Additional questions chapter 8

1. Linear Expenditure System: implications of 0-homogeneity and wealth elasticity.

Consider the demand function where each component function is respectively defined by: $\widehat{x}_\ell(p,w) = b_\ell + \gamma_\ell \dfrac{w - \sum_{j=1}^{L} p_j b_j}{p_\ell}$, $\ell = 1,\ldots,L$, with the fixed parameters $b_j, \gamma_j, j = 1,\ldots,L$.

1.1 Show that the expenditure on each commodity (i.e., $p_\ell x_\ell$) is a linear function of the price vector and wealth, (p,w). Make sure the expression is simplified so that the linear relationship is obvious.

1.2 What happens to commodity expenditure if all the b_j parameters are zero? Explain.

1.3 Do we need to impose conditions on the parameters b_ℓ and $\gamma_\ell, \ell = 1,\ldots,L$, to guarantee that $\widehat{x}$ satisfies the condition of 0-homogeneity? Explain.

1.4 Under what conditions on the parameters b_ℓ and $\gamma_\ell, \ell = 1,\ldots,L$, is good ℓ a normal good? A luxury? A necessity? Explain.

2. Obtaining a simple Slutsky matrix.

For the demand function defined by the two component functions ($L = 2$),

$$\widehat{x}_1(p_1,p_2,w) = [(w+5p_1)/\,(3p_1)] - 5 \text{ and } \widehat{x}_2(p_1,p_2,w) = 2(w+5p_1)/\,(3p_2),$$

provide the complete Slutsky matrix. Show your work and simplify the elements.