**Assignment 1: Due Feb 27 before Midnight**

**Directions:** Respond appropriately to the following questions. Upload your final assignment onto e-learning by the due date. Insert all tables and images, if any, into your word file (or pdf) so that answers are all in one place. Copy and paste your STATA code at the end of the assignment or submit a separate do file. Part of your grade (5 points) will be based on the code, and the remaining will be based on your ability to follow directions and *fully* explain econometric models (75 points). This is an individual assignment. You must turn in your own word document (or pdf). Late submissions within 24 hours will receive 50% of the original points, late submissions within 48 hours will receive 25%, and so on.

1. (Lecture 2) (12 points) Use the data in CHARITY [obtained from Franses and Paap (2001)] to answer the following questions:
2. (2 points) What is the average gift in the sample of 4,268 people (in Dutch guilders)? What percentage of people gave no gift?
3. (2 points) What is the average mailings per year? What are the minimum and maximum values?
4. (2 points) Estimate the model

by OLS and report the results in the usual way, including the sample size and R-squared.

1. (4 points) Interpret the slope coefficient. If each mailing costs one guilder, is the charity expected to make a net gain on each mailing? Does this mean the charity makes a net gain on every mailing? Explain.
2. (2 points) What is the smallest predicted charitable contribution in the sample? Using this simple regression analysis, can you ever predict zero for gift?
3. (Lecture 3) (14 points) The file CEOSAL2 contains data on 177 chief executive officers and can be used to examine the effects of firm performance on CEO salary.
4. (3 points) Estimate a model relating annual salary to firm sales and market value. Make the model of the constant elasticity variety for both independent variables. Report the results in the usual way.
5. (4 points) Add *profits* to the model from part (i), re-estimate the model and report the results in the usual way. Why can this variable not be included in logarithmic form? Would you say that these firm performance variables explain most of the variation in CEO salaries?
6. (3 points) Add the variable *ceoten* to the model in part (ii), re-estimate the model and report the results in the usual way. What is the estimated percentage return for another year of CEO tenure, holding other factors fixed?
7. (4 points) Find the sample correlation coefficient between the variables log(*mktval*) and *profits*. Are these variables highly correlated? What does this say about the OLS estimators? [Hint: You can use the stata command correlate.]
8. (Lecture 4) (17 points) Refer to the example used in Lecture 4 to compare the returns to education at junior colleges and four-year colleges. The model after rearrangement is

where *totcoll* is total years of college. Use the data set TWOYEAR, which comes from Kane and Rouse (1995).

1. (5 points) Run the regression above and report the OLS estimates in the usual form, including the standard errors, sample size and R-squared. How do you interpret ? Is it statistically significant?
2. (2 points) The variable *phsrank* is the person’s high school percentile. (A higher number is better. For example, 90 means you are ranked better than 90 percent of your graduating class.) Find the smallest, largest, and average *phsrank* in the sample.
3. (4 points) Add *phsrank* to the model and report the OLS estimates in the usual form. Is *phsrank* statistically significant? How much is 10 percentage points of high school rank worth in terms of wage?
4. (3 points) Compare regression results in (i) and (iii), does adding *phsrank* to the model substantively change the conclusions on the returns to two- and four-year colleges? Explain.
5. (3 points) The data set contains a variable called *id*. Explain why if you add *id* to the model you expect it to be statistically insignificant. What is the two-sided p-value?
6. (Lecture 4) (9 points) Use the data set GPA1 to answer this question.
7. (3 points) Run the regression *colGPA* on *PC*, *hsGPA*, and *ACT* and obtain a 95% confidence interval for βPC. Is the estimated coefficient statistically significant at the 5% level against a two-sided alternative?
8. (3 points) Discuss the statistical significance of the estimates and in part (i). Is *hsGPA* or *ACT* the more important predictor of *colGPA*? Explain.
9. (3 points) Add the two indicators *fathcoll* and *mothcoll* to the regression in part (i). Is either individually significant? Are they jointly statistically significant at the 5% level?
10. (Lecture 5) (10 points) Use the data in WAGE1 for this exercise.
11. (4 points) Estimate the equation

and report the OLS estimates in the usual form. Save the residuals and plot a histogram.

[Hint: 1) You can obtain the residuals of each prediction by using the **residuals** command and storing these values in a variable named whatever you’d like, e.g., predict resid\_wage, residuals. 2) You can use the **histogram** command to plot a histogram, e.g., histogram resid\_wage.]

1. (4 points) Repeat part (i), but with log(*wage*) as the dependent variable.
2. (2 points) Would you say that Assumption MLR.6 is closer to being satisfied for the level-level model or the log-level model? Explain.
3. (Lecture 5) (13 points) The model we used in class to explain the standardized outcome on a final exam (*stndfnl*) in terms of percentage of classes attended, prior college grade point average, and ACT score is

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1. (2 points) Argue that
2. (3 points) Use the equation above to estimate the partial effect of *priGPA* on *stndfnl* when *priGPA* is at its mean value 2.59, and *atndrte* is also at it mean value 82. Interpret your estimate. [Hint: The estimated OLS equation can be found in Lecture 5.]
3. (4 points) Show that the equation can be re-written as

where .

How do you interpret ?

1. (4 points) Following (iii), suppose that, in place of , you put . Now how do you interpret the coefficients on *atndrte* and *priGPA*?