

## Topic 1 - The demand side : some consumer theory

- Preferences and choice. When an economic agent faces the decision to buy a quantity  $q$  at price  $T$ , his choice can be represented by

$$\max u(q, T, \theta)$$

where  $\theta$  is a parameter reflecting his taste or any other intrinsic characteristic of the individual that is relevant for the consumption choice. The value of the function for given  $q$ ,  $T$  and  $\theta$  summarizes the surplus (or satisfaction) of the consumer with taste  $\theta$  when he buys  $q$  units at price  $T$ . To keep things simple, assume the utility is  $u(q, T, \theta) = \theta V(q) - T$ ,  $V(0) = 0$ ,  $V' > 0$  and  $V'' < 0$ .

- Consumption choice with linear prices. If the consumer faces a price per unit  $p$  (linear price), then  $T = p \cdot q$  and his surplus is simply  $\theta V(q) - p \cdot q$ . This function is concave and the optimal choice of the consumer is to select the quantity that satisfies

$$\theta V'(q) - p = 0$$

provided this quantity is positive. This quantity can be denoted by  $q(p, \theta)$  and is called individual demand. Under reasonable assumptions (which are satisfied in our example)  $q(p, \theta)$  is decreasing in  $p$ .

- Market demand. The total demand for the good is simply the sum of all individual demands. We denote it by  $D(p)$ . If individual demands are decreasing in  $p$ , so is total demand. The inverse function of  $D(p)$  is called inverse demand and is denoted by  $p(q)$ .

- Consumers' surplus. The individual surplus of a consumer with taste  $\theta$  buying the good at price  $p$  is simply  $\theta V(q(p, \theta)) - p \cdot q(p, \theta)$ . Consumers' surplus is simply the sum of individual surplus. It is also the area above the price line  $p$  and below the inverse demand curve.

- Estimation. Generally firms do not have all the relevant information to determine  $D(p)$  from primitives (utilities, tastes...). Demand can be estimated however by collecting data and using statistic methods.