#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. When would the two estimators give the same answer?

#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. Repeat the regressions with the intercept suppressed. Discuss the results.


#7. Go to the Federal Reserve Economic Database (www.research.stlouisfed.org/fred2/) and collect U.S. time series data on current-dollar consumption and GDP over the sample period 1980:1-2013:4. Using STATA, 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 error for consumption in the first two quarters of 2013? 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 error for consumption growth for the first two quarters of 2014? Contrast with the results in part (d). Which model do you prefer: levels or growth rates?

#8. Use the estimates from #7a and normally distributed errors to perform a Monte Carlo experiment that derives the sampling distribution (from 25 samples) for the marginal propensity to consume. You are free to use any software program (i.e., Excel, GAUSS, Mathematica, STATA, etc.). Comment on the sampling distribution, as well as its mean and standard deviation.