**Sony Nghiem**

**Exercise 6 – Advanced Econometrics**

Problem 1

(A)

Ordered probit model for pctstk

|  |  |
| --- | --- |
|  | (1) |
| VARIABLES | pctstck |
|  |  |
| choice | 0.371\*\* |
|  | (0.184) |
| age | -0.0501\*\* |
|  | (0.0226) |
| educ | 0.0261 |
|  | (0.0353) |
| female | 0.0456 |
|  | (0.206) |
| black | 0.0934 |
|  | (0.282) |
| married | 0.0936 |
|  | (0.233) |
| finc25 | -0.578 |
|  | (0.423) |
| finc35 | -0.135 |
|  | (0.431) |
| finc50 | -0.262 |
|  | (0.427) |
| finc75 | -0.566 |
|  | (0.478) |
| finc100 | -0.228 |
|  | (0.469) |
| finc101 | -0.864 |
|  | (0.529) |
| wealth89 | -9.56e-05 |
|  | (0.000374) |
| prftshr | 0.482\*\* |
|  | (0.216) |
| Constant cut1 | -3.087\* |
|  | (1.624) |
| Constant cut2 | -2.054 |
|  | (1.619) |
|  |  |
| Observations | 194 |

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1. Ordered probit model with heteroskedasticity-robust to cluster correlation within family

|  |  |
| --- | --- |
|  | (1) |
| VARIABLES | pctstck |
|  |  |
| choice | 0.371\*\* |
|  | (0.183) |
| age | -0.0501\*\* |
|  | (0.0242) |
| educ | 0.0261 |
|  | (0.0351) |
| female | 0.0456 |
|  | (0.200) |
| black | 0.0934 |
|  | (0.253) |
| married | 0.0936 |
|  | (0.255) |
| finc25 | -0.578 |
|  | (0.524) |
| finc35 | -0.135 |
|  | (0.500) |
| finc50 | -0.262 |
|  | (0.496) |
| finc75 | -0.566 |
|  | (0.539) |
| finc100 | -0.228 |
|  | (0.534) |
| finc101 | -0.864 |
|  | (0.539) |
| wealth89 | -9.56e-05 |
|  | (0.000374) |
| prftshr | 0.482\* |
|  | (0.251) |
| Constant cut1 | -3.087\* |
|  | (1.724) |
| Constant cut2 | -2.054 |
|  | (1.714) |
|  |  |
| Observations | 194 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Ordered probit model with heteroskedasticity-robust standard errors

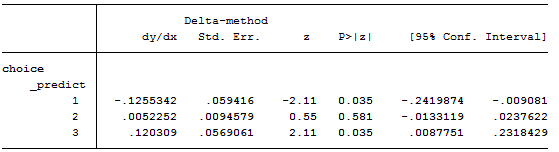
|  |  |
| --- | --- |
|  | (1) |
| VARIABLES | pctstck |
|  |  |
| choice | 0.371\*\* |
|  | (0.178) |
| age | -0.0501\*\* |
|  | (0.0246) |
| educ | 0.0261 |
|  | (0.0350) |
| female | 0.0456 |
|  | (0.205) |
| black | 0.0934 |
|  | (0.260) |
| married | 0.0936 |
|  | (0.247) |
| finc25 | -0.578 |
|  | (0.495) |
| finc35 | -0.135 |
|  | (0.486) |
| finc50 | -0.262 |
|  | (0.475) |
| finc75 | -0.566 |
|  | (0.516) |
| finc100 | -0.228 |
|  | (0.515) |
| finc101 | -0.864\* |
|  | (0.518) |
| wealth89 | -9.56e-05 |
|  | (0.000359) |
| prftshr | 0.482\*\* |
|  | (0.244) |
| Constant cut1 | -3.087\* |
|  | (1.737) |
| Constant cut2 | -2.054 |
|  | (1.729) |
|  |  |
| Observations | 194 |

Robust standard errors in parentheses

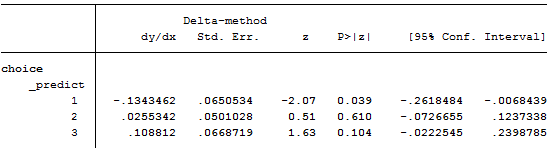
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Eyeballing the results, there are no significant difference between the standard errors between the two.

(C) The estimated average marginal effects of choice on probabilities of asset allocation in defined contribution plans



(D) Estimate the marginal effects of choice for a single, nonblack female with 12 years of education who is 60 years old. Assume she has net worth (in 1989) equal to $150,000 and earns $45,000 per year, and her plan is not profit sharing.



(E) E(pctstk |choice =1, x\*) =



E(pctstk |choice =0, x\*) =



Problem 2.

Here is the descriptive statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Obs | Mean | Std.Dev. | Min | Max |
| NR | 4,360 | 5262 | 3496 | 13 | 12548 |
| YEAR | 4,360 | 1984 | 2.292 | 1980 | 1987 |
| AG | 4,360 | 0.0321 | 0.176 | 0 | 1 |
| BLACK | 4,360 | 0.116 | 0.320 | 0 | 1 |
| BUS | 4,360 | 0.0759 | 0.265 | 0 | 1 |
| CON | 4,360 | 0.0750 | 0.263 | 0 | 1 |
| ENT | 4,360 | 0.0151 | 0.122 | 0 | 1 |
| EXPER | 4,360 | 6.515 | 2.826 | 0 | 18 |
| FIN | 4,360 | 0.0369 | 0.189 | 0 | 1 |
| HISP | 4,360 | 0.156 | 0.363 | 0 | 1 |
| HLTH | 4,360 | 0.0170 | 0.129 | 0 | 1 |
| HOURS | 4,360 | 2191 | 566.4 | 120 | 4992 |
| MAN | 4,360 | 0.282 | 0.450 | 0 | 1 |
| MAR | 4,360 | 0.439 | 0.496 | 0 | 1 |
| MIN | 4,360 | 0.0156 | 0.124 | 0 | 1 |
| NC | 4,360 | 0.258 | 0.437 | 0 | 1 |
| NE | 4,360 | 0.190 | 0.392 | 0 | 1 |
| OCC1 | 4,360 | 0.104 | 0.305 | 0 | 1 |
| OCC2 | 4,360 | 0.0915 | 0.288 | 0 | 1 |
| OCC3 | 4,360 | 0.0534 | 0.225 | 0 | 1 |
| OCC4 | 4,360 | 0.111 | 0.315 | 0 | 1 |
| OCC5 | 4,360 | 0.214 | 0.410 | 0 | 1 |
| OCC6 | 4,360 | 0.202 | 0.402 | 0 | 1 |
| OCC7 | 4,360 | 0.0920 | 0.289 | 0 | 1 |
| OCC8 | 4,360 | 0.0147 | 0.120 | 0 | 1 |
| OCC9 | 4,360 | 0.117 | 0.321 | 0 | 1 |
| PER | 4,360 | 0.0167 | 0.128 | 0 | 1 |
| PRO | 4,360 | 0.0764 | 0.266 | 0 | 1 |
| PUB | 4,360 | 0.0401 | 0.196 | 0 | 1 |
| RUR | 4,360 | 0.204 | 0.403 | 0 | 1 |
| S | 4,360 | 0.351 | 0.477 | 0 | 1 |
| SCHOOL | 4,360 | 11.77 | 1.746 | 3 | 16 |
| TRA | 4,360 | 0.0656 | 0.248 | 0 | 1 |
| TRAD | 4,360 | 0.268 | 0.443 | 0 | 1 |
| UNION | 4,360 | 0.244 | 0.430 | 0 | 1 |
| WAGE | 4,360 | 1.649 | 0.533 | -3.579 | 4.052 |

1. Pooled Probit Regression

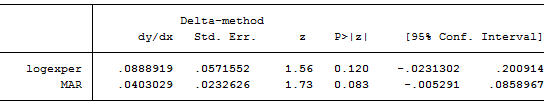
Pooled probit model

|  |  |
| --- | --- |
|  | (1) |
| VARIABLES | UNION |
|  |  |
| logexper | 0.321 |
|  | (0.207) |
| SCHOOL | 0.0653\*\* |
|  | (0.0305) |
| MAR | 0.146\* |
|  | (0.0844) |
| BLACK | 0.399\*\*\* |
|  | (0.132) |
| HISP | 0.199 |
|  | (0.135) |
| RUR | -0.0637 |
|  | (0.109) |
| HLTH | -0.498\*\* |
|  | (0.229) |
| NE | 0.169 |
|  | (0.154) |
| S | -0.0286 |
|  | (0.135) |
| NC | 0.170 |
|  | (0.151) |
| AG | -0.772\*\* |
|  | (0.330) |
| MIN | -0.304 |
|  | (0.357) |
| CON | -0.739\*\*\* |
|  | (0.213) |
| MAN | -0.384\*\* |
|  | (0.179) |
| TRA | -0.000861 |
|  | (0.211) |
| TRAD | -0.750\*\*\* |
|  | (0.185) |
| FIN | -1.054\*\*\* |
|  | (0.324) |
| BUS | -1.135\*\*\* |
|  | (0.198) |
| PER | -1.106\*\*\* |
|  | (0.241) |
| ENT | -0.826\*\* |
|  | (0.365) |
| PRO | -0.304 |
|  | (0.206) |
| OCC1 | -0.808\*\*\* |
|  | (0.169) |
| OCC2 | -0.906\*\*\* |
|  | (0.174) |
| OCC3 | -0.941\*\*\* |
|  | (0.195) |
| OCC4 | -0.174 |
|  | (0.144) |
| OCC5 | -0.244\* |
|  | (0.129) |
| OCC6 | -0.0344 |
|  | (0.131) |
| OCC7 | 0.152 |
|  | (0.141) |
| OCC8 | -0.630\* |
|  | (0.361) |
| 1981.YEAR | -0.0918 |
|  | (0.0787) |
| 1982.YEAR | -0.121 |
|  | (0.114) |
| 1983.YEAR | -0.233 |
|  | (0.143) |
| 1984.YEAR | -0.225 |
|  | (0.167) |
| 1985.YEAR | -0.379\*\* |
|  | (0.191) |
| 1986.YEAR | -0.468\*\* |
|  | (0.212) |
| 1987.YEAR | -0.297 |
|  | (0.232) |
| Constant | -1.282\*\* |
|  | (0.620) |
|  |  |
| Observations | 4,360 |

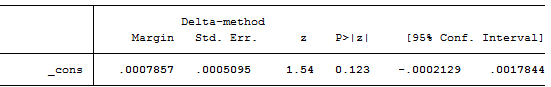
Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

For the average marginal effect of logexper and MAR,



For the average marginal effect of exper



1. Random effect regression

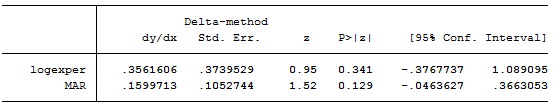
Random effect Probit Regression

|  |  |  |
| --- | --- | --- |
|  | (1) | (2) |
| VARIABLES | UNION | lnsig2u |
|  |  |  |
| logexper | 0.356 |  |
|  | (0.374) |  |
| SCHOOL | 0.0396 |  |
|  | (0.0597) |  |
| MAR | 0.160 |  |
|  | (0.105) |  |
| BLACK | 1.007\*\*\* |  |
|  | (0.281) |  |
| HISP | 0.519\* |  |
|  | (0.265) |  |
| RUR | 0.0234 |  |
|  | (0.153) |  |
| HLTH | -0.363 |  |
|  | (0.313) |  |
| NE | 0.431\* |  |
|  | (0.256) |  |
| S | -0.0758 |  |
|  | (0.234) |  |
| NC | 0.267 |  |
|  | (0.239) |  |
| AG | -1.051\*\*\* |  |
|  | (0.368) |  |
| MIN | -0.464 |  |
|  | (0.442) |  |
| CON | -0.776\*\*\* |  |
|  | (0.254) |  |
| MAN | -0.254 |  |
|  | (0.217) |  |
| TRA | -0.107 |  |
|  | (0.247) |  |
| TRAD | -0.818\*\*\* |  |
|  | (0.220) |  |
| FIN | -2.137\*\*\* |  |
|  | (0.453) |  |
| BUS | -1.143\*\*\* |  |
|  | (0.263) |  |
| PER | -1.217\*\*\* |  |
|  | (0.390) |  |
| ENT | -0.510 |  |
|  | (0.408) |  |
| PRO | -0.0486 |  |
|  | (0.237) |  |
| OCC1 | -0.647\*\*\* |  |
|  | (0.205) |  |
| OCC2 | -0.862\*\*\* |  |
|  | (0.230) |  |
| OCC3 | -0.702\*\*\* |  |
|  | (0.272) |  |
| OCC4 | -0.278 |  |
|  | (0.188) |  |
| OCC5 | -0.108 |  |
|  | (0.176) |  |
| OCC6 | -0.166 |  |
|  | (0.174) |  |
| OCC7 | 0.0629 |  |
|  | (0.191) |  |
| OCC8 | 0.195 |  |
|  | (0.477) |  |
| YEAR | -0.0693 |  |
|  | (0.0524) |  |
| Constant | 135.2 | 1.134\*\*\* |
|  | (102.9) | (0.127) |
|  |  |  |
| Observations | 3,815 | 3,815 |
| Number of NR | 545 | 545 |

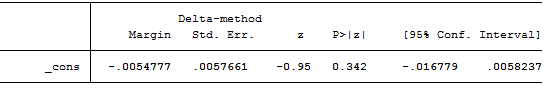
Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Here are the average marginal effects of logexper and MAR



Here is the average marginal effect of exper



1. Correlated Random Effect Probit Regression

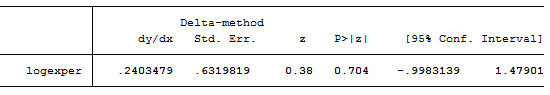
Correlated Random Effect Probit Regression

|  |  |  |
| --- | --- | --- |
|  | (1) | (2) |
| VARIABLES | UNION | lnsig2u |
|  |  |  |
| barlogexper | -0.0667 |  |
|  | (0.766) |  |
| barHOURS | -0.000108 |  |
|  | (0.000205) |  |
| barWAGE | 1.234\*\*\* |  |
|  | (0.261) |  |
| logexper | 0.240 |  |
|  | (0.632) |  |
| SCHOOL | -0.0550 |  |
|  | (0.0650) |  |
| MAR | 0.132 |  |
|  | (0.113) |  |
| BLACK | 1.130\*\*\* |  |
|  | (0.267) |  |
| HISP | 0.534\*\* |  |
|  | (0.243) |  |
| RUR | 0.0879 |  |
|  | (0.155) |  |
| HLTH | -0.373 |  |
|  | (0.330) |  |
| NE | 0.389 |  |
|  | (0.269) |  |
| S | 0.0289 |  |
|  | (0.229) |  |
| NC | 0.313 |  |
|  | (0.279) |  |
| AG | -0.967\*\* |  |
|  | (0.402) |  |
| MIN | -0.586 |  |
|  | (0.525) |  |
| CON | -0.794\*\*\* |  |
|  | (0.282) |  |
| MAN | -0.298 |  |
|  | (0.265) |  |
| TRA | -0.150 |  |
|  | (0.296) |  |
| TRAD | -0.800\*\*\* |  |
|  | (0.272) |  |
| FIN | -2.153\*\*\* |  |
|  | (0.515) |  |
| BUS | -1.109\*\*\* |  |
|  | (0.291) |  |
| PER | -1.174\*\*\* |  |
|  | (0.395) |  |
| ENT | -0.403 |  |
|  | (0.547) |  |
| PRO | -0.00446 |  |
|  | (0.324) |  |
| OCC1 | -0.735\*\*\* |  |
|  | (0.276) |  |
| OCC2 | -0.912\*\*\* |  |
|  | (0.258) |  |
| OCC3 | -0.750\*\* |  |
|  | (0.339) |  |
| OCC4 | -0.326 |  |
|  | (0.232) |  |
| OCC5 | -0.174 |  |
|  | (0.211) |  |
| OCC6 | -0.202 |  |
|  | (0.214) |  |
| OCC7 | 0.0435 |  |
|  | (0.216) |  |
| OCC8 | 0.188 |  |
|  | (0.562) |  |
| YEAR | -0.0500 |  |
|  | (0.0854) |  |
| Constant | 96.69 | 1.038\*\*\* |
|  | (169.3) | (0.133) |
|  |  |  |
| Observations | 3,815 | 3,815 |
| Number of NR | 545 | 545 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The average marginal effect of logexper



1. Random effect probit regression with lagged union status

Random effect probit with lagged union status

|  |  |  |
| --- | --- | --- |
|  | (1) | (2) |
| VARIABLES | UNION | lnsig2u |
|  |  |  |
| logexper | -0.000683 |  |
|  | (0.262) |  |
| lagged\_union | 1.134\*\*\* |  |
|  | (0.159) |  |
| SCHOOL | 0.0269 |  |
|  | (0.0370) |  |
| MAR | 0.187\*\* |  |
|  | (0.0903) |  |
| BLACK | 0.613\*\*\* |  |
|  | (0.179) |  |
| HISP | 0.279\* |  |
|  | (0.163) |  |
| RUR | -0.0234 |  |
|  | (0.113) |  |
| HLTH | -0.348 |  |
|  | (0.320) |  |
| NE | 0.190 |  |
|  | (0.177) |  |
| S | -0.0484 |  |
|  | (0.154) |  |
| NC | 0.161 |  |
|  | (0.181) |  |
| AG | -0.734\*\* |  |
|  | (0.339) |  |
| MIN | -0.249 |  |
|  | (0.426) |  |
| CON | -0.618\*\* |  |
|  | (0.242) |  |
| MAN | -0.213 |  |
|  | (0.216) |  |
| TRA | -0.0946 |  |
|  | (0.248) |  |
| TRAD | -0.665\*\*\* |  |
|  | (0.218) |  |
| FIN | -1.454\*\*\* |  |
|  | (0.382) |  |
| BUS | -0.991\*\*\* |  |
|  | (0.247) |  |
| PER | -1.089\*\*\* |  |
|  | (0.348) |  |
| ENT | -0.740 |  |
|  | (0.483) |  |
| PRO | -0.129 |  |
|  | (0.261) |  |
| OCC1 | -0.610\*\*\* |  |
|  | (0.211) |  |
| OCC2 | -0.796\*\*\* |  |
|  | (0.211) |  |
| OCC3 | -0.692\*\* |  |
|  | (0.283) |  |
| OCC4 | -0.236 |  |
|  | (0.180) |  |
| OCC5 | -0.119 |  |
|  | (0.162) |  |
| OCC6 | -0.163 |  |
|  | (0.168) |  |
| OCC7 | 0.0649 |  |
|  | (0.172) |  |
| OCC8 | -0.187 |  |
|  | (0.505) |  |
| YEAR | -0.0133 |  |
|  | (0.0386) |  |
| Constant | 25.17 | -0.121 |
|  | (75.92) | (0.294) |
|  |  |  |
| Observations | 3,815 | 3,815 |
| Number of NR | 545 | 545 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Somewhat different numbers from the last two columns of table II of Vela and Verbeek (1998), but we can conclude that there is a statistically significance of lagged union effect on the present union status.