



Background Information

The cost of healthcare is a major concern in the United States, affecting individuals' ability to pay for their medical expenses, companies' ability to provide their employees with robust benefits, and the government's ability to provide social services.



In 2022, spending on healthcare amounted to 17.3% of the U.S. GDP, representing the largest per-capita amount for any developed country. With the exception of a slight post-pandemic drop in 2022, expenditures have grown every year since the federal government began tracking figures in 1960 [1]. There is a significant interest in finding ways to either reduce costs or at least limit their growth so they do not further crowd out other investments.

Problem Statement

In this project, students will explore the change in national healthcare expenditures based on different growth rates. The generated values will be compared with statistics from U.S. Census Bureau.

Instructions

WARNING: This is not the actual Exam for your section. You will not receive any credit for completing this project.

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.



EXAM REVIEW PROJECT INSTRUCTIONS
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1. Download and extract the provided Data Files ZIP file. It contains the following file for use in this assignment:
 - a. **expenditures.csv** – Information on healthcare expenditures in the United States from 1960 to 2022 [1].

Column Name	Type	Description
Year	Number	Year of the data.
Expenditures in Billions	Currency	Healthcare expenditures in 2024-valued billions of dollars.
4.50% Rate	Currency	Healthcare expenditures in 2024-valued billions of dollars with 4.50% annual growth.
4.75% Rate	Currency	Healthcare expenditures in 2024-valued billions of dollars with 4.75% annual growth.
5.00% Rate	Currency	Healthcare expenditures in 2024-valued billions of dollars with 5.00% annual growth.
5.25% Rate	Currency	Healthcare expenditures in 2024-valued billions of dollars with 5.25% annual growth.
5.50% Rate	Currency	Healthcare expenditures in 2024-valued billions of dollars with 5.50% annual growth.
Average	Currency	Empty column.
Maximum	Currency	Empty column.
Minimum	Currency	Empty column.
Class	Currency	Empty column.

2. Create a new Microsoft Excel workbook named **examreview1_nhp_lastname_firstname.xlsx**.
3. We must adjust the sheets in our workbook.
 - a. Rename *Sheet1* to *Expenditures*.
 - b. Add a new sheet named *Analysis Questions*.
4. Import the following item into the workbook:
 - a. **expenditures.csv** file – Import starting in cell **A4** of the *Expenditures* sheet. The file is comma-delimited. Its first row contains headers.
5. We wish to apply formatting to the *Expenditures* sheet.
 - a. We must set up a table to store data on healthcare expenditures.
 - i. If a table does not already exist in cells **A4** through **K67**, 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 **A4** through **K67**, format the table using a style of your choice other than the default table style.
 - b. For the table, turn on the **Total Row** option.

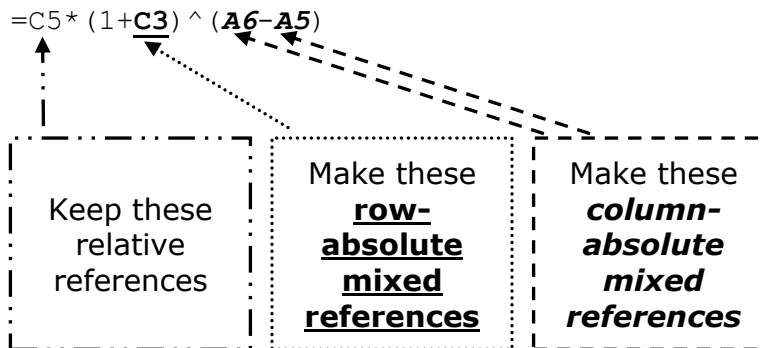


- c. Enter text in the cells as indicated below:
 - i. **A1**: Healthcare Expenditures
 - ii. **A3**: Annual Growth Rate:
 - iii. **C3**: 4.50%
 - iv. **D3**: 4.75%
 - v. **E3**: 5.00%
 - vi. **F3**: 5.25%
 - vii. **G3**: 5.50%
 - viii. **A68**: Average
 - d. Merge-and-center cells **A1** through **K1**.
 - e. Merge (but not center) cells **A3** through **B3**.
 - f. Apply the *Title* cell style to cell **A1**.
6. We need to perform calculations to analyze the *Expenditures* sheet.
- a. We would like to summarize the expenditures and projections.
 - i. In the total row, individually average columns **B** through **G**.
 - ii. In the total row, do not display any statistics in columns **H** through **K**.
7. On the *Expenditures* sheet, we wish to calculate healthcare expenditure estimates with different assumptions about the carrying capacity and growth rate.
- a. We want to estimate future healthcare expenditure values.
 - i. Enter the formula into the cell as indicated below.
HINT: To avoid errors, copy-and-paste the provided formula.
(1) **C6**: $=C5 * (1+C3) ^ (A6-A5)$



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

In cell **C6**, modify the cell references so they are column-absolute mixed, row-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) **C6** through **G67**: AutoFill the formula from cell **C6**.

- b. In column **H**, write a formula that, for each year, uses a function to find the average of the projected healthcare expenditures. Compare each year's projections from columns **C** through **G**.
 - c. In column **I**, write a formula that, for each year, uses a function to find the highest of the projected healthcare expenditures. Compare each year's projections from columns **C** through **G**.
 - d. In column **J**, write a formula that, for each year, uses a function to find the lowest of the projected healthcare expenditures. Compare each year's projections from columns **C** through **G**.
 - e. In column **K**, calculate the healthcare expenditures class by nesting **IF()** functions to display a class according to the following rules:
 - i. Class of **A** if the average of projected healthcare expenditures was at least \$2,000 billion.
 - ii. Class of **B** if the average of projected healthcare expenditures was at least \$1,000 billion but less than \$2,000 billion.
 - iii. Class of **C** if the average of projected healthcare expenditures was less than \$1,000 billion.
8. We must apply additional formatting to the *Expenditures* sheet.
- a. Format the cells as indicated below:
 - i. **B5** through **J68**: currency with 3 decimal places



- b. AutoFit the widths of columns **A** through **K**.
 - c. Apply the *Green-Yellow-Red* color scale conditional formatting option to cells **B5** through **G67**.
9. We would like to create a chart to plot the healthcare expenditure over time.
 - a. Create a 2-D line chart based on cells **A4** through **B67** of the *Expenditures* sheet. Move the chart to a new chart-only sheet named *Expenditures Chart*.

Ensure that the years are shown as labels for the horizontal (category) axis, not plotted as chart data. Specify appropriate chart and axis titles.
 - b. Add a trendline based on the average healthcare expenditures. Use the trendline type that best fits the data and project the values forward 20 periods (through the year 2042). Display the **R-squared** value on the chart.

NOTE: You cannot use the *Moving Average* type for your trendline.
10. To better understand our data, we wish to create a PivotTable.
 - a. Create a new PivotTable based on the data in cells **A4** through **K67** of the *Expenditures* sheet. Place the PivotTable on a new sheet named *Expenditures PivotTable*.
 - b. On the PivotTable do the following:
 - i. Add the year as a **Rows** field.
 - ii. Add the expenditures as a **Values** field.
 - c. We need to perform formatting on our PivotTable.
 - i. Group the years into sets of 10 starting at 1960.
 - ii. Summarize the expenditures by averaging them.
 - iii. Format the cells as indicated below:
 - (1) **Average of Expenditures in Billions** field: currency with 3 decimal places
11. 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**.



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- 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**.
12. Starting in row **2** of the *Analysis Questions* sheet, answer three of the five analysis questions below. Respond to one question per row.
- a. Which trendline type did you use on *Expenditures Chart*? Why did you choose this type of trendline?
 - b. There has been a nearly continuous increase in healthcare expenditures. What do you think is the main reason behind this?
 - c. The annual growth rate for healthcare costs has slowed in recent years. The average annual increase from 1960 to 1999 was 5.6% but was only 3.1% from 2000 to 2022. What are some potential reasons for this slowed growth rate?
 - d. Home healthcare has been one of the fastest growing of all healthcare spending areas, with 2022 spending being more than 12 times the amount spent in 1982 after adjusting for inflation [2]. What is a possible cause for this dramatic increase?
 - e. In 2022, prescriptions accounted for 9.1% of total healthcare spending. This is more than double the 4.5% figure of 1982 [2]. What is a possible reason for this increase?
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Grading Rubric

This is a practice assignment and is worth no points. A comparable Exam would be worth 150 points and graded using this rubric, with partial credit awarded as appropriate:

Steps 3a-b	5 points total	Steps 8a-c	7.5 points total
Step 4	7.5 points	Step 9a	15 points
Steps 5a-f	15 points total	Step 9b	10 points
Step 6a	7.5 points	Steps 10a-c	15 points total
Step 7a	20 points	Steps 11a-f	7.5 points total
Steps 7b-e	17.5 points total	Steps 12a-e (pick 3 of 5)	7.5 points each



The analysis questions in Steps 12a-e will be evaluated using this rubric:

Standard	Meets Requirements (3.75 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 TopNews [3].

References

- [1] "National Health Expenditure Accounts: NHE Summary," Centers for Medicare & Medicaid Services, Washington, DC, Jul. 2024. Available: <https://www.cms.gov/data-research/statistics-trends-and-reports/national-health-expenditure-data/historical>.
- [2] "National Health Expenditure Accounts: National Health Expenditures by Type of Service and Source of Funds," Centers for Medicare & Medicaid Services, Washington, DC, Jul. 2024. Available: <https://www.cms.gov/data-research/statistics-trends-and-reports/national-health-expenditure-data/historical>.
- [3] *Stethoscope and Money*. 2011. Available: http://topnews.us/images/imagecache/main_image/Health-Care-Spending.jpg.