

Exercise 5

The binary variable to be explained is *approve*, which is equal to one if a mortgage loan to an individual was approved. The key explanatory variable is *white*, a dummy variable equal to one if the applicant was white. The other applicants in the data set are black and Hispanic.

To test for discrimination in the mortgage loan market, a linear probability model can be used:

$$approve = \beta_0 + \beta_1 * white + u$$

- a) If there is discrimination against minorities, and the appropriate factors have been controlled for, what is the sign of β_1 ?
- b) Use data *loanapp.gdt* to regress *approve* on *white*. Interpret the coefficient on *white*. Is it statistically significant? Is it practically large?
- c) As controls, add the variables *hrat*, *obrat*, *loanprc*, *unem*, *male*, *married*, *dep*, *sch*, *cosign*, *chist*, *pubrec*, *mortlat1*, *mortlat2*, and *vr*. What happens to the coefficient on *white*? Is there still evidence of discrimination against nonwhites?
- d) Now, allow the effect of race to interact with the variable measuring other obligations as a percentage of income (*obrat*). Is the interaction term significant?
- e) Estimate a Probit model of *approve* on *white*. Find the estimated probability of loan approval for both whites and nonwhites. How do these compare with the linear probability estimates?
- f) Now, add the variables *hrat*, *obrat*, *loanprc*, *unem*, *male*, *married*, *dep*, *sch*, *cosign*, *chist*, *pubrec*, *mortlat1*, *mortlat2*, and *vr* to the Probit model. Is there statistically significant evidence of discrimination against nonwhites?
- g) Estimate the model from part (f) by Logit. Compare the coefficient on *white* to the Probit estimate.