

Quiz 7

Instructions

For questions 6-10, using the Boston HMDA data we used in class, you will run two regression to estimate the probability of being denied a mortgage application . You use data **HMDA** available in R from **AER** library. Search in R Help the dataset and read about the variables included.

You estimate 2 regressions:

Regr 1: Use a probit to regress deny on afam (i.e. Black dummy), pirat (payments to income ratio), hirat (Housing expense to income ratio), lvrat (Loan to value ratio), phist (dummy variable =1 if bad public credit record), selfemp (dummy variable=1 if self employed)

Regr 2: Use a logit to regress deny on afam (i.e. Black dummy), pirat (payments to income ratio), hirat (Housing expense to income ratio), lvrat (Loan to value ratio), phist (dummy variable =1 if bad public credit record), selfemp (dummy variable=1 if self employed)

Display both regression results and their marginal effects into a stargazer table.

Tips:

1. Before you run the regressions you need to redefine the deny variable from factor to numeric: `HMDA$Deny=as.numeric(HMDA$deny)-1`
2. In the stargazer table, you do not use heteroskedasticity robust standard errors because probit and logit are estimated using MLE. See slides for the stargazer format.
3. Use command `maBina` from package `erer` to calculate marginal effects.

Question 1

1 / 1 pts

The major flaw of the linear probability model is that

- ☐ the regression R^2 cannot be used as a measure of fit.
- ☐ the actuals can only be 0 and 1, but the predicted are almost always different from that.
- ☐ people do not always make clear-cut decisions.
- ☒ the predicted values can lie above 1 and below 0.

Question 2

1 / 1 pts

The probit model

- ☐ should not be used since it is too complicated.
- ☐ always gives the same fit for the predicted values as the linear probability model for values between 0.1 and 0.9.
- ☒ forces the predicted values to lie between 0 and 1.
- ☐ is the same as the logit model.

Question 3

1 / 1 pts

Maximum likelihood estimation yields the values of the coefficients that

- ☐ are typically larger than those from OLS estimation.
- ☐ minimize the sum of squared prediction errors.
- ☐ come from a probability distribution and hence have to be positive.

- ☒ maximize the likelihood function.

Question 4

1 / 1 pts

To measure the fit of the probit model, you should:

- ☒ use the fraction correctly predicted or the pseudo R².
- ☐ plot the predicted values and see how closely they match the actuals.
- ☐ use the log of the likelihood function and compare it to the value of the likelihood function.
- ☐ use the regression R².

Question 5

1 / 1 pts

The following problems could be analyzed using probit and logit estimation with the exception of whether or not

- ☒ being a female has an effect on earnings.

- ☐ applicants will default on a loan.
- ☐ a college student decides to study abroad for one semester.
- ☐ a college student will attend a certain college after being accepted.

Question 6

1 / 1 pts

In the probit regression, the estimates suggest that, everything else the same, an African-American applicant is rejected, on average _____ than a white applicant.

- ☐ 55% less often
- ☐ 12% less often.
- ☐ 55% more often.
- ☒ 12% more often

Question 7

1 / 1 pts

In the probit regression, the estimates suggest that, everything else the same, an increase in payments to income ratio by 0.1, on average, will increase the probability of mortgage denial by:

☐ 2.66%.

☐ 26.6%.

☐ 44.2%.

☒ 4.42%.

Question 8

1 / 1 pts

In the logit regression, the estimates suggest that, everything else the same, a self-employed person is more likely to have their mortgage rejected by:

☐ 29%

☐ 0.6%.

☐ 0.29%

☒ 5.6%

Question 9**1 / 1 pts**

In both regressions, all estimates are statistically significant at 5% level, except for the coefficient on:

- ☒ hirat
- ☐ lvrat
- ☐ selfemp
- ☐ phist

Question 10**1 / 1 pts**

In the logit regression, the estimates suggest that, everything else the same, an increase in loan to value ratio by 0.1, on average, will increase the probability of mortgage denial by:

- ☐ 2.55%
- ☐ 25%.

☒ 2.1%

☐ 0.21%

Quiz Score: **10** out of 10