

Summation of Demand and Network Externality

I. Summation of Demand

Each individual has her own demand curve. We get the market demand from adding together individual's quantity demanded at every price; this is called *horizontal summation*. If individual demand curves are linear with different vertical-intercept, the market demand will not be smooth. To get the function of market demand,

- i. Find the vertical intercepts of all individual demand curves.
- ii. The market demand will be a conditional function; the number of conditions equals to the number of unique intercepts from i. The conditions correspond to the range of price between two adjacent intercepts.
- iii. Do horizontal summation for each of the conditions

Example

$$q_1 = 10 - p$$

$$q_2 = 20 - 4p$$

$$q_3 = 15 - p$$

$$q_4 = 10 - 2p$$

II. Network Externality Effect

The original graph of bandwagon effect on the lecture slides is wrong; the professor has corrected that.

A. The idea of Externality

The idea of externality is that what an agent—could be an individual or a firm—does have effect on others; since the agent acts according to her private benefit and cost, this effect on others is not taken into consideration in her choice. If the effect is positive we call it positive externality; if the effect is negative we call it negative externality.

B. Network Externality and how the graph is drawn

Network externality refers to the case where quantity demanded by one consumer changes in response to the change in quantity demanded by other consumers. If the consumer's quantity demanded increase in response to increase in quantity demanded by other consumers, we call that a positive externality effect ("Bandwagon Effect"). If the consumer's quantity demanded decrease in response to increase in quantity demanded by other consumers, we call that a negative externality effect ("Snob Effect").

Example of positive network externality

Two gamers: Kevin and Samuel. The amount of time they play depends on two things: it is decreasing in the cost of playing per hour, and increasing in the amount of time the other person plays.

$$n_1 = 10 - p + 0.5n_2$$

$$n_2 = 20 - 2p + 0.5n_1$$