

## ECO475 HW1<sup>1</sup>

1. In class we discussed data truncation from below. Now consider the following truncated model from both above and below:

$$Y = \begin{cases} x'\beta + \epsilon, & \text{if } L < Y^* < U \\ \text{Not observed,} & \text{otherwise} \end{cases}$$

where  $\epsilon \sim N(0, \sigma^2)$  and  $(L, U)$  are observed bounds. Propose a method to consistently estimate  $\beta$  and  $\sigma^2$ . Please be as detailed as possible.

2. Consider the data in `hw1data.dta`. It contains data about whether KFC open a store at 120 locations.  
y: 1 if open a new store, 0 if not.  
x1: 1 if there is a shopping mall near the location  
x2: 1 if there is already a McDonald store near the location  
x3: 1 if there is a subway station near the location  
x4: log of pedestrian flow at the nearest major intersection (pedestrian flow measured in 10,000)  
x5: log-distance to the nearest KFC distribution center (distance measured in 10km)  
x6: population residence density of the location (in 10,000)

Answer the following questions.

- (a) Compute probit estimates of a model in which the market entry decision  $y$  is the dependent variable and corresponding t-statistics, tabulate and interpret them.
- (b) Compute the average marginal effect of x2 and x5, interpret your result.
- (c) Repeat part (a) and (b) using Logit model.
- (d) Let  $\hat{\beta}_P$  and  $\hat{\beta}_L$  be the probit estimates and logit estimates. Let  $\|\beta\|$  be norm of  $\beta$ , that is, the square root of the sum of squares of each element in the vector  $\beta$ . Compare  $\hat{\beta}_P/\|\hat{\beta}_P\|$  and  $\hat{\beta}_L/\|\hat{\beta}_L\|$ . Are they very different?

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<sup>1</sup>Due by 11:59pm, Feb 20, 2020. Online submission through Quercus. Submit a PDF file that includes both theoretic derivations and computer outputs.