Background Information

As one might expect, it is generally in a city’s best financial interest to have more residents. A larger population generally yields a larger tax base and more income. There is also an additional financial benefit that comes with larger populations: additional federal grant money. In order to be eligible for many programs, a city has to be above a certain population threshold.

One such population threshold is 50,000 people. At the present time, the population of Charleston, West Virginia, is close to falling below this level. In 2014, its estimated population was 50,404. Further compounding the problem is that Charleston’s population is also somewhat older than average, with a median age of 41.7 versus 37.2 nationally. Charleston’s population has been dropping for years, so it appears that Charleston may fall below 50,000 by the 2020 census.

Problem Statement

In this assignment, students will explore the demographics of Charleston and its surrounding area and to understand how the city could be affected by the federal grant threshold.

Instructions

IMPORTANT: This is not the actual Homework 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.

1. Download and extract the provided Data Files ZIP file. It contains the following file for use in this assignment:
   a. population.csv – Population and demographics information for the Charleston, West Virginia area [1]–[3].

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Text</td>
<td>Name of location.</td>
</tr>
<tr>
<td>Ages</td>
<td>Text</td>
<td>Age group for population figure.</td>
</tr>
<tr>
<td>Year</td>
<td>Number</td>
<td>Year of population figure.</td>
</tr>
<tr>
<td>Population</td>
<td>Number</td>
<td>Population for the specified location, year, and age group.</td>
</tr>
</tbody>
</table>

2. Begin by creating a new Microsoft Excel workbook named lastname_firstname_hh3_cfgp.xlsx.
3. **We must adjust the sheets in our workbook.**
   a. Rename *Sheet1* to *Population*.
   b. Add a new sheet named *Scenarios*.
   c. Add a new sheet named *Analysis Questions*.

4. **Import the following item into the workbook:**
   a. *population.csv* file – Import starting in cell A3 of the *Population* sheet. The file is comma-delimited and has headers.

5. **We wish to apply formatting to the *Population* sheet.**
   a. Create a table based on cells A3 through D78 using a style of your choice. The table has headers.

   The table will overlap external data ranges. Convert the selection to a table and remove all external connections.
   b. For the table, turn on the *First Column* option.
   c. Enter text in the cells as indicated below:
      i. **A1**: Kanawha County Population
      d. Merge (but not center) cells A1 through D1.
      e. Apply the *Heading 1* cell style to cell A1.
      f. Format the cells as indicated below:
         i. **D4** through **D78**: number with no decimal places, use 1000 separator
      g. AutoFit the widths of columns A through D.

6. **To better understand our data, we wish to create a PivotTable.**
   a. Create a new PivotTable based on the data in cells A3 through D78 of the *Population* sheet. Place the PivotTable on a new sheet named *Population PivotTable*.
   b. On the PivotTable, do the following:
      i. Add the ages as a *Filters* field.
      ii. Add the year as a *Rows* field.
      iii. Add the location as a *Columns* field.
      iv. Add the population as a *Values* field.
   c. We need to perform formatting on our PivotTable.
      i. Group the years into sets of 10 starting at 1985.
      ii. Summarize the population figures by summing them.
iii. Format the cells as indicated below:

(1) **Sum of Population** field: number with no decimal places, use 1000 separator

7. We also wish to apply formatting to the Scenarios sheet.

a. Enter text in the cells as indicated below:

   i. **A1**: Population Scenarios
   ii. **A3**: Scenario
   iii. **B5**: Annual Growth Rate
   iv. **C5**: 2010
   v. **D5**: 2011
   vi. **E5**: 2012
   vii. **F5**: 2013
   viii. **G5**: 2014
   ix. **H5**: 2015
   x. **I5**: 2016
   xi. **J5**: 2017
   xii. **K5**: 2018
   xiii. **L5**: 2019
   xiv. **M5**: 2020
   xv. **A6**: Population Threshold
   xvi. **B6**: 0%
   xvii. **C6**: 50000
   xviii. **A7**: Charleston Population
   xix. **B7**: 0%
   xx. **C7**: 51400
   xxi. **A8**: Amount above Threshold

b. Merge (but not center) cells **A1** through **M1**.

c. Apply the **Heading 1** cell style to cell **A1**.

d. Apply background fill colors to the cells as indicated below:

   i. **A5** through **M5**: *Blue, Accent 1, Lighter 40%*
   ii. **A8** through **M8**: *White, Background 1, 25% Darker*
e. Format the cells as indicated below:
   i. **B6** through **B7**: percentage with 2 decimal places
   ii. **C6** through **M8**: currency with no decimal places

f. AutoFit the width of columns **A** through **B**. Set the width of columns **C** through **M** to 7 (0.64”).

8. On the **Scenarios** sheet, we wish to calculate information about possible population in the future.
   a. We wish to compute the gap between Charleston’s population and the population threshold. Enter the formulas in the cells as indicated below.
      i. **C8** = **C7** - **C6**
      ii. **C8** through **M8**: 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:

         $=C6\times(1+B6)$

         iii. We will now AutoFill the modified formula. Enter the formula into the cells as indicated below.

         (1) **D6 through M7**: AutoFill the formula from cell **D6**.
We will now evaluate two different scenarios for Charleston’s population.

a. The first scenario involves an -0.5% annual change, the same rate as from 1990 to 2010.
   i. Enter text in the cells as indicated below:
      (1) A3: Historic Growth Rate
      (2) B7: -0.50%
   ii. There is nothing to do for this step. Please proceed to the next step.
   iii. Using Scenario Manager, create a new scenario named Historic Growth Rate. Have the scenario work by changing the values of cells A3 and B7 to the values they contain now.

b. The second scenario involves maintaining a population of 52,500 in 2020, which is 5% above the threshold.
   i. Enter text in the cells as indicated below:
      (1) A3: 5% Above Threshold
      (2) B7: 0.00%
   ii. Use Goal Seek to find an annual growth rate to achieve a population of 2,500 above the threshold in cell M8. Have Goal Seek change the value of cell B7 until it locates the correct value.
   iii. Using Scenario Manager, create a new scenario named 5% Above Threshold. Have the scenario work by changing the values of A3 and B7 to the values they contain now.

10. 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 (8.39”).
d. Set the height for rows 2 through 5 to 110 (1.53”).
e. Change the vertical alignment setting for columns A and B so that text is displayed at the top of each row.
f. Turn on text wrapping for column B.
Starting in row 2 of the Analysis Questions sheet, answer four of the five analysis questions below. Respond to one question per row.

a. Based on the age group populations shown on the PivotTable, do you think that Charleston could have enough new births to cause a net increase its population? Why or why not?

b. How is Charleston’s population changing relative to that of the rest of Kanawha County?

c. Do you think that the growth rate calculated by Goal Seek in the second scenario is attainable? Why or why not?

d. Other than merging with other area cities and towns, what sort of things could Charleston do to help boost its population? List one or two ideas.

e. On a national perspective, what sort of relationship exists between the country’s rising total population and the number of cities meeting the 50,000 threshold for federal grants? What would happen if the thresholds were adjusted to become a percentage of the country’s total population rather than a fixed number?

Grading Rubric

This is a practice assignment and is worth no points. A comparable Homework would be worth 50 points and graded using this rubric, with partial credit awarded as appropriate:

| Steps 3a-c | 1 points total | Steps 8a-b | 6 points total |
| Step 4    | 2 points total | Steps 9a-b | 10 points total |
| Steps 5a-g| 3 points total | Steps 10a-f| 3 points total |
| Steps 6a-c| 10 points total| Steps 11a-e (pick 4 of 5) | 2.5 points each |
| Steps 7a-f| 4 points total |

The analysis questions in Steps 11a-e can be evaluated using this rubric:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Meets Requirements (1.25 points)</th>
<th>Does Not Meet Requirements (0 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer is reasonable.</td>
<td>Answer addresses the question prompt and is factually correct or a reasonable interpretation of available data.</td>
<td>Answer does not address the question prompt, is factually incorrect, or is an unreasonable interpretation of available data.</td>
</tr>
<tr>
<td>Answer is supported.</td>
<td>Logical rationale is provided to support the given answer.</td>
<td>Logical rationale is not provided to support the given answer.</td>
</tr>
</tbody>
</table>

Acknowledgments

The image in the introduction appears courtesy of Analogue Kid [4].
References


