

Consumer value & policy functions

Apply the envelope theorem

$$\frac{\partial v(p, m)}{\partial p_i} = -\lambda(p, m) x_i(p, m)$$

$$\frac{\partial v(p, m)}{\partial m} = \lambda(p, m)$$

Combine: $\frac{\partial v(p, m)}{\partial p_i} = - \frac{\partial v(p, m)}{\partial m} x_i(p, m)$

$$x_i(p, m) = - \frac{\frac{\partial v(p, m)}{\partial p_i}}{\frac{\partial v(p, m)}{\partial m}}$$

1 in the firm's problem

normal good if $\frac{\partial x_i(p, m)}{\partial m} > 0$

inferior good if $\frac{\partial x_i(p, m)}{\partial m} < 0$

Giffen good if $\frac{\partial x_i(p, m)}{\partial p_i} > 0$

substitutes x_i and x_j are substitutes at (p, m) if $\frac{\partial x_i(p, m)}{\partial p_j} > 0$

complements x_i and x_j are complements at (p, m) if $\frac{\partial x_i(p, m)}{\partial p_j} < 0$