The recid data will be on the syllabus.

1. For the next class please compute the marginal effect of an extra month of time served (tserved) on the dependent variable, log(durat), for the following three models: OLS, censored, truncated. Why are the answers different from one another?
2. Just for fun I have looked at the question of why people are not recidivists. For this there are two extra tables at the bottom of the document. How would you go about using the extra tables to compare those who went back to jail during the study period and those who did not?

The code that I used to create the censoring point is

Ldurat01 = ldurat

Smpl if ldurat > 4.248495

Ldurat01=4.248495

Smpl @all

There is a variable in the recid.raw file called cens, which is a 0, 1 sequence to indicate whether and observation is censored. There is a coding mistake in this series; it includes eight fewer observations than the code shown above. The above code is consistent with the discussion in Wooldridge’s text.

The OLS results are

|  |  |  |
| --- | --- | --- |
| Dependent Variable: LDURAT |  |  |
| Method: Least Squares |  |  |
| Date: 09/20/11 Time: 19:35 |  |  |
| Sample: 1 1445 |  |  |  |
| Included observations: 1445 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 3.569168 | 0.137962 | 25.87066 | 0.0000 |
| WORKPRG | 0.008758 | 0.048946 | 0.178933 | 0.8580 |
| PRIORS | -0.059064 | 0.009172 | -6.439761 | 0.0000 |
| TSERVED | -0.009400 | 0.001301 | -7.227340 | 0.0000 |
| FELON | 0.178543 | 0.058408 | 3.056836 | 0.0023 |
| ALCOHOL | -0.262801 | 0.059809 | -4.393985 | 0.0000 |
| DRUGS | -0.090744 | 0.054937 | -1.651780 | 0.0988 |
| BLACK | -0.179101 | 0.047435 | -3.775689 | 0.0002 |
| MARRIED | 0.134433 | 0.055434 | 2.425089 | 0.0154 |
| EDUC | 0.005391 | 0.009926 | 0.543184 | 0.5871 |
| AGE | 0.001326 | 0.000225 | 5.895805 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.108729 |     Mean dependent var | 3.745150 |
| Adjusted R-squared | 0.102514 |     S.D. dependent var | 0.925045 |
| S.E. of regression | 0.876348 |     Akaike info criterion | 2.581476 |
| Sum squared resid | 1101.291 |     Schwarz criterion | 2.621639 |
| Log likelihood | -1854.117 |     Hannan-Quinn criter. | 2.596466 |
| F-statistic | 17.49383 |     Durbin-Watson stat | 2.035517 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

The result when we treat the censoring problem is

|  |  |  |
| --- | --- | --- |
| Dependent Variable: LDURAT01 |  |  |
| Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing) |
| Date: 09/20/11 Time: 23:20 |  |  |
| Sample: 1 1445 |  |  |  |
| Included observations: 1445 |  |  |
| Right censoring (value) series: 4.248495 |  |
| Convergence achieved after 5 iterations |  |
| QML (Huber/White) standard errors & covariance |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | z-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 4.073603 | 0.369183 | 11.03411 | 0.0000 |
| WORKPRG | -0.050399 | 0.121311 | -0.415451 | 0.6778 |
| PRIORS | -0.136572 | 0.024924 | -5.479581 | 0.0000 |
| TSERVED | -0.018960 | 0.003097 | -6.121231 | 0.0000 |
| FELON | 0.423724 | 0.143228 | 2.958390 | 0.0031 |
| ALCOHOL | -0.609625 | 0.144569 | -4.216845 | 0.0000 |
| DRUGS | -0.294994 | 0.126743 | -2.327496 | 0.0199 |
| BLACK | -0.527684 | 0.114962 | -4.590090 | 0.0000 |
| MARRIED | 0.324759 | 0.136011 | 2.387739 | 0.0170 |
| EDUC | 0.021674 | 0.025085 | 0.864027 | 0.3876 |
| AGE | 0.003851 | 0.000726 | 5.304629 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Error Distribution |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| SCALE:C(12) | 1.778042 | 0.054466 | 32.64523 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
| Mean dependent var | 3.704314 |     S.D. dependent var | 0.899405 |
| S.E. of regression | 0.856890 |     Akaike info criterion | 2.188736 |
| Sum squared resid | 1052.929 |     Schwarz criterion | 2.232550 |
| Log likelihood | -1569.362 |     Hannan-Quinn criter. | 2.205089 |
| Avg. log likelihood | -1.086064 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Left censored obs | 0 |      Right censored obs | 901 |
| Uncensored obs | 544 |      Total obs | 1445 |
|  |  |  |  |  |
|  |  |  |  |  |

If we pretend that we have a truncated sample then the result is

|  |  |  |
| --- | --- | --- |
| Dependent Variable: LDURAT01 |  |  |
| Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing) |
| Date: 09/20/11 Time: 23:21 |  |  |
| Sample (adjusted): 3 1440 |  |  |
| Included observations: 544 after adjustments |  |
| Truncated sample |  |  |
| Right censoring (value) series: 4.248495 |  |
| Convergence achieved after 7 iterations |  |
| Covariance matrix computed using second derivatives |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | z-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 3.422180 | 0.395760 | 8.647119 | 0.0000 |
| WORKPRG | 0.120506 | 0.132232 | 0.911325 | 0.3621 |
| PRIORS | -0.067861 | 0.021109 | -3.214828 | 0.0013 |
| TSERVED | -0.009759 | 0.002856 | -3.417128 | 0.0006 |
| FELON | 0.210315 | 0.165217 | 1.272959 | 0.2030 |
| ALCOHOL | -0.333527 | 0.150777 | -2.212052 | 0.0270 |
| DRUGS | 0.030793 | 0.141941 | 0.216941 | 0.8283 |
| BLACK | 0.011823 | 0.131252 | 0.090082 | 0.9282 |
| MARRIED | 0.426278 | 0.165649 | 2.573382 | 0.0101 |
| EDUC | -0.033931 | 0.030417 | -1.115519 | 0.2646 |
| AGE | 0.000818 | 0.000692 | 1.182586 | 0.2370 |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Error Distribution |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| SCALE:C(12) | 1.124921 | 0.059566 | 18.88514 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
| Mean dependent var | 2.803013 |     S.D. dependent var | 0.919767 |
| S.E. of regression | 0.898388 |     Akaike info criterion | 2.448981 |
| Sum squared resid | 430.1846 |     Schwarz criterion | 2.543811 |
| Log likelihood | -654.1229 |     Hannan-Quinn criter. | 2.486057 |
| Avg. log likelihood | -1.202432 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Left censored obs | 0 |      Right censored obs | 0 |
| Uncensored obs | 544 |      Total obs | 544 |
|  |  |  |  |  |
|  |  |  |  |  |

Censoring from the left. Anyone who returned to jail was censored and their ldurat was recoded as 2.248494. Therefore anyone remaining free for 70 or more months was not censored. The result is

|  |  |  |
| --- | --- | --- |
| Dependent Variable: LDURAT02 |  |  |
| Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing) |
| Date: 09/21/11 Time: 09:34 |  |  |
| Sample: 1 1445 |  |  |  |
| Included observations: 1445 |  |  |
| Left censoring (value) series: 2.248494 |  |
| Convergence achieved after 4 iterations |  |
| Covariance matrix computed using second derivatives |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | z-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 2.719962 | 0.239091 | 11.37625 | 0.0000 |
| WORKPRG | -0.038246 | 0.085114 | -0.449356 | 0.6532 |
| PRIORS | -0.091917 | 0.016766 | -5.482456 | 0.0000 |
| TSERVED | -0.014803 | 0.002452 | -6.037718 | 0.0000 |
| FELON | 0.281646 | 0.101558 | 2.773247 | 0.0056 |
| ALCOHOL | -0.390980 | 0.105202 | -3.716448 | 0.0002 |
| DRUGS | -0.235967 | 0.096331 | -2.449534 | 0.0143 |
| BLACK | -0.406370 | 0.082584 | -4.920696 | 0.0000 |
| MARRIED | 0.134130 | 0.095770 | 1.400551 | 0.1613 |
| EDUC | 0.024269 | 0.017048 | 1.423532 | 0.1546 |
| AGE | 0.002530 | 0.000388 | 6.519661 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Error Distribution |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| SCALE:C(12) | 1.444443 | 0.038269 | 37.74399 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
| Mean dependent var | 3.536390 |     S.D. dependent var | 1.001725 |
| S.E. of regression | 0.962325 |     Akaike info criterion | 2.915941 |
| Sum squared resid | 1327.983 |     Schwarz criterion | 2.959754 |
| Log likelihood | -2094.767 |     Hannan-Quinn criter. | 2.932293 |
| Avg. log likelihood | -1.449666 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Left censored obs | 544 |      Right censored obs | 0 |
| Uncensored obs | 901 |      Total obs | 1445 |
|  |  |  |  |  |
|  |  |  |  |  |

Now using the same model, but assuming that the recidivists have disappeared into the “system” and “the man” won’t give us access to them. The sample is now truncated from below. We only observe those who have stayed out of jail. The result for the truncated sample is (In order to do this one I switched from the quadratic hill climb to the BHHH algorithm):

|  |  |  |
| --- | --- | --- |
| Dependent Variable: LDURAT02 |  |  |
| Method: ML - Censored Normal (TOBIT) (BHHH) |  |
| Date: 09/21/11 Time: 09:39 |  |  |
| Sample: 1 1445 |  |  |  |
| Included observations: 901 |  |  |
| Truncated sample |  |  |
| Left censoring (value) series: 2.248494 |  |
| Convergence achieved after 16 iterations |  |
| QML (Huber/White) standard errors & covariance |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | z-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 4.309321 | 0.008187 | 526.3379 | 0.0000 |
| WORKPRG | 0.005334 | 0.003115 | 1.712533 | 0.0868 |
| PRIORS | 0.000634 | 0.000580 | 1.092823 | 0.2745 |
| TSERVED | -0.000220 | 0.000115 | -1.922038 | 0.0546 |
| FELON | -0.001016 | 0.003680 | -0.276135 | 0.7824 |
| ALCOHOL | -0.022847 | 0.003633 | -6.289454 | 0.0000 |
| DRUGS | 0.012116 | 0.003612 | 3.354676 | 0.0008 |
| BLACK | -0.003589 | 0.003036 | -1.182459 | 0.2370 |
| MARRIED | -0.004246 | 0.003305 | -1.284907 | 0.1988 |
| EDUC | 0.000750 | 0.000583 | 1.286801 | 0.1982 |
| AGE | 7.30E-06 | 1.30E-05 | 0.563108 | 0.5734 |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Error Distribution |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| SCALE:C(12) | 0.044125 | 0.000728 | 60.61163 | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
| Mean dependent var | 4.313988 |     S.D. dependent var | 0.045583 |
| S.E. of regression | 0.044397 |     Akaike info criterion | -3.376937 |
| Sum squared resid | 1.754272 |     Schwarz criterion | -3.312961 |
| Log likelihood | 1533.310 |     Hannan-Quinn criter. | -3.352499 |
| Avg. log likelihood | 1.701787 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Left censored obs | 0 |      Right censored obs | 0 |
| Uncensored obs | 901 |      Total obs | 901 |
|  |  |  |  |  |
|  |  |  |  |  |