ECON 4230 Intermediate Econometric Theory
Problem Set #1
Due: Tuesday, February 19, 2019

Directions. **Make sure your answers are typed and tables are appropriately formatted. Turn in a hard copy at the beginning of class on the date above.**

#1. For the two-variable regression model, derive the ordinary least squares slope estimator for two cases: (1) with an intercept; and (2) when the intercept is restricted to be zero. Compare the slope estimator for the two cases and comment on the results.

#2. Verify the second-order conditions for case (2) above when the intercept is suppressed.

#3. Using Table 2.10 from our textbook, estimate three separate regression models to predict family income using (*i*) critical reading, (*ii*) mathematics, and (*iii*) writing SAT scores. Which model is the best predictor of family income? Defend your answer.

#4. Gujarati and Porter, 5th Edition, Exercise 3.10.

#5. Go to the Federal Reserve Economic Database (FRED) and collect U.S. time series data on current-dollar consumption and GDP over the sample period 1980:1-2018:4. Estimate a two-variable Keynesian consumption function and address the following items:

a) Report the regression results and comment on the results.
b) Provide a graph of the residuals over time.
c) Using the graph in part (b) and economic theory to guide your answers, which Classical assumptions are most dubious?
d) What is the prediction level of consumption in the first two quarters of 2018? Did the model do a good job of predicting consumption?
e) What is the R^2 value? How do you interpret the number and why do you think it is so high?
f) Re-estimate the model using growth rates of consumption and GDP. Graph the residuals and contrast the results with the consumption function estimated in levels. What is the predicted level of consumption for the first two quarters of 2018 using the model in growth rates? Contrast with the results in part (d). Which model do you prefer: levels or growth rates?
g) Finally, perform a hypothesis test that the government spending multiplier equals 10.