Personnel and Benefits Committee Report and Minutes
October 14, 2014

Attending: Pam Carter, Don Morley, Gail Katz, Carla Myers, Leann Morgan, Ceil Malek

The Personnel and Benefits Committee met on Tuesday, October 14, 2014 to discuss a number of salary models proposed by institutional research. One or more of these models will be used to determine appropriate market adjustments to the salaries of UCCS faculty holding an appointment of 50 percent or more. Funding for these adjustments comes from a pool set aside by the Chancellor's Office and approved by the regents of the University of Colorado.

Initially, P&B discussed how the funds for salary adjustments will be divided between tenure track (TT) and non tenure track (NTT) faculty. No decision was made during the meeting. We decided to wait until more analysis is completed to see where major problems exist before recommending an allocation method. However, two allocation methods were discussed. The first would divide the pool based on total salaries paid to each group. This allocation would give approximately 72% of the pool to TT and 28% to NTT. An alternative would be based on the split in the number of TT and NTT to total faculty. This allocation would allocate approximately 59% to TT and 41% to NTT. This issue will be discussed further at a future meeting.

Institutional Research (IR) is currently using four models to analyze salaries. They are referred to as the CUPA model, Delaware model, Regression model and the Z-model. Each of these models has certain pros and cons. The P&B committee reviewed each model to determine strengths and weaknesses. The committee also looked at whether the models actually achieve the intended goal of determining the faculty salaries that are substantially below market and the appropriate salary adjustment that should be made to these salaries.

P&B understands the analysis is for market adjustments only. The analysis does not consider other factors such as gender, race or ethnicity. The four models are assessed below.

Before jumping into the formulas and detailed explanations, institutional research has provided some basic summary information:

- Not all active faculty-held positions are included. Excluded from the models are (a) positions with an entry date in calendar year 2014, (b) summer appointments, (c) additional non-regular faculty positions that regular faculty might hold, and (d) positions with zero FTE or zero annual salary. The resulting list includes **402 faculty members** with active appointments as of August 28, 2014.
- Some sub-disciplines are grouped with their larger discipline family when the data do not lend themselves to use of the greater detail. For example, the units within the College of Education are new this year, but the data are older, thus all COE departments are regarded as one unit for CUPA and Delaware data. This is also true of the departments within Beth-El as well as Business. However, the various areas within VAPA are separated.
- The UCCS Teach faculty are coded as if they are in Education and the Library faculty as if they are in English.

- The most recent CUPA (2013-2014) and Delaware (2012-2013) data is used. The CUPA salaries are posted online at http://www.uccs.edu/ir/data/employees.html.
- For merit, evaluations entered into PeopleSoft for 2012, 2013, and 2014 are used.
- For years of service, there are two options. One is years in position based on one's Position Entry Date, which can change if a person was moved into a new position. The second option is to use years since original hire, which can include years worked at the other CU institutions.
- The dollar amount of the pool used for these models is $255,806.
- An individual's peer salary is the CUPA average salary among our 31 peer institutions within the same discipline and rank. Data is not available for all 31 peer institutions in 2013-2014.

1. CUPA Allocation Model

This model is easy to understand. The model is also merit based which is critical to any model used in this analysis. However, no consideration is given to years of service or years in rank. This may be a weakness of the model to the extent that compression is often related to the number of years of service at an institution. Salary increases at institutions of higher learning often do not keep up with market salaries in many academic disciplines. We've all seen the cases where someone will move to a new university in order to get her or his salary back up to market.

The model compares an individual's annual salary to 90% of his or her CUPA peer salary. In order to be eligible for an adjustment, the faculty member must have an average 3-year merit rating equal to or better than the average in their department. The initial run of the model shows that there is more money available for adjustments than needed to get every salary up to 90%. A suggestion is to increase the 90% goal to a higher rate until all money is used. This is implicitly done now but making it more transparent would be better.

The merit cutoff in this model eliminates 180 people from receiving a market adjustment. The target of 90% of the peer excludes 283 cases. After implementing the model, 63 individuals would receive an allocation ranging from $108 to $15,573. That is an average of $4,060 per recipient.[1]

The formula:

a. If the individual's 3-year average merit is at or greater than the average 3-year merit in his/her department, and the individual's salary is less than 90% of his/her peer salary, then calculate the difference between his/her annual salary and 90% of the peer salary.
b. Find the total sum of all gaps for all eligible faculty calculated in the step above. This amount is $247,930.
c. Divide the "gap" from step (a) by the total sum from step (b). This represents the individual's gap as a percentage of the total. Multiply this by the total pool amount (which is $255,806).
   - *Note that the total gap amount is LESS THAN the pool, thus the allocations are slightly larger than the actual individual gaps. This bump ranges from $4 to $480. This bump may be something to reconsider; there may be other ways to distribute*

---

[1] Note: the model descriptions and examples in this report were provided by institutional research.

> *the $7,876. This issue can be eliminated by increasing the CUPA comparison to a number greater than 90%. For example, if all salaries are adjusted to 91-92% of CUPA means, all of the pool would be allocated.*

Examples:

Alice has a 3-year average merit of 4.7 and her average is above the department average of 4.1. Her annual salary is 74,000 and her peer salary is 99,000.

a. 90% of 99,000 is $89,100
b. $89,100 – 74,000 = 15,100
c. $15,100 / $247,930 = 6.1%
d. 6.1% * $255,806 = $15,580

Sven has a 3 year average merit of 4.3 and his average is above the department average of 4.0. His annual salary is $81,000 and his peer salary is $91,500.

a. 90% of 91,500 is $82,350
b. $82,350 – 81,000 = 1,350
c. $1,350 / $247,930 = 0.5%
d. 0.5% * $255,806 = $1,393

2. The Delaware Model

The Delaware Model was envisioned several years ago as an attempt to adjust salaries partially based on productivity in a department or unit. Two measures of productivity are used. The first is student credit hour (SCH) generation in the unit compared to SCH in supposedly similar units in the Delaware study. The second measure looks at research funding in the unit compared to similar units in the Delaware study. This seems like a reasonable approach. However, measuring productivity across universities and within a university is problematic.

Student credit hours generated in a unit can be affected by many factors. Does the unit have a university core course(s) which all student must take? If so, some units may show up with strong credit hour production while other units without a core course will have lower SCH productivity. What is the standard class size? UCCS prides itself on small class size. SCH productivity measures and any comparison will be distorted if a sufficient number of peer schools in the Delaware data have very large class size. Are courses taught by graduate teaching assistants versus regular instructors? This not only distorts the SCH numbers but also the cost effectiveness of the unit.

Turning to research productivity measures there are other obvious issues. Some peer institutions have a long history of obtaining grants and have built departments or colleges for the specific purpose of writing grants. A few large grants at a number of peer institutions can distort the reported grant dollars. Further, grants are often shared across department and this may skew the data. Some colleges and departments at UCCS are very active in writing and publishing articles that are not sponsored or part of a grant. If the mission of the campus is to publish academic works does it matter whether it is

sponsored or unsponsored? Units focused on unsponsored research may be unduly penalized in the existing model.

Beyond just these basic issues there were many concerns over how the Delaware model is implemented. The model "builds a comparison assistant professor salary" starting with a mean UCCS salary and adding the standard deviation of UCCS salaries (part b of the model). Nobody quite understands why this is done. The model then adds a flat salary adjustment for rank and years of service. Full professors get more and assistants less. The amounts added seem arbitrary. The adjustments for the Delaware productivity measures are also arbitrary. Some units get a partial amount while others get the full amount. If there is no comparison data a unit will get a partial adjustment. The fact that no comparison data exists for some units is extremely troubling. The question is why build a comparison model and salary when the CUPA data provide current comparative salaries by rank and discipline.

The results of the Delaware analysis indicate the salary shortfall is about $4.7 million. This amount is much larger than the results from the other models and is an indicator that "constructed salaries" are not coming out correctly. Assuming $250,000 is available each year to resolve compression problems it would take 19 years to bring salaries up to Delaware salaries. This is more than half the career of many individuals. Almost all faculty appear eligible for adjustments using this model which is curious since the CUPA Allocation model eliminates 180 faculty due to lower merit.

The P&B committee strongly agreed that the Delaware model is difficult to understand, full of inherent problems, unreliable and either should be revised or not be considered in any market based analysis. The committee supports looking at the productivity of the faculty but the current Delaware model has too many problems to be useful.

Here is a description of how the Delaware model works.

   a.   Identify the average salary of new assistant professors by discipline using the CUPA data. (If data on "new" assistant professors is not available, then use assistant professors.)
   b.   Adjust the new assistant professor salary using a z-score and the standard deviation of UCCS salaries. The process is completed using the following method.
        i.   Calculate the standard deviation of UCCS salaries. This is currently $25,862.
        ii.   Calculate the average UCCS salary. This is currently $67,093.
        iii. Calculate the individual's Z score. The Z score is normalized to have a mean of zero and ranges from -1.52 to 4.20.
        iv.   If the individual's Z score is greater than 0, then increase the new assistant comparison salary by the product (Z score * standard deviation among UCCS salaries).
   c.   Add an adjustment for rank and years of service to the new assistant comparison salary. This is equal to YRS * $1,250 for professors, $1,000 for associate professors, $800 for assistant professors, or $700 for instructors. *Note that these dollar adjustments are somewhat arbitrary but were used the last time a Delaware model was implemented.*

d. Add an adjustment for merit to the new assistant comparison salary by multiplying it by the individual's 3 year merit as a percentage of the department's average 3 year merit. Thus, the merit adjusted peer salary is found by multiplying the peer salary from part c by the ratio of (3yr merit / dept. 3yr avg merit).

e. Add an adjustment for the Delaware measures. If instructional expenditures per SCH in the department are better (less than) that of the peers, then assign 50 points – or, if not, then assign 25 points. If research expenditures per TTT in the department are better (higher than) that of the peers, then assign 50 points – or, if not, then assign 25 points. *There is a maximum of 100 points or 1 when converted to a percentage.*

  i. *Warning! Electrical Engineering, Mechanical Engineering, and Geography have no peer data and they are assigned 25 instructional points. But their research points are 50.*

  ii. *Only SPA and VAPA receive the full 100 points.*

f. Calculate the total gap between the annual salaries and the constructed salaries (after step e). This is $4,758,738.

g. Calculate the individual's share of the total and multiply by the pool of 255,806.

Example:

Alice has an annual salary of 74,000 and the CUPA salary for new assistant professors in her department is $65,500. Her salary is 0.27 standard units above the campus average salary. She is a professor with 10 years of service with merit of 4.7 compared to an average of 4.1 in her department. Her department has 75 Delaware points of 100 possible.

a. $65,500
b. $65,500 + (25,862 * 0.27) = $72,482
c. $72,482 + (1250 * 10yrs) = $84,982. Switch to a gap of 84,982 – 74,000 = $10,982
d. $10,982 * (4.7 / 4.1) = $12,589
e. $12,589 * .75 = $9,442
f. 9442 / 4,758,738 = .19%
g. 0.19 * 255,806 = $508

3. The Regression Model

The regression model finds a predicted salary based on a set of independent variables. The actual regression model takes the form: Salary = f{Gender, Ethnicity, Years in position, Squared years in position, Rank, Standardized merit within a department and a Market Index}. The model generates regression coefficients for each variable and the constant term. The coefficients are multiplied by a faculty member's characteristic for each variable and then summed to get the predicted salary. The difference between the predicted salary and an actual faculty salary is a measure of a person's salary adjustment. Those of you conversant in regression realize the regression will minimize the sum of the squared error so some predicted salaries will appear higher than the actual salaries and some will be lower. If one argues that many to most UCCS salaries are below CUPA peers this may be a poor method to resolve the issue.

A criticism of this model is the attempt to predict salaries. Why find a predicted salary when the CUPA data provides comparisons of salaries at peer institutions? Isn't this an appropriate market comparison? A more troubling issue is the set of independent variables. Using gender, ethnicity or other similar variable in a market analysis may not be appropriate. These variables are apt to be more valuable in models attempting to determine salary inequities within the faculty caused by gender, ethnicity, or other relevant factors that may be contributing to these inequities. While the P&B committee may support the idea that such models be developed in the future, this is not part of the current analysis.

The regression model does explain 80% of total variation within faculty salaries which seems respectable. However, gender, years of service and merit do not contribute to the explanation of variance in the model. The reported t-values on these variables are insignificant. Thus, gender, years of service and merit do not help explain the variation in salaries. Everyone should be happy that gender does not play a part in explaining variation in salaries. However, a finding that years of service and merit plays no part in explaining variation is indeed troubling. The problem with the years of service is explainable. Years of service and years of service squared are loaded into the model. These two variables are likely to be correlated and result in a multicollinearity problem in the model. There are known resolutions to this particular problem, one of which is to drop one of the correlated variable. This raises another problem if the statistician strongly believes both variables are important in explaining variation.

Based on the results P&B suggest running a stepwise regression or a reduced model with only the significant independent variables. This would leave a model devoid of any merit factors. Even if this were done, it still leaves a model that finds a predicted salary based on market salary index. This is counterintuitive. A better model might be to find the set of independent variables to predict a market salary which could then be compared to individual salaries at UCCS. However, at the end of the day why is all of this being done when the market comparison data already exists?

Another problem with the regression models is the current specification includes both the tenure track (TT) and non-tenure track faculty (NTT). To the extent that these are two very different populations, a separate model should be developed for each group. This brings up another potential problem which is a pervasive problem in the NTT CUPA data. That is, often times there are no good market comparisons for this population of faculty at UCCS. The problem also exists in the ranks of the TT faculty but to a lesser extent. In an attempt to develop better peer comparisons for NTT faculty and for library faculty, P&B suggests looking to develop peer comparisons for these groups based on a percentage of assistant faculty salaries. Such a model may prove more reliable than the somewhat dubious CUPA data that now exists for the NTT and library faculty.

The Regression model works as follows. Allocations are based on the difference between one's annualized salary and an unstandardized predicted salary generated by the regression analysis. The regression incorporates gender, ethnic minority status, years in position, squared years in position, rank, merit (using a standardized Z score within department), and a market index. The market index is each department's assistant professor salary as compared to the lowest assistant professor salary among our peers (which happens to be Communication). This model explains 80% of the variance in salaries (R^2).

The total gap between annual and predicted salaries is $1,549,221. After implementing the model, 234 faculty would receive an allocation ranging from$ 0 to $4849 with an average of $1043 per recipient.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	41651.789	2516.986		16.548	.000
	Male	-1110.926	1263.242	-.021	-.879	.380
	White	-5213.088	1763.784	-.068	-2.956	.003
	Yrs	-819.771	523.910	-.162	-1.565	.118
	Yrs2	63.482	30.650	.220	2.071	.039
	Market	56188.453	2775.434	.479	20.245	.000
	Rank	14810.424	681.327	.664	21.738	.000
	MeritZ	115.911	506.422	.005	.229	.819

a. Dependent Variable: Salary

Example:

> Alice is a full professor and has a market index of 0.20 and a merit Z score of 0.6. She has 10.3 years of service and a current salary of $74,000.
>
> a. $41652 + (-1110.9 * 0) + (-5213.1 * 1) + (-819.8 * 10.3) + (63.5 * 10.3^2) + (56188.5 * 0.20) + (14810.4 * 3) + (115.9 * 0.6) = 90,517.8$ *predicted salary*
> b. 90,517.8 – 74,000 = 16,518 *gap*
> c. 16,518 / 1,549,221 = .017
> d. .017 * 255,806 = 2,727

4. The Z model

The Z model begins with the CUPA salary norms for each discipline and faculty rank. This market figure is then adjusted up (or down) for each faculty member by his or her years of service and years within rank. The adjusted market salary can be adjusted down to reflect the fact that an individual is in a "new" rank for a relatively short period of time and is assumed to enter the rank at market. In some cases an associate professor is in rank for a considerable period of time because they never applied for promotion. Some associate professors remain in rank because their performance is insufficient to achieve the rank of professor. These individuals would be expected to have lower market value. Other associate professors remain in rank because they have no desire to be promoted. For a number of faculty, this situation occurred in the past when promotions came without any pay increases (dry promotions). The lack of a salary adjustment reduced or eliminated the incentive to be promoted.

The Z-model also considers the three year average merit for each individual. The average merit must meet a minimum threshold before an individual is eligible for a market adjustment. No adjustment is made if merit is below the threshold. Given these initial adjustments and checks, the market adjusted salary is compared to the actual salary to determine the distance between the two salaries. This is simply the difference between the discipline and rank-adjusted CUPA salary and the actual salary of the faculty member. These dollar differences are summed over all faculty to determine the total size of the merit based market adjustment needed to bring all faculty up to their peer CUPA comparison. In a given year, there may not be sufficient funding available to eliminate all salary deficits. In these years, the salary increase for each eligible faculty is adjusted for the size of the available pool of funds relative the total amount needed to eliminate all inequities. For example, if the available pool of funds for a given year is $250,000 but the sum of the funds needed to correct all salaries is $1,000,000 then a meritorious faculty member will see her or his salary adjusted by ¼ or 25% of the total amount needed to completely eliminate a market difference. The model distributes the total available pool based on this method so that all eligible faculty do receive some salary relief.

In sum, the model incorporates rank, years in service, years in rank, merit and is based on market comparisons to allocate the available dollars. The model is built in a spreadsheet so there are no statistical issues to deal with as there are with the regression model. P&B is supportive of this model. The model is currently undergoing minor change to add flexibility and to determine some of the final parameters in the model.

The model works as follows:

a. Calculate the median years in rank per rank. The medians are:

Distinguished Professor	14.44
Professor	8.82
Associate Professor	8.23
Assistant Professor	5.12
Senior Instructor	8.21
Instructor	4.61
Clinical	4.63

b. Calculate the individual's years above the median years for their rank. Use this metric to determine whether the market salary is adjusted up or down.
c. Adjust the CUPA peer salary based on years in rank. If an associate professor has more than 14 years as an associate professor, the adjustment is capped.
d. Calculate the "distance" or difference between one's annual salary and the adjusted comparison salary.
e. Adjust the "distance" or size of the market adjustment for an individual's merit. If one's 3-year average merit is greater than the threshold the distance is adjusted upward by a certain percentage set by the analyst.

f. Sum these "distances" to arrive at a total amount needed to resolve all market related issues. Based on the available pool of funds determine a proportionate share of the pool to be given as the salary adjustment to the individual for the year.

Example:

Note: This example is based on some simulated data being used to test the model. The final parameters for the Z-model will be set by institutional research with guidance from the chancellor's office and the P&B committee. The specific parameters required for the model are the median years in rank for all faculty at UCCS at the associate and professor levels, the minimum merit score to be eligible for an adjustment, an adjustment factor for merit, a median cap placed on years in rank for associates and a factor to adjust for years in rank. The adjustment for years in rank increases the CUPA salary if a person is above the median time in rank and decreases the CUPA salary if a person is below the median time in rank. The assumption is that more time in rank translates into more salary compression.

Alice is back. Her salary from the CUPA example above is $74,000 and her peer CUPA comparison is $99,000. Alice has an average merit rank of 4.7 which puts her 1.7 units above the minimum merit score. Alice is eligible for an adjustment. Alice is an associate professor and has been in rank for 7 years. At 7 years, she is one year below the median years in rank for all associate professors at UCCS. Because she is one year below the median time in rank, her CUPA comparison salary is adjusted downward (in the current simulation) by .5% to $98,505. Using this figure, the adjusted distance between her salary and the CUPA comparison is $24,505. Because her merit is 1.7 units above minimum merit, this distance is now adjusted up by 30% to $31,856 (the set of adjustments for above minimum merit at this point is still under discussion and will be finalized later).

In the simulation, there are other deserving individuals and when all of their adjusted distances are summed, the total amount needed for all adjustments is $102,012. The amount available for increases is set at 1% of the total actual salaries over all individuals in the analysis. In this simulation the 1% amounts to an available pool of $8,420. Alice gets a proportional piece of the available amount. Alice's salary is very compressed so her proportion the $8,420 is 31.2% or $2,629. Her salary is adjusted to $76,629. She will most likely be eligible for more compression relief in future years.