

**Homework #5 (Regression)**  
**PSCI 2300 - Fall 2019 (Dr. Hensel)**

This homework assignment is due at the beginning of class (i.e., before lecture starts) on **Wednesday, December 4**. Any work turned in after lecture begins that day (even if only a few minutes into class) will be assessed a late penalty. Also, note that all work must be your own -- students found to have copied their answers from other students (or to have had their answers copied by other students) will receive automatic zero grades on this assignment, and may face further disciplinary action.

*This homework assignment requires you to analyze data on the countries of the world compiled by the author of our textbook, which is the same data set that you used in Homework #4 (and is available from the same portion of the class web site where you access the homework assignments). You will analyze this data using SPSS (or PSPP) statistical software. The last page of this homework assignment sheet provides instructions for using SPSS and PSPP, and more detail is available in the class SPSS Guide that Dr. Hensel has created and posted on the same web page where you access the homework assignments.*

1. Come up with a theoretical story to explain the total wealth of countries around the world. You should spend 2-3 sentences each explaining the expected impact of the following 3 independent variables, which you then summarize in three research hypotheses:

- Whether or not the country is democratic ( $H_1$ )
- The country's literacy rate ( $H_2$ )
- The country's total population ( $H_3$ )

2. Use SPSS (or PSPP) to run a multiple regression analysis of voter turnout, adding population age and battleground state status as well as education. The dependent variable is **Gdp\_08** ("GDP (billions) WB" - the size of the country's economy as measured by the World Bank) and the independent variables are **Democ** ("Democracy?" - a dummy variable indicating whether or not the country is democratic), **Literacy** ("Literacy rate (CIA)" - the country's literacy rate as measured by the CIA), and **Pop\_total** ("Total population in millions, 2010 (UN)" - the country's population as measured by the UN).

Be sure that your homework includes the full output, including the "Model Summary" box (where you will find  $R^2$ ), "ANOVA" (where you will find F and its significance), and "Coefficients" (where you will find the unstandardized coefficients with their t-ratios and significance).

3. Is the impact of democracy on wealth statistically significant in this model? This will require evaluating the significance of the t-ratio for this variable.

4. Interpret the impact of democracy on wealth in this model. If this variable is not statistically significant, that is all you need to answer, because we can not rule out random chance as an explanation for the observed association. If it is significant, interpret the meaning of the unstandardized regression coefficient, and decide whether or not the direction of this relationship is consistent with  $H_1$ .

Note that this is a dummy variable!

5. Is the impact of literacy on wealth statistically significant in this model? This will require evaluating the significance of the t-ratio for this variable.

6. Interpret the impact of literacy on wealth in this model. If this variable is not statistically significant, that is all you need to answer, because we can not rule out random chance as an explanation for the observed association. If it is significant, interpret the meaning of the unstandardized regression coefficient, and decide whether or not the direction of this relationship is consistent with  $H_2$ .

7. Is the impact of population on wealth statistically significant in this model? This will require evaluating the significance of the t-ratio for this variable.
8. Interpret the impact of population on wealth in this model. If this variable is not statistically significant, that is all you need to answer, because we can not rule out random chance as an explanation for the observed association. If it is significant, interpret the meaning of the unstandardized regression coefficient, and decide whether or not the direction of this relationship is consistent with  $H_3$ .
9. Interpret the significance of the model overall, using the F-ratio and its associated p-value ("Sig.").
10. Interpret the model fit, using  $R^2$ .

### SPSS Instructions for This Assignment

- For more detail about using SPSS or PSPP, including links to online resources that give more details on how to use these methods in SPSS and interpret their results, see my SPSS Guide document that is posted on the class web site.

**<<http://www.paulhensel.org/Teaching/spss.pdf>>**

- Download the data set that you will need for this assignment (perhaps to a flash drive if you are not working on your own personal computer) -- *please note that this is the same data set used for homework #4, so if you still have that available, you do not need to do any additional work to reacquire it.* From a computer that has SPSS or PSPP, open this data file, using one of the following two options:
  - Double-click on the data set, which should automatically open SPSS and then open the data set in SPSS. [Note that this option does not work in PSPP]
  - Open SPSS/PSPP manually by clicking on the icon or on an alias/shortcut to it. Once it is open, select and open the data set using **File > Open** from the menu bar at the top of the screen.

### *Regression*

- Go to **Analyze > Regression > Linear**. This will open a dialog box that allows you to choose variables for analysis.
- Select the dependent variable on the left side of this box, push the arrow button toward the top of the screen, and the variable should then appear in the "Dependent" window at the right side of the box. Do the same to select the independent variables, and push the button in the middle of the screen to select this for the "Independent(s)" box. Using the Statistics button, make sure that Estimates, Confidence Intervals, and Model Fit are selected (in PSPP select "Coeff," "Conf. interval," "R," and "ANOVA" to get the same information), click Continue to return to the variable selection screen, and click OK to run the analysis. (If you want to remove a variable from the list, select the variable in the right side of the box, and click the arrow in the middle of the screen.)
- Once the output appears in the Output Viewer window, be sure to print it out (or copy and paste it into a word processing document), because you will need to turn this in to get full credit for your assignment.