Consumer Choice: the Demand Side of the Market

Consumers face constraints on their choices because they have limited incomes.

Wealthy and poor individuals have limited budgets relative to their desires.

Every decision has an opportunity cost. A decision to buy more French wine this month is also a decision to purchase fewer restaurant meals.

How do consumers make choices?

Economists theorize that each consumer spends her money to maximize satisfaction or utility.

We cannot measure utility directly, but we can find out how much you value a Starbucks' mocha relative to a movie ticket. If you would give 3 mochas for 1 movie ticket, then the utility of a movie ticket to you is 3 mochas.

This method is cumbersome so economists measure your utility of a movie ticket by looking at how much you are willing to pay for it.

Total Utility

Total utility is defined as the largest sum of money that a consumer will voluntarily give up for a good.

For example, I might consider buying 7 pints of Ben and Jerry's Chunky Monkey ice cream only if they cost $21.50 or less. Therefore, the total utility that I derive from 7 pints of Chunky Monkey is $21.50. Total utility measures the benefit that I receive from the 7 pints.

Marginal Utility

To understand the maximization of total utility we must consider marginal utility. It is the addition to total utility that an individual derives by consuming one more unit of the good.

For example, if I consumed 6 pints of Chunky Monkey, marginal utility measures how much additional satisfaction I get by increasing my consumption to 7 pints instead.

Consider the following table of Leah's Total and Marginal Utility from Chunky Monkey:

Quantity (per month)	Total Utility (dollars)	Marginal Utility (dollars)	Label for the point on the graph
0	0.00	------	
1	6.00	6.00	A
2	11.00	5.00	B
3	15.00	4.00	C
4	18.00	3.00	D
5	20.00	2.00	E
6	21.00	1.00	F
7	21.50	0.50	G
8	21.50	0.00	H

Total utility tells us that 1 pint is worth no more than $6.00 to me and 2 pints are worth no more than $11.00 to me, etc.

Marginal utility tells us that the first pint is worth $6 to me and the second pint is worth $5.00 to me, while the third is worth $4.00, etc.

Law of Diminishing Marginal Utility

The more of a good the consumer has, the less marginal utility an additional unit has.

> For example, each additional pint of Chunky Monkey is worth less to me. The first pint I might eat by myself. The second I might share with my husband. The third I might share with my sister, and the fourth I might share with my dog Erwin. The fifth I might share with my mother in law. Thus, each successive pint has a lower priority.

Consider a graph of Leah's marginal utility:

Price per pint

Pints per month
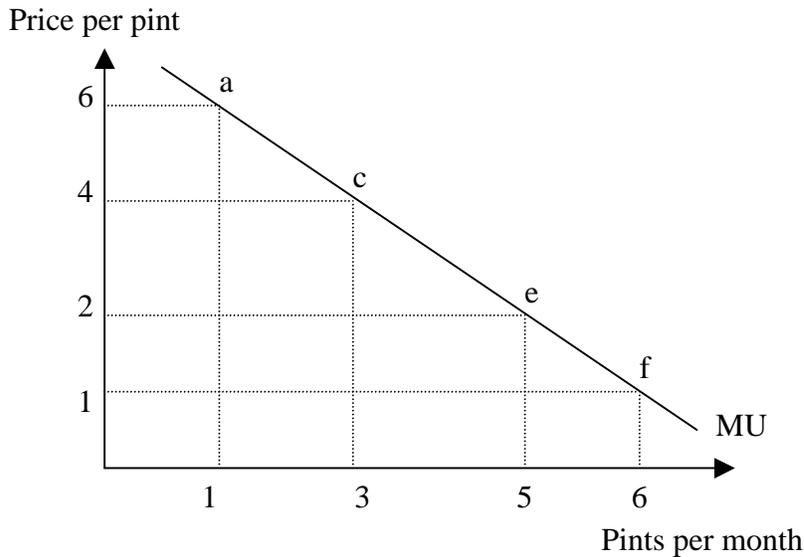
The graph of marginal utility has a negative slope, which indicates that marginal utility falls as quantity consumed increases.

Can you think of any exceptions to the law of diminishing marginal utility?

Note that total utility will increase as long as marginal utility is positive. For example, when a commodity is very scarce (say diamonds), economists expect it to have high marginal utility even though it provides very little total utility.

Can you think of a good that has a very low marginal utility but a very high total utility?

Optimal Purchase Rule:

How many pints of Chunky Monkey should I purchase?

I want to maximize my total benefit from the pints while minimizing their cost. As long as marginal utility is positive, I can increase my total utility by consuming more pints. But each additional pint costs money. It is best to maximize net total utility.

Net total utility = total utility – total expenditure, where total expenditure = $P*Q_D$.

Net total utility is maximized by considering net marginal utility, which is equal to marginal utility – price.

Suppose the price of 1 pint is $3.00. If I purchase 3 pints the net marginal utility is $1.00, so I can still increase my net total utility by purchasing more.

<u>Two rules that govern the optimal purchase rule</u>:

> <u>Rule 1</u>: if net marginal utility is positive (i.e., marginal utility > price), the consumer buys too little of the good to maximize net total utility.

> <u>Rule 2</u>: if net marginal utility is negative (i.e., marginal utility < price), the consumer buys too much of the good to maximize net total utility.

Combining these 2 rules tells us that net total utility is maximized when net marginal utility is equal to zero (i.e., marginal utility = price).

Thus, marginal utility = price is the optimal purchase rule.

<u>More than 1 good</u>

The optimal purchase rule for more than 1 good is to set the ratio of marginal utility (MU) to the price (P) of the good equal for every good purchased. The ratio measures how much additional utility is generated by spending $1 extra on each good.

> Consider 2 goods; a and b. At an optimum, $\dfrac{MU_a}{P_a} = \dfrac{MU_b}{P_b}$. In other words, the additional utility generated from spending $1 more on good a is equal to the additional utility generated from spending $1 more on good b. If not, purchases can be altered to raise utility.

> If $\dfrac{MU_a}{P_a} > \dfrac{MU_b}{P_b}$, then more money should be spent on good a and less should be spent on good b. Shifting money toward good a and away from good b will equalize the ratios. As more of good a is consumed, the MU_a falls, while the MU_b rises.

<u>Demand Curve</u>

The demand curve is the marginal utility curve. The law of diminishing marginal utility implies that demand curves have a negative slope.

> For example, at the price of $3.00, I will buy 4 pints. But if the price rises to $5, I will purchase only 2 pints. And if the price fell to $2, I will buy 5 pints. As the price rises, I use the good for higher valued uses –to share with my sister or husband. As the price falls, I use the good for lower valued uses –to share with my dog or mother in law.

Recall the importance of <u>opportunity cost</u>: the real cost of the 4 pints that are purchased for $3.00 is not the $12 I have given up. It is the 4 movie rentals that are given up. I have given up $12 worth of other goods in order to buy the 4 pints of Chunky Monkey.

Consumer Surplus

Consumer surplus is another name for net total utility. It measures the difference between total utility and total expenditure. Economists assume that firms maximize profit, while consumers maximize consumer surplus.

The consumer must experience some gain from a voluntary transaction; otherwise the consumer would refuse to purchase the good.

Calculating Consumer Surplus from Leah's Chunky Monkey Purchases:

Quantity (pints per month)	Marginal Utility (dollars)	Price (dollars)	Net Marginal Utility (i.e., per unit surplus)
1	6.00	3.00	3.00
2	5.00	3.00	2.00
3	4.00	3.00	1.00
4	3.00	3.00	0.00
5	2.00	3.00	-1.00

At the price of $3.00, 4 pints are purchased and the total consumer surplus is $6. The last pint offers no surplus because the optimal purchase rule sets marginal utility equal to price.

Consider the graph of consumer surplus:
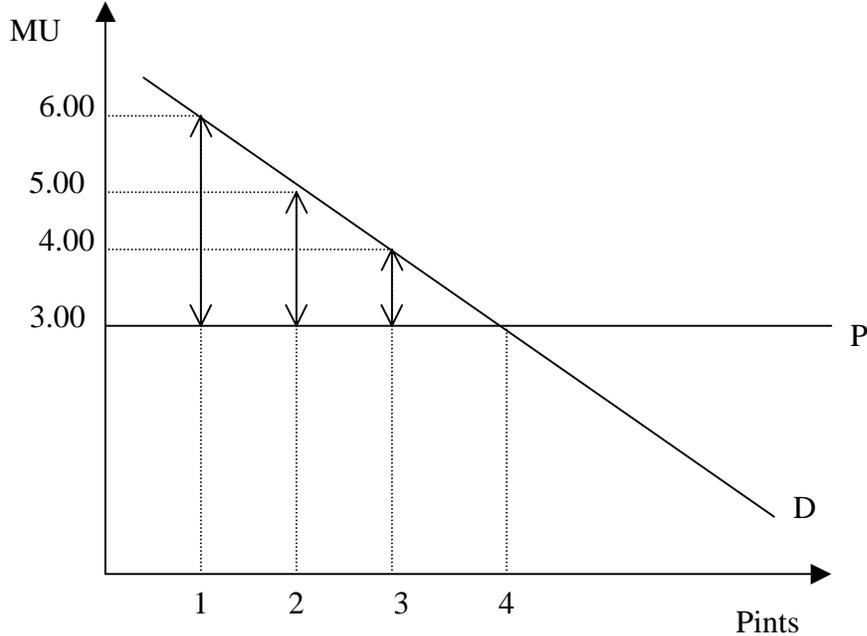
Consumer surplus is the area under the demand curve and above the price. Leah was willing to pay $18 for the 4 pints (i.e., the total utility of 4 pints), but only paid $12 (i.e., $3*4) so her total consumer surplus is $6.

Price, Income, and Quantity Demanded

Recall that a rise in income may lead to an increase or a decrease in quantity demanded.
        Inferior good: An increase in income reduces quantity demanded.
        Normal good: An increase in income increases quantity demanded.

There are two effects of *any* price change:
        Income effect: If the price of a good falls, you have more money left after buying it.
        Substitution effect: If the price of a good falls, it falls relative to other goods.
                For example, Sprint's "Nickel Nights" program reduces the cost of long-distance
                calling at night relative to the cost of day calls. This should encourage the
                substitution of night calls for day calls.

Consider a normal good first:

	Income effect	Substitution effect
Price of oil falls	Real income is higher so you take more Sunday drives.	Gas is cheaper so you drive instead of taking the bus
Quantity Demanded of Oil	Increases	Increases

Thus, a normal good must have a downward sloping demand curve. Both the income and substitution effects predict a negative relationship between price and quantity demanded.

Consider an inferior good:

	Income effect	Substitution effect
Price of plastic watches falls	Real income is higher so you buy fewer plastic watches	Plastic watches are cheaper than metal watches
Q_D of plastic watches	Decreases	Increases

Depending on the relative strength of the substitution and income effect, the demand for an inferior good may have a negative or positive slope.

If plastic watches account for a small portion of the consumer's budget, then demand will have a negative slope because the small income effect will be overwhelmed by the substitution effect, which *always* predicts a negatively sloped demand curve.

Any change in price has an income effect and a substitution effect. If the price of tacos falls, you'll probably eat more tacos at lunch because your real income has increased and other lunch items (like pizza) have become relatively more expensive.

From Individual Demand Curves to Market Demand Curves

We looked at how individual demands are derived from consumer choice. Now we need to understand how price affects quantity demanded in an entire market.

If every person's purchase decisions are independent of others' purchase decisions, then we simply add up the individual demand curves horizontally.

Consider 2 people in the market for Chunky Monkey:

Leah's D   Joe's D   Market D

Pints per month
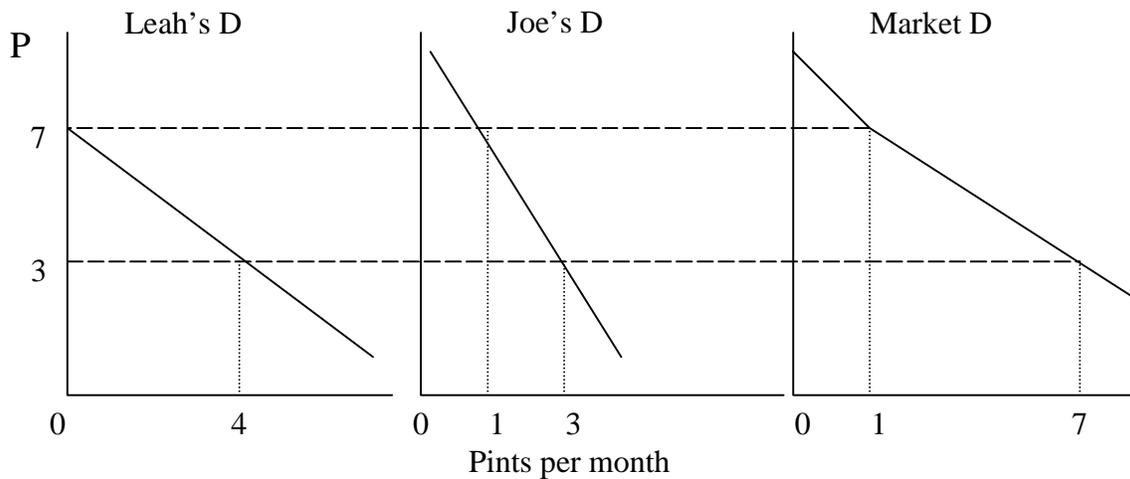
Steps to move from individual demands to market demand:
(1) Pick any relevant price.
(2) Find quantity demanded at that price for each person.
(3) Add the quantity demanded at that price to get quantity demanded in the market.
Repeat these steps for all possible prices.

> What happens to the above graph if we add one more person?

Revisit the Law of Demand:
A lower price generally increases the amount of a good that people in a market are willing to buy. Therefore, most goods have demand curves with negative slopes.

Individual demand curves slope downward because of the law of diminishing marginal utility. Market demand curves are the sum of individual demands, so market demands should also have a negative slope.

Market demands may slope downward even if individual demands do not, because most consumers are different.

> For example, if "Into Thin Air" falls in price, people who already own the book won't buy another copy but others will buy it.

> Think of the market for beef. People differ with respect to their tastes for beef. If the price of beef rises, avid beef eaters may continue to buy beef at high prices, while lesser beef enthusiasts may drop out of the market entirely. It is the disappearance of those customers that accounts for the negative slope of market demand curves versus individual demand curves.

> In our diagram above, only Joe will buy Chunky Monkey at the price of $7. Yet, at prices below $7, Leah will purchase the ice cream as well. Thus, as the price falls, Joe will buy more and Leah will enter the market, insuring that quantity demanded increases as price falls.

Examples where demand has a positive slope:
(a) If people judge quality by price, then a fall in price may signal poor quality leading people to buy less of the good. If the price of generic aspirin is less than Bayer, people may buy less of the generic brand.
(b) Snob appeal: some people buy expensive items to advertise their wealth. If the price of a Rolls Royce fell, people may buy fewer of them.