

Laboratorio di valutazione delle decisioni di investimento

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1 Exercise on Bivariate profit with selection

Download the STATA data file `beeps_panel_V12_exer.dta`

The objective of the exercise is to estimate the probability that a firm is discouraged from applying for a loan. Discouraged firms are those firms that although need credit do not apply for a loan fearing rejection. In the dataset the variable *discour* is equal 1 if a firm declare that the main reason for not applying was that "application procedures are complex", or "Did not think it would be approved", 0 otherwise. In the decision there is a selection effect that it is likely to affect the final estimation: the

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| K.17 | What was the main reason why this establishment did not apply for any line of credit or loan in fiscal year 2007 ? SHOW CARD 18.1 |
|-------------|--|

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|---|---|----------------------------|
| No need for a loan - establishment has sufficient capital | 1 | GO TO QUESTION K.21 |
| Application procedures for loans or lines of credit are complex | 2 | GO TO QUESTION K.21 |
| Interest rates are not favorable | 3 | GO TO QUESTION K.21 |
| Collateral requirements are too high | 4 | GO TO QUESTION K.21 |
| Size of loan and maturity are insufficient | 5 | GO TO QUESTION K.21 |
| It is necessary to make informal payments to get bank loans | 6 | GO TO QUESTION K.21 |
| Did not think it would be approved | 7 | GO TO QUESTION K.21 |
| Other | 8 | GO TO QUESTION K.21 |

probability to be discouraged depends on the probability a firm apply for a loan. Also the decision of the bank to ration some firms (turn down applications) is affected by the selection. The variable *ration* is equal 1 for those firms whose application for a loan was rejected, 0 otherwise.

1. Draw the selection tree, identifying the apply-yes/no-decision, the decision to be discouraged and the decision of the bank to ration firms that applied.
2. Indicate for each branch of the tree the number of observations for each category (applicants, non applicants, discouraged, non discouraged, rationed, non rationed). Make sure that in each branch the number of observation sum to the total of the observations of the branch.

3. estimate the probability to be discouraged, including in the regression the variables that you think may have an effect on this decision.
4. estimate the probability to be financed for those firms that applied for a loan.

Optional question. Once you estimate both models, draw with the appropriate graphic tool the predicted probability to be financed for firms that are rationed, for firms that are financed and for those that are discouraged. Compare the three probability and