Consumer Choice Theory - Review

ECO 305 - Microeconomic Theory

Utility maximization

$$\max U(x_1, x_2)$$
subject to $p_1 x_1 + p_2 x_2 \leq M$

"Dual" expenditure minimization

$$\min p_1 x_1 + p_2 x_2$$
subject to $U(x_1, x_2) \geq u$

FONC: $\frac{\partial U}{\partial x_i} = \lambda p_i$ $\quad \overset{\mu = 1/\lambda}{\longleftrightarrow} \quad$ FONC: $p_i = \mu \frac{\partial U}{\partial x_i}$

Common SOSC - diminishing MRS

Marshallian (uncompensated) demands $x_i = D_i^m(p_1, p_2, M)$

Hicksian (compensated) demands $x_i = D_i^h(p_1, p_2, u)$

Indirect utility function $u = U^*(p_1, p_2, M)$ $\quad \overset{\text{Inverses}}{\longleftrightarrow} \quad$ **Expenditure function** $M = M^*(p_1, p_2, u)$

Roy's Identity

$$D_i^m(p_1, p_2, I) = -\frac{\partial U^*/\partial p_i}{\partial U^*/\partial M}$$

Shepherd's Lemma[1]

$$D_i^h(p_1, p_2, u) = \frac{\partial M^*}{\partial p_i}$$

$$\downarrow$$

$$x_i = D_i^h(p_1, p_2, u) = D_i^m(p_1, p_2, M^*(p_1, p_2, u))$$

$$\Downarrow$$

Slutsky Equation

$$\frac{\partial D_i^h}{\partial p_j} = \frac{\partial D_i^m}{\partial p_j} + x_j \frac{\partial D_i^m}{\partial M}$$

[1] The textbook calls this Hotelling's Lemma