Chapter 4

Consumer Choice

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Key issues

1. Properties of preferences
2. Utility Function
3. Budget constraint
4. Consumer's constrained choice: Utility Maximization problem

Individual decision making

- individual tastes (preferences) determine pleasure people derive from goods
- consumers face constraints on their choices
- consumers maximize their pleasure from consumption subject to constraints
- we want to predict behavior - not judge it

Consumer's problem

- consumer allocates money over goods: buys a bundle or market basket of goods
- 2 possible theories of consumer behavior
  - maximizing behavior
  - random behavior
- We are modeling behavior as maximizing utility or satisfaction subject to budget constraints. We derive demand function (which we assumed in the previous chapters)
- Two important tools for this analysis: (1) preferences or indifference curve and the associated MRS, and (2) budget constraint and MRT.
- Consumer chooses a bundle for which
  - (a) MRS = MRT
  - (b) the bundle is on the budget line
- I show this geometrically using indifference curve. MRS = tangent or slope of the indifference curve at a point. MRT = tangent or slope of the budget line at a point
- First I talk about preferences or indifference curve

Assumptions about consumer preferences

1. completeness
2. transitivity
3. more is better known as monotonicity

(Aside: It has been shown that when a preference ordering satisfies those properties, it could be represented by a utility function).

Assumption 1: Completeness

- consumer can rank any two bundles of goods
- only one of following is true: consumer
  - prefers bundle x to bundle y
  - prefers bundle y to bundle x
  - is indifferent between them

Assumption 2: Transitivity (rationality)

- consumer's preference over bundles is consistent:
- if consumer prefers
  - Bundle z to Bundle y and
  - Bundle y to Bundle x
- then consumer prefers Bundle z to Bundle x

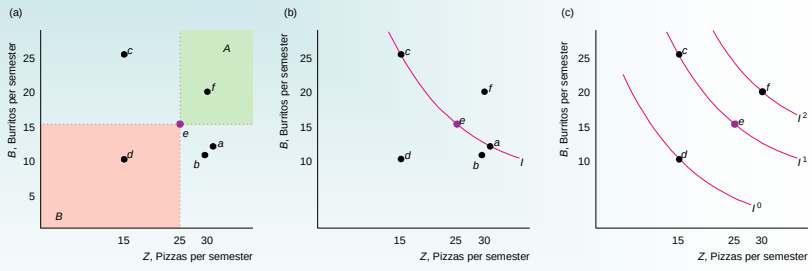
Assumption 3: More is better

- more of a good is better than less of it
  - good: commodity for which more is preferred to less at least at some levels of consumption
  - bad: something for which less is preferred to more, such as pollution
- consumers are not satiated

Indifference curve

- we ask Lisa to identify all the bundles that give her the same amount of pleasure as consuming bundle e
- her answer: Curve I in Figure 4.1b, “Indifference Curve”

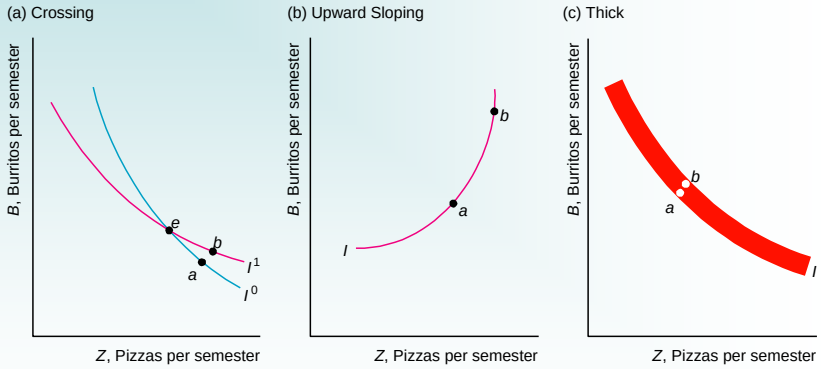
Figure 4.1 Bundles of Pizzas and Burritos Lisa might consume



Properties of Indifference curve

1. bundles on indifference curves farther from the origin are preferred to those on indifference curves closer to the origin
2. there is an indifference curve through every possible bundle
3. indifference curves cannot cross
4. indifference curves are “thin”
5. indifference curves slope down

Figure 4.2
Impossible Indifference Curves



Willingness to substitute

- downward-sloping indifference curve $\Rightarrow$ consumer is willing to substitute one good for the other
- marginal rate of substitution (*MRS*) of burritos (rise) for pizza (run), is slope of indifference curve:

$$MRS = \frac{\Delta B}{\Delta Z}$$

MRS varies along the indifference curve

- It is shown in the figure of next slide that
- An indifference curve bow away from the origin (convex)
- Which indicates diminish marginal rates of substitution (*MRS*)

Figure 4.3
Marginal Rate of Substitution

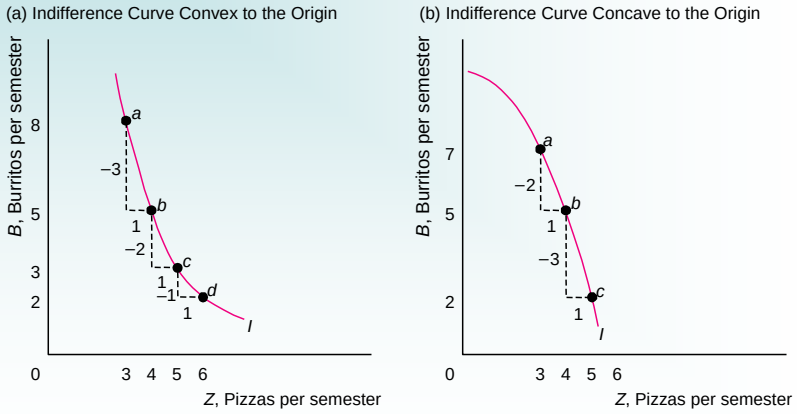
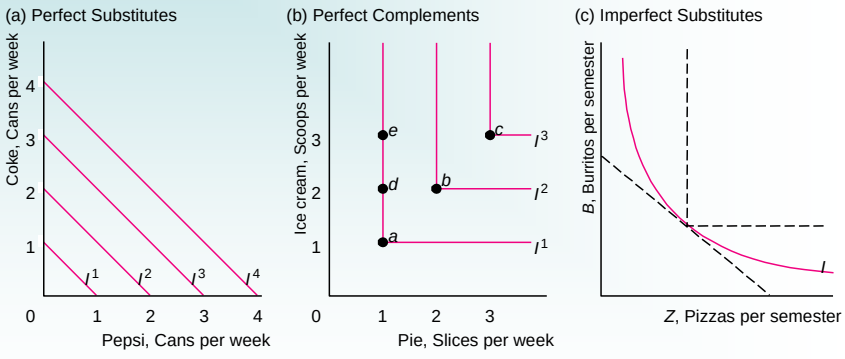


Figure 4.4 Perfect Substitutes, Perfect Complements, Imperfect Substitutes



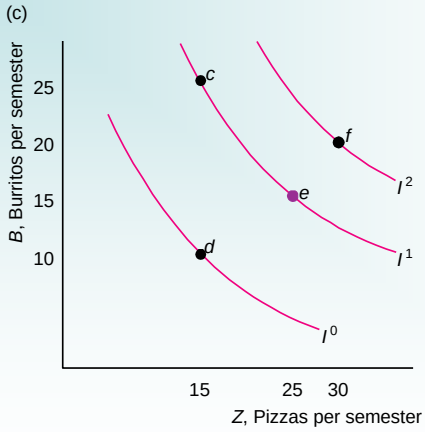
Utility Function U(Z,B)

- utility function:
  - relationship between utility measure and every possible bundle of good
  - U(Z,B): level of utility a consumer derives from consuming Z units of pizza and B units of burritos
- numerical value that reflects relative rankings of various bundles of goods
- In our example a bundle consists of a certain amount of pizza (represented as x-axis good) and a certain amount of burritos (represented as y-axis good). If Lisa prefers bundle **a** to **b**, then utility from **a** > utility from **b**

Utility and indifference curves

- Indifference curves are obtained for each level of utility as follows:
- When you plot all those bundles (Z,B) that give the same utility level say 10, you get one indifference curve (cf. I^1 in figure 4.1c). If you plot all those bundles (Z,B) that produce another utility level say 15, you will get another indifference curve (cf. I^2 in figure 4.1c). The second curve is on the right side of the first curve. The indifference curves help to find an optimal choice. I will explain this later.

Figure 4.1c Bundles of Pizzas and Burritos Lisa Might Consume



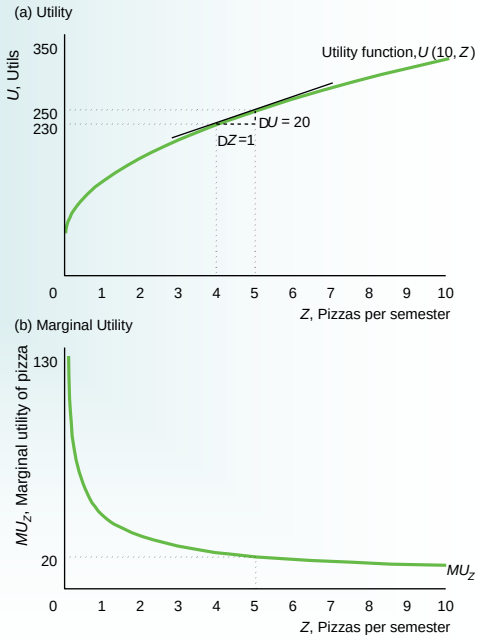
Utility and marginal utility

- Marginal utility of *Z:* $MU_Z = \frac{\Delta U}{\Delta Z}$

- Change in utility from a small increase in *Z* holding *B* fixed
- Example: Suppose U(Z,B) = 2Z + 3B: $MU_Z = \frac{\Delta U}{\Delta Z} = 2$

- Suppose we have only one good z, and utility function is $U(z) = z^{0.8}$, $MU_Z = \frac{\Delta U}{\Delta Z} = 0.8Z^{-0.2}$
- Note that marginal utility varies with the level of z, and it is decreasing as you have higher and higher z

Figure 4.5
Utility and Marginal Utility



Utility and marginal of substitution

Lisa trades from one bundle on an indifference curve to another by giving up some burritos to gain more pizza

$$MRS = \frac{\Delta B}{\Delta Z} = -\frac{MU_Z}{MU_B}$$

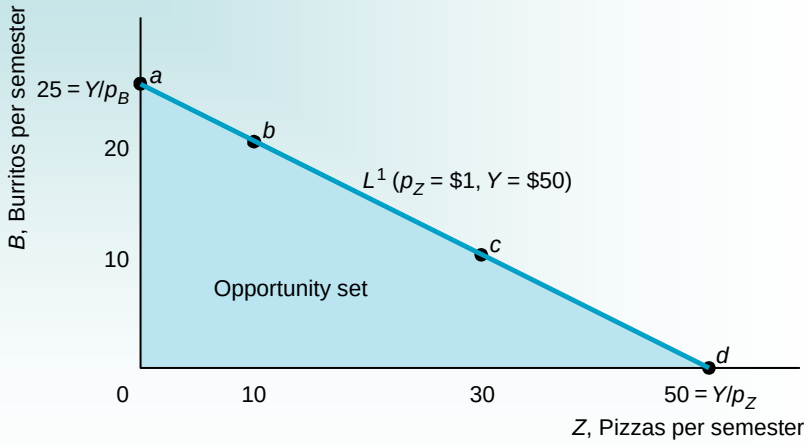
Budget constraint

- Lisa spends all her income, Y, on pizza and burritos
- her budget constraint is

$$p_B B + p_Z Z = Y$$

- $p_B B$ = expenditure on B burritos
- $p_z Z$ = expenditure on Z pizzas

Figure 4.6 Budget Constraint



Slope of budget constraint

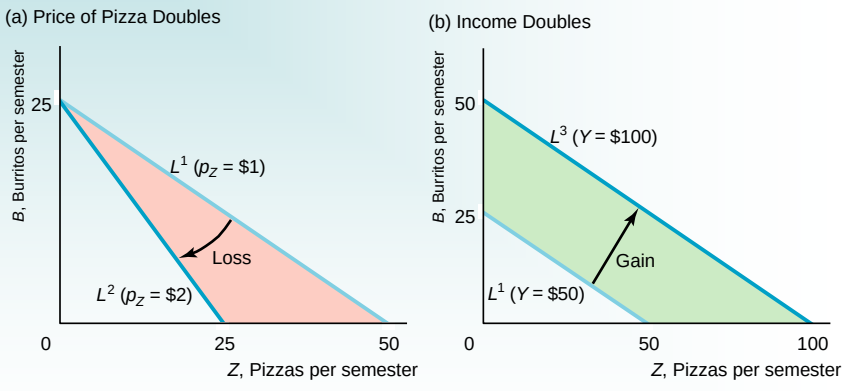
- is called the marginal rate of transformation

$$MRT = \frac{\Delta B}{\Delta Z} = -\frac{p_Z}{p_B}$$

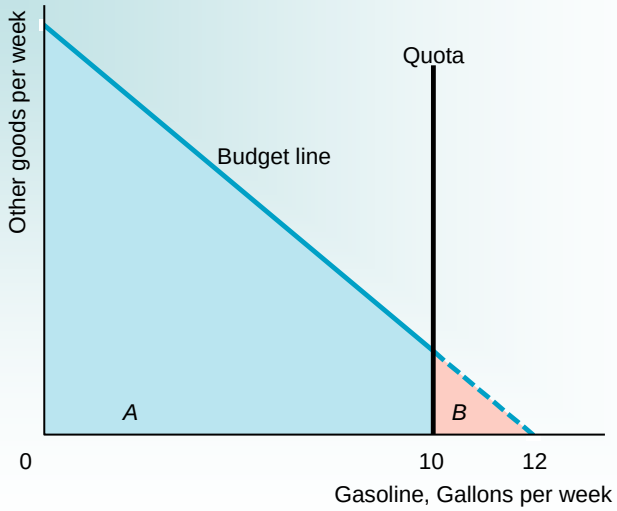
- in our example:

$$MRT = -\frac{p_Z}{p_B} = -\frac{\$1}{\$2} = -\frac{1}{2}$$

Figure 4.7
Changes in the Budget Constraint



Page 92 Solved Problem 4.2



Utility Maximization: Budget line meets indifference curves

- maximize utility subject to the budget constraint
- optimal bundle, two possibilities:
  - interior solution: buy some units of all goods
  - corner solution: buy only one good

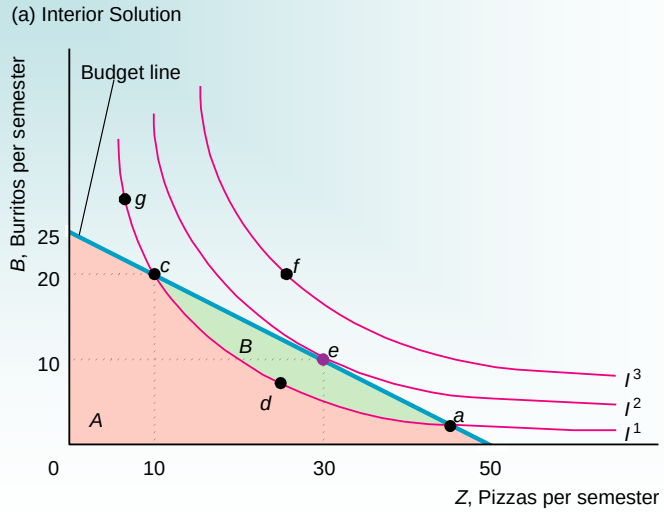
Animated Graph: Explaining utility maximization Problem

- Putting all the pieces together, we have the following
- (Animated Graph: Utility Maximization)

Interior solution

- consumer buys some units of all goods
- optimum bundle, *e*, where highest indifference curve touches the budget line

Figure 4.8a
Consumer Maximization



Tangency property

- at interior optimum, indifference curve is tangent to budget line:

$$MRS = MRT, \text{ i.e., } -\frac{MU_Z}{MU_B} = -\frac{p_Z}{p_B}$$

$$\frac{MU_Z}{p_Z} = \frac{MU_B}{p_B}$$

- last dollar spent on pizza gives as much extra utility as that spent on burrito

Summary: Utility maximized

Consumers maximize their well-being subject to the budget constraint where

- highest possible indifference curve hits budget constraint
- indifference curve is tangent to budget constraint (if both goods are purchased): $MRS = MRT$
- last dollar spent on one good gives as much extra utility as the last dollar spent on any other consumed good

Solved problem: Food stamps

Are poor people necessarily better off receiving food stamps or a comparable amount of cash?

Answer

- cash gives a greater choice
- whether that greater choice matters depends on the tastes of poor people (how much food they eat)

Food Stamp Example: Animated Graph

- I illustrate the above using an animated graph first and then I explain once again the steps of the animated graph.
- Animated Graph: Food stamp example

Figure 4.10
Food Stamps Versus Cash