Econometrics Lab 1

# Estimating Linear Regression

**1. Engel's Law** Engel's law states that, with a given set of tastes and preferences, as income rises, the proportion of income spent on food falls, even if actual expenditure on food rises. In other words, the income elasticity of demand of food is less than 1. The law was named after the statistician Ernst Engel (1821–1896).

This exercise uses the dataset engel.dat, which is a Chinese household survey data (Gong et al., 2005). We use the following variables

| | |
|---|---|
| $food$ | Food consumption per capita |
| *totcper* | Total consumption per capita |
| *totcinc* | Total income per capita |
| *dcoast* | A dummy for households in the coast area. |
| *dmiddle* | A dummy for households in the middle area. |
| *dwest* | A dummy for households in the west area. |
| *age* | The average age of husband and wife. |

(1) Obtain "summary of statistics" for the first three variables.

(2) Draw scatter plots of $food$ v.s. *totcinc*, $\log(food)$ v.s. $\log(totcinc)$, $food/totcper$ v.s. $\log(totcinc)$. Do you see any pattern?

(3) Estimate the following model,

$$\log(food) = \beta_0 + \beta_1 \log(totcinc) + u. \tag{1}$$

(4) According to your estimates, does food consumption per capita increases as income increases?

(5) Estimate the following model,

$$food/totcper = \beta_0 + \beta_1 \log(totcinc) + u. \tag{2}$$

(6) According to the sign of $\beta_1$, does the Engel's law hold for Chinese households?

(5) Choose samples from the coast area. Estimate (1) and (2). Does your conclusion in (4) and (6) still hold for this sub-sample?

(7) Do the same thing for households in the middle and the west area. Discuss your results.