Documentation for Food Security Map

Consider the following single-variable model for Current Population Survey (CPS) data:

$$y_i = \alpha + \beta x_i + \varepsilon_i \tag{1}$$

where for the i^{th} household y_i represents a measure of food insecurity and x_i represents a predictor of food insecurity. The objective of this stage is to retrieve estimates of α and β.

We then use the estimates from Eq. (1) and American Community Survey (ACS) data to predict food insecurity at the block-group level. As a first step, we calculate the following for each block group:

$$\sum_{h=1}^{H} y_{bh} = \sum_{h=1}^{H} (\hat{\alpha} + \hat{\beta} x_{bh}) \tag{2}$$

$$y_b = \hat{\alpha} H + \hat{\beta} x_b \tag{3}$$

where y_b is an estimate of the sum of food insecurity scores for a given block group. We can then find the average food insecurity score as y_b/H.