Check your understanding: The Linear Expenditure System

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Linear Expenditure System of Demand

When households consume *more than one good*, the linear expenditure system (LES) must be used. Even if there is only one domestic good, if consumers are allowed to consume imports, it is still necessary to use the LES. Consumption of good i by household h

$$p_i C_{ih} = p_i \theta_{ih} + m_{ih}(E_h - \sum p_i \theta_{ih})$$

where p_i is the price of good i, C_{ih} is consumption of good i by household h, θ_{ih} is the intercept of the consumption function by house h, m_{ih} is the marginal (= average) propensity to consume good i by household h and E_h is expenditure on consumption by household h. Expenditure $E_h = (1 - s_h)(1 - t_h)Y_h$, where s_h is the savings propensity, t_h is the tax rate and Y_h is income, all the household h. This is an "adding up" consumption function in that in the end

$$C_{ih} = E_h$$

where expenditure

$$E_h = (1 - s_h)(1 - t_h)Y_h$$

The next step is to define the *Frisch parameters*, which will serve to estimate the intercepts of the LES. Write

$$f_h = E_h / (E_h - \sum \theta_{ih})$$

as the ratio of expenditure to *supernumerary expenditure*, θ_{ih}) and can be shown to be a measure of the marginal utility of income with respect to income.[1] This can then be substituted into the consumption function

[1] See Dervis et al. (1982)

$$C_{ih} = \theta_{ih} + m_{ih}(E_h / f_h)$$

since p in the base social accounting matrix (SAM) is always 1. If there is supplemental information on the marginal propensity to consume, it can be used here. A short cut is to take the marginal propensity to consume, m_{ih} as

$$m_{ih} = C_{ih} / E_h$$

The consumption function can be written as

$$C_{ih} = \theta_{ih} + C_{ih} / f_h$$

so that

$$\theta_{ih} = C_{ih}(1 - /f_h)$$

This is the expression for estimating the intercepts of the LES. Frisch parameter are usually between 1 and 2.[2].

[2] See Nganou (2005)

References

Dervis, K., J. D. Melo, and S. Robinson (1982). *General Equilibrium Models for Development Planning*. Cambridge: Cambridge Univerisity Press.

Nganou, J.-P. (2005). Estimation of the parameters of a linear expenditure system (les) demand function for a small African economy. MPRA paper no. 31450, World Bank.