**Exercise 7**

To examine the quantity theory of money, Brumm (2005) [‘‘Money Growth, Output Growth, and Inflation: A Reexamination of the Modern Quantity Theory’s Linchpin Prediction,’’ *Southern Economic Journal*, 71(3), 661–667] specifies the equation:

$$Inflation=β\_{0}+β\_{1}\*Money+β\_{2}\*Output+u$$

where *INFLAT* is the growth rate of the general price level, *MONEY* is the growth rate of the money supply, and *OUTPUT* is the growth rate of national output. According to theory we should observe that $β\_{0}=0, β\_{1}=1,$ and $β\_{2}=-1$. The data used in this paper is contained in the file *brumm.gdt*. It consists of 1995 year data on 76 countries.

1. Estimate the model by OLS and interpret all the parameters.
2. Test the joint hypothesis that $β\_{0}=0, β\_{1}=1$ and $β\_{2}=-1$. What do you conclude?
3. Examine the least squares residuals for the presence of heteroskedasticity related to the variable *Money*.
4. Obtain robust standard errors for the model and compare them to the OLS standard errors. Does your conclusion change in part (b) after using robust standard errors?
5. It is argued that *Output* may be endogenous. Four instrumental variables are proposed, *INITIAL* = initial level of real GDP, *SCHOOL* = a measure of the population’s educational attainment, *INVEST* = average investment as a share of GDP, and *POPRATE* = average population growth rate. Using these instruments, obtain instrumental variables (2SLS) estimates of the inflation equation (do the two stage procedure).
6. Are the instruments strong?