Analysis of Faculty Compensation
Fiscal Year 2013

May 9, 2013
Statistical Analysis

- Statistical analysis was based on a total of 946 individuals in tenure track positions \(^1\).

\(^1\) 33 faculty were excluded that were in primarily administrative roles or who left the university during the year.
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- Salaries are 9 month base pay (or equivalent for Basic Science or other Division/Departments with 12 month appointments or part-time faculty).

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- Salaries are 9 month base pay (or equivalent for Basic Science or other Division/Departments with 12 month appointments or part-time faculty)
- Excludes supplementary pay (Department chairs, etc)
- Separate analyses for
  - Assistant Professors
  - Associate Professors
  - Full Professors

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Statistical Methodology

Variables used in explaining differences in Salary

- Department
- Time in Rank

Statistical Models

- Linear Regression using log transformation of Salary
- Robust Regression Models using log Salary
Statistical Methodology

Variables used in explaining differences in Salary

- Department
- Time in Rank
- Rank at Hire (new)
Statistical Methodology

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- Department
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- Department Chair Indicator (Full)
- Distinguished Professor Indicator (Full)
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- Distinguished Professor Indicator (Full)
- Gender

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- Race - collapsed to Caucasian versus non-Caucasian (Asian, Black, Hispanic, or more than 2 races/ethnic groups)
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Statistical Models

- Linear Regression using log transformation of Salary
- Robust Regression Models using log Salary
Assistant Professor Summary (n = 167)

- Variables used: Department, Rank at Hire, Race, and Gender

- Model explains 95% of the variation in Salaries

- Median Salaries for Caucasians were 2.15% lower [95% CI 4.59% lower to 0.14% higher] than non-Caucasians

- Median Salaries for Males were 1.68% higher [95% CI 0.90% lower to 4.29% higher] than Females

- Neither Gender nor Race are statistically significant predictors of Salary after adjusting for Departments.
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Assistant Professors: Caucasians minus Non-Caucasians
Trend - Gender

Assistant Professors: Males minus Females

Year
% Difference

−4 −2 0 2 4 6 8
Associate Professor Summary (n = 230)

- Additional Predictor: Time in Rank

Model explains 77% of the variation in Salaries

Median Salaries for Caucasians were 2.78\% lower [95\% CI 7.44\% lower to 1.52\% higher] than non-Caucasians

Median Salaries for Males were 3.75\% higher [95\% CI 0.93\% lower to 8.64\% higher] than Females

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Associate Professors: Caucasians minus non-Caucasians

Year
% Difference
−10 −5 0 5
Trend - Gender

Associate Professors: Males minus Females

Year
% Difference

-5 0 5

Year
% Difference

Full Professors (n = 548)

- Predictors: Department, Time in Rank, Rank at Hire, Department Chair, and Distinguished Professor
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- Predictors: Department, Time in Rank, Rank at Hire, Department Chair, and Distinguished Professor
- Model explains 70% of the variation in Salaries
- Median Salaries for Caucasians were 0.77% lower [95% CI 5.22% lower to 3.45% higher] than non-Caucasians
- Median Salaries for Males were 4.45% higher [95% CI 0.64% to 8.17% higher] than Females
- Race is not a statistically significant predictor of Salary after accounting for Departments and other variables
- Gender does appear to be significant using the robust regression
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Trend - Race

Full Professors: Caucasians minus non-Caucasians

Year
% Difference

−5 0 5 10

OLS

RR

RROLS

% Difference


Year
Trend - Gender

Full Professors: Males minus Females

Year

% Difference

Full Professors: Males minus Females

OLS

RR
Distinguished Professors ($n = 212$)

- Model explains 63% of the variation in Salaries

Median Salaries for Caucasians were 4.81% lower [95% CI 10.58% lower to 2.48% higher] than non-Caucasians

Median Salaries for Males were 3.23% higher [95% CI 2.93% lower to 10.01%] higher than Females

Neither Race nor Gender are statistically significant predictors of Salary after adjusting for other variables
Distinguished Professors (n = 212)

- Model explains 63% of the variation in Salaries
- Median Salaries for Caucasians were 4.81% lower [95% CI 10.58% lower to 2.48 % higher] than non-Caucasians
- Neither Race nor Gender are statistically significant predictors of Salary after adjusting for other variables
Distinguished Professors (n = 212)

- Model explains 63% of the variation in Salaries
- Median Salaries for Caucasians were 4.81% lower [95% CI 10.58% lower to 2.48 % higher] than non-Caucasians
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Distinguished Professors (n = 212)

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Comments

Differences for Full Professors without the Distinguished Professors
Comments

Differences for Full Professors without the Distinguished Professors
▶ Promotions
Comments

Differences for Full Professors without the Distinguished Professors

- Promotions
  - Decrease Time to Promotion from Associate to Full for Women
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  - Differences primarily in Salaries after 2008
  - Promotion of Female Full Professors to Distinguished Professors
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- Promotions
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  - Differences primarily in Salaries after 2008
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Next Step

- Prediction Model (using only Male Faculty Salaries) at each rank

- Identify cases with potential inequity where salary is lower than expected

- Further review by the Provost of individual cases to take into account other factors such as quality/productivity of work, salary compression with recent hires, etc

- Increase salary where warranted
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Limitations

- Model gives “average” Salary
- Factors that influence individual Salary but not accounted for:
  - Difference among sub-fields within a department
  - Productivity/quality of work
  - Outside offers from other institutions (formal records are not routinely kept) *Coefficients for new hires at Duke, suggest that increases may be on the order of 15% or more.*
  - Previous administrative roles
  - Leaves taken in prior years
  - Partial retirement not accounted for in system
Full Professors w/out Distinguished Professors (n = 336)

- Predictors: Department, Time in Rank, New Hire, and Department Chair
- Model explains 56% of the variation in Salaries
- Median Salaries for Caucasians were 1.79% higher [95% CI 3.47% lower to 7.64% higher] than non-Caucasians
- Median Salaries for Males were 5.92% higher [95% CI 0.68% higher to 11.2% higher] than Females
- Race is not a statistically significant predictor of Salary after adjusting for difference in Salaries explained by Departments and other variables
- Gender does appear to be significantly associated with Salary after adjusting for the other predictors
## Distribution of Positions

<table>
<thead>
<tr>
<th></th>
<th>Assistant</th>
<th>Associate</th>
<th>Professor</th>
<th>Distinguished</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Female</strong></td>
<td>61</td>
<td>75</td>
<td>79</td>
<td>49</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>106</td>
<td>155</td>
<td>258</td>
<td>163</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Assistant</th>
<th>Associate</th>
<th>Professor</th>
<th>Distinguished</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asian</strong></td>
<td>38</td>
<td>32</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>6</td>
<td>16</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Caucasian</strong></td>
<td>116</td>
<td>174</td>
<td>287</td>
<td>179</td>
</tr>
<tr>
<td><strong>Hispanic</strong></td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>3</td>
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<tr>
<td><strong>2+</strong></td>
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### Distributions of Gender by Divisions

<table>
<thead>
<tr>
<th>Division</th>
<th>Female</th>
<th>Male</th>
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<tbody>
<tr>
<td>Basic Sciences</td>
<td>24</td>
<td>97</td>
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<tr>
<td>Divinity</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Fuqua School of Business</td>
<td>13</td>
<td>71</td>
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<tr>
<td>Humanities</td>
<td>64</td>
<td>85</td>
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<tr>
<td>Law</td>
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<td>29</td>
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<tr>
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<td>Nicholas School of the Environment</td>
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<tr>
<td>Pratt School of Engineering</td>
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<tr>
<td>Sanford School of Public Policy</td>
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<tr>
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<td>4</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>50</td>
<td>114</td>
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# Distributions of Race by Division

<table>
<thead>
<tr>
<th>Division</th>
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<th>2+</th>
<th>Asian</th>
<th>Black</th>
<th>Caucasian</th>
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<tbody>
<tr>
<td>Basic Sciences</td>
<td>5</td>
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<td>22</td>
<td>0</td>
<td>94</td>
</tr>
<tr>
<td>Divinity</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>22</td>
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<tr>
<td>Fuqua</td>
<td>2</td>
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<td>17</td>
<td>1</td>
<td>64</td>
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<tr>
<td>Humanities</td>
<td>5</td>
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<td>13</td>
<td>15</td>
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<td>Law</td>
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<td>School of Nursing</td>
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<td>0</td>
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<td>10</td>
<td>12</td>
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