

## PS206 Homework #2 (Due Friday, April 24th)

Listed under Homework #2 on our class page is a Stata do file called “mylogit.do”. There is also an R file called “mylogit.R”. Download the files of your choice and do the following problems.

(1) First run a logit with “voted2004” as the dependent variable and “yrseeduc” as the independent variable using the commands you used in Homework #1. Then run our user-written maximum likelihood program to estimate the same model. In **Stata** you can simply type `do C:\mylogit.do` (assuming you saved mylogit.do on your C drive – of course if you save it somewhere else you need to change that path). The type `ml maximize` to run the program.

In **R** you can simply run mylogit.R after you modify the file to look for the data in the right place. Verify that the program you are using produces the same results as the “canned” routines we used last week.

(2) Now try changing the start values for our maximum likelihood problem. To do this in **Stata** first type `drop program mylogit`, and then run the do file again – this reloads the program. Then type `init _cons = 2` and `init yrseeduc = 1`. These two commands reset the start values from the default of 0 for each coefficient to 2 for the constant term, and 1 for years of education. Typing `ml maximize` will estimate the model using these new start values.

To change the start values in the **R** code in the same way, modify the line that reads `startv <- c(0,0)` to read `startv <- c(2,1)`, and then run the code again.

Examine the output of the log-likelihood at each iteration and explain why it differs from the same output in question 1.

(3) Now rescale this logit code to produce coefficients similar to those produced by a probit model. To do this in **Stata**, replace every `exp('theta')` with `exp('theta' * 1.81)`. To do this in **R**, replace every `exb <- exp(X%*%beta)` with `exb <- exp((X%*%beta) * 1.81)`.

Run the program again (first dropping and reloading it if you are using **Stata**). Then run a probit model using the “canned” routine on the same data. Explain in detail why the modification we made to our code produced logit coefficients that were similar to probit coefficients.