables Not in the YEAR6 Model

Variable	Score Chi-Square	Pr> Chi-Square
HIREAGE	0.03	0.86
SEX	3.18	0.07
SCIEN	1.34	0.24
SS_HUM	0.75	0.39
HPROF	3.38	0.07
UMK	2.1	0.15
UMS	1.83	0.18
AA_HISP	2.22	0.14
ASIAN	3.69	0.05
SEXI	3.18	0.07
SCIENI	0.57	0.45
HPROFI	2.8	0.09
SS_HUMI	0.55	0.46
UMKI	2.02	0.16
UMRI	0.14	0.71
UMSI	0.47	0.49
ASIANI	3.61	0.06

*p < .10

TABLE 6. Promotion and Attrition of Associate Professors Who Were Tenured from 1983-7

	Year					
	First	Second	Third	Fourth	Fifth	Sixth
Associate Professors Promoted to Professor:						
Number each Year	0	1	0	7	25	16
Cumulative Number	0	1	1	8	32	41
Cumulative % of Total (N=195)	<1%	<1%	<1%	4%	16%	21%
Associate Professors Leaving the Institution:						
Number each Year	0	7	4	4	4	2
Cumulative Number	0	7	11	15	19	21
Cumulative % of Total (N=195)	0%	4%	6%	8%	10%	11%