ECONOMICS 6002 CLASS 22
LIMITED DEPENDENT VARIABLE MODELS

1. Limited dependent variables are subject to an upper and/or lower limit on their allowable range.
   a. Truncation: sample is limited to values satisfying the limit(s)
   b. Censoring: values beyond the limit are set at the limit

2. Truncation
   a. Truncated values can be estimated through the specification of a distribution function for the disturbances - usually normal for continuous variables and Poisson for count data
   b. Estimation can be done through maximum likelihood
   c. Regression suffers from an omitted variable problem, and is inconsistent

3. Sample Selection and Incidental truncation
   a. Omitted variable bias from sample-selection
   b. Estimation via Heckman two-step ("Heckit") procedure
      i. Estimate selection equation by maximum likelihood
      ii. Calculate truncation bias variable from estimate of selection equation
      iii. Estimate incidentally truncated equation augmented by truncation bias variable using OLS or GLS.

4. Censoring
   a. A censored variable is distributed normally (continuously) at non-limit points, but has a discrete distribution (similar to a discrete-choice model) at a limit point.
   b. The Tobit ("Tobin's probit") model estimates through maximum likelihood, with a normal likelihood for the non-limit observations and a probit likelihood function for the limit observations.
   c. As usual, the ML estimates are consistent only if the distributional assumptions (e.g., normality, homoskedasticity) are consistent with the data.
   d. If the limit and non-limit observations are drawn from different distributions, the model can be estimated by
      i. Specifying a probit model for the limit observations, and
      ii. A truncated distribution for the non-limit observations

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