Ec 703

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PROBLEM SET NO. 5

1. Consider a Walrasian economy with L goods, I identical households each with excess demand function $z(p)$, and J identical firms each with a constant returns to scale production set $Y \in \Re^L$. Show that the Walrasian equilibrium aggregate production vector $\Sigma_{j=1}^{J} y^j$ is unique.

2. Verify the Slutsky equation for excess demand function $Z_i(p, W_i)$ of a given household i whose wealth equals the sum of the value of its commodity endowments $p.\omega_i$ and lumpsum income W_i:

$$\frac{\partial Z_{li}}{\partial p_k} = S^i_{lk} - Z_{ki} \frac{\partial Z_{li}}{\partial W_i}$$

where p_k denotes the price of good k, and S^i_{lk} denotes the Slutsky substitution effect between goods l and k. (You can invoke the relevant Slutsky equation for the optimal consumption demand of household i.)

3. Suppose that each household i has a homothetic utility function, resulting in unit income elasticity of demand for every good (i.e., its optimal consumption demand vector can be expressed as $X_i = x_i(p)[p.\omega_i + W_i]$). If in addition if each household's endowment vector ω_i is proportional to the economy wide endowment vector $\omega \equiv \sum_i \omega_i$ (i.e., there exists a scalar $\alpha_i \in (0, 1)$ such that $\omega_i = \alpha_i.\omega$, then (using (1)) show that the Jacobian matrix of the aggregate excess demand function of the economy is negative definite at every price vector.