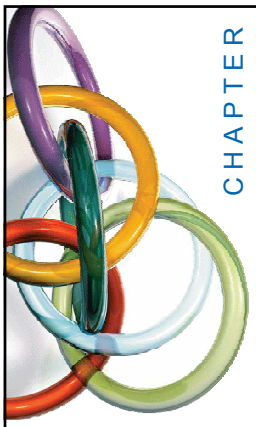


CHAPTER 3

Consumer Behavior

Prepared by:
Fernando & Yvonn Quijano

CHAPTER 3 OUTLINE

Consumer Behavior

- **theory of consumer behavior** Description of how consumers allocate incomes among different goods and services to maximize their well-being.

Consumer behavior is best understood in three distinct steps:

1. Consumer preferences
2. Budget constraints
3. Consumer choices

3.1 CONSUMER PREFERENCES

Market Baskets

- **market basket** (or **bundle**) List with specific quantities of one or more goods.

TABLE 3.1 Alternative Market Baskets

Market Basket	Units of Food	Units of Clothing
A	20	30
B	10	50
D	40	20
E	30	40
G	10	20
H	10	40

To explain the theory of consumer behavior, we will ask whether consumers *prefer* one market basket to another.

3.1 CONSUMER PREFERENCES

Some Basic Assumptions about Preferences

1. **Completeness:** Preferences are assumed to be *complete*. In other words, consumers can compare and rank all possible baskets. Thus, for any two market baskets *A* and *B*, a consumer will prefer *A* to *B*, will prefer *B* to *A*, or will be indifferent between the two. By *indifferent* we mean that a person will be equally satisfied with either basket.

   Note that these preferences ignore costs. A consumer might prefer steak to hamburger but buy hamburger because it is cheaper.

3.1 CONSUMER PREFERENCES

Some Basic Assumptions about Preferences

2. **Transitivity:** Preferences are *transitive*. Transitivity means that if a consumer prefers basket *A* to basket *B* and basket *B* to basket *C*, then the consumer also prefers *A* to *C*. Transitivity is normally regarded as necessary for consumer consistency.

3. **More is better than less:** Goods are assumed to be desirable—i.e., to be *good*. Consequently, *consumers always prefer more of any good to less.* In addition, consumers are never satisfied or satiated; *more is always better, even if just a little better.* This assumption is made for pedagogic reasons; namely, it simplifies the graphical analysis. Of course, some goods, such as air pollution, may be undesirable, and consumers will always prefer less. We ignore these "bads" in the context of our immediate discussion.

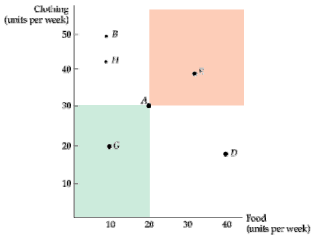
3.1 CONSUMER PREFERENCES

Indifference Curves

Figure 3.1
Describing Individual Preferences

Because more of each good is preferred to less, we can compare market baskets in the shaded areas. Basket *A* is clearly preferred to basket *G*, while *E* is clearly preferred to *A*.

However, *A* cannot be compared with *B*, *D*, or *H* without additional information.



3.1 CONSUMER PREFERENCES

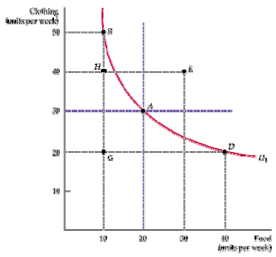
Indifference Curves

- **indifference curve** Curve representing all combinations of market baskets that provide a consumer with the same level of satisfaction.

Figure 3.2
An Indifference Curve

The indifference curve U_1 that passes through market basket *A* shows all baskets that give the consumer the same level of satisfaction as does market basket *A*; these include baskets *B* and *D*.

Our consumer prefers basket *E*, which lies above U_1, to *A*, but prefers *A* to *H* or *G*, which lie below U_1.



3.1 CONSUMER PREFERENCES

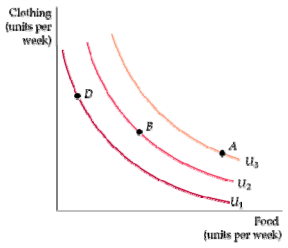
Indifference Maps

- **indifference map** Graph containing a set of indifference curves showing the market baskets among which a consumer is indifferent.

Figure 3.3
An Indifference Map

An indifference map is a set of indifference curves that describes a person's preferences.

Any market basket on indifference curve U_3, such as basket *A*, is preferred to any basket on curve U_2 (e.g., basket *B*), which in turn is preferred to any basket on U_1, such as *D*.

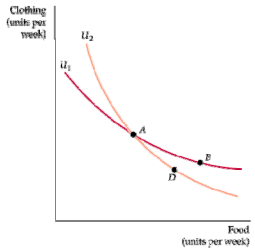


Indifference Maps

Figure 3.4
Indifference Curves Cannot Intersect

If indifference curves U_1 and U_2 intersect, one of the assumptions of consumer theory is violated.

According to this diagram, the consumer should be indifferent among market baskets *A*, *B*, and *D*. Yet *B* should be preferred to *D* because *B* has more of both goods.



The Marginal Rate of Substitution

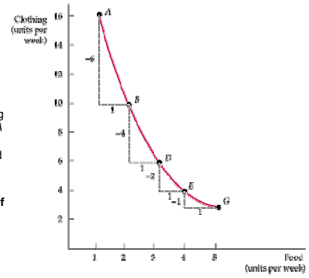
- **marginal rate of substitution (MRS)** Maximum amount of a good that a consumer is willing to give up in order to obtain one additional unit of another good.

Figure 3.5
The Marginal Rate of Substitution

The magnitude of the slope of an indifference curve measures the consumer's marginal rate of substitution (MRS) between two goods.

In this figure, the MRS between clothing (*C*) and food (*F*) falls from 6 (between *A* and *B*) to 4 (between *B* and *D*) to 2 (between *D* and *E*) to 1 (between *E* and *G*).

Convexity The decline in the MRS reflects a **diminishing marginal rate of substitution**. When the MRS diminishes along an indifference curve, the curve is convex.



Perfect Substitutes and Perfect Complements

- **perfect substitutes** Two goods for which the marginal rate of substitution of one for the other is a constant.

- **perfect complements** Two goods for which the MRS is zero or infinite; the indifference curves are shaped as right angles.

Bads

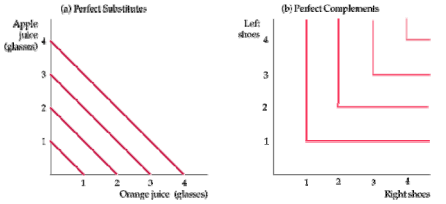
- **bad** Good for which less is preferred rather than more.

3.1 CONSUMER PREFERENCES

Perfect Substitutes and Perfect Complements

Figure 3.6

Perfect Substitutes and Perfect Complements



In **(a)**, Bob views orange juice and apple juice as perfect substitutes: He is always indifferent between a glass of one and a glass of the other.

In **(b)**, Jane views left shoes and right shoes as perfect complements: An additional left shoe gives her no extra satisfaction unless she also obtains the matching right shoe.

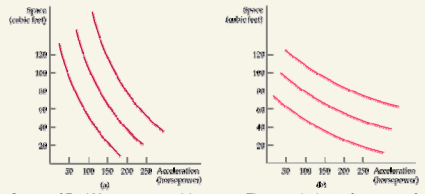
3.1 CONSUMER PREFERENCES

EXAMPLE 3.1 Designing New Automobiles (I)

Figure 3.7

Preferences for Automobile Attributes

Preferences for automobile attributes can be described by indifference curves. Each curve shows the combination of acceleration and interior space that give the same satisfaction.



Owners of Ford Mustang coupes **(a)** are willing to give up considerable interior space for additional acceleration.

The opposite is true for owners of Ford Explorers **(b)**. They prefer interior space to acceleration.

3.1 CONSUMER PREFERENCES

Utility and Utility Functions

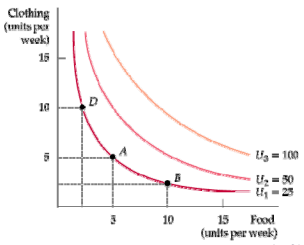
- **utility** Numerical score representing the satisfaction that a consumer gets from a given market basket.
- **utility function** Formula that assigns a level of utility to individual market baskets.

Figure 3.8

Utility Functions and Indifference Curves

A utility function can be represented by a set of indifference curves, each with a numerical indicator.

This figure shows three indifference curves (with utility levels of 25, 50, and 100, respectively) associated with the utility function *FC*.



3.1 CONSUMER PREFERENCES

Ordinal versus Cardinal Utility

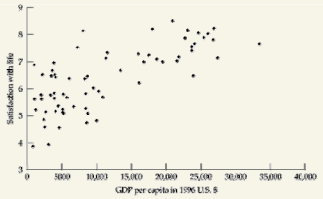
- **ordinal utility function** Utility function that generates a ranking of market baskets in order of most to least preferred.
- **cardinal utility function** Utility function describing by how much one market basket is preferred to another.

EXAMPLE 3.2 Can Money Buy Happiness?

Figure 3.9

Income and Happiness

A cross-country comparison shows that individuals living in countries with higher GDP per capita are on average happier than those living in countries with lower per-capita GDP.



3.2 BUDGET CONSTRAINTS

- **budget constraints** Constraints that consumers face as a result of limited incomes.

The Budget Line

- **budget line** All combinations of goods for which the total amount of money spent is equal to income.

$$P_F F + P_C C = I \qquad (3.1)$$

TABLE 3.2 Market Baskets and the Budget Line

Market Basket	Food (*F*)	Clothing (*C*)	Total Spending
A	0	40	$80
B	20	30	$80
D	40	20	$80
E	60	10	$80
G	80	0	$80

The table shows market baskets associated with the budget line $F + 2C = \$80$

3.2 BUDGET CONSTRAINTS

The Budget Line

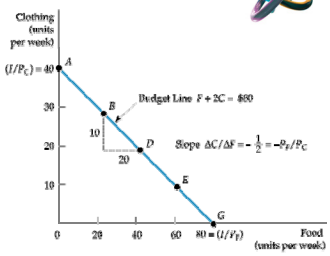
Figure 3.10

A Budget Line

A budget line describes the combinations of goods that can be purchased given the consumer's income and the prices of the goods.

Line *AG* (which passes through points *B*, *D*, and *E*) shows the budget associated with an income of $80, a price of food of P_F = $1 per unit, and a price of clothing of P_C = $2 per unit.

The slope of the budget line (measured between points *B* and *D*) is $-P_F/P_C = -10/20 = -1/2$.



$$C = (I / P_C) - (P_F / P_C)F \qquad (3.2)$$

3.2 BUDGET CONSTRAINTS

The Effects of Changes in Income and Prices

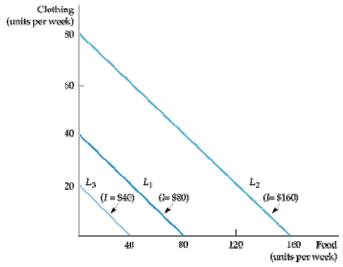
Figure 3.11

Effects of a Change in Income on the Budget Line

Income Changes A change in income (with prices unchanged) causes the budget line to shift parallel to the original line (L_1).

When the income of $80 (on L_1) is increased to $160, the budget line shifts outward to L_2.

If the income falls to $40, the line shifts inward to L_3.



3.2 BUDGET CONSTRAINTS

The Effects of Changes in Income and Prices

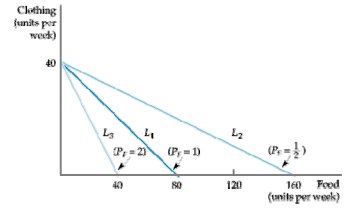
Figure 3.12

Effects of a Change in Price on the Budget Line

Price Changes A change in the price of one good (with income unchanged) causes the budget line to rotate about one intercept.

When the price of food falls from $1.00 to $0.50, the budget line rotates outward from L_1 to L_2.

However, when the price increases from $1.00 to $2.00, the line rotates inward from L_1 to L_3.



3.3 CONSUMER CHOICE

The maximizing market basket must satisfy two conditions:

1. *It must be located on the budget line.*
2. *It must give the consumer the most preferred combination of goods and services.*

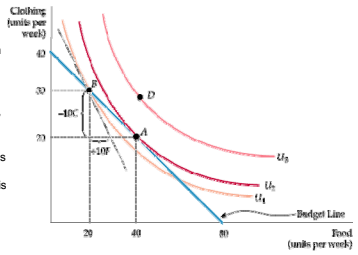
Figure 3.13

Maximizing Consumer Satisfaction

A consumer maximizes satisfaction by choosing market basket *A*. At this point, the budget line and indifference curve U_2 are tangent.

No higher level of satisfaction (e.g., market basket *D*) can be attained.

At *A*, the point of maximization, the MRS between the two goods equals the price ratio. At *B*, however, because the MRS [− (−10/10) = 1] is greater than the price ratio (1/2), satisfaction is not maximized.



3.3 CONSUMER CHOICE

Satisfaction is maximized (given the budget constraint) at the point where

$$\text{MRS} = P_F / P_C \qquad \textbf{(3.3)}$$

- **marginal benefit** Benefit from the consumption of one additional unit of a good.
- **marginal cost** Cost of one additional unit of a good.

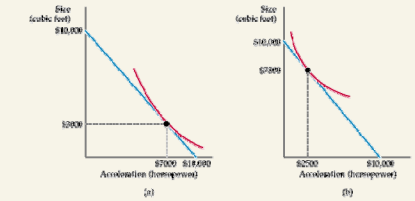
The condition given in equation (3.3) illustrates the kind of optimization conditions that arise in economics. In this instnace, satisfaction is maximized when the **marginal benefit**—the benefit associated with the consumption of one additional unit of food—is equal to the **marginal cost**—the cost of the additional unit of food. The marginal benefit is measured by the MRS.

3.3 CONSUMER CHOICE

EXAMPLE 3.3 Designing New Automobiles (II)

Figure 3.14

Consumer Choice of Automobile Attributes



The consumers in **(a)** are willing to trade off a considerable amount of interior space for some additional acceleration. Given a budget constraint, they will choose a car that emphasizes acceleration. The opposite is true for consumers in **(b)**.

3.3 CONSUMER CHOICE

Corner Solutions

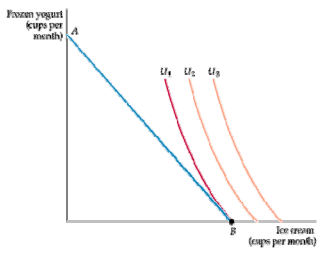
- **corner solution** Situation in which the marginal rate of substitution of one good for another in a chosen market basket is not equal to the slope of the budget line.

Figure 3.15

A Corner Solution

When the consumer's marginal rate of substitution is not equal to the price ratio for all levels of consumption, a corner solution arises. The consumer maximizes satisfaction by consuming only one of the two goods.

Given budget line *AB*, the highest level of satisfaction is achieved at *B* on indifference curve U_1, where the MRS (of ice cream for frozen yogurt) is greater than the ratio of the price of ice cream to the price of frozen yogurt.



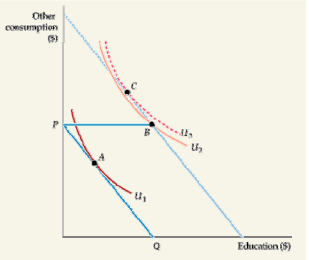
3.3 CONSUMER CHOICE

EXAMPLE 3.4 A College Trust Fund

Figure 3.16
A College Trust Fund

When given a college trust fund that must be spent on education, the student moves from *A* to *B*, a corner solution.

If, however, the trust fund could be spent on other consumption as well as education, the student would be better off at *C*.



Chapter 3: Consumer Behavior

3.4 REVEALED PREFERENCE

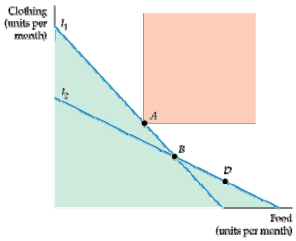
If a consumer chooses one market basket over another, and if the chosen market basket is more expensive than the alternative, then the consumer must prefer the chosen market basket.

Figure 3.17
Revealed Preference: Two Budget Lines

If an individual facing budget line I_1 chose market basket *A* rather than market basket *B*, *A* is revealed to be preferred to *B*.

Likewise, the individual facing budget line I_2 chooses market basket *B*, which is then revealed to be preferred to market basket *D*.

Whereas *A* is preferred to all market baskets in the green-shaded area, all baskets in the pink-shaded area are preferred to *A*.



Chapter 3: Consumer Behavior

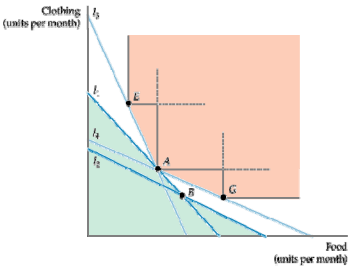
3.4 REVEALED PREFERENCE

Figure 3.18
Revealed Preference: Four Budget Lines

Facing budget line I_3 the individual chooses *E*, which is revealed to be preferred to *A* (because *A* could have been chosen).

Likewise, facing line I_4, the individual chooses *G* which is also revealed to be preferred to *A*.

Whereas *A* is preferred to all market baskets in the green-shaded area, all market baskets in the pink-shaded area are preferred to *A*.



Chapter 3: Consumer Behavior

3.4 REVEALED PREFERENCE

EXAMPLE 3.5 Revealed Preference for Recreation

Figure 3.19

Revealed Preference for Recreation

When facing budget line I_1, an individual chooses to use a health club for 10 hours per week at point *A*.

When the fees are altered, she faces budget line I_2.

She is then made better off because market basket *A* can still be purchased, as can market basket *B*, which lies on a higher indifference curve.

3.5 MARGINAL UTILITY AND CONSUMER CHOICE

- **marginal utility (MU)** Additional satisfaction obtained from consuming one additional unit of a good.
- **diminishing marginal utility** Principle that as more of a good is consumed, the consumption of additional amounts will yield smaller additions to utility.

$$0 = \mathrm{MU}_F(\Delta F) + \mathrm{MU}_C(\Delta C)$$

$$-(\Delta C/\Delta F) = \mathrm{MU}_F/\mathrm{MU}_C$$

$$\mathrm{MRS} = \mathrm{MU}_F/\mathrm{MU}_C \qquad (3.5)$$

$$\mathrm{MRS} = P_F/P_C \qquad (3.6)$$

$$\mathrm{MU}_F/\mathrm{MU}_C = P_F/P_C$$

$$\mathrm{MU}_F/P_F = \mathrm{MU}_C/P_C \qquad (3.7)$$

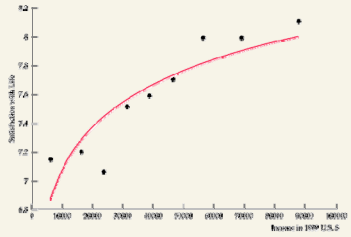
- **equal marginal principle** Principle that utility is maximized when the consumer has equalized the marginal utility per dollar of expenditure across all goods.

3.5 MARGINAL UTILITY AND CONSUMER CHOICE

EXAMPLE 3.6 Marginal Utility and Happiness

Figure 3.20

Marginal Utility and Happiness



A comparison of mean levels of satisfaction with life across income classes in the United States shows that happiness increases with income, but at a diminishing rate.

3.5 MARGINAL UTILITY AND CONSUMER CHOICE

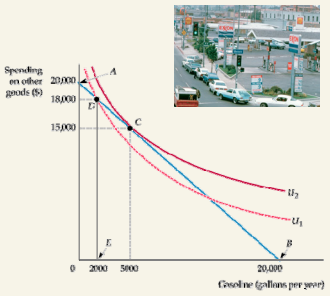
EXAMPLE 3.7 Gasoline Rationing

Figure 3.21
Inefficiency of Gasoline Rationing

When a good is rationed, less is available than consumers would like to buy. Consumers may be worse off. Without gasoline rationing, up to 20,000 gallons of gasoline are available for consumption (at point *B*).

The consumer chooses point *C* on indifference curve U_2, consuming 5000 gallons of gasoline.

However, with a limit of 2000 gallons of gasoline under rationing (at point *E*), the consumer moves to *D* on the lower indifference curve U_1.



Chapter 3: Consumer Behavior

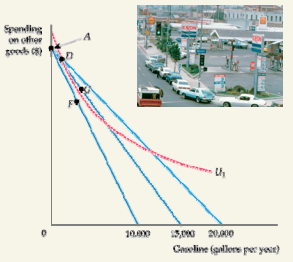
3.5 MARGINAL UTILITY AND CONSUMER CHOICE

EXAMPLE 3.7 Gasoline Rationing (continued)

Figure 3.22
Comparing Gasoline Rationing to the Free Market

If the price of gasoline in a competitive market is $2.00 per gallon and the maximum consumption of gasoline is 10,000 gallons per year, the woman is better off under rationing (which holds the price at $1.00 per gallon), since she chooses the market basket at point *F*, which lies below indifference curve U_1 (the level of utility achieved under rationing).

However, she would prefer a free market if the competitive price were $1.50 per gallon, since she would select market basket *G*, which lies above indifference curve U_1.



Chapter 3: Consumer Behavior

3.6 COST-OF-LIVING INDEXES

- **cost-of-living index** Ratio of the present cost of a typical bundle of consumer goods and services compared with the cost during a base period.

Ideal Cost-of-Living Index

- **ideal cost-of-living index** Cost of attaining a given level of utility at current prices relative to the cost of attaining the same utility at base-year prices.

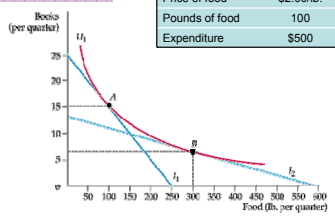
Chapter 3: Consumer Behavior

3.6 COST-OF-LIVING INDEXES

Ideal Cost-of-Living Index

TABLE 3.3 Ideal Cost-of-Living Index		
	1995 (*Sarah*)	2005 (*Rachel*)
Price of books	$20/book	$100/book
Number of books	15	6
Price of food	$2.00/lb.	$2.20/lb.
Pounds of food	100	300
Expenditure	$500	$1260

Figure 3.23
Cost-of-Living Indexes



The initial budget constraint facing Sarah in 1995 is given by line I_1; her utility-maximizing combination of food and books is at point *A* on indifference curve U_1.

Rachel requires a budget sufficient to purchase the food-book consumption bundle given by point *B* on line I_2 (and tangent to indifference curve U_1).

3.6 COST-OF-LIVING INDEXES

Ideal Cost-of-Living Index

TABLE 3.3 Ideal Cost-of-Living Index		
	1995 (*Sarah*)	2005 (*Rachel*)
Price of books	$20/book	$100/book
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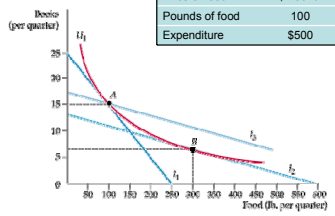
Figure 3.23
Cost-of-Living Indexes



A price index, which represents the cost of buying bundle *A* at current prices relative to the cost of bundle *A* at base-year prices, overstates the ideal cost-of-living index.

3.6 COST-OF-LIVING INDEXES

Laspeyres Index

- **Laspeyres price index** Amount of money at current year prices that an individual requires to purchase a bundle of goods and services chosen in a base year divided by the cost of purchasing the same bundle at base-year prices.

Comparing Ideal Cost-of-Living and Laspeyres Indexes
The Laspeyres index overcompensates Rachel for the higher cost of living, and the Laspeyres cost-of-living index is, therefore, greater than the ideal cost-of-living index.

Paasche Index

- **Paasche index** Amount of money at current-year prices that an individual requires to purchase a current bundle of goods and services divided by the cost of purchasing the same bundle in a base year.

Comparing the Laspeyres and Paasche Indexes Just as the Laspeyres index will overstate the ideal cost of living, the Paasche will understate it because it assumes that the individual will buy the current-year bundle in the base period.

3.6 COST-OF-LIVING INDEXES

- **fixed-weight index** Cost-of-living index in which the quantities of goods and services remain unchanged.

Price Indexes in the United States: Chain Weighting

- **chain-weighted price index** Cost-of-living index that accounts for changes in quantities of goods and services.

EXAMPLE 3.8 The Bias in the CPI

A commission chaired by Stanford University professor Michael Boskin concluded that the CPI overstated inflation by approximately 1.1 percentage points—a significant amount given the relatively low rate of inflation in the United States in recent years.

Approximately 0.4 percentage points of the 1.1-percentage-point bias was due to the failure of the Laspeyres price index to account for changes in the current year mix of consumption of the products in the base-year bundle.