**Introduction Poverty Measurement Workshop**

Exercises – Housing

This problem set focuses on rent imputation and consists of three parts. The first is a brief review of basic concepts and the other two are based on a hypothetical country dataset using STATA. Throughout this exercise, use “**04\_Housing\_ex**” dataset. We strongly recommend that you create a do-file for this exercise so that you can reproduce the results whenever necessary.

**Exercise 1**

The information available in the dataset comprises: *actual paid-rent* (**rent**) for tenants and *self-reported* *rent* (**rent\_self**) for owners. Based on this information solve the following items:

* 1. Perform some summary statistics of these two variables for owners and renters by geographic areas.
  2. Are these reasonable values? Is it possible to identify outliers? If so, modify the data taking into account regional disparities by the following procedure:

For both **rent** and **self\_rent**, first take a natural log and then identify observations that lie more than 2.5 standard deviation units away from the mean, where both standard deviation and mean are defined at regional level. Use variable “**subregion**” to define regions. Replace outliers with a missing value.

* 1. Many countries in the world construct the per capita rent by combining actual rent for tenants and self-reported rent for owners whenever available. Following this method, calculate the total per capita consumption including per capita food, non-food and rent. Be sure to divide the rent variable by household size.
  2. Create the mean budget share of rent for each decile of total per capita consumption.
  3. Calculate the headcount ratio using the national poverty line.

Impute a value of housing consumption whenever information on rents is missing, following approaches described below.

**Exercise 2 - Hedonic housing model**

The idea is to estimate an econometric model in which rents reported by a subset of the population (either actual or self-reported) are regressed on a set of housing characteristics.

* 1. Estimate the linear projection for all households including an error term taken from a normal distribution.
  2. Create the per capita rent as the addition of actual data (paid & reported) and estimated rents.
  3. Using the same model as in 2.1, obtain three types of predictions following predlog command in STATA and three versions of create per capita rent. (To install predlog command, type “findit predlog” in STATA)
  4. Calculate the headcount ratio using the national poverty line. Compare these results with previous exercises.

**Exercise 3 - Two-stage estimation method of hedonic housing model**

Assume there is no information of self-reported rent for owners.

* 1. Perform some summary statistics by type of households: non-renters and renters such as maximum education level, number of adults and children (under 6), labor status of household head and number of other members employed among others. Are these two populations similar?
  2. Estimate the hedonic model correction by selection bias. Include other variables in the selection model in order to identify this from the hedonic model.
  3. Create the per capita rent as the addition of actual rent and estimated rents.
  4. Calculate the headcount ratio using the national poverty line. Compare these results with previous exercises.