Lecture 2. Aggregate Demand

I consumers

consumer i with rational preferences $\succeq_i$ and wealth w_i.

preferences strictly convex $\Rightarrow$ demand correspondances single-valued

i's demand function for good l is denoted by $x_{li}(p, w_i)$, and the collection of demand functions for all the goods denoted by $x_i(p, w_i)$.

The aggregate (market) demand $x(p, w_1, w_2 ... w_I)$ is given by

$$x(p, w_1, w_2 ... w_I) = \sum_{i=1}^{I} x_i(p, w_i)$$

$(w_1, w_2 ... w_I)$ also denoted as w.

If individual demands are continuous, satisfy Walras law, and are homogenous of degree zero, then market demand has the same properties.

1. Aggregate Demand and Aggregate Wealth

In general, aggregate demand depends on each individual wealth - "distribution matters for market demand".

When does it only depend on aggregate wealth $\sum_{i=1}^{I} w_i$?

If for any two distributions $w = (w_1, w_2 ... w_I)$ and $w' = (w'_1, w'_2 ... w'_I)$ with $\sum_{i=1}^{I} w_i = \sum_{i=1}^{I} w'_i$ it holds that

$$x(p, w) = x(p, w')$$

This can only hold if for all $i, j = 1, 2, ... I$, and $l = 1, 2 ... L$

$$\frac{\partial x_{il}(p, w_i)}{\partial w_i} = \frac{\partial x_{jl}(p, w_j)}{\partial w_j}$$

Examples:

All consumers have identical homothetic preferences.

All consumers have preferences that are quasilinear in the same good.

In general:

Proposition: Aggregate demand depends only on aggregate wealth, iff the preferences admit indirect utility functions of the form:

$$v_i(p, w_i) = a_i(p) + b(p)w_i$$

2. Aggregate demand and revealed preferences

Definition: The aggregate demand function $x(p,w)$ satisfies the weak axiom of revealed preference, if for any two situation (p,w) and (p',w') it holds:

$$\begin{aligned} px(p',w') &\leq \textstyle\sum_{i\in I} w_i \text{ and } x(p,w) \neq x(p',w') \\ &\Rightarrow p'x(p,w) > \textstyle\sum_{i\in I} w'_i \end{aligned}$$

Validity of weak axiom of all individual demand functions does not imply validity of weak axiom for aggregate demand.

Definition: The individual demand function $x_i(p,w_i)$ satisfies the law of demand property, if for all p,p' with $x_i(p,w_i) \neq x_i(p',w_i)$ it holds:

$$(p'-p)(x_i(p',w_i) - x_i(p,w_i)) < 0$$

Proposition: If every consumer's individual demand function satisfies the law of demand, the aggregate demand satisfies the weak axiom.