90-771, Applied Econometrics II
Heinz School, Carnegie Mellon University
Spring, 2004-5

Solution # 3

Please use the MEPS data from the website for this assignment. We are curious about the determinants of medical spending.

1. **Please use a linear probability model to make an estimate of and a 95% confidence interval for the effect of having employment on the probability of having health insurance. Please use bootstrapping to calculate the standard error of the estimate and to calculate the confidence interval. In the LPM, please control for age, sex, employment and income.**

   It was necessary to recode income in thousands to get reasonable results. See the SAS program.

   The LPM estimates appear on page 2 of the output. The bootstrapped standard error appears on page 10. The LPM estimates that being employed raises the chances of being insured by about 1.9 percentage points with bootstrapped standard error of 1.1 percentage points.

   A 95% bootstrapped BCa confidence interval for this effect is from -.2 percentage points up to 4.0 percentage points.

2. **Please use a linear regression model to estimate the effect of a $1 increase in income on health spending, controlling for age, sex, and employment. Make a 95% confidence interval.**

   This model appears on page 14. The estimate and 95% CI for the effect of a $1 increase in income on spending is to increase it by 0.45 cents plus or minus 0.76 cents.

3. **Why might you want to estimate a Tobit model or a sample selection model rather than the linear regression model?**

   Well, spending is zero for about 17% of the observations — see page 1. As we discussed in class, when a LHS variable has a lot of zeros, OLS may not be a good idea.

4. **Please use a Tobit model to calculate the average marginal effect of income on expected medical spending in the sample. (proc qlim!)**

   The results of this are reported on page 15. The marginal effect of a $1 increase in income on spending is to raise it by $0.01. (remember that income is measured in $1,000 in the SAS program)

Unfortunately, it appears that qlim does not calculate the marginal effect of income on expected spending, rather it calculates the marginal effect of income on spending-star.

To get the proper marginal effect, we have to multiply the sample selection coefficient on income by the probability of spending $> 0$ for each obs. To do this, we need the average predicted probability for each obs, and this is obtained by specifying "predicted" on the output line (see the SAS program).

The results for this appear on page 17. and the average predicted probability is 0.53. So, the Tobit marginal effect of a \$1 increase in income is to increase spending by $0.53(21.1)/1000 = \$0.011$.

5. **Do the same using a sample selection model. On the selection equation please include age, sex, employment, insurance, and income. On the spending equation, please include age, sex, and income.**

   The results from this appear on pages 18-19. It appears that the effect of income on spending here is that a \$1 increase in income lowers spending by about \$0.015.

   Unfortunately, it appears that qlim does not calculate the marginal effect of income on expected spending, rather it calculates the marginal effect of income on spending-star.

   To get the proper marginal effect, we have to multiply the sample selection coefficient on income by the probability of spending¿0 for each obs. To do this, we need the average predicted probability for each obs, and this is obtained by specifying "predicted" on the output line (see the SAS program).

   The results for this appear on page 20. and the average predicted probability is 0.95. So, the marginal effect of a \$1 increase in income is to decrease spending by $0.95(14.73)/1000 = \$0.014$.