Marshallian and Hicksian Demand Functions

An Overview of Two Key Demand Functions in Economics

Learning Outcomes

1. Understand the differences between Marshallian and Hicksian demand functions.
2. Learn how each demand function is derived and their respective assumptions.
3. Apply the mathematical formulation of Marshallian and Hicksian demand to economic problems.

Marshallian (Uncompensated) Demand

- Objective: Maximizes utility given a consumer's income and market prices.
- Dependent on income and prices: x(p1, p2, I).
- Changes in income affect the demand.

Mathematical formulation:

Maximize U(x1, x2) subject to p1x1 + p2x2 = I.

Hicksian (Compensated) Demand

- Objective: Minimizes expenditure for a fixed level of utility.
- Dependent on prices and utility: h(p1, p2, U).
- Income effects are removed, focuses on substitution effects.

Mathematical formulation:

Minimize p1x1 + p2x2 subject to U(x1, x2) = U.

Relationship Between Marshallian and Hicksian Demand

- Marshallian demand incorporates income effects, Hicksian does not.
- Hicksian demand can be derived from Marshallian by holding utility constant and minimizing expenditure.
- Marshallian demand can be derived from Hicksian by compensating for changes in income.

Key Equations

- Marshallian Demand:

$x(p_1, p_2, I) = \text{argmax } U(x_1, x_2) \text{ subject to } p_1x_1 + p_2x_2 = I.$

- Hicksian Demand:

$h(p_1, p_2, U) = \text{argmin } p_1x_1 + p_2x_2 \text{ subject to } U(x_1, x_2) = U.$

Conclusion

- Marshallian demand reflects consumer behavior based on income and prices.
- Hicksian demand isolates substitution effects by holding utility constant.
- Both functions are essential tools for understanding consumer theory.