INTERMEDIATE ECONOMICS SKILLS ASSESSMENT, MICRO

(IESA-Micro)

LEARNING GOALS

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General Goals

Intermediate microeconomic theory takes many of the ideas presented in an introductory microeconomics class and formalizes them. The assumptions behind individual behavior, firm behavior, and what defines a market equilibrium are made explicit. Students analyze these models to derive predictions including the optimal behavior of market participants and equilibrium outcomes. Students also learn to evaluate the welfare of participants and assess the efficiency of equilibrium outcomes in a variety of contexts.

In large part, intermediate micro is a tools course, but it is not solely a tools course. Students must also recognize real-world situations where the models they learn are (and are not) appropriate. They should be able to apply their new tool set to simple real-world questions and use it to argue for (or against) particular policies. Connecting the mathematical formalism to concrete examples has the additional benefits of motivating students and helping them connect abstract new concepts to their pre-existing knowledge.

Specific Goals

I. Conceptual issues

1. Define the term model as used in economics.
2. Identify endogenous and exogenous variables in a model.
3. Define comparative statics.
4. Know and be able to apply the concepts of Pareto efficiency and sum-of-surplus efficiency.
5. Define and apply the concept of equilibrium.
6. Understand the effects of constraints in optimization and strategic interaction settings.

II. Methodology

1. Calculate first partial, cross partial, and second partial derivatives of the following classes of functions: polynomial, exponential, and logarithmic.
2. Solve single variable optimization problems (e.g., profit maximization with quantity, expected utility with insurance).
3. Solve multivariable constrained optimization problems with Lagrangians; e.g., utility maximization, expenditure minimization, profit maximization with inputs, cost minimization.
4. Interpret the economic meanings of the first order conditions, tangency conditions, and Lagrange multipliers in the various problems.

III. The Consumer's Problem

A. Budgets

1. Given prices and income, determine a consumer's budget set. Determine how the budget set changes with changes in those variables.
2. Generate budget sets from endowments.
3. Calculate the slope of the budget constraint and explain how it reflects opportunity costs.

B. Preferences and Utility Functions

1. Determine whether a preference relation satisfies the following properties: completeness, transitivity, monotonicity, and convexity.
2. Know the definition of rational preferences.
3. Explain the relationship between preference relations and utility functions.
4. Determine whether a utility function represents a preference relation.
5. Explain the meaning of and solve for the marginal rate of substitution.
6. Determine whether a utility function satisfies the following properties: monotonocity, quasiconcavity, homotheticiy, essentiality, and quasilinearity.
7. Recognize and apply positive monotonic transformations of utility functions.
8. Determine whether two utility functions represent the same preferences.

C. Consumer choice

1. Explain the role of marginal utility in consumer choice.
2. Solve the utility maximization problem for Marshallian demands, the indirect utility function, and the expenditure function, including corner solutions when prompted.
3. Solve the expenditure minimization problem for compensated demands, the expenditure function, and the indirect utility function, including corner solutions when prompted.
4. Recognize the graphical tangency condition in the utility maximization and expenditure minimization problems and be able to explain indifference curves and iso-expenditure curves.
5. Explain the Slutksy equation and demonstrate that it holds for a given utility function.
6. Explain the difference between uncompensated (Marshallian) and compensated (Hicksian) demand functions.
7. Determine if a good is normal, borderline, inferior, regular/ordinary, Giffen, luxury or necessity.
8. Define and recognize whether goods are complements or substitutes.
9. Determine the change in a consumer's well-being from a price change. Explain why it is not given in terms of utility.
10. Identify compensating variation, equivalent variation, and consumer surplus and when they are used.
11. Interpret the Lagrange Multiplier as the shadow price (utility gain from an additional dollar of income while at the current optimum).

IV. The Firm's Problem

A. Technology

1. Define technology, the production set, and production functions.
2. Explain the properties of production functions including convexity and monotonicity and determine if a given function satisfies them.
3. Determine whether a production function exhibits increasing, decreasing or constant returns to scale and whether it is homogeneous of any degree.
4. Determine for each of a production function's inputs whether there is an increasing, constant or decreasing marginal product.
5. Explain how marginal product and returns to scale differ conceptually.
6. Determine the technical rate of substitution of a production function.

B. Profit Maximization and Cost Minimization

1. Demonstrate the tangency of the isoprofit line with the production function.
2. Solve the firm's profit maximization function for input demands, supply function, and profit function in both the short-run and long-run and describe how they differ.
3. Solve the firm's cost minimization function for conditional input demands, cost function, marginal cost function, average cost function, and supply function in both the short-run and long-run and describe how they differ.
4. Recognize that profit maximization implies cost minimization.
5. Explain the relationship between profits and producer surplus.
6. Explain the concept of economic rents.
7. Solve for short-run and long-run elasticities of supply and demand and know their relationship.
8. Recognize the relationship between short-run and long-run costs.
9. Solve for a firm's shut down and exit prices.
10. Recognize the relationship between short-run and long-run profits with and without firm entry.
11. Interpret the Lagrange Multiplier as the shadow price (cost of producing an additional unit of the good while at the current optimum).

V. Equilibrium and Welfare

A. Partial Equilibrium

1. Starting from preferences and technologies, solve for partial equilibrium outcomes.
2. Know the assumptions underlying perfect competition.
3. Define ad valorem and commodity (per unit) taxes.
4. Calculate the revenue raised and deadweight loss by a commodity tax.
5. Understand the relationship between supply and demand elasticities and the economic incidence of a tax.
6. Solve for equilibria when there are positive or negative consumption or production externalities and demonstrate that they are inefficient.
7. Determine the effects of externalities on efficiency.
8. Compare and contrast ways to correct externalities via regulation, creating markets, merging firms, and taxation.

B. General Equilibrium

1. Determine the conditions under which two consumers will have gains from trade.
2. Solve for the competitive equilibrium of an exchange economy and graphically depict it in an Edgeworth box.
3. State Walras' Law.
4. Define and solve for the lens, contract curve, and core of an exchange economy.
5. Know the Fundamental Welfare Theorems and how economists use them in discussions of government intervention in the economy.

VI. Market Power

A. Monopoly

1. Solve the monopolist's problem and explain why the outcome is inefficient.
2. Determine the effect of taxes and subsidies on the monopolist.

B. Oligopoly

1. Solve Cournot and Bertrand models.
2. Explain why Cournot competition is inefficient and Bertrand competition is efficient.
3. Show that collusion by firms is not sustainable in a Cournot model.

VII. Choice under Uncertainty and Game Theory

A. Decision-Making under Uncertainty

1. Distinguish among risk-averse, risk-neutral, and risk-loving agents.
2. Compute measures of risk aversion given a utility function.
3. Demonstrate that choices under uncertainty are determined by diminishing MRS.
4. Solve for expected utility, certainty equivalents, and risk premia.
5. Determine the price of actuarially-fair insurance
6. Solve for optimal levels of insurance for a risk-averse individual.
7. Explain the assumptions behind actuarily fair insurance pricing.
8. Define adverse selection and moral hazard and explain their implication for insurance availability and pricing.

B. Game Theory

1. Define the best response function and the Nash equilibrium.
2. Determine the efficient outcomes of a strategic form game.
3. Determine the pure-strategy and mixed-strategy Nash equilibria of a strategic form game.
4. Identify dominated strategies and iteratively eliminate them.

Topics and learning goals explicitly not required

A. Revealed Preference

- Explain what it means for bundles to be *revealed preferred* and *indirectly revealed preferred*.
- Determine whether the Weak Axiom of Revealed Preference (WARP) holds for consumer selected bundles (hence, whether the observed consumer choices are consistent with the economic model).
- Determine whether the Strong Axiom of Revealed Preference (SARP) holds for consumer choices.

B. Labor Supply

- Write down a utility maximizing model with individuals choose leisure and consumption given wages and nonlabor income.
- Solve for optimal labor-leisure choices.
- Derive effects of changes in wages and nonlabor income.
- Compute the reservation wage.
- Explain how the labor supply curve can be backward-bending

C. Additional Topics Related to Taxation

- Determine the inefficiency of a commodity tax relative to a lump-sum tax.
- Explain why substitution effects cause commodity taxes to be inefficient.
- Understand and calculate the efficiency implications of input and profit taxes in the context of partial equilibrium.
- Define and distinguish the economic and statutory incidence of a tax.

D. Intertemporal Decision-Making in a Two-Period Model

- Derive optimal consumption in each period.
- Derive the price of consumption in the second period in terms of first period income
- Derive consequences on saving of changing the interest rate

E. Price Discrimination

- Define the three degrees of price discrimination.
- Solve for equilibria in markers where firms price discriminate (e.g., quantity discounts in a budget constraint)

F. Differentiated products

- Solve for equilibria when 2 firms sell similar but not identical products.

G. Asymmetric Information

- Explain the two types of asymmetric information—hidden characteristics and hidden actions—and how they lead to the problems of adverse selection and moral hazard.
- Define and provide examples of the principal agent problem.
- Demonstrate the asymmetric information can lead to inefficiently low levels of effort

- Separating and pooling equilibria
- Signaling
- Incentive compatibility

H. Other

- Negative prices
- Satiation
- Discrete goods
- Natural monopoly