

Overview

A joint Administration-Academic Senate Committee redesigned our annual campus pay equity study of ladder rank faculty salaries. The analysis includes an examination of equity by gender and ethnicity for the campus overall and by academic school that go beyond the annual residual analysis conducted in the past (1997-2014). Analysis of salary data from October 2018 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.

Methodology

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

- Demographic factors entered 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: 2009 to 2018, 1999 to 2008, 1989 to 1998, or prior to 1988.
- 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.

Progress Rate 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). The appendix shows normative time table and sample calculations.

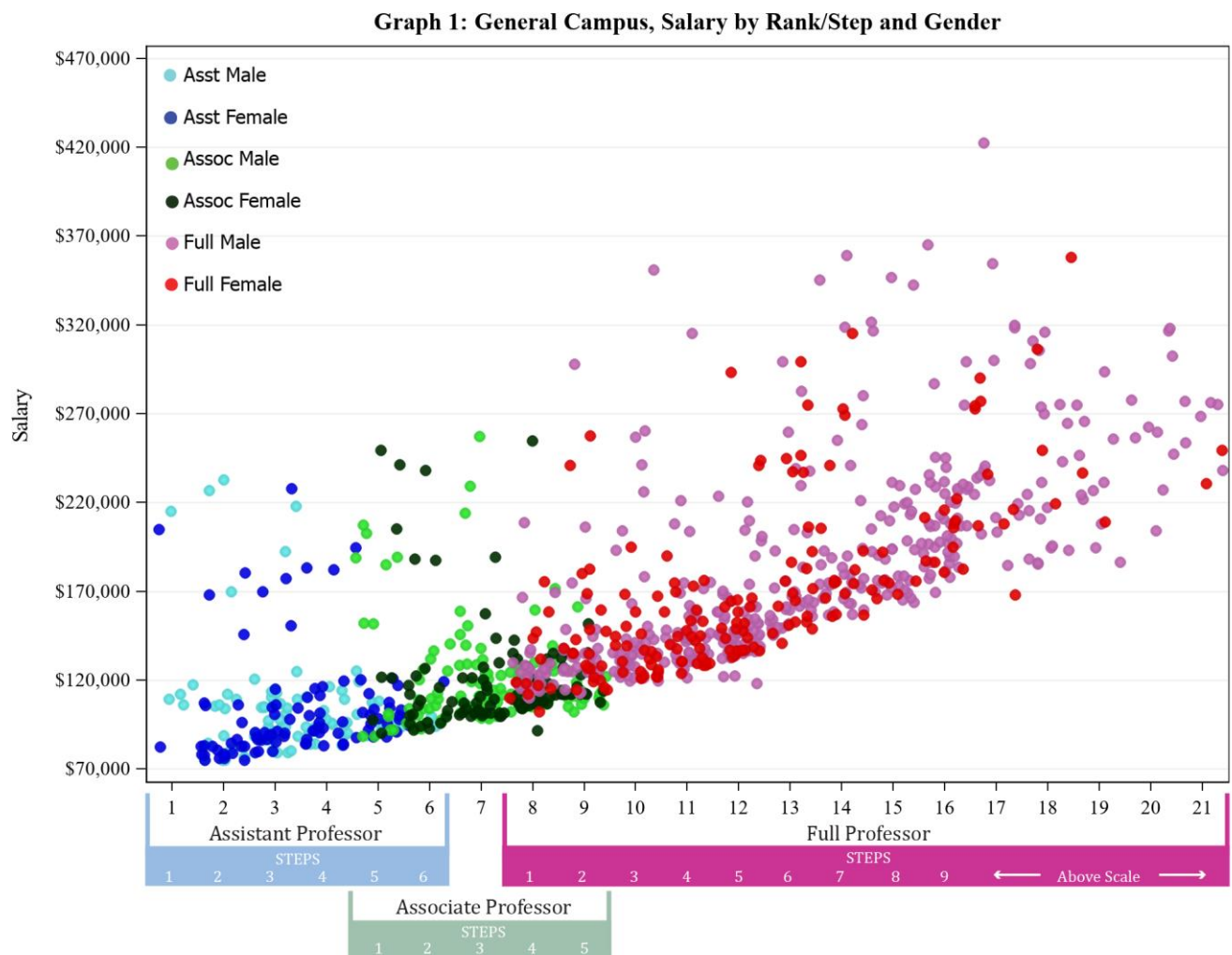
In order to evaluate whether biases exist within progression through the ranks, several box and scatter plots by gender, ethnicity, rank, and school were generated to visualize and investigate the data. Progression rate differences by demographic groups were also tested with t-tests. Finally, a series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

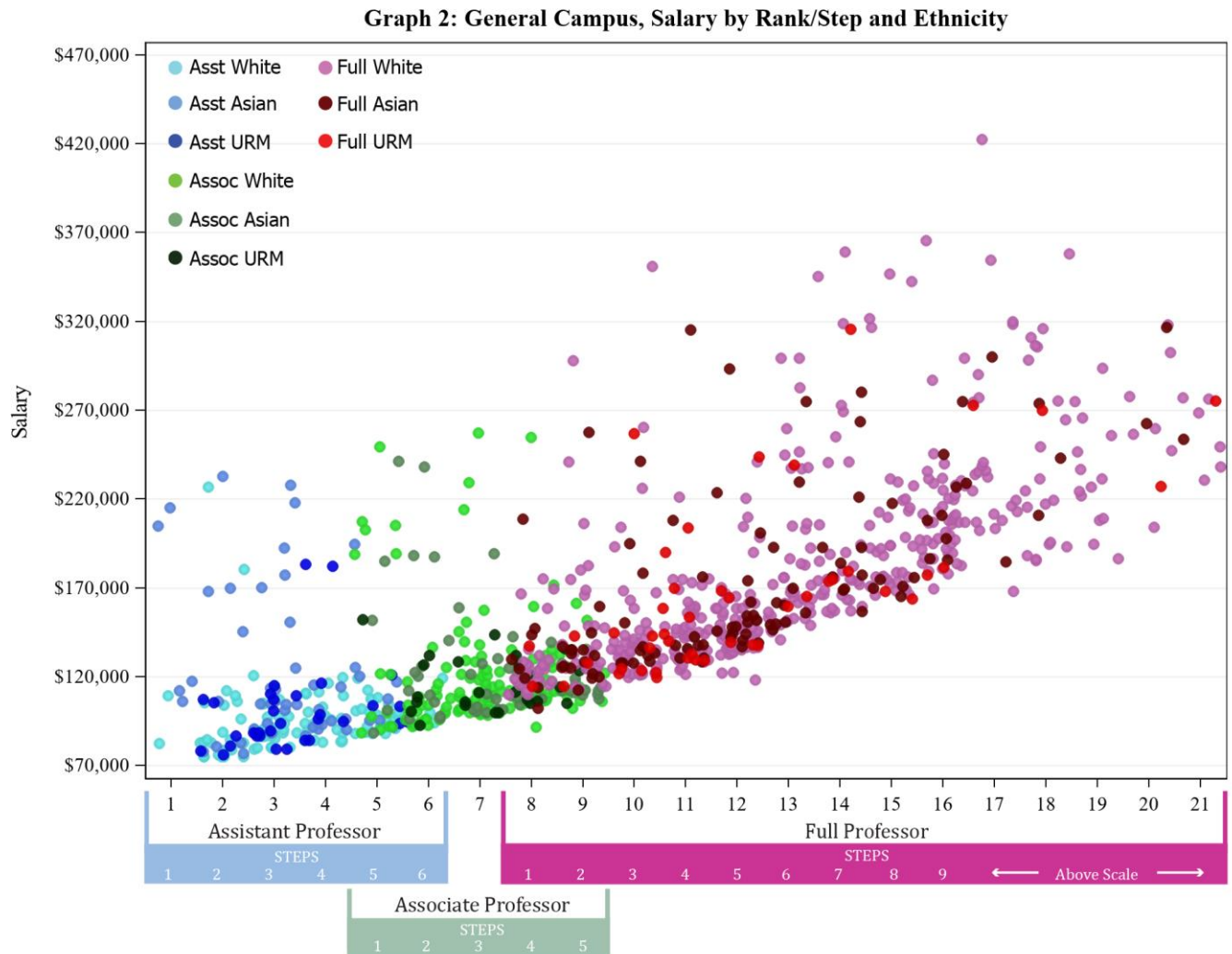
There is a possibility that one or more of the explanatory factors in the salary regression models are correlated; we therefore evaluated the effect of multicollinearity in our models. There was evidence of multicollinearity, therefore, data are presented with and without removal of variables with variance inflation factors (VIF) ≥ 10 . In the interest of consistency over time, except in rare circumstances of high levels of collinearity (VIF > 20), variables retained in the final model corrected for collinearity are the same as the previous year.

Results for Salary Data (October 2018)

Campus level

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





2. Multiple linear regression analysis: When these data are evaluated with the simplest model that includes only demographic variables the result indicate that, compared to their colleagues who are male, women earn salaries that are 11.5% lower, Asian faculty 2.8% lower, and URM faculty 11% lower. However, only 4% 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 1% between women, Asian, and URMs when compared to white men; and the percentage of salary variation explained by the model increases to 91%. This indicates that at the campus level, there is little evidence of salary inequity associated with gender and/or ethnicity.

Table 1-GC

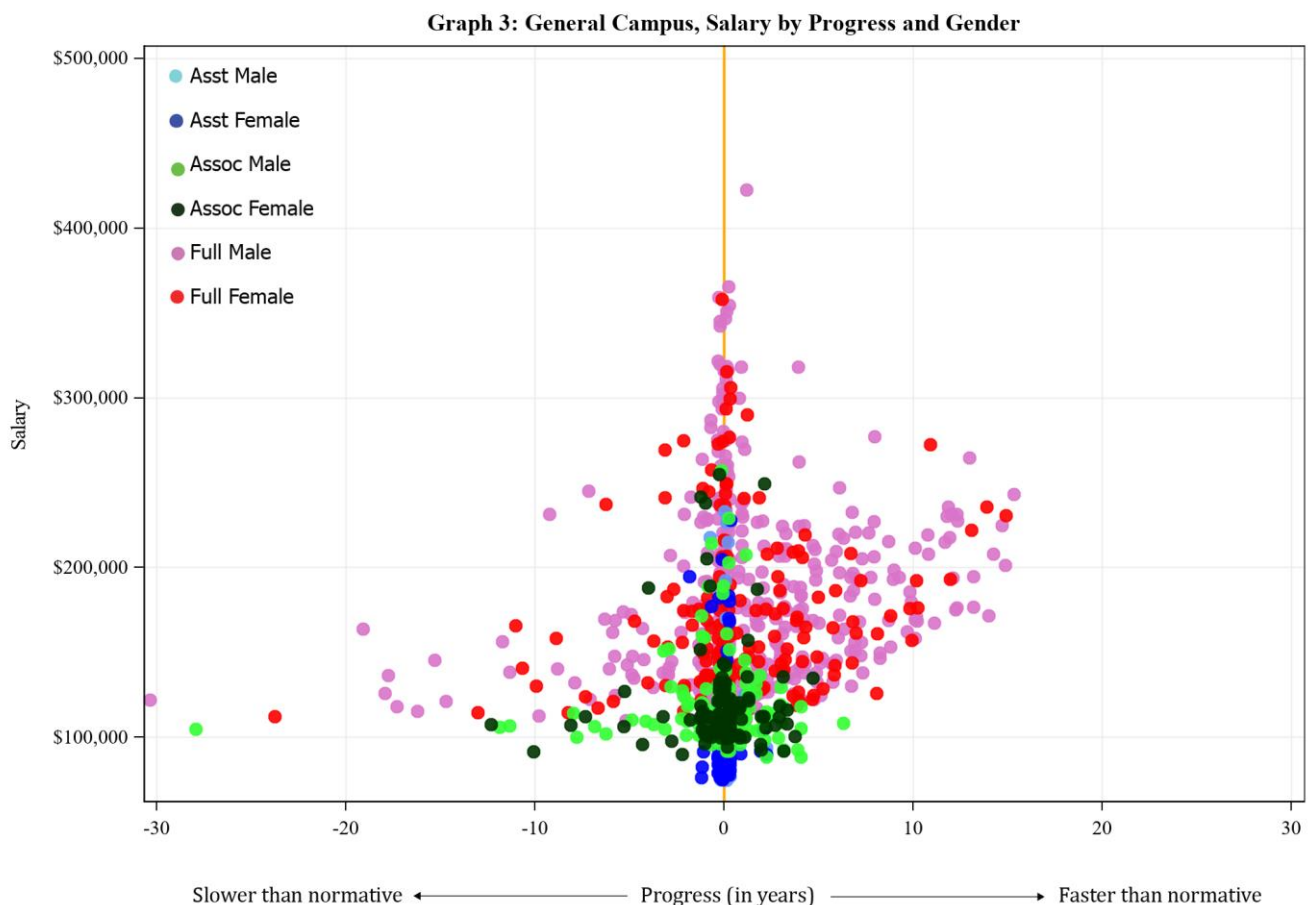
Submodel ¹	R-sq	Significant Variables	Salary Difference		
			Women vs Men	Asian vs White	URM vs White
1 Demography	0.04	Women***, URM**	-11.5%	-2.8%	-11.4%
2 Demography, Experience	0.41	Women***, Experience***	-6.0%	3.7%	-4.4%
3 Demog, Exper, Field	0.73	Women*, Experience***, Field***	-3.1%	-2.5%	-2.1%
4 Demog, Exper, Field, Rank	0.91	Experience***, Field***, Rank***	-0.2%	0.7%	0.6%
5 Demog, Exper, Field, Rank ²	0.91	Field***, Rank***	-0.2%	0.6%	0.5%

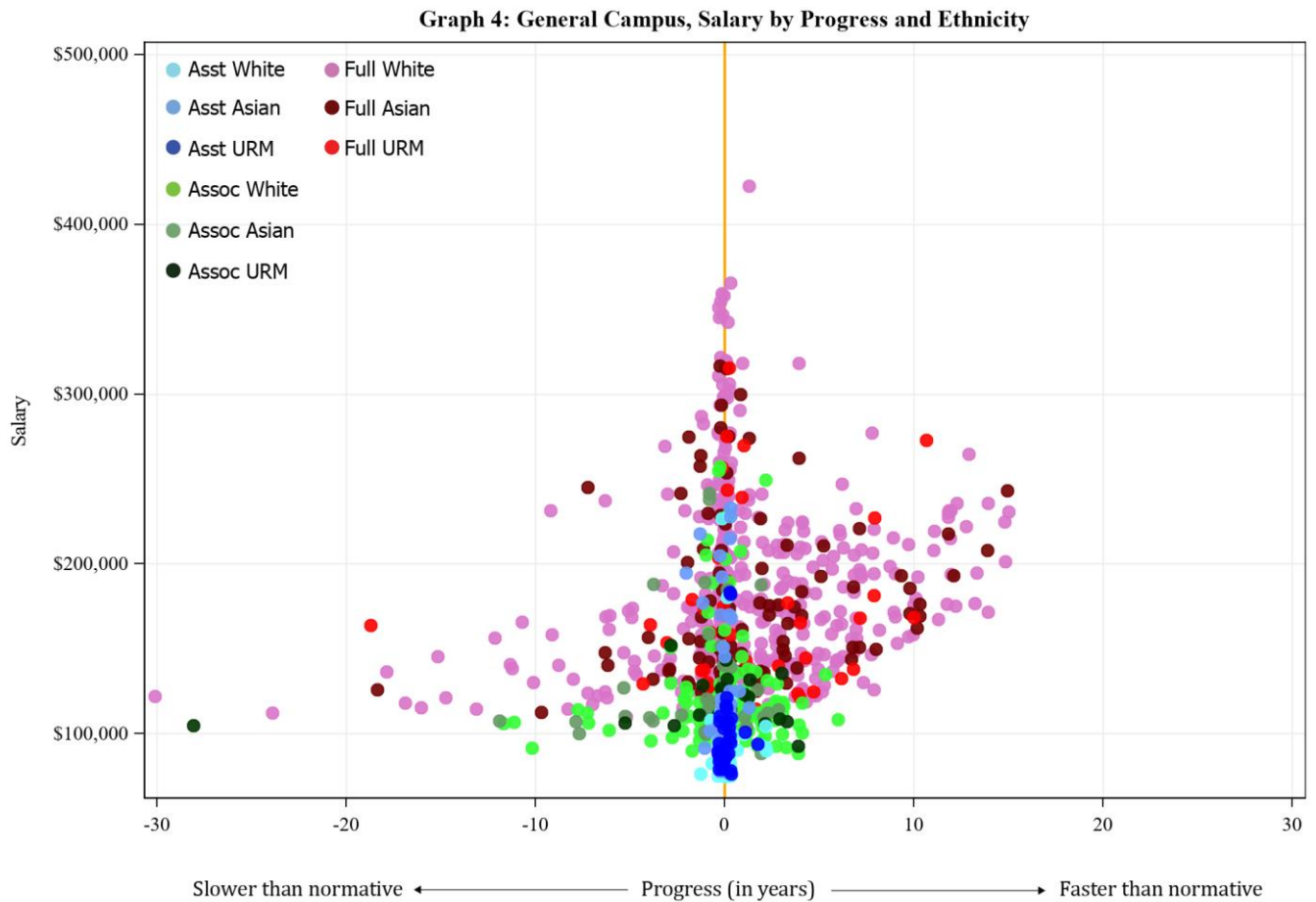
*p<0.05, **p<0.01, ***p<0.001

¹Experience includes years of service, years since degree, and decade of hire. Field includes school and the market ratio of salaries tied to the faculty member's department. Rank includes their starting rank at UCI, their current rank at UCI, and where they stand in relation to normal progress.

²Final model corrected for collinearity and included demographics, decade of hire, years since degree, school***, market salary ratio***, progress***, current rank***, and initial rank***.

3. Progress Rate Graphs: By Gender and Ethnicity are illustrated in Graphs 3 and 4.





4. Progress Rate Analysis: There has been debate on whether rank should be included in predicting salary. In previous studies, rank is generally included in predictive modeling unless there is evidence of bias against one group progressing through the ranks. Cursory *t*-tests on the rate of progression indicate that there is no significant difference between White men and Asian or URM faculty. However, women do progress at a slightly slower rate than white men. Further multivariate regression analyses were conducted adjusting for experience, discipline, and initial rank. These analyses showed no significant differences between White men and Women, Asian, or URM faculty. This indicates that it is appropriate to include rank in the regression equations predicting salary.

Progress Rate (in years) Comparison

Comparison	n	Mean	t	df	p-value
White Male vs	470	0.92			
Women ^a	397	0.31	-2.32	859	0.021
URM	104	0.32	-1.28	572	0.201
Asian ^a	219	0.42	-1.58	506	0.114

^aHomogeneity of variance assumption not met. Satterthwaite variance estimator used.

Note. Multivariate regression was conducted estimating rates of progression adjusting for experience, discipline, and initial rank. These analyses showed no significant differences between White men and Women, URM, or Asian faculty.

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 some exceptions.

Summary

In 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.

Appendix

PROGRESSION THROUGH THE RANKS

Normal time (in years) it takes to achieve rank/step

STARTING RANK/STEP	ENDING 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).