

UK Institutional Research Brief:

Three Key Trends in the Employment of UK Women Faculty: An Analysis of Hiring Patterns, Salary Equity, and Time-in-Rank

March 2011

The 2009-2014 Strategic Plan affirms UK's commitment to "recruiting and retaining a talented and committed cadre of faculty and staff." One of the Plan's strategies for achieving a first-rate workforce involves sustaining progress in the employment of women and minorities at all levels of the University. Another strategy calls for strengthening market competitive compensation and benefits to attract, retain and reward talented faculty and staff. This research brief describes the Office of Institutional Research's efforts to study faculty hiring patterns by gender. This evaluation also measures the extent to which women have achieved parity with men in the area of compensation. Finally, this summary examines promotion patterns from Assistant to Associate Professor and from Associate to Full Professor for women and men.

The analysis is based on a data set developed by Institutional Research staff for the purpose of investigating employment trends of UK faculty. Data were extracted from UK Human Resources static files for the years 1993-94 to 2010-11. The data set contains information on all active, full-time tenured or tenure eligible faculty members, including those who are on leave. The file is limited to faculty holding ranks of assistant, associate and full professors; librarians, lecturers and instructors were excluded from the data set.

Hiring Patterns of Tenured and Tenure Eligible Faculty

A total of 1,598 tenured or tenure eligible faculty worked at UK during the 1993-94 academic year. Table 1 shows the number of faculty members tenured or tenure eligible gradually increased and peaked in 1999-2000 at 1,680. This number gradually declined to 1,598 in 2005-2006 before rising to 1,698 in 2009-2010. There was a small decline of two faculty members, from 1698 to 1696, in 2010-11. The overall percentage increase from 1993-94 to 2010-11 was 6.1 percent. Female faculty increased by 49.0 percent, from 337 in 1993-94 to 502 in 2010-11. The number of male faculty declined by 5.3 percent, from 1261 in 1993-94 to 1194 in 2010-11.

Table 1: Faculty by rank and gender: AY 1994 - 2011

AY	<i>Women Faculty</i>				<i>Men Faculty</i>				Total
	Professor	Associate	Assistant	Sub-Total	Professor	Associate	Assistant	Sub-Total	
1994	58	114	165	337	542	422	297	1261	1598
1995	59	126	174	359	552	441	285	1278	1637
1996	65	140	176	381	551	444	284	1279	1660
1997	68	157	166	391	557	460	266	1283	1674
1998	65	171	160	396	561	456	242	1259	1655
1999	65	177	162	404	572	443	247	1262	1666
2000	71	187	166	424	565	441	250	1256	1680
2001	72	187	167	426	569	435	248	1252	1678
2002	69	196	141	406	571	413	231	1215	1621
2003	74	199	145	418	579	399	239	1217	1635
2004	78	206	135	419	582	388	240	1210	1629
2005	84	195	138	417	569	399	232	1200	1617
2006	90	204	123	417	549	392	240	1181	1598
2007	93	214	136	443	587	392	242	1221	1664
2008	105	214	155	474	571	382	249	1202	1676
2009	115	206	164	485	568	365	252	1185	1670
2010	127	198	172	497	584	367	250	1201	1698
2011	129	197	176	502	585	367	242	1194	1696

- The growth in the number of women faculty members coincided with a 72.8 percent rise in the number of female associate professors and a 122.4 percent jump in the number of full professors. The ranks of women associate professors grew from 114 in 1993-1994 to 197 in 2010-11. The number of women holding the rank of full professor increased from 58 in 1993-1994 to 129 in 2010-11 (see Figure 1).
- The decline in the number of men holding faculty positions reflects a 13.0 percent decrease in the number of associate professors and an 18.5 percent decline in the number of assistant professors. From 1993-94 to 2010-11, the number of associate professors fell from 422 in to 367 and the number of assistant professors dipped from 297 to 242 in (see Figure 2).

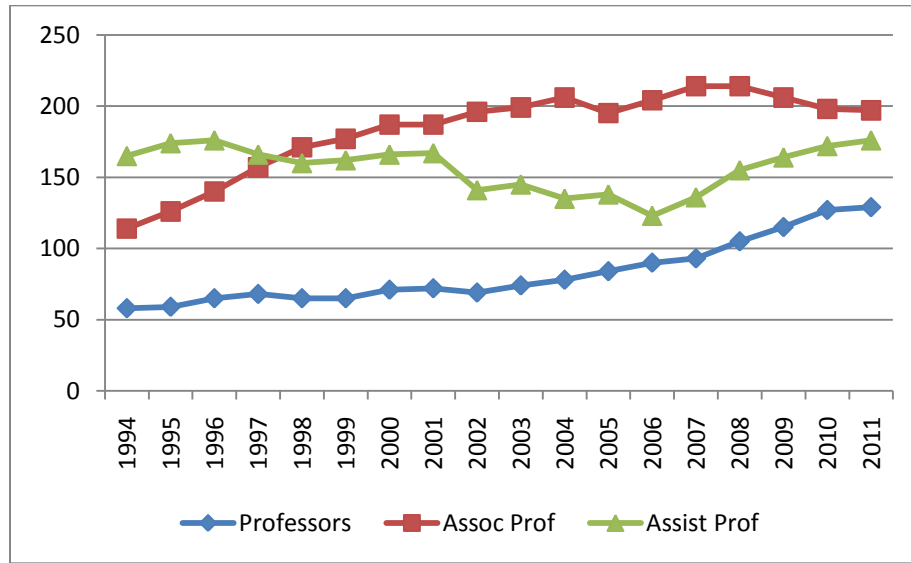


Figure 1 – Tenured and Tenure Eligible Women Faculty by Rank: AY 1994 to 2011

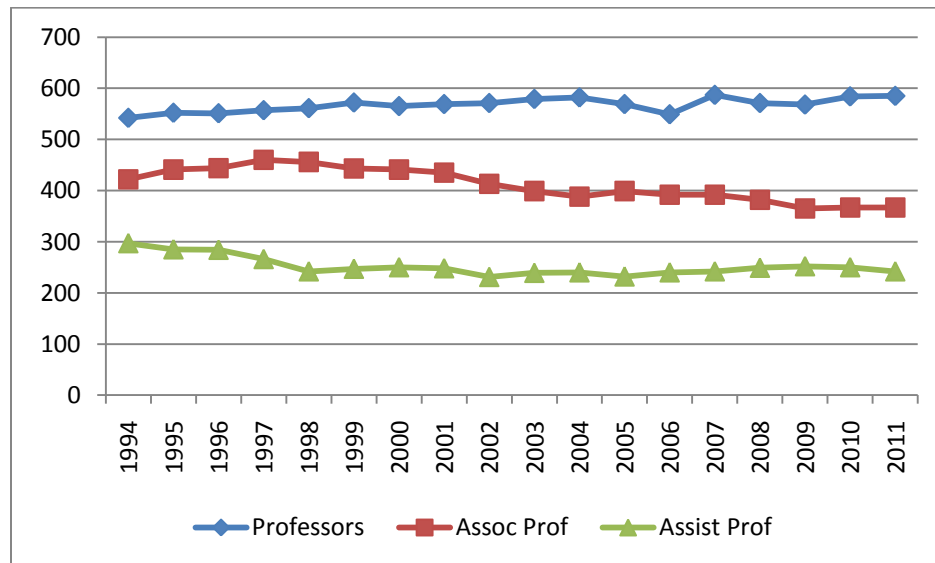


Figure 2 - Tenured and Tenure Eligible Men Faculty by Rank: AY 1994 to 2011

Salary Equity

Institutional Research staff separated faculty members working in the six Medical Center colleges from the other colleges prior to analyzing salaries by gender. This step was taken because faculty salaries tend to be higher, on average, and gender differences greater in the Medical Center colleges. The tables and graphs below focus on base salaries earned by faculty members. Salaries of faculty members employed on 11-month or 12-month contracts have been converted to 9-month rates. Salary differences between women and men were first adjusted for college, race, time-in-rank, and time at UK (time at UK only for associate and full professors) and then computed as a percent of the average salary for a given rank and academic year.

Colleges Apart from the Medical Center

Table 2 presents selected compensation statistics for men and women faculty during the 1994 and 2011 academic years, the first and last years of this study. (The complete set of salary statistics for the intervening years of the study soon will be posted on the IR website.) In 1994, men earned higher average base salaries than women at each rank. The adjusted differences in mean salaries as a percent of the overall mean were 4.9 percent for full professors, 1.0 percent for associate professors, and 4.8 percent for assistant professors. In 2011, men continued to earn higher salaries at the ranks of full and associate professors. However, the magnitude of these salary disparities diminished. The adjusted difference in mean salaries as a percent of the overall mean narrowed to 2.1 percent for full professors and 0.4 percent for associate professors. Interestingly, after adjusting for demographic characteristics and college, women assistant professors earned higher salaries than men, which resulted in an adjusted difference as a percent of the overall mean of -3.9 percent.

Table 2. Mean Base Salary (converted to 9 month rates) by Gender for the First and Last Study Years: The Ten Colleges Apart from the Medical Center

AY	Faculty Rank	Overall Mean	Women Faculty Mean	Men Faculty Mean	Unadjusted Diff Mean (Men-Women)	Difference as Prct of Overall Mean	Adjusted Diff Mean (Men-Women)	Adjusted difference as Prct of Overall Mean
1994	Assistant Professor	41303	39655	42211	2557	6.2%	1975	4.8%
	Associate Professor	46221	44276	46732	2456	5.3%	477	1.0%
	Full Professor	62695	58523	63089	4567	7.3%	3079	4.9%
2011	Assistant Professor	67532	64869	69587	4718	7.0%	-2633	-3.9%
	Associate Professor	74224	72431	75204	2773	3.7%	283	0.4%
	Full Professor	103215	97362	104316	6954	6.7%	2174	2.1%

For the 10 colleges residing outside of the Medical Center, the salary difference between male and female faculty at all three ranks was not very large and declined during the study period. Figure 3 presents the adjusted average salaries for women and men from 1994 to 2011, computed as a percent of the average salary for a given rank.

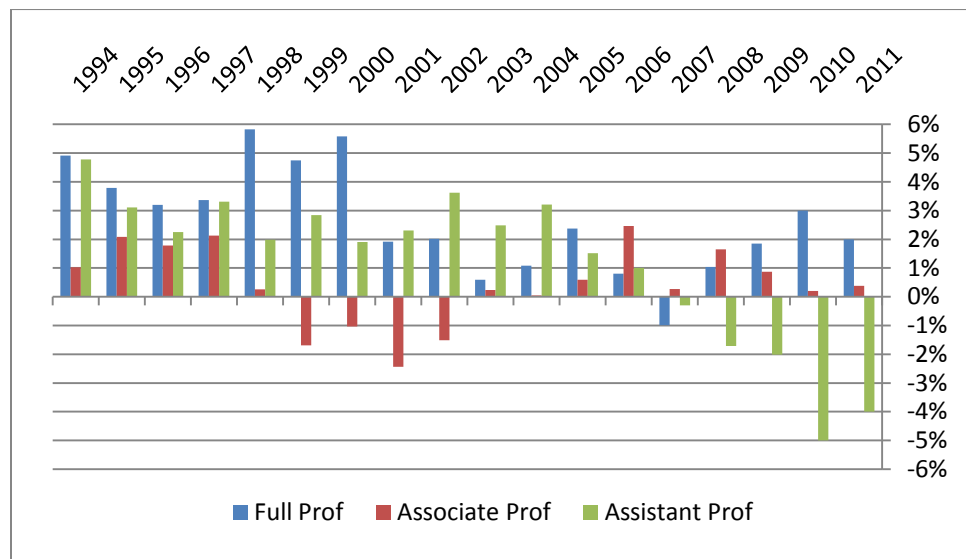


Figure 3 - Adjusted Percentage Difference between Men's and Women's Average Salaries in Colleges Apart from the Medical Center: AY 1994 to AY 2011

The difference between men's and women's salaries began to decline around 2000-2001, ending in the years 2006-07, 2007-08 and 2008-09 in the range of (-2%; 2%) for all three ranks. However, for the last two years, 2009-10 and 2010-11, the disparity in salaries increased somewhat for full professors (from 2% to 3% and then back to 2%), but decreased almost to zero for associate professors. Notably, the gender disparity in salaries dipped significantly into the negative range for assistant professors (from -2% to -5% for 2009-2010 and to -4% for 2010-2011), indicating that women assistant professors earn more than men after adjustments for college, race and time-in-rank.

Colleges in the Medical Center

Table 3 presents selected salary statistics by gender for the six colleges in the Medical Center. In 1994, the average base salaries at each rank were higher for men than women. The adjusted differences in mean salaries as a percent of the overall mean were 25.6 percent for full professors, 4.8 percent for associate professors, and 16.7 percent for assistant professors. In 2011, men continued to earn higher salaries at each ranks, but the size of these salary disparities was somewhat smaller for full and assistant professors. The adjusted difference in mean salaries as a percent of the overall mean narrowed to 18.4 percent for full professors and 12.1 percent for assistant professors. The salary disparity for associate professors widened to 7.5 percent of the overall mean.

**Table 3. Mean salary (converted 9 month base salary) by Gender for the first and last study years:
The Six Medical Center Colleges**

AY	Faculty Rank	Overall Mean	Women Faculty Mean	Men Faculty Mean	Unadjusted Diff Mean (Men-Women)	Difference as Prct of Overall Mean	Adjusted Diff Mean (Men-Women)	Adjusted difference as Prct of Overall Mean
1994	Assistant Professor	75704	60113	84490	24377	32.2%	12662	16.7%
	Associate Professor	80966	62785	86313	23528	29.1%	3866	4.8%
	Full Professor	108414	75431	112882	37452	34.5%	27751	25.6%
2011	Assistant Professor	88681	79107	95029	15922	18.0%	10700	12.1%
	Associate Professor	114666	100993	121648	20655	18.0%	8578	7.5%
	Full Professor	158729	134209	165734	31525	19.9%	29268	18.4%

Figure 4 presents women's and men's adjusted average salaries, computed as a percent of the average salary for a given rank and academic year. For the group of six colleges in the Medical Center, the salary difference between male and female faculty at all three ranks was fairly large, but declined during the study period, particularly for associate and assistant professors. The salary variance for the medical colleges is very high and is not reduced sufficiently by adjustment for college, race, time-in-rank and time at UK. Most of the gender differences in salaries are not statistically significant (all differences below 15% for assistant professors, below 17% for associate professors and below 30% for full professors were not statistically significant).

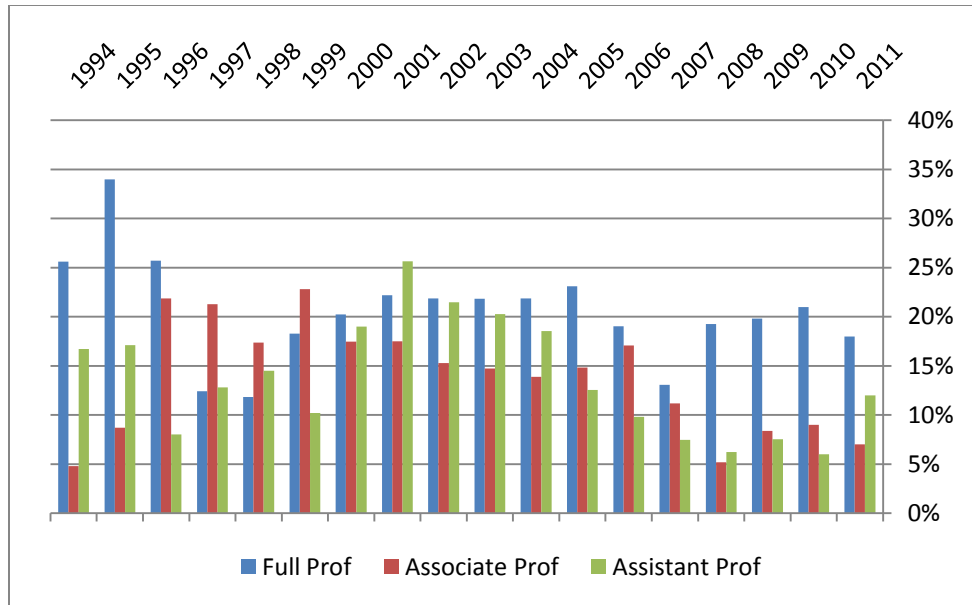


Figure 4 - Adjusted Percentage Difference between Men's and Women's Average Salaries in Medical Center Colleges: AY 1994 to 2011

Time-in-Rank Analysis

Survival analysis was used to compare time-in-rank for women and men faculty in each rank. This statistical technique is used to model time to event data when 'censoring' (i.e., incomplete information) is present¹. In the time-in-rank analysis, the event is defined as *promotion* for assistant and associate professors and as *leaving UK* for full professors. Censoring occurred because some faculty members left UK before being promoted and because all remaining observations were truncated at the end of the study period (2010-11 academic year). The survival function describes the probability of staying in the same rank and the failure function describes the probability of being promoted (for assistant and associate professors) and the probability of attrition (for full professors).

Assistant professors

On average, just under half of assistant professor cohorts were promoted to associate professor (women: 46%; men: 49%). The small difference is due to the fact that women are more likely than men to leave before the sixth year; on average, 44% of a female cohort and 38% of a male cohort left before their sixth year at UK. Of those who did not leave before their sixth year, on average 82% of women and 80% of men were promoted.

¹ The survival function at a specified point in time estimates the probability that the time of the event is later than that time point. The failure function is 1 minus the survival function; at a specified point in time, it estimates the probability that the event of interest occurred at or before that time point.

Promotion patterns were examined based on assistant professor cohorts starting at UK in 1993-94 to 2004-05. 2004-2005 was the last year with at least 6 years of cohort data available. The Test of Equality over Strata (genders) revealed no significant differences in promotion patterns between male and female assistant professors (Log-Rank = 2.675, $p = .10$). Figure 5 presents the cumulative probability of promotion after one to six years in rank by gender.

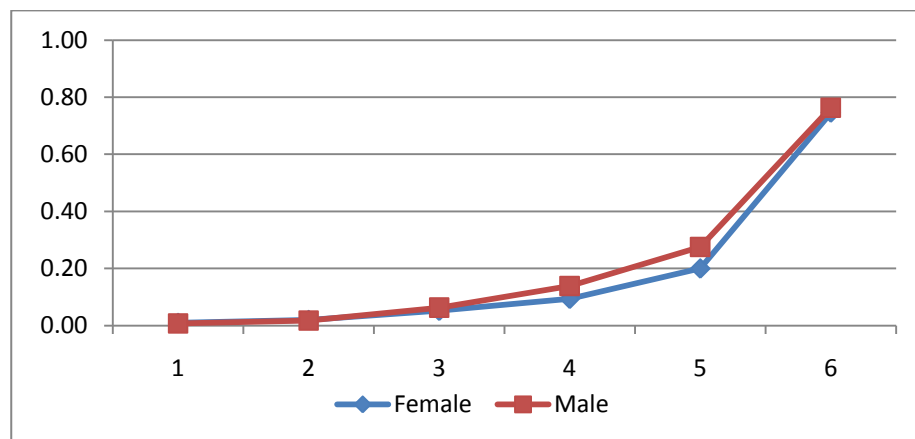


Figure 5 – Cumulative Probability of Promotion to Rank of Associate Professor after One to Six Years in Rank by Gender

Associate professors

Male associate professors were significantly more likely to be promoted earlier to the rank of full professor as shown by the Test of Equality over Strata (Log-Rank = 13.123, $p = .0003$). The difference stayed significant after controlling for college, race and whether the faculty member had been hired as an associate professor (Cox regression Chi-Square = 5.196, $p = 0.0226$).

Figure 6 presents the cumulative probability of promotion after one to 16 years in rank, by gender. The probabilities were estimated and the patterns were compared using survival analysis. The computations are based on the associate professor cohorts from 1993-1994 to 2004-2005.

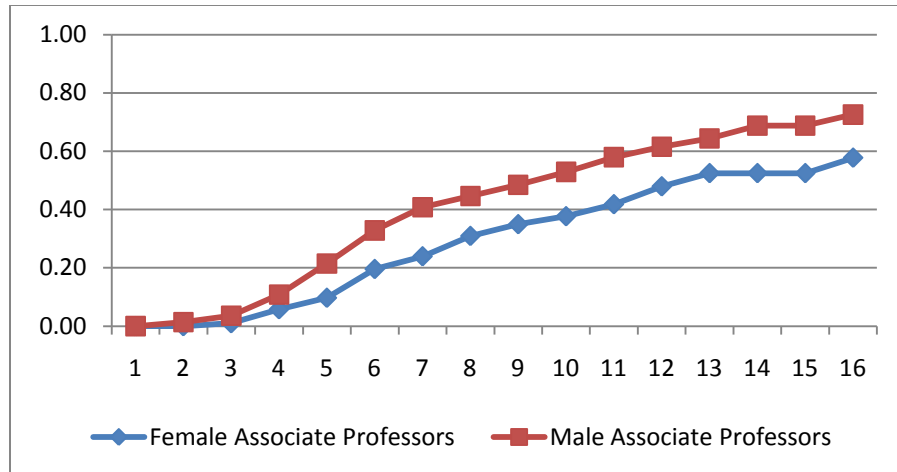


Figure 6 – Cumulative Probability of Promotion to Rank of Full Professor after One to Six Years in Rank by Gender

Full Professors

The Test of Equality over Strata (genders) detected significant differences in the attrition patterns of women and men holding the rank of full professor (Log-Rank = 5.339, $p = 0.0209$). Female professors were more likely to leave UK after fewer years in this rank. The difference stayed significant after controlling for college, race and whether the faculty member had been hired as a full professor (Cox regression Chi-Square = 4.641, $p = 0.0312$). Figure 7 graph presents the cumulative probability of attrition after 1 to 15 years in rank, by gender. The computations are based on the full professor cohorts from 1993-1994 to 2007-2008.

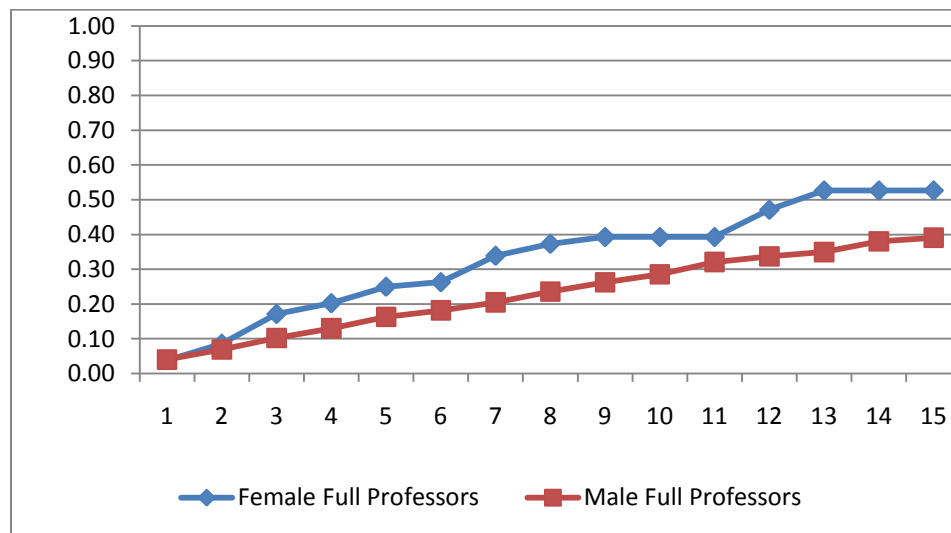


Figure 7 – Cumulative Probability of Attrition after One to 15 Years in Rank by Gender

Conclusions

UK has made significant progress since the early 1990's by employing more women in tenured and tenure eligible faculty positions. The number of women faculty members increased from 337 in 1993-94 to 502 in 2010-11, a 49.0 percent gain. The ranks of women associate professors grew by 72.8 percent and the number of full professors jumped 122.4 percent. During this time period, the number of male faculty declined by 5.3 percent, from 1261 in 1993-94 to 1194 in 2010-11.

Our study has shown that the University also has made strides in reducing salary inequities between men and women in many of our colleges. IR staff examined salary differences between women and men over time by first adjusting for each faculty member's college, race, time-in-rank, and time at UK. Salary differences between men and women working in one of the 10 colleges outside of the Medical Center started to shrink around 2000-2001. Currently, adjusted salaries for women and men at the rank of associate professor are essentially equal. After controlling for other variables, we found women assistant professors now earn more than men. However, women who hold the rank of full professor in one of the colleges outside of the Medical Center still earn, on average, \$2,200 less than men at the same rank, after adjusting for other factors.

Adjusted salary differences between male and female faculty employed in one of the six colleges in the Medical Center continue to be quite large at each rank and may require closer attention. It is possible adjusted salary differences may still be great in these colleges because we were not able to control for certain variables, such as gender-related preferences for certain professional disciplines (e.g., surgery, pediatrics). The results of the faculty Work-Life Survey administered by the Office of Institutional Research and Human Resources in October 2010, found women and men differ significantly in their perceptions about compensation. In the Medical Center colleges, women holding the rank of associate professor were less likely than their male counterparts to feel fairly compensated in relation to their "colleagues at UK" (Chi-Square = 11.539, $p = .021$) or their colleagues "in my field" (Chi-Square 9.585, $p = .048$).

In studying faculty promotion patterns, IR staff found about half of male and female assistant professor cohorts were promoted to associate professor. No significant differences were detected in promotion patterns between male and female assistant professors. However, men at the rank of associate professor were more likely than women to be promoted earlier to full professor. Women holding the rank of full professor were more likely than men to leave UK after fewer years at this rank.

The results of two items on the 2010 Work-Life Survey have a bearing on promotion patterns and retirement plans of women and men. Faculty members were asked the extent to which they agreed that their departments valued their research, teaching, and service. Women holding the rank of full professor were less likely than men to agree that the department valued their contributions in each of the three mission areas:

- 58.2 percent of women *agreed or strongly agreed* that their department valued their **research**, compared to 75.2 percent for men (Chi-Square = 18.502, $p = .001$).

- 56.4 percent of women *agreed or strongly agreed* the department valued their **teaching**, compared to 73.9 percent of men (Chi-Square = 15.947, $p = .003$).
- 53.0 percent of women *agreed or strongly agreed* the department valued their **service**, compared to 76.4 percent of men (Chi-Square = 24.916, $p < .0001$).

Another question on the Work-Life Survey asked faculty whether they planned to continue to work at the University of Kentucky until retirement. The overall analysis revealed differences in the retirement plans of men and women (Chi-square = 15.220, $p = 0.004$). No differences were detected for male and female assistant professors. However, only 56.7 percent of women holding the rank of associate professor answered *Probably Yes* or *Definitely Yes*, compared to 66.6% of the men at this rank (Chi-Square=10.005, $p = 0.040$). The difference was highly significant for full professors (Chi-Square = 14.918, $p = 0.005$) with 63.9% of women and 81.8% of men answering *Probably Yes* or *Definitely Yes*.

Thus, the retirement plans of women promoted to full professor mirror, to some extent, the behavior modeled in the survival analysis where women are more likely than men to leave UK after fewer years in this rank. It is not possible to infer from our research whether a meaningful connection exists between women's feelings of being valued and their retirement intentions and behavior. Future research might explore the complex relationships involving salary disparities, perceptions of being appreciated for one's professional contributions, and career-related plans.