

## ECONOMETRICS II - QED. SPRING 2024

### EXERCISES ON UNIT 1 (FIRST PART)

Send a “.do” file containing the necessary estimations, along with a PDF document containing the answers to each question, to my email address: henry.redondo@ua.es. Submit your assignment by Thursday, May 1st.

1. Use the data in GROGGER.DTA for this question and define a binary variable, say *arr86*, equal to unity if a man was arrested at least once during 1986, and zero otherwise.
  - (a) Estimate a linear probability model relating *arr86* to *pcnv*, *avgsen*, *tottime*, *ptime86*, *inc86*, *black*, *hispan*, and *born60*. Report the usual and heteroskedasticity-robust standard errors.
    - i. Estimate the proportion of predicted probabilities which are above 1 and below zero
    - ii. Interpret what is the effect on the probability of arrest if there is an increase of one standard deviation in the legal income (*inc86*)
    - iii. What is the estimated effect on the probability of arrest if the proportion of prior convictions increases from 0.25 to 0.75?
    - iv. Test the joint significance of *avgsen* and *tottime*, using a nonrobust and a robust test.
  - (b) Now estimate a probit model.
    - i. Consider a black person not born in 1960 with average values for *avgsen*, *tottime*, *inc86*, and *ptime86*, what is the estimated effect on the probability of arrest if the proportion of prior convictions increases from 0.25 to 0.75? Compare this result with the answer from part (a.iii).
    - ii. Compute the average partial effect on the probability of arrest of an increase in the proportion of prior convictions from 0.25 to 0.75. Interpret this effect and compare it with part (a.i).
    - iii. Obtain the percent correctly predicted. What is the percent correctly predicted when *narr86* = 0? When *narr86* > 0? What do you make of these findings?
    - iv. Add the terms *pcnvsq*, *pt86sq*, and *inc86sq* to the model. Are these individually or jointly significant? Describe the estimated relationship between the probability of arrest and the proportion of prior convictions. In particular, when does the proportion of prior convictions have a negative effect on probability of arrest?
2. The data KEANE.DTA contains employment and schooling history for a sample of men for the years 1981 to 1987. The three possible outcomes are enrolled in school (*status* = 1), not in school and not working (*status* = 2), and working (*status* = 3). The base category is enrolled in school. Use the data for 1981 for this exercise.
  - (a) Estimate a multinomial logit model using education, a quadratic in past work experience, and a black binary indicator as explanatory variables.
  - (b) Estimate the average partial effect of education on the probability of each outcome.
  - (c) Estimate the partial effect of education on the probability of each outcome for non-blacks with 11 years of education and 1 year of experience.
  - (d) Estimate the partial effect of black on the probability of each outcome for average years of education and experience.
  - (e) Compute the percent correctly predicted for each category and the overall percentage correctly.