



Homework #2

Higher Education Salary Problem

Background Information

Within higher education, faculty salaries have become a contentious issue as tuition rates increase and state aid shrinks. Competitive salaries are important for recruiting top quality instructors, but they can also lead to increased costs in an era of tight budgets.



The issue of faculty salaries is especially significant in West Virginia. Salaries in the state have tended to lag significantly behind peer institutions, although some schools such as West Virginia University have made efforts to address shortfalls.

Problem Statement

In this assignment, students will explore data about faculty salaries in Southern Regional Education Board member states to look for patterns and to make predictions about future salary rates.

Instructions

IMPORTANT: Complete the steps below in the order they are given. Completing the steps out of order may complicate the assignment or result in an incorrect result.

1. Download and extract the provided Data Files ZIP file. It contains the following files for use in this assignment:
 - a. **salary.csv** – Salary information for member states of the Southern Regional Education Board from the 2006-2007 to 2020-2021 academic years [1]–[3].

Column Name	Type	Description
College	Text	Name of the college.
State	Text	State where college is located.
Academic Year	Number	Ending academic year of the data (e.g., 2021 is for the 2020-2021 academic year).
Category	Text	Degree-awarding category of the college.
FTE Enrollment	Number	Number of full-time equivalent students at the college.
Prof Salary	Currency	Average salary for professors.
Assoc Prof Salary	Currency	Average salary for associate professors.
Asst Prof Salary	Currency	Average salary for assistant professors.
Instructor Salary	Currency	Average salary for instructors.

2. Create a new Microsoft Excel workbook named **hw2_lastname_firstname_hesp.xlsx**.



Homework #2

Higher Education Salary Problem

3. We must adjust the sheets in our workbook.
 - a. Rename *Sheet1* to *Salaries*.
 - b. Add a new sheet named *Scenarios*.
 - c. Add a new sheet named *Analysis Questions*.
4. Import the following item into the workbook:
 - a. **salary.csv** file – Import starting in cell **A3** of the *Salaries* sheet. The file is comma-delimited. Its first row contains headers.
5. We wish to apply formatting to the *Salaries* sheet.
 - a. We must set up a table to store data on salaries.
 - i. If a table does not already exist in cells **A3** through **I8610**, create one using a style of your choice. The table has headers and will overlap external data ranges. If prompted, convert the selection to a table and remove all external connections.
 - ii. If a table already exists in cells **A3** through **I8610**, format the table using a style of your choice other than the default table style.
 - b. We need to add additional table columns to store statistics and a sparkline.
 - i. Insert four new table columns to the right of existing column **I**.
 - c. For the table, turn on the **First Column** option.
 - d. Enter text in the cells as indicated below:
 - i. **A1**: Higher Education Salaries
 - ii. **J3**: Min Salary
 - iii. **K3**: Max Salary
 - iv. **L3**: Max-Min Ratio
 - v. **M3**: Ratio Under 2.0
 - e. Merge (but not center) cells **A1** through **N1**.
 - f. Apply the *Heading 1* cell style to cell **A1**.
6. On the *Salaries* sheet, we wish to calculate salary statistics.
 - a. In column **J**, write a formula to calculate the minimum salary for the college and academic year.
 - b. In column **K**, write a formula to calculate the maximum salary for the college and academic year.



Homework #2

Higher Education Salary Problem

- c. In column **L**, write a formula to calculate, for each college and academic year, the ratio between the maximum and minimum salaries.

You can calculate the ratio using the formula:

$$\frac{[Max\ Salary]}{[Min\ Salary]}$$

- d. In column **M**, write a formula to determine if the salary ratio was less than 2.0. If it was, display `Under 2.0`; otherwise, display `Not Under 2.0`.
7. We must apply additional formatting to the *Salaries* sheet.
- Format the cells as indicated below:
 - E4** through **E8610**: number with no decimal places, use 1000 separator
 - F4** through **K8610**: currency with no decimal places
 - L4** through **L8610**: number with 2 decimal places
 - AutoFit the widths of columns **A** through **M**.
 - Apply *Red-Yellow-Green* color scale conditional formatting to cells **F4** through **I8610**.
8. To better understand our data, we wish to create a PivotTable.
- Create a new PivotTable based on the data in cells **A3** through **M8610** of the *Salaries* sheet. Place the PivotTable on a new sheet named *Salaries PivotTable*.
 - On the PivotTable, do the following:
 - Add the state as a **Filters** field.
 - Add the category and then the academic year as **Rows** fields.
 - Add the professor salary, associate professor salary, assistant professor salary, and instructor salary as **Values** fields.
 - We need to perform formatting on our PivotTable.
 - Group the academic years into sets of 3 starting at 2007.
 - Summarize the salary figures by averaging them.
 - Format the cells as indicated below:
 - (1) **Average of Prof Salary, Average of Assoc Prof Salary, Average of Asst Prof Salary, and Average of Instructor Salary** fields: currency with no decimal places



Homework #2

Higher Education Salary Problem

9. We also wish to apply formatting to the *Scenarios* sheet.
- a. Enter text in the cells as indicated below:
 - i. **A1**: West Virginia Salary Scenarios
 - ii. **A3**: Scenario
 - iii. **B5**: Annual Raise
 - iv. **C5**: 2021
 - v. **D5**: 2022
 - vi. **E5**: 2023
 - vii. **F5**: 2024
 - viii. **G5**: 2025
 - ix. **H5**: 2026
 - x. **I5**: 2027
 - xi. **J5**: 2028
 - xii. **K5**: 2029
 - xiii. **L5**: 2030
 - xiv. **A6**: Target Salary
 - xv. **B6**: 0%
 - xvi. **C6**: \$100,000
 - xvii. **A7**: Average for Full Professors
 - xviii. **B7**: 3%
 - xix. **C7**: \$80,543
 - xx. **A8**: Gap with Target Salary
 - b. Merge (but not center) cells **A1** through **L1**.
 - c. Apply the *Heading 1* cell style to cell **A1**.
 - d. Apply background fill colors to the cells as indicated below:
 - i. **A5** through **L5**: *Blue, Accent 1, Lighter 40%*
 - ii. **A8** through **L8**: *White, Background 1, 25% Darker*
 - e. Format the cells as indicated below:
 - i. **B6** through **B7**: percentage with 2 decimal places
 - ii. **C6** through **L8**: currency with no decimal places



Homework #2

Higher Education Salary Problem

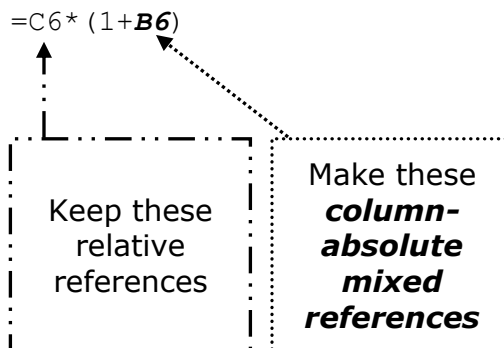
- f. AutoFit the width of columns **A** through **B**. Set the width of columns **C** through **L** to 9.
10. On the *Scenarios* sheet, we wish to calculate information about possible salaries in the future.
- a. We wish to compute the gap between salaries and the target salary. Enter the formulas in the cells as indicated below.
- i. **C8**: $=C6-C7$
- ii. **C8** through **L8**: AutoFill the formula from cell **C8**.
- b. We want to estimate future salary scenarios.
- i. Enter the formula into the cell indicated below.

HINT: To avoid errors, copy-and-paste the provided formula.

(1) **D6**: $=C6*(1+B6)$

- ii. We must adjust the future values formula so its cell references are correct when the formula is copied.

In cell **D6**, modify the cell references so they are column-absolute mixed or relative references as indicated:



- iii. We will now AutoFill the modified formula. Enter the formula into the cells as indicated below.
- (1) **D6** through **L7**: AutoFill the formula from cell **D6**.
11. We will now evaluate two different scenarios for salaries in West Virginia higher education.
- a. The first scenario involves a 3% annual raise.
- i. Enter text in the cells as indicated below:
- (1) **A3**: 3% Raise
- (2) **B7**: 3.00%



Homework #2

Higher Education Salary Problem

- ii. There is nothing to do for this step. Please proceed to the next step.
 - iii. Using Scenario Manager, create a new scenario named `3% Raise`. Have the scenario work by changing the values of cells **A3** and **B7** to the values they contain now.
 - b. The second scenario involves raising the average salary for full professors at 4-year colleges to \$100,000 in 2030.
 - i. Enter text in the cells as indicated below:
 - (1) **A3**: \$100,000 Average Salary in 2030
 - (2) **B7**: 0.00%
 - ii. Use Goal Seek to find an annual raise rate to achieve a \$0 gap with the target salary in cell **L8**. Have Goal Seek change the value of cell **B7** until it locates the correct value.
 - iii. Using Scenario Manager, create a new scenario named `$100,000 Average`. Have the scenario work by changing the values of **A3** and **B7** to the values they contain now.
- 12. We need to set up the *Analysis Questions* sheet so that it can store responses to the analysis questions.
 - a. Enter text in the cells as indicated below:
 - i. **A1**: Question Number
 - ii. **B1**: Response
 - b. Bold the contents of row **1**.
 - c. AutoFit the width of column **A**. Set the width of column **B** to 100.
 - d. Set the height for rows **2** through **4** to 110.
 - e. Change the vertical alignment setting for columns **A** and **B** so that the text is displayed at the top of each row.
 - f. Turn on text wrapping for column **B**.
- 13. Starting in row **2** of the *Analysis Questions* sheet, answer three of the five analysis questions below. Respond to one question per row.
 - a. Faculty at 2-year and technical colleges tend to be paid less than faculty at 4-year colleges. Why might this be the case?
 - b. Faculty salaries are noticeably higher at Marshall University and West Virginia University than the other 4-year colleges in West Virginia. Name at least two possible reasons for this.
 - c. Other than job title and duties, name at least two other factors that might affect an employee's pay.



Homework #2

Higher Education Salary Problem

- d. Many higher education employees have expressed concern that pay rates for colleges in West Virginia make them uncompetitive when recruiting faculty. Do you believe that this is a valid argument? Why or why not?
- e. Among 4-year colleges (including masters and doctoral institutions) in 2021, was there a relationship between the number of students enrolled and salaries for professors? Why might this be (or not be) the case?

Grading Rubric

This assignment is worth 60 points. It will be graded by your instructor using this rubric, with partial credit awarded as appropriate:

Steps 3a-c	2 points total	Steps 9a-f	4 points total
Step 4	2 points	Steps 10a-b	8 points total
Steps 5a-f	2 points total	Steps 11a-b	6 points total
Steps 6a-d	10 points total	Steps 12a-f	4 points total
Steps 7a-c	3 points total	Steps 13a-e (pick 3 of 5)	3 points each
Steps 8a-c	10 points total		

The analysis questions in Steps 13a-e will be evaluated using this rubric:

Standard	Meets Requirements (1.5 points)	Does Not Meet Requirements (0 points)
Answer is reasonable.	Answer addresses the question prompt and is factually correct or a reasonable interpretation of available data.	Answer does not address the question prompt, is factually incorrect, or is an unreasonable interpretation of available data.
Answer is supported.	Logical rationale is provided to support the given answer.	Logical rationale is not provided to support the given answer.

Acknowledgments

The image in the introduction appears courtesy of the Southern Regional Education Board [4].

References

- [1] "Average nine-month-equivalent salaries," Apr. 2023. Available: <https://www.sreb.org/general-information/average-nine-month-equivalent-salaries>.
- [2] "Full-time-equivalent Enrollments," Oct. 2023. Available: <https://www.sreb.org/general-information/full-time-equivalent-enrollments>.



Homework #2

Higher Education Salary Problem

- [3] "State Data Exchange: Survey Guide, 2019-20." Available:
<https://www.sreb.org/sites/main/files/file-attachments/guidebook20.pdf?1593710803>.
- [4] *Southern Regional Education Board Logo*. Available:
<http://assets.slate.wvu.edu/resources/903/1285877119.jpg>.