APEC 8001 Recitation

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Today's Agenda

1. TA Introduction
2. First Problem Set
3. Rational Preferences
4. Choice Structures & WARP
5. Properties of Walrasian Demands
6. More Difficult Topics from Lecture 1
7. Questions

TA Introduction

- Monique Davis
- 2nd year PhD student in Applied Economics Graduate Program
- Primary Fields of Interest: Policy Analysis & Labor Economics

First Problem Set

- Contains problems based on this week's lectures
- Uploaded to the course Canvas page under the Problem Sets in the Modules section
- You may work in groups no bigger than 4
- You must submit your solutions to the problem set by 1:30PM (CDT), September 17 either online or hand in a hard copy (if you attend in person classes)
- I will extend the submission deadline to 1:30AM (CDT), September 18 for students located in time zones that are at least 6 hours ahead of CDT
- Make sure the names of all group members are listed on your problem sets

Rational Preferences

MWG states the following definition of rational preferences:

The preference relation $\succsim$ is ***rational*** if it has the following two properties:

1. ***Completeness***: For all $x, y \in X$, either $x \succsim y$ or $y \succsim x$ (or both)
2. ***Transitivity***: For all $x, y, z \in X$, if $x \succsim y$ and $y \succsim z$, then $x \succsim z$

Question: What are the implications of this definition?

Rational Preferences

Answer: All we need to show a preference relation $\succsim$ is rational, is to show it is complete and transitive

For completeness, show for all pairs of alternatives $x, y \in X$, there is a strict preference $\succ$, weak preference $\succsim$, or indifference $\sim$ between x & y

For transitivity, show that all preference relations "chains" for at least three alternatives in the choice set (i.e, $x, y, z \in X$), imply a logical (non-contradictory) preference relation between the end points of that chain

Choice Structures & WARP

MWG states the following definition of weak axiom of revealed preference (WARP):

The choice structure $(\mathscr{B}, C())$ satisfies the ***weak axiom of revealed preference*** if the following property holds:

> If for some $B \in \mathscr{B}$ with $x, y \in B$, we have $x \in C(B)$, then for any $B' \in \mathscr{B}$, with $x, y \in B'$, and $y \in C(B')$, we must also have $x \in C(B')$.

Let us work through a couple examples demonstrate whether a given choice structure satisfies WARP...

Choice Structures & WARP - First Example

Let $X = \{x, y, z\}$
Define $\mathscr{B} = \{\{x, y\}, \{y, z\}, \{x, z\}, \{x\}, \{y\}, \{z\}\}$
Also, define:

$$C(\{x, y\}) = \{x\}$$
$$C(\{y, z\}) = \{y\}$$
$$C(\{x, z\}) = \{z\}$$
$$C(\{x\}) = \{x\}$$
$$C(\{y\}) = \{y\}$$
$$C(\{z\}) = \{z\}$$

Question: Does this choice structure satisfy WARP?

Choice Structures & WARP - Second Example

Let $X = \{x, y, z\}$
Define $\mathscr{B}' = \{\{x, y, z\}, \{x, y\}, \{y, z\}, \{x, z\}, \{x\}, \{y\}, \{z\}\}$
Also, define:

$$C(\{x, y, z\}) = \{x\}$$
$$C(\{x, y\}) = \{x\}$$
$$C(\{y, z\}) = \{z\}$$
$$C(\{x, z\}) = \{z\}$$
$$C(\{x\}) = \{x\}$$
$$C(\{y\}) = \{y\}$$
$$C(\{z\}) = \{z\}$$

Question: Does this choice structure satisfy WARP?

Choice Structures & WARP - Third Example

Let $X = \{x, y, z\}$
Define $\mathscr{B}' = \{\{x, y, z\}, \{x, y\}, \{y, z\}, \{x, z\}, \{x\}, \{y\}, \{z\}\}$
Also, define:

$$C(\{x, y, z\}) = \{x\}$$
$$C(\{x, y\}) = \{x\}$$
$$C(\{y, z\}) = \{y\}$$
$$C(\{x, z\}) = \{x\}$$
$$C(\{x\}) = \{x\}$$
$$C(\{y\}) = \{y\}$$
$$C(\{z\}) = \{z\}$$

Question: Does this choice structure satisfy WARP?

Note: Take time on your own to determine if there exists a rational preference relation which rationalizes each of these choice structures

Properties of Walrasian Demands

You'll learn in today's lecture that a consumer's ***Walrasian demand correspondence*** (or ***function***), $x(p, w)$, is the consumer's demanded bundle of commodities (i.e., goods) given a vector of prices and the consumer's wealth (or income)

Two of the most important properties about Walrasian demands are:

1. Walrasian demands must be homogenous of degree zero
2. Walrasian demands must satisfy Walras' law

Properties of Walrasian Demands

Homogeneity of Degree Zero:

- Show for any $\tau > 0$, multiplying all prices (p) and wealth (w) by τ leaves $x(p, w)$ unchanged
- i.e., show for any $\tau > 0$, $x(\tau p, \tau w) = x(p, w)$
- Question: can you show this for $x_1(p_1, p_2, w) = \frac{p_2}{p_1}$ & $x_2(p_1, p_2, w) = \frac{w - p_2}{p_2}$, where $p_1, p_2 > 0$ & $w > p_2$?

Properties of Walrasian Demands

Walras' Law:

- Show for every $p >> 0$ and $w > 0$, $p \cdot x(p, w) = w$
- Keep in mind, this is a dot product since p and $x(p, w)$ are vectors
- So, given two goods, x_1 & x_2: $p_1 x_1 + p_2 x_2 = w$
- Question: can you show this for $x_1(p_1, p_2, w) = \frac{p_2}{p_1}$ & $x_2(p_1, p_2, w) = \frac{w - p_2}{p_2}$, where $p_1, p_2 > 0$ & $w > p_2$?

More Difficult Topics from Lecture 1

- Relationship between preference relations and choice rules
- Weak axiom of revealed preference
- Revealed preference relations

Questions?

Any remaining questions?