

Econ 101: Principles of Microeconomics

Ch. 10: The Rational Consumer

Fall 2009

Outline

- 1 Utility: Getting Satisfaction
- 2 Budgets and Optimal Consumption
- 3 The Optimal Consumption Choice
- 4 Spending the Marginal Dollar
- 5 From Utility to the Demand Curve

The Rational Consumer

- One of the key assumptions underlying economics is the concept of the *rational consumer*; i.e., that individuals know what they want and seek to make the most of the available opportunities given the scarcity constraints they face.
- Notice that there are two key components here:
 - ① The notion that individuals have **preferences**: This defines what they *want to consume*.
 - ② The notion that individuals have **constraints**: These define what they *can consume*.
- In this chapter, we will
 - Define more precisely what we mean by each of these notions.
 - Use them to determine how the individual can then make choices so as to maximize their well-being (or **utility**).

Utility: Getting Satisfaction

Utility

- The first concept is that individuals have **preferences**; i.e., we assume that individuals can look at two alternatives and state either
 - ① that they prefer one alternative over the other
 - ② or that they are entirely indifferent between the two alternatives (i.e., they like them equally).
- The overall measure of the person's well-being is called their **utility**
- It is assumed that these preferences are logically consistent (or transitive). For example:
 - If the individual says they prefer **apples** to **oranges**
 - ... and they say they prefer **oranges** to **peaches**
 - ... then they will prefer **apples** to **peaches**.
- It is important to note that we are not saying
 - That preference cannot change over time
 - That individual preferences can (or even should) be compared.
- We are also not commenting on *what* people like, but simply assuming that they have a consistent set of preferences.

The Utility Function

- The individual's overall measure of well-being (i.e., their **utility**) is assumed to depend on their **consumption bundle**; i.e., the set of goods and services consumed by the individual.
- The relationship between an individual's consumption bundle and the total utility it generates for that individual is called the individual's **utility function**.
- While the units used to measure utility are not important, we'll use the hypothetical units: **utils**.

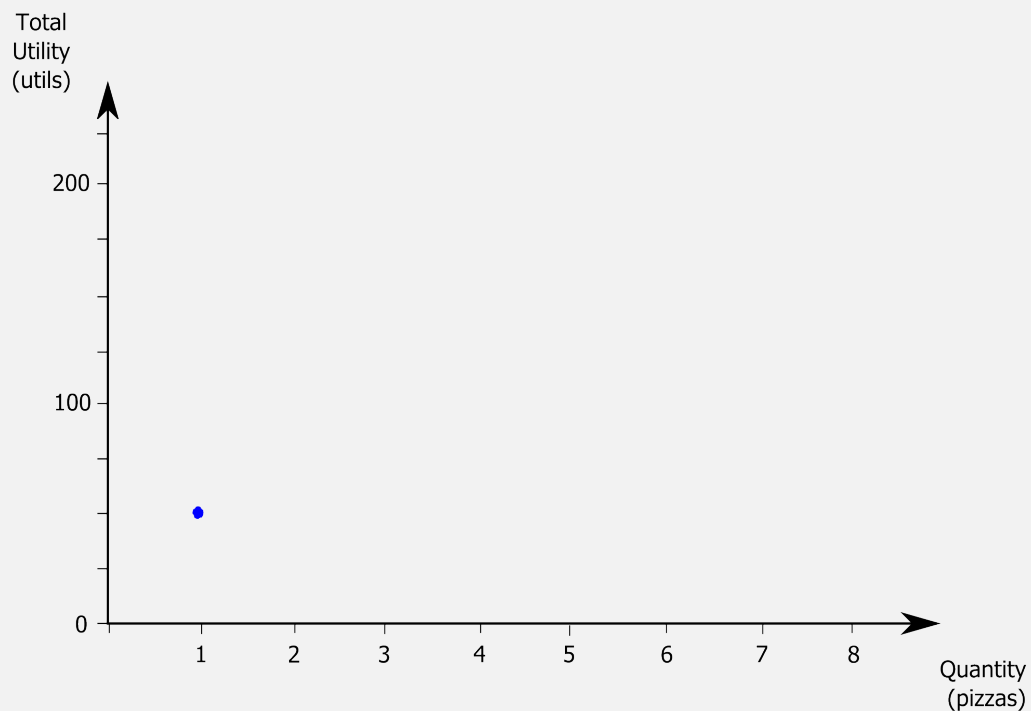
Total versus Marginal Utility

- Suppose we are considering an individual's (say Anne's) preferences towards pizza.
- We could measure how much **Total Utility** she receives from a given quantity of pizza over a two-week period.
- In general, we would expect that her total utility increases as she consumes additional pizza, though at some point she is likely to get tired of pizza and actually view it as a bad.
- It is also useful to think in terms of **Marginal Utility**; i.e., the additional utility generated by consuming one more unit of a good or service.
- This will help us in applying *marginal analysis* to the decisions made by the consumer.
- The **Marginal Utility Curve** graphically shows marginal utility as a function of the quantity consumed.

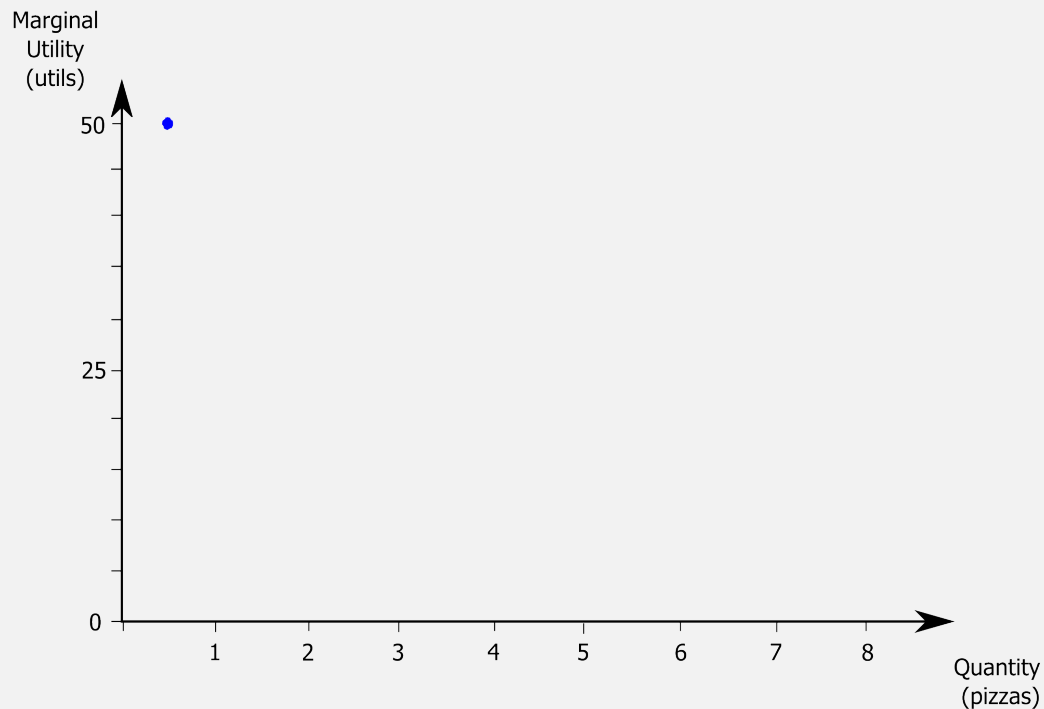
Anne's Utility from Pizza

Number of Pizzas	Total Utility	Marginal Utility
0	0	
1	50	50
2	88	38
3	121	33
4	150	29
5	175	25
6	196	21
7	214	18
8	229	15

The Total Utility Curve



The Marginal Utility Curve



The Principle of Diminishing Marginal Utility

- Notice that the marginal (or additional) utility Anne receives from pizza decreases as she consumes more and more pizza.
- This is known as the **Principle of Diminishing Marginal Utility**, which says that each successive unit of a good or service consumed adds less to total utility than the previous unit.
- If you think about it, this is true of most commodities.
- However, there are exceptions, particularly for commodities in which
 - Experience alters the enjoyment (e.g., downhill skiing)
 - Consumption is only useful after a given quantity is reached (e.g., wallpaper).

How Much Pizza to Consume?

- *With no other constraints*, what would determine how much pizza Anne should eat?
- She should continue to eat pizza as long as she enjoyed eating the last pizza.; i.e., as long as the **marginal utility** from the last pizza is positive
- But in reality, there are constraints and trade-offs Anne faces. What are they?
 - Anne only has so much money with which to buy pizza; i.e., she faces a budget constraint.
 - In addition, because she has a limited budget, buying pizza means she may not have enough money to buy other things, like movie tickets.
- While the previous section defined the utility function as describing what we *want to consume*, the current section focuses on the budget constraint determines what we *can consume*.

The Budget Constraint

- A **budget constraint** requires that the cost of a consumer's consumption bundle be no more than the consumer's income.
- Anne doesn't buy as much pizza as she can
 - not only because she stops enjoying more pizza (i.e., her marginal utility from pizza eventually becomes zero),
 - but also because she only has a limited amount of money to spend on anything.
- The **consumption possibilities set** is the set of all the possible consumption bundles that the consumer can afford given their income.
- The **budget line** identifies all the possible consumption bundles that are available to the consumer who spends *all* of their income.
- Consider a person
 - whose available income is given by Y
 - who can only spend money on one of two goods: X_1 and X_2
 - who faces prices for these two goods denoted by P_1 and P_2 , respectively.
- The budget line is then given by: $P_1X_1 + P_2X_2 = Y$.

Anne's Budget Constraint

- Suppose that Anne has a monthly budget of \$50 (i.e., $Y = 50$).
- Suppose she can spend this money on either pizza (X_1) or movies (X_2).
- Finally, suppose that
 - A pizza costs \$10 (i.e., $P_1 = 10$)
 - A movie ticket costs \$5 (i.e., $P_2 = 5$)
- Then Anne's budget line is given by:

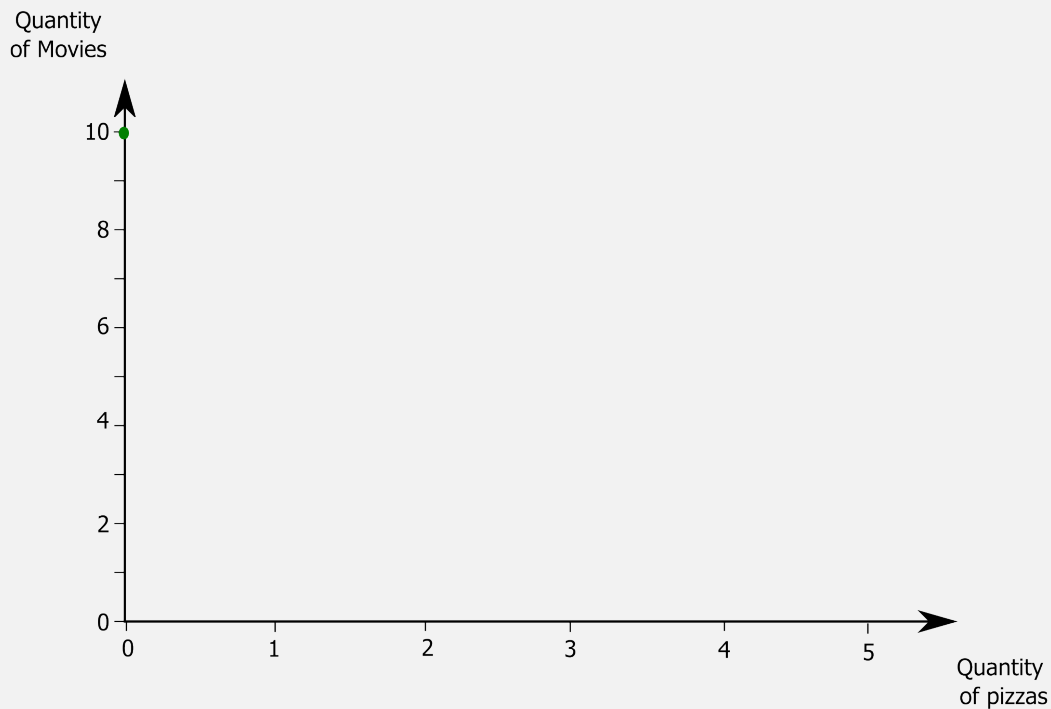
$$10X_1 + 5X_2 = 50 \quad (1)$$

Budget Line in Table Form

- We can consider Anne's budget constraint in tabular form

Pizza		Movies	
Quantity (X_1)	Expenditure	Quantity (X_2)	Expenditure
0	0	10	50
1	10	8	40
2	20	6	30
3	30	4	20
4	40	2	10
5	50	0	0

The Budget Line



Aside: The Budget Line's Slope

- The budget constraints slope measures the amount of one good that must be sacrificed in order to buy more of another good
- Remember that the budget line is: $P_1X_1 + P_2X_2 = Y$.
- We can rewrite our budget line as $X_2 = \frac{Y}{P_2} - \frac{P_1}{P_2}X_1$
- The slope of the budget line is $-\frac{P_1}{P_2}$
- In our example $-\frac{P_1}{P_2} = -2$
Ann must give up 2 movies to get 1 pizza.

Combining the Budget Constraint and Preferences

- If we combine information about preferences (marginal utility values) with information about what is affordable (the budget constraint) we can develop a useful rule to guide us to an individual's utility-maximizing choice:
 - The highest possible utility will be point for the consumers occurs when **the marginal utility per dollar** is the same for both goods
- To see this, we first need to know Anne's preferences towards movies.

Anne's Preferences Towards Movies

Number of Movies	Total Utility	Marginal Utility
0	0	
1	75	75
2	117	42
3	153	36
4	181	28
5	206	25
6	225	19
7	243	18
8	260	17

Putting the Pieces Together

Pizza		Movies		
Quantity (X_1)	Total Utility from Pizza	Quantity (X_2)	Total Utility from Movies	Total Utility
5	175	0	0	175
4	151	2	117	268
3	121	4	181	302
2	88	6	225	313
1	50	8	260	310
0	0	10	291	291

Putting the Pieces Together

Pizza		Movies		
Quantity (X_1)	Total Utility from Pizza	Quantity (X_2)	Total Utility from Movies	Total Utility
5	175	0	0	175
4	151	2	117	268
3	121	4	181	302
2	88	6	225	313
1	50	8	260	310
0	0	10	291	291

The Marginal Utility Per Dollar

- The results on the previous slide shows us the **optimal consumption bundle** for Anne(i.e., the consumption bundle that maximizes her total utility *given* her budget constraint).
- In moving down the table, consuming more movies and less pizza, two factors affect her choices
 - ① As she moves down the table, she gains additional (i.e., marginal utility) from consuming more movies, but in order to do so she must give up the additional (i.e., marginal utility) from the pizza she forgoes.
 - ② How many additional movies she can see for each pizza she forgoes depends on the relative prices of pizzas and movies.
- A useful way of thinking about her problem is the notion of the marginal utility per dollar obtained from each good.

The Marginal Utility Per Dollar for Movies

Number of Movies	Marginal Utility	MU/\$
0	75	15
1	42	8.4
2	36	7.2
3	28	5.6
4	25	5.0
5	19	3.8
6	18	3.6
7	17	3.4
8		

The Marginal Utility Per Dollar for Pizzas

Number of Pizza	Marginal Utility	MU/\$
0		
1	50	5.0
2	38	3.8
3	33	3.3
4	29	2.9
5	25	2.5

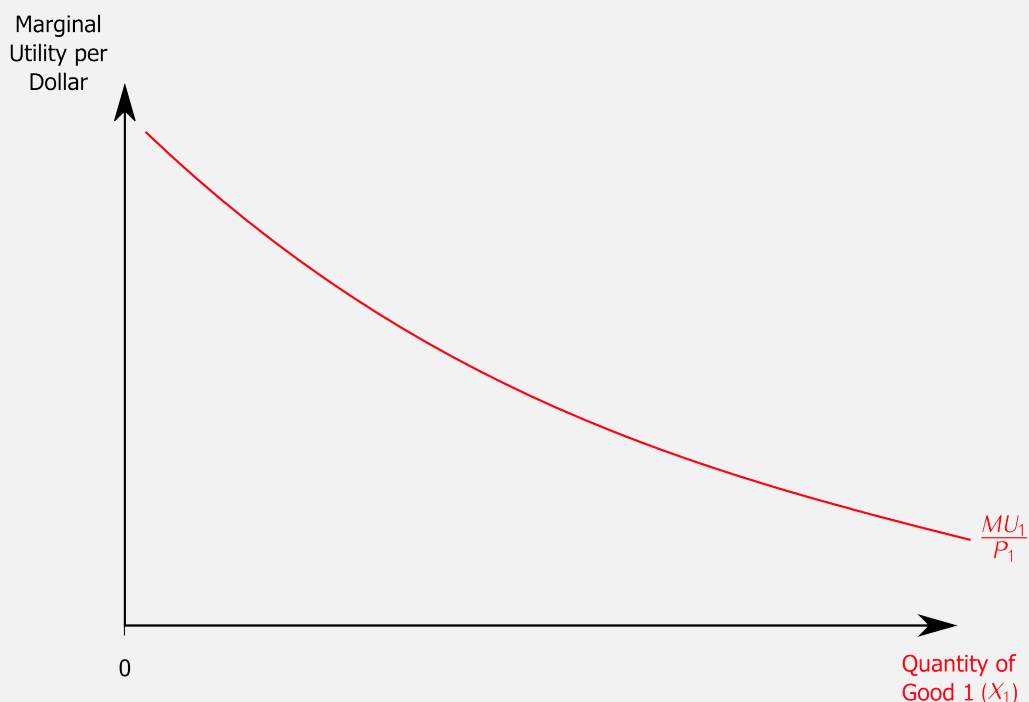
Spending the Marginal Dollar

Pizza (\$10)			Movies (\$5)		
Quantity	Marginal Utility	MU/\$	Quantity	Marginal Utility	MU/\$
5	25	2.5	0		
4	29	2.9	2	42	8.1
3	33	3.3	4	28	5.6
2	38	3.8	6	19	3.8
1	50	5.0	8	17	3.4
0			10	15	3.0

- Anne's optimal consumption bundle occurs when the marginal utility per dollar spent is the same for both goods.
- This is known as the **optimal consumption rule**:

$$\frac{MU_1}{P_1} = \frac{MU_2}{P_2} \tag{2}$$

Graphically



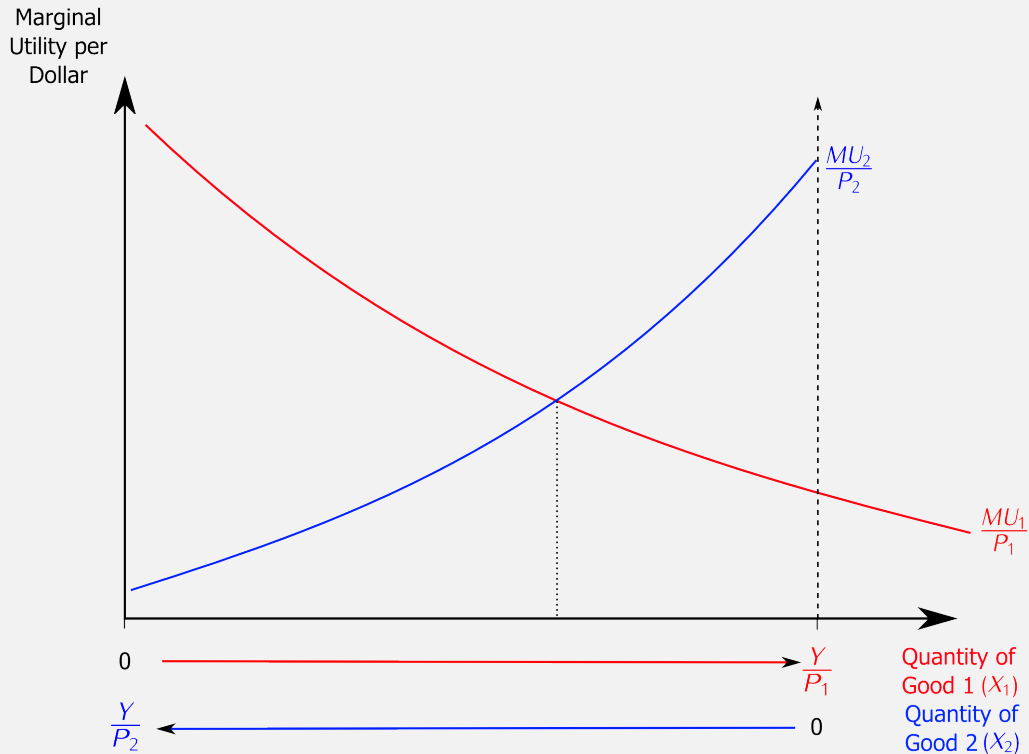
From Utility to the Demand Curve

Marginal Utility and the Law of Demand

- What happens to the optimal quantity demanded of a good as the price increases?
- We saw in earlier chapters that the quantity demanded decreases (the so-called *law of demand* comes into play).
- We can see this same result using results of the current chapter.
 - With an increase in price, the customer preferences (and MU's) don't change.
 - ... but the marginal utility (i.e., $\frac{MU_i}{P_i}$) per dollar does decline

Marginal Utility and Demand

What happens to the quantity demanded for good 2 as its price increases?



The Substitution and Income Effects

- The previous slide illustrates **the substitution effect**
 - As the price of good 2 increased, the individual substituted away from good
 - Consuming more of good 1.
 - For example, in the case of Anne, an increase in the price of pizza would cause her to substitute away from pizza and towards more movies.
- There is another consequence of a price change, known as the **income effect**
 - With a drop in price, the individual can purchase the same bundle of goods as they did before and have money left over.
 - It is as if their income has gone up by the savings due to the price decrease.
 - For most cases, this *income effect* is small.
 - However, for big ticket items (such as housing), the income effect of a price reduction can be large.