Overview

A joint Administration-Academic Senate Committee redesigned our annual campus pay equity study of ladder rank faculty salaries. The committee included:

- Diane O'Dowd (Chair), Vice Provost, Academic Personnel
- Ryan Cherland, Assistant Vice Chancellor, Institutional Research & Decision Support
- Jean Chin, Data Management and Compensation Analyst, Academic Personnel
- Teresa Dalton, Lecturer SOE, Criminology, Law and Society
- Michael Dessen, Chair and Professor, Music
- William Parker, 2016-17 Senate Chair, Professor Emeritus, Physics
- Jone Pearce, Dean's Professor of Organization and Management, Paul Merage School of Business
- Gina Roque, Director, Data Management and Analysis, Institutional Research
- Jean Daniel Saphores, Professor, Civil and Environmental Engineering
- Joan Tenma, Assistant Vice Chancellor, Academic Personnel
- Jessica Utts, Professor, Statistics
- Yaming Yu, Professor, Statistics

The analyses presented in this report focus on regression models that go beyond the annual residual analysis conducted in the past (1997-2014) and include evaluation of rate of progression through the ranks. Data were examined at the whole campus level, and for 14 Schools/Units. SOM faculty continue to be excluded from this study due to the differences in compensation associated with participation in the COMP plan.

Analysis of salary data from July 1, 2015 (after all salary adjustments had been applied) indicate no evidence of systemic disparity in pay associated with gender and/or ethnicity at the campus level when experience, discipline, and rank are included in the model. However, there is further work to do to understand the issues around the 1) low percentage of women and minority faculty at the higher ranks and steps across campus, and 2) differences in the rate of progression through the ranks and salary disparities by gender/ethnicity in some units.

Methodology

Multiple linear regression model: A series of regressions were used to examine potential correlations between gender/ethnicity variables and salary. This approach provides a broad view of faculty employment and pay structure by the demographic variables and by experience, discipline, and rank.

- Demographic factors enter the equation as indicator variables for Women, Asian, and Underrepresented Minorities (URM).
- Experience variables include Years Since Degree, Years of Service, and Decade of Hire. Years Since Degree is the number of years passed from the year the highest degree was earned to the present. Years of Service is the number of years passed since the individual became a Ladder Rank faculty member. Decade of Hire consists of four binary categorical variables to account for the decade the individual became senate faculty: 2007 to 2016, 1997 to 2006, 1987 to 1996, or prior to 1996.

- Discipline is accounted for by adding an indicator variable for each school. The discipline variable accounts for internal demand and a market ratio derived using AAUDE salary data for UCI's peer institutions is used to account for external demand by field.
- Rank includes Current Rank and Step, Initial Rank and Step at time of hire, and Progress Rate as predictor variables.

<u>Progress Rate</u> measures number of years the faculty member is ahead or behind normal progression through the ranks. Normative time to achieve each rank is determined by computing the number of years it would take to move from the initial rank to the current rank and step, if the individual is progressing at the university's established normal rate. If an individual was promoted to their specific rank/step in the normative time, then rate of progression is 0. If they took longer than normative time, rate of progression is expressed as a negative number (years). If they took less than normative time then rate of progression is expressed as a positive number (years). Appendix shows normative time table and sample calculations.

In order to evaluate whether biases exist within progression through the ranks, several box and scatter plots by gender, ethnicity, rank, and school were generated to visualize and investigate the data. Progression rate differences by demographic groups were also tested with t-tests, ANOVA, and Bonferroni statistical methods. Lastly, a series of regression models were run to quantify progression rate differences that may exist by gender or ethnicity.

There is a possibility that one or more of the explanatory factors in the salary regression models are correlated; we therefore evaluated the effect of multicollinearity in our models. For the whole campus data there was little evidence of collinearity and therefore all variables were included in the regression equations. However, in a small number of Schools/units there was evidence of collinearity and in those cases data is presented with and without removal of one or more of the variables from the regression analysis.

Results for Salary Data (July 1, 2015)

Campus level
1. <u>Salary data for all ladder rank faculty</u> plotted as a function of rank/step/gender and rank/step/ethnicity are illustrated in Graphs 1 and 2.

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UCI Ladder Rank Faculty Salary
Draft Equity study, 2015

Graph 1: Salary by Rank/Step and Gender - General Campus
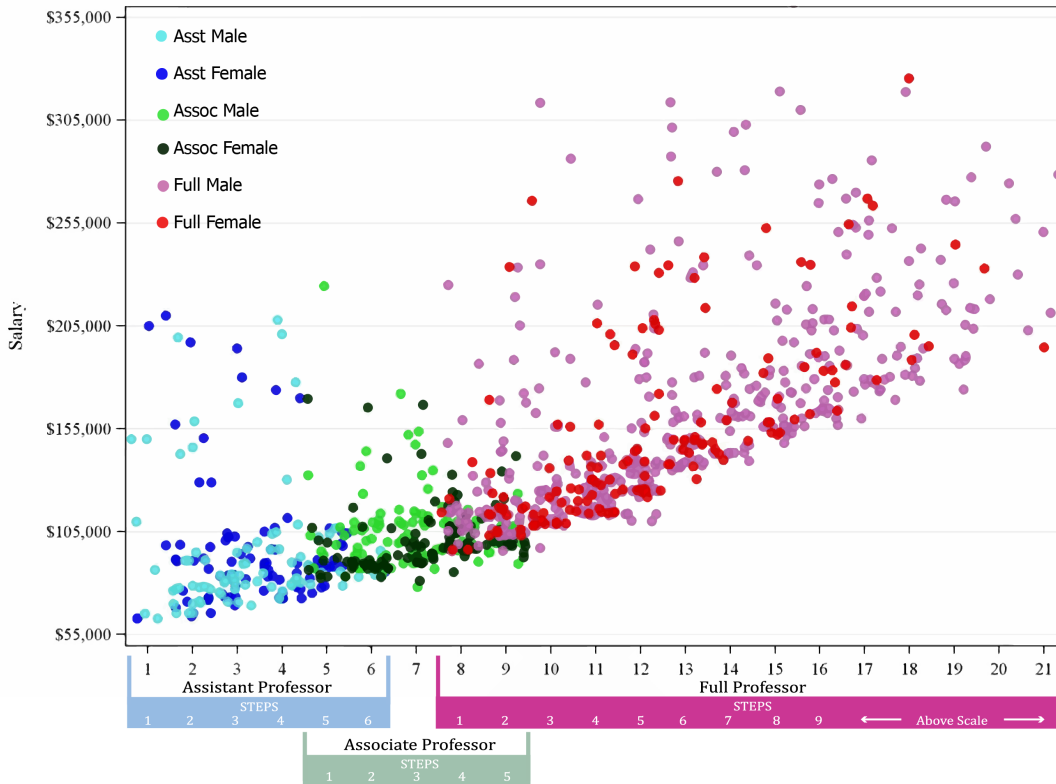
Graph 2: Salary by Rank/Step and Ethnicity- General Campus

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UCI Ladder Rank Faculty Salary
Draft Equity study, 2015
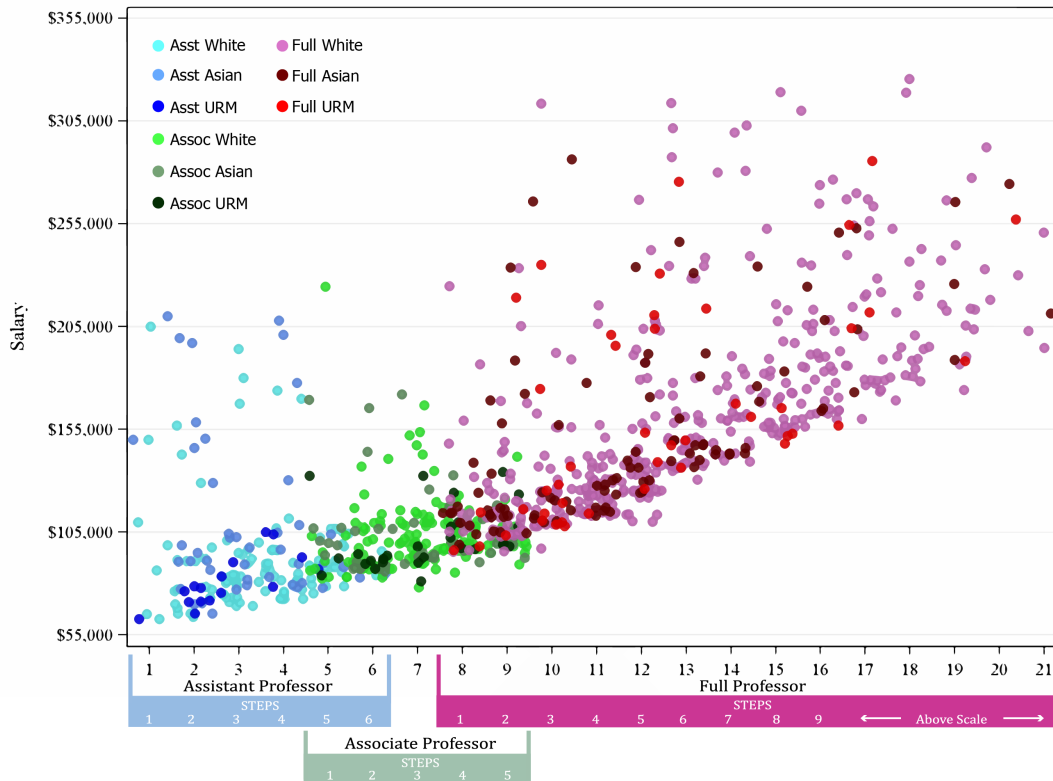
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2. <u>Multiple linear regression analysis</u>: When these data are evaluated with the simplest model that includes only demographic variables the result indicate that women earn salaries that are 19% lower, compared to their colleagues who are white and male, but only 5% of the salary variation is explained by the model (Table 1). As additional explanatory variables are added to the model, salary differences diminish to less than 2% between women, Asian, and URMs when compared to white men; and the percentage of salary variation explained by the model increases to 91% (Table 1). This indicates that at the campus level, there is little evidence of salary inequity associated with gender and/or ethnicity.

Table 1.

Variables Included in Sub-models	Percentage of salary variation explained by the model	Salary Difference		
		Women vs White Men	Asian vs White Men	URM vs White Men
1 Demography	4%	-19.5%	-4.0%	-5.5%
2 Demography, Experience	43%	-10.6%	5.0%	0.0%
3 Demography, Experience, Discipline	74%	-4.7%	-1.4%	1.0%
4 Demography, Experience, Discipline, Rank	91%	-0.7%	0.3%	1.7%

3. <u>Rank/Step Distribution Analysis</u>: When controlling for rank and step, regression analyses show salaries are similar by demographic variables at the time of hire as well. The distribution of faculty among ranks is displayed in Table 2. The table, along with graphs of the data, reveals women and minorities predominately begin the lower ranks while the ranks in which white men begin is more evenly dispersed. The current rank for white men is also normally distributed while the distribution for others are skewed to the right.

UCI Ladder Rank Faculty Salary
Draft Equity study, 2015

Table 2.

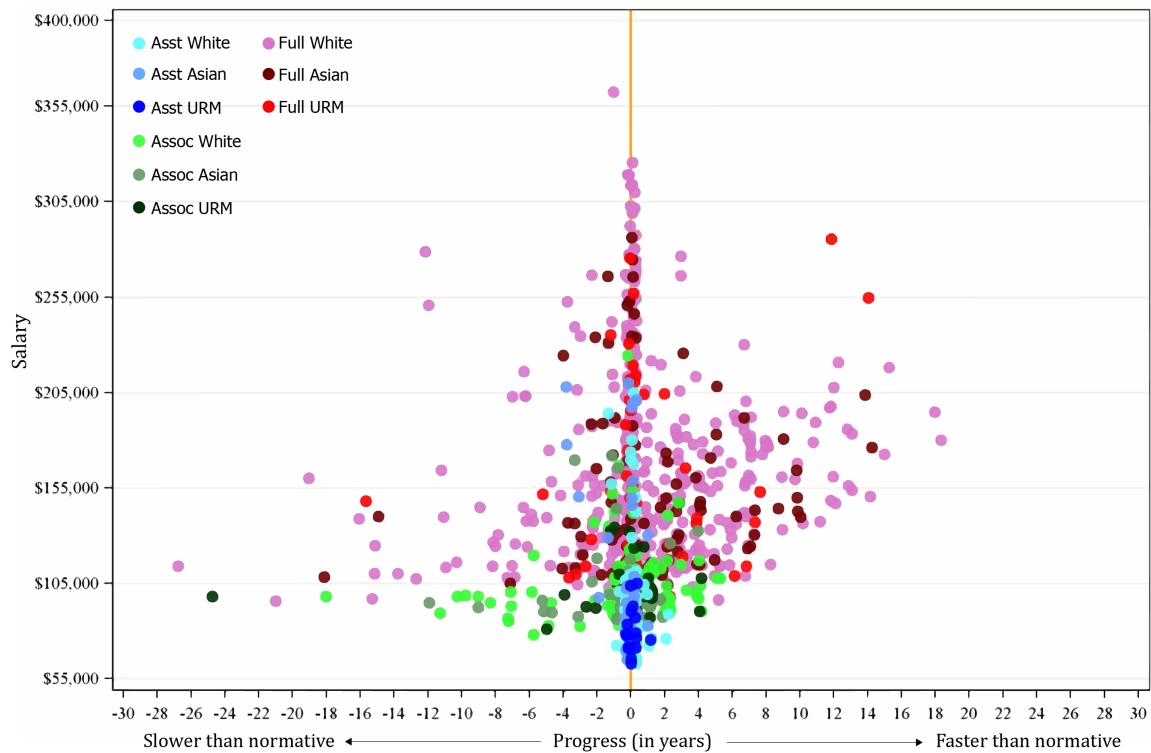| All Faculty		Current Salary				CPI Initial Salary			
		N	%	Mean	StdErr	N	%	Mean	StdErr
I. Asst Prof, All Steps	White/Unk Men	62	6.3%	$95,784	$3,887	308	31.1%	$77,858	$1,099
	Women	49	5.0%	$86,482	$2,930	167	16.9%	$74,083	$1,201
	Asian	44	4.4%	$110,789	$6,295	147	14.9%	$86,153	$2,361
	URM	16	1.6%	$80,706	$3,102	62	6.3%	$74,217	$1,403
II. Assoc Prof, All Steps	White/Unk Men	83	8.4%	$105,186	$2,104	56	5.7%	$94,059	$2,235
	Women	73	7.4%	$100,465	$1,751	35	3.5%	$93,757	$3,047
	Asian	49	5.0%	$104,602	$2,908	21	2.1%	$104,166	$7,021
	URM	27	2.7%	$101,511	$2,923	9	0.9%	$91,668	$5,056
III. Full Prof, Steps 1-5	White/Unk Men	152	15.4%	$131,742	$2,621	55	5.6%	$151,488	$7,128
	Women	67	6.8%	$131,913	$3,296	25	2.5%	$130,925	$5,757
	Asian	63	6.4%	$135,727	$4,874	16	1.6%	$134,450	$9,013
	URM	26	2.6%	$145,873	$8,966	12	1.2%	$176,891	$8,470
IV. Full Prof, Steps 6-9	White/Unk Men	117	11.8%	$182,473	$4,361	39	3.9%	$203,938	$8,373
	Women	37	3.7%	$172,657	$5,394	9	0.9%	$197,360	$17,058
	Asian	29	2.9%	$170,652	$6,629	7	0.7%	$182,934	$17,572
	URM	12	1.2%	$168,833	$11,175	3	0.3%	$192,871	$42,699
V. Full Prof, Above Scale	White/Unk Men	57	5.8%	$215,323	$4,780	13	1.3%	$213,383	$11,863
	Women	12	1.2%	$224,333	$12,702	2	0.2%	$230,342	$26,050
	Asian	8	0.8%	$224,438	$13,033	2	0.2%	$258,699	$5,827
	URM	6	0.6%	$233,583	$15,340	1	0.1%	$237,243	.

4. Progress Rate Graphs: By Gender and Ethnicity

Graph 3: Salary by Progress and Gender - General Campus

Legend:
- Asst Male
- Asst Female
- Assoc Male
- Assoc Female
- Full Male
- Full Female

Slower than normative ← Progress (in years) → Faster than normative
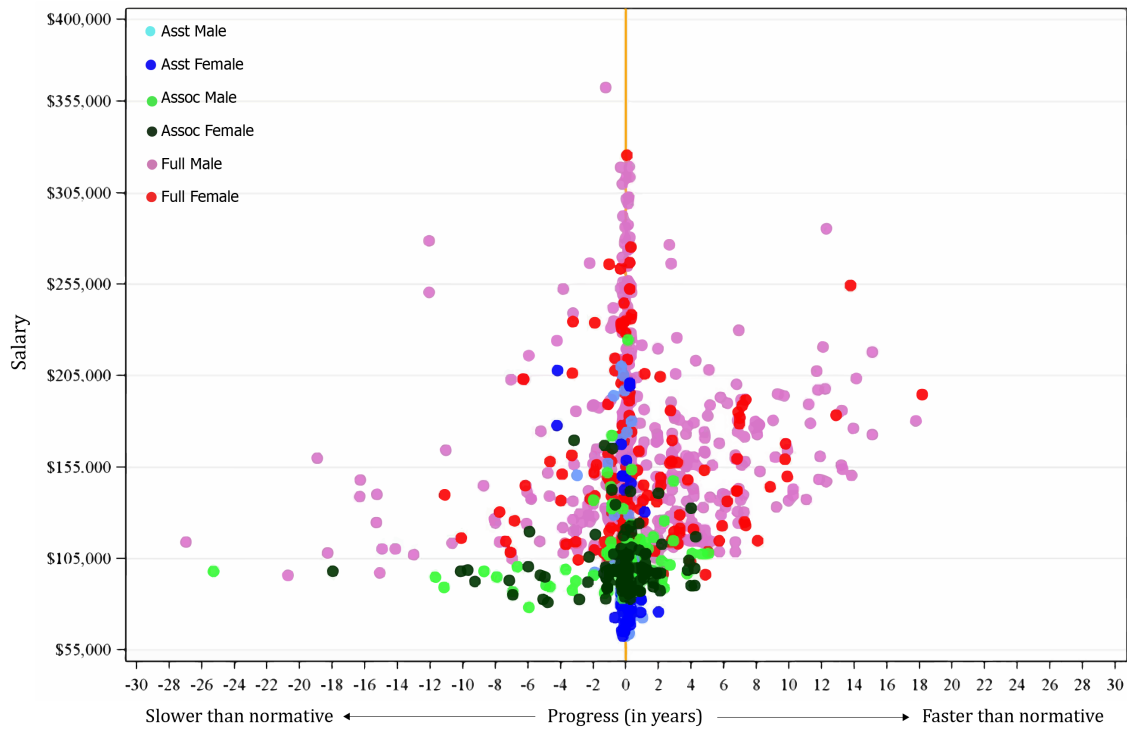
Graph 4: Salary by Progress and Ethnicity - General Campus

Legend:
- Asst White
- Asst Asian
- Asst URM
- Assoc White
- Assoc Asian
- Assoc URM
- Full White
- Full Asian
- Full URM

Slower than normative ← Progress (in years) → Faster than normative

5. <u>Progress Rate Analysis</u>: The results indicate there isn't a statistically significant difference in progression rate means by either gender or ethnicity when compared to white male faculty, indicating there is no evidence of systemic biases against promotion at the campus level.

Progress Rate (in years) comparison

	n	Mean	t	df	p
White Male	558	0.51			
Women vs White Male	395	0.21	1.10	951	0.2711
URM vs White Male	94	0.17	0.65	650	0.5135
Asian vs White Male	235	0.38	0.37	791	0.7083

School Level

Analyses at the school level yield a range of results. When controlling for experience, department within the school, and rank, salary differences are, for the most part, similar to that of the campus as a whole, but there are exceptions. Some units show statistically significant lower salaries for women and minority groups while the opposite holds true in other units. Known limitations to the current analysis are that data on "Stop the Clock" was not readily available nor was there enough data to consistently address the impact of outside offers.

Summary

We found no evidence for systemic inequity in salary associated with gender and/or ethnicity among faculty at the campus level. However this study does highlight several areas for further evaluation including   understanding factors contributing to low representation of women and minority faculty in the higher ranks and steps. Progression rates through the ranks should also be further examined. Although, overall progression rates are similar for all faculty, there were outliers and evidence to suggest that groups of faculty in specific academic units may benefit from intervention to help them progress through the ranks and steps

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Appendix

PROGRESSION THROUGH THE RANKS
Normal time (in years) it takes to achieve rank/step

ENDING RANK/STEP

STARTING RANK/STEP	Asst2	Asst3	Asst4	Asst5	Asst6	Assoc1	Assoc2	Assoc3	Assoc4	Assoc5	Prof1	Prof2	Prof3	Prof4	Prof5	Prof6	Prof7	Prof8	Prof9	ProfAS
Asst1	2	4	--	--	--	6	8	10	--	--	12	15	18	21	24	27	30	33	36	40
Asst2	--	2	4	--	--	6	8	10	--	--	12	15	18	21	24	27	30	33	36	40
Asst3	--	--	2	4	--	--	6	8	10	--	--	13	16	19	22	25	28	31	34	38
Asst4	--	--	--	2	4	--	--	6	8	11	--	--	14	17	20	23	26	29	32	36
Asst5 *	--	--	--	--	--	--	2	4	6	--	--	9	12	15	18	21	24	27	30	33
Asst6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Assoc1	--	--	--	--	--	--	2	4	--	--	6	9	12	15	18	21	24	27	30	34
Assoc2	--	--	--	--	--	--	--	2	4	--	--	7	10	13	16	19	22	25	28	32
Assoc3	--	--	--	--	--	--	--	--	2	5	--	--	8	11	14	17	20	23	26	30
Assoc4	--	--	--	--	--	--	--	--	--	3	--	--	6	9	12	15	18	21	24	28
Assoc5	--	--	--	--	--	--	--	--	--	--	--	--	3	6	9	12	15	18	21	25
Prof1	--	--	--	--	--	--	--	--	--	--	--	3	6	9	12	15	18	21	24	28
Prof2	--	--	--	--	--	--	--	--	--	--	--	--	3	6	9	12	15	18	21	25
Prof3	--	--	--	--	--	--	--	--	--	--	--	--	--	3	6	9	12	15	18	22
Prof4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	6	9	12	15	19
Prof5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	6	9	12	16
Prof6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	6	9	13
Prof7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	6	10
Prof8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	7
Prof9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
ProfAS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

EXAMPLES:

Professor A: Normal Progression
Initial Rank/Step: Assistant Professor III
Current Rank/Step: Professor VI
Years of Service: 25 years
Expected time to get from Asst III to Prof VI: 25 years
Progress Rate: 0 (Normal Progression)

Professor B: Accelerated Progression
Initial Rank/Step: Assistant Professor II
Current Rank/Step: Professor VIII
Years of Service: 26 years
Expected time to get from Asst II to Prof VIII: 33 years
Progress Rate: +7 (Accelerated Progression)

Professor C: Slower Progression
Initial Rank/Step: Assistant Professor I
Current Rank/Step: Associate Professor IV
Years of Service: 20 years
Expected time to get from Asst I to Assoc IV: 12 years*
Progress Rate: -5 (Accelerated Progression)

For Professor C, why is the progress rate not -8?
Because we have to correct for the 3 years that Prof C would have normally gotten to progress to the next step (it should not count against Prof C). Otherwise everyone who is between reviews and progressing normally will look like they are progressing slowly.

* It is not normative for someone who started at Asst I to end up as an Assoc IV. One would expect that this individual would have moved to Full Professor by now, which is why the matrix does not have a year attributed to that cross section. We obtained the expected time from Asst I to Assoc IV by adding 2 years (normal review cycle for Assoc III to Assoc IV) to the expected time from Asst I to Assoc III (10 years).