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LECTURE 5
CONSUMERS AND UTILITY MAXIMIZATION
February 4, 2020

I. INTRODUCTION TO CONSUMER OPTIMIZATION

II. THE BUDGET CONSTRAINT
- A. Description
- B. Diagram for the case of 2 goods
- C. What causes the budget constraint to change?

III. UTILITY MAXIMIZATION
- A. What do consumers seek to maximize?
- B. Marginal utility
- C. Diminishing marginal utility
  1. Intuition and example
  2. Relationship between total utility and marginal utility
- D. The condition for utility maximization (the rational spending rule)

IV. CONSUMER OPTIMIZATION AND THE DEMAND CURVE
- A. Why do demand curves slope down?
  1. Substitution effect
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- B. Why do demand curves shift?

V. "FAIRNESS AS A CONSTRAINT ON PROFIT SEEKING" BY KAHNEMAN, KNETSCH, AND THALER
- A. Introduction to behavioral economics
- B. Empirical approach
- C. Findings
- D. Implications for analysis of household and firm behavior

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Announcements

- Hand in Problem Set 1.
- Suggested answers will be posted after class on Thursday.

I. Introduction to Consumer Optimization

Why Consumer Optimization Is Important

- It has implications for how we view the desirability of market outcomes.
- It can help us to understand the many choices that consumers make.

II. The Budget Constraint

A Household's Budget Constraint

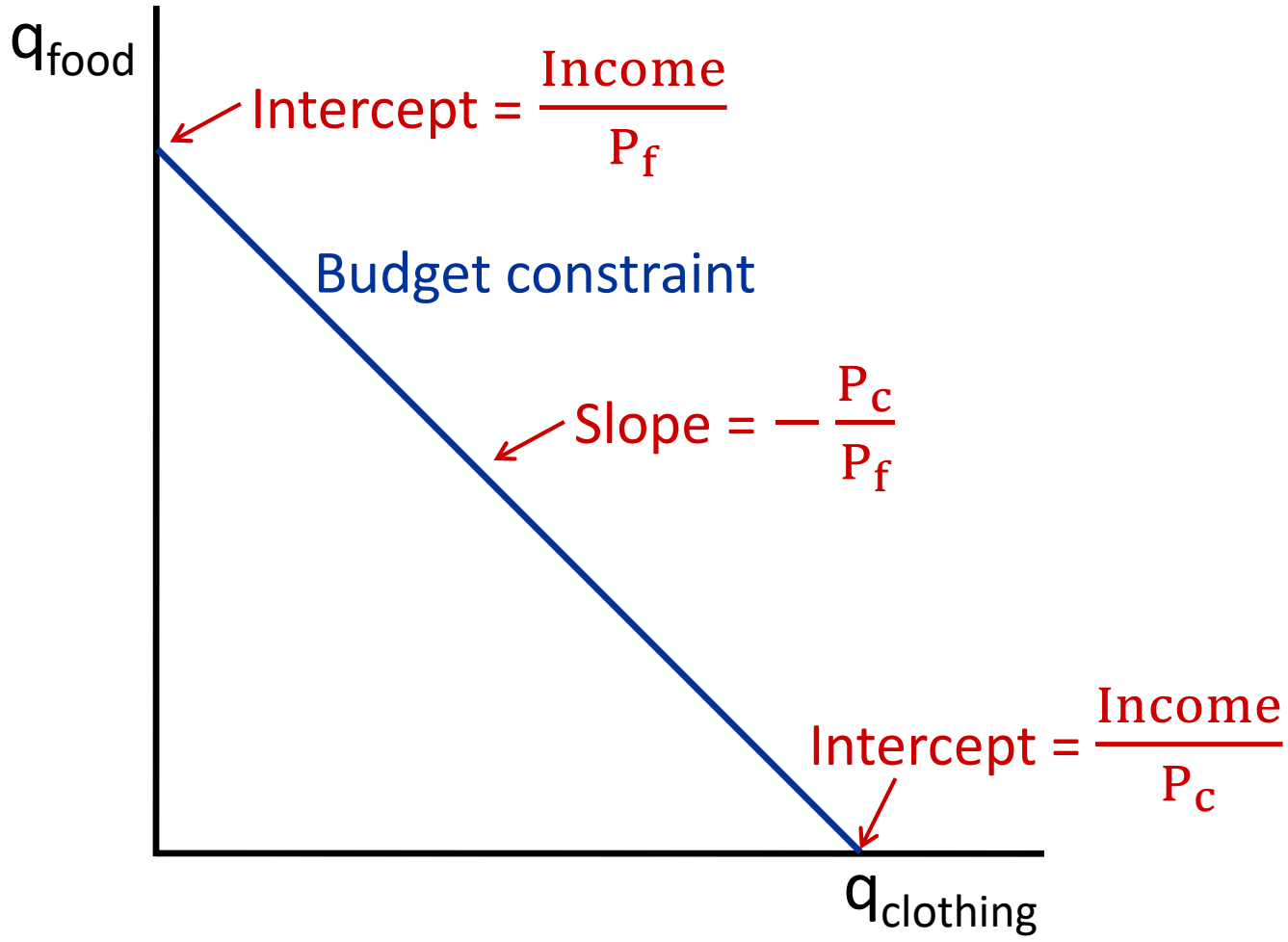
- In words: The total amount the household spends cannot exceed its income.
- In symbols:

$$P_a \cdot q_a + P_b \cdot q_b + P_c \cdot q_c + \ldots + P_z \cdot q_z = Income,$$

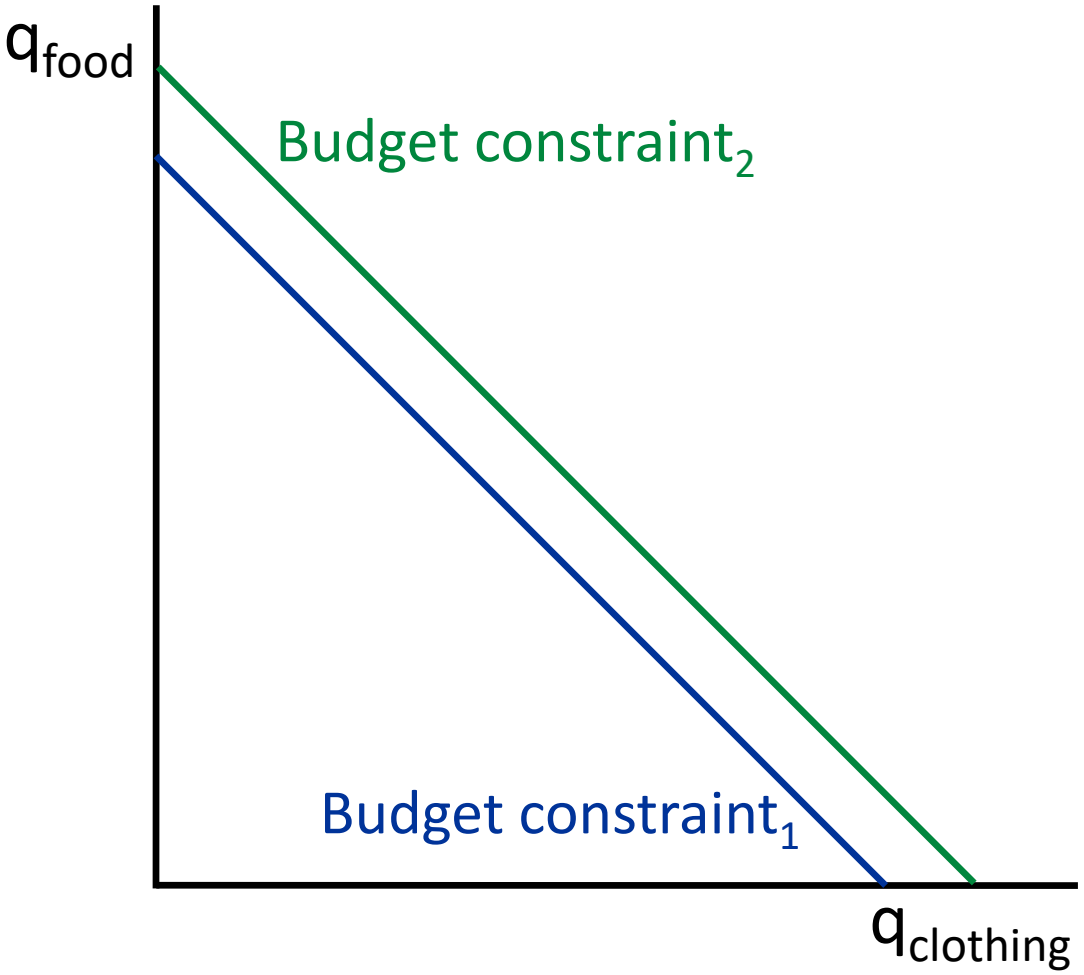
where the *P*'s are the market prices of the various goods, and the *q*'s are the quantities that the individual household buys.

Budget Constraint for the Case of Two Goods

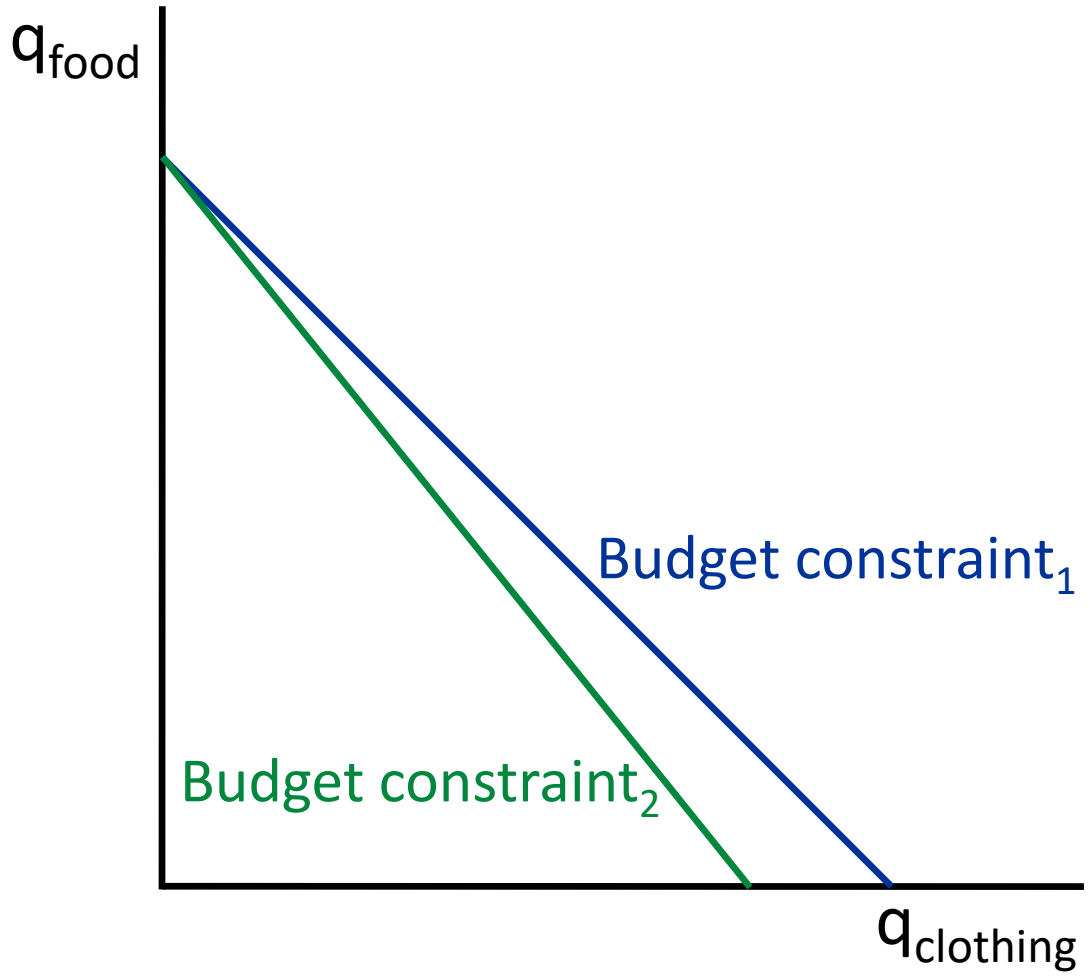
$$P_{food} \cdot q_{food} + P_{clothing} \cdot q_{clothing} = Income$$



A Rise in the Household's Income



A Rise in the Price of Clothing



Recall that the slope of the budget constraint is $-P_c/P_f$.

III. Utility Maximization

What do we think consumers maximize?

- Happiness, satisfaction, utility.
- We don't make judgments about *what* gives people happiness.

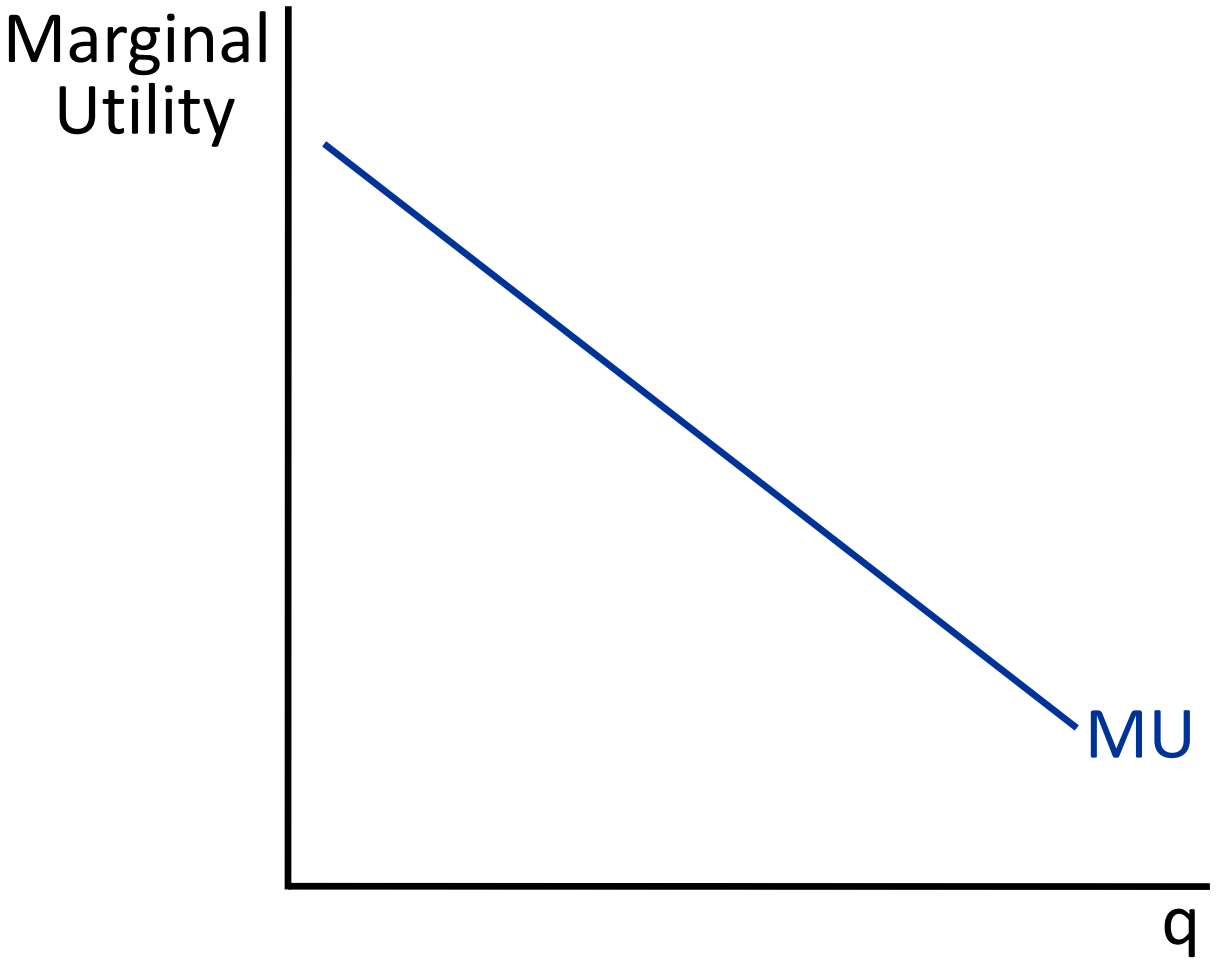
Utility

- Total utility: The total happiness one gets from consuming some amount of a good.
- Marginal utility: The extra utility derived from consuming one more unit of a good.

Diminishing Marginal Utility

- As a household consumes more of a good, the marginal utility of the good declines.

Diminishing Marginal Utility



Relationship between Total Utility and Marginal Utility

- Suppose

$$U = f(q)$$

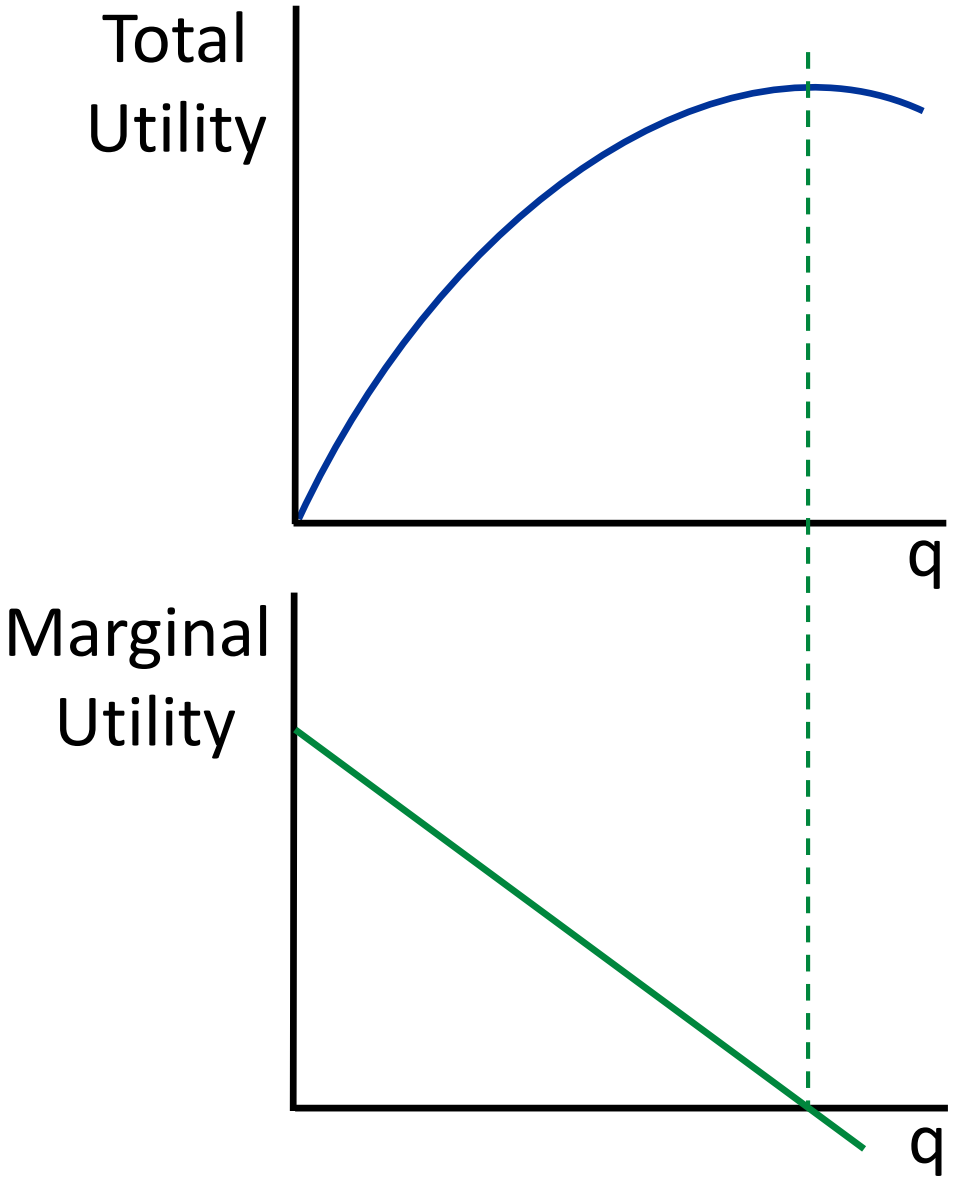
where q is the quantity of some good a household consumes, and U is the total utility the household gets from consuming the good.

- Then

$$MU = f'(q),$$

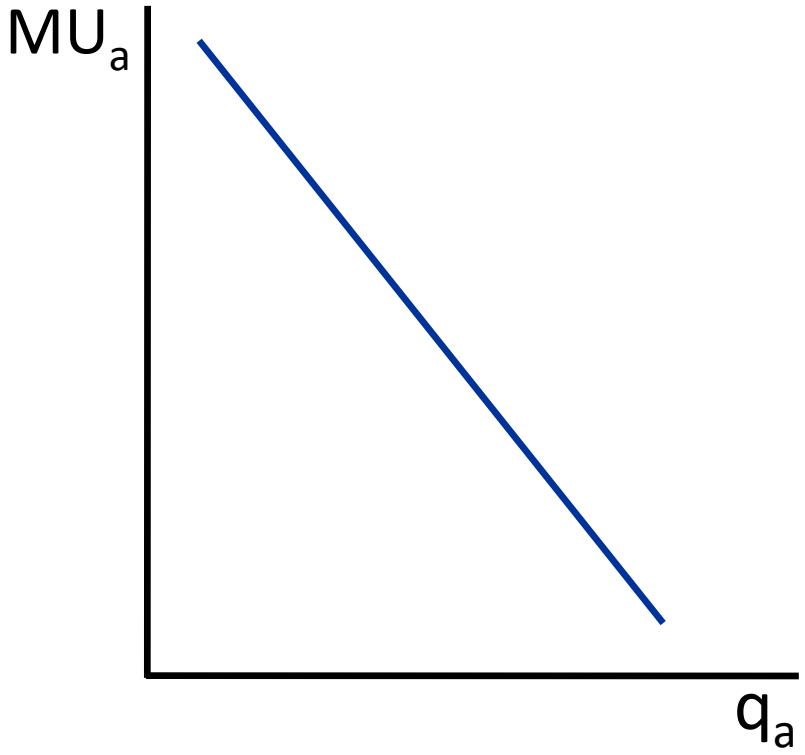
where MU is marginal utility.

Relationship between Total and Marginal Utility

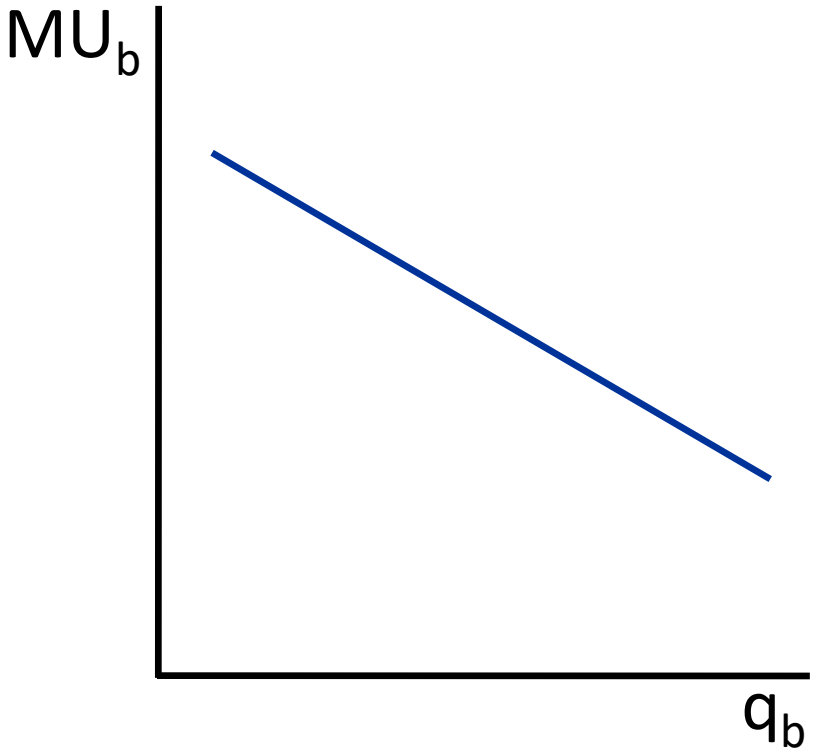


Marginal Utility Likely Declines at Different Rates for Different Goods

Good a



Good b



The Condition for Utility Maximization (the Rational Spending Rule)

- A household is doing the best that it can—that is, it is maximizing its utility—if:

  The marginal utility derived from spending one more dollar on a good is the same for all goods.

The Condition for Utility Maximization with Just Two Goods (Food and Clothing)

$$\frac{\$1}{P_c} MU_c = \frac{\$1}{P_f} MU_f$$

This is the same as:

$$\frac{MU_c}{P_c} = \frac{MU_f}{P_f}$$

Where the *P*'s are the market prices of the two goods and the *MU*'s are the marginal utilities of an additional unit of the two goods for the household.

The General Condition for Utility Maximization (the Rational Spending Rule)

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \ldots = \frac{MU_z}{P_z},$$

where the *P*'s are the market prices of the different goods, and the *MU*'s are the marginal utilities of an additional unit of the different goods for the household.

IV. Consumer Optimization and the Demand Curve

A Rise in the Price of Clothing

- Suppose the household starts with:

$$\frac{MU_c}{P_c} = \frac{MU_f}{P_f}$$

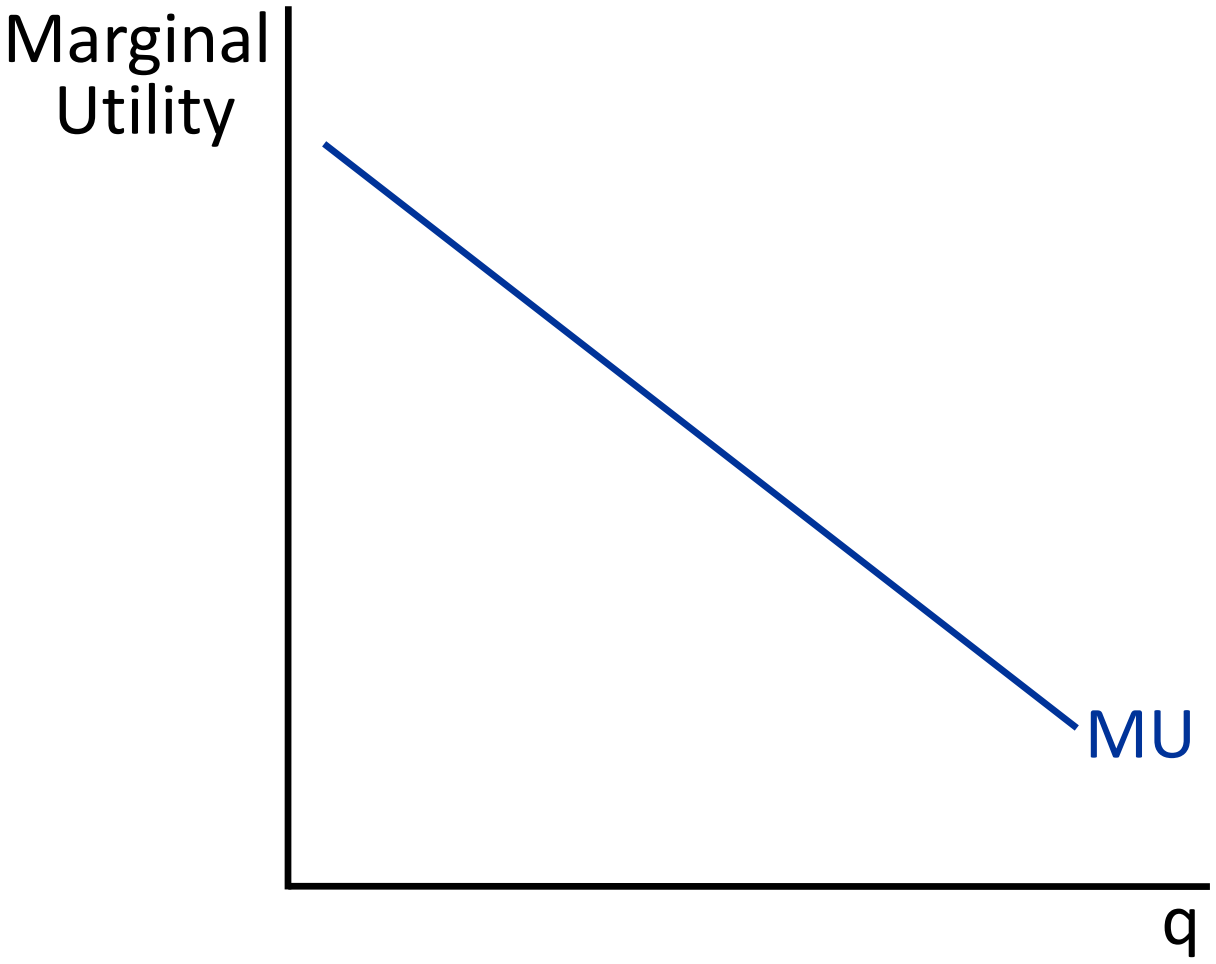
- If P_c rises, and the household didn't change its purchases, then:

$$\frac{MU_c}{P_c} < \frac{MU_f}{P_f}$$

- The household will need to buy less clothing (and more food) until:

$$\frac{MU_c}{P_c} = \frac{MU_f}{P_f}$$

Diminishing Marginal Utility

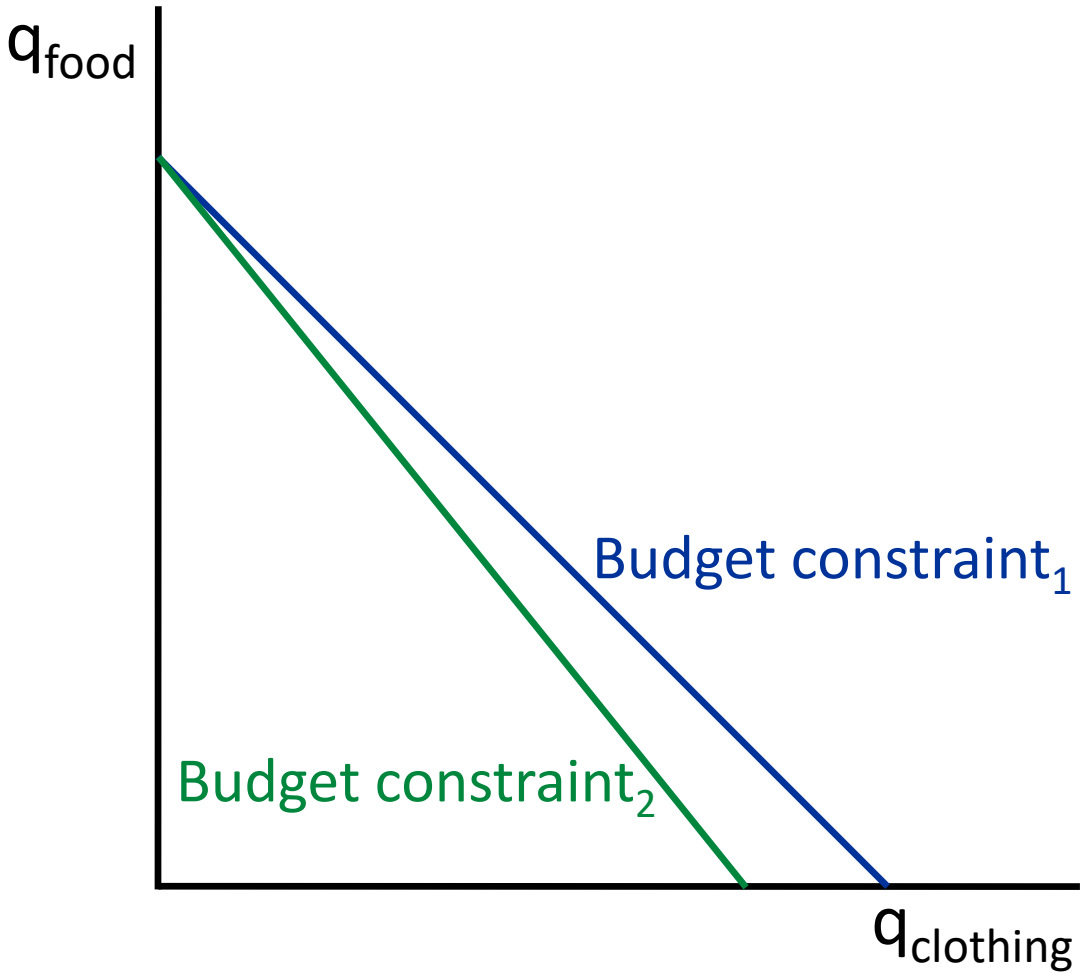


Why Demand Curves Slope Down

- Substitution effect: When the price of a good rises, a household wants less of the good and more of other goods, because the good is relatively more expensive.

- Income effect: When the price of a good rises, a household wants less of all goods, because its budget constraint has changed for the worse.

A Rise in the Price of Clothing



Returning to the Market for Blueberries

- An optimizing consumer sets:

$$\frac{MU_{blueberries}}{P_{blueberries}} = \frac{MU_{everything\ else}}{P_{everything\ else}}$$

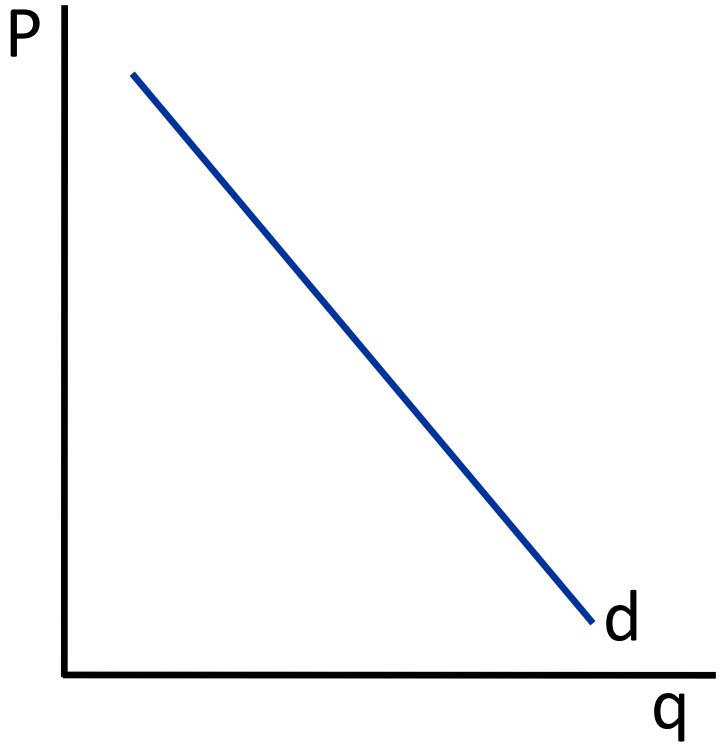
- A decline in the $P_{blueberries}$ causes:

$$\frac{MU_{blueberries}}{P_{blueberries}} > \frac{MU_{everything\ else}}{P_{everything\ else}}$$

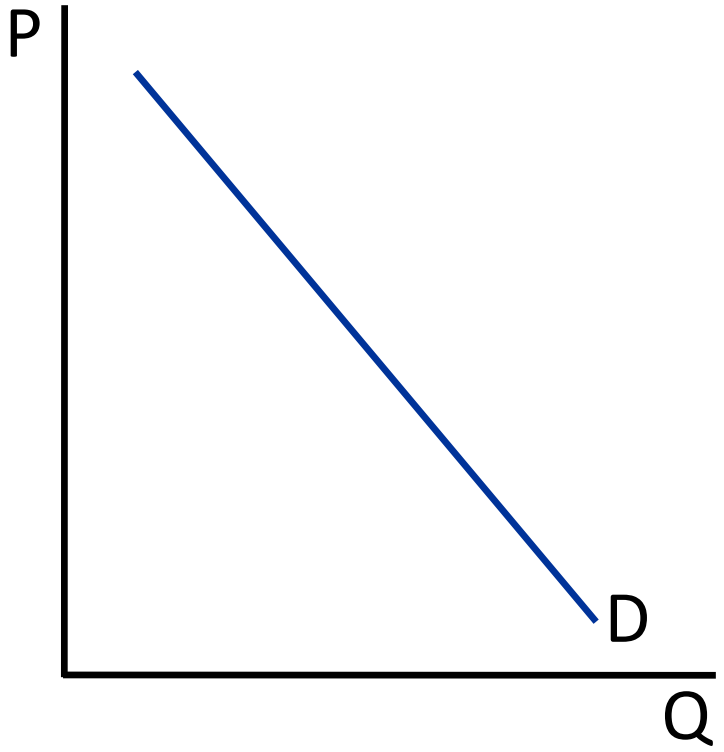
- The optimizing consumer will want to consume more blueberries because of both the substitution and income effects.

Demand Curves

Individual Household



Market



Household and Market Demand Curves

- The market demand curve is the horizontal sum of each individual household's demand curve.
- Because each household's demand curve (d) slopes down, the market demand curve (D) slopes down.
- Because each household's demand curve is derived from optimizing behavior, the market demand curve is as well.

The Telegraph

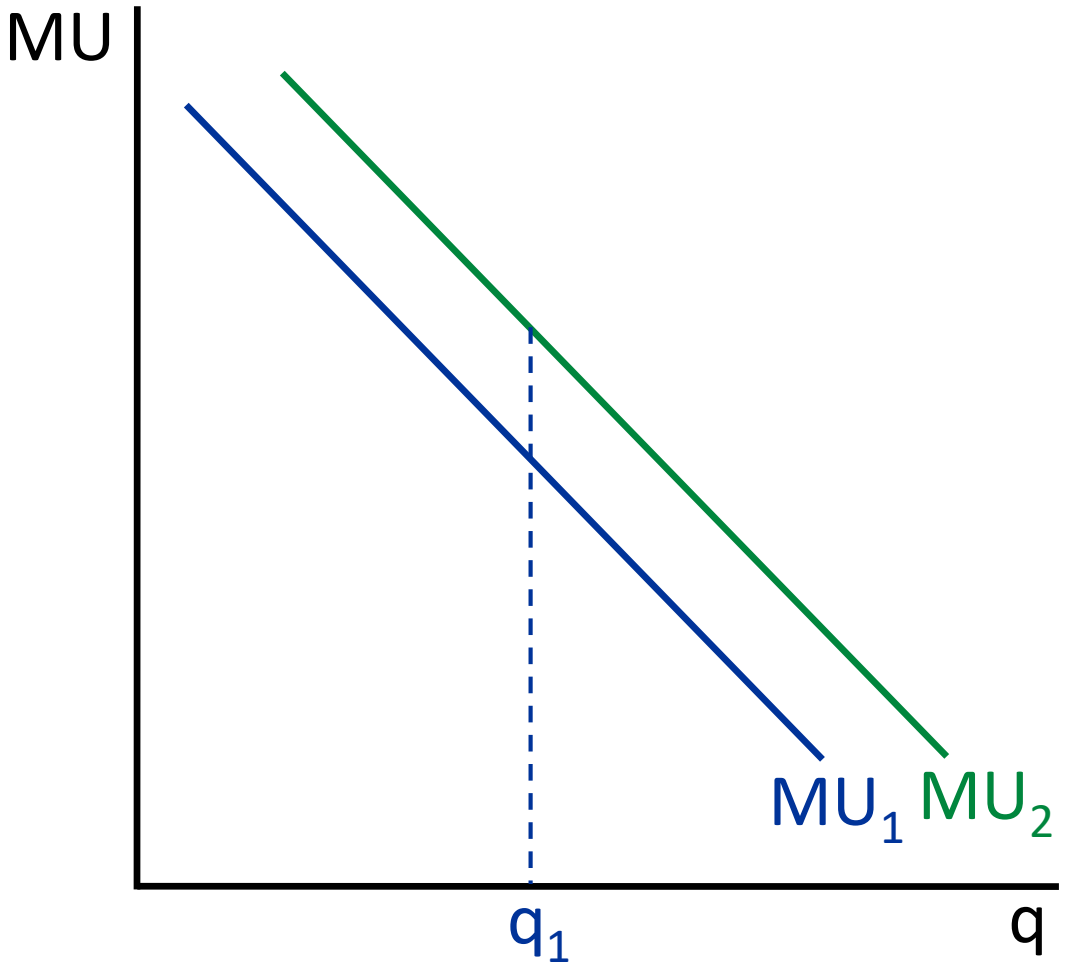
Blueberries may help prevent Alzheimer's, new research suggests

4:41PM GMT 13 Mar 2016

Scientists say the fruit is loaded with healthful antioxidants which could help prevent the effects of the increasingly common form of dementia

Blueberries, already classified as a “superfruit” for its health boosting properties, could now also help fight dementia, new research suggests. The study shows the berry, which can potentially lower the risk of heart disease and cancer, could also be a weapon in the battle against Alzheimer's disease. Scientists say the fruit is loaded with healthful antioxidants which could help prevent the devastating effects of the increasingly common form of dementia. One study involved 47 adults aged 68 and older, who had mild cognitive impairment, a risk condition for Alzheimer’s disease.

Positive News about Blueberries



Positive News about Blueberries

- An optimizing consumer sets:

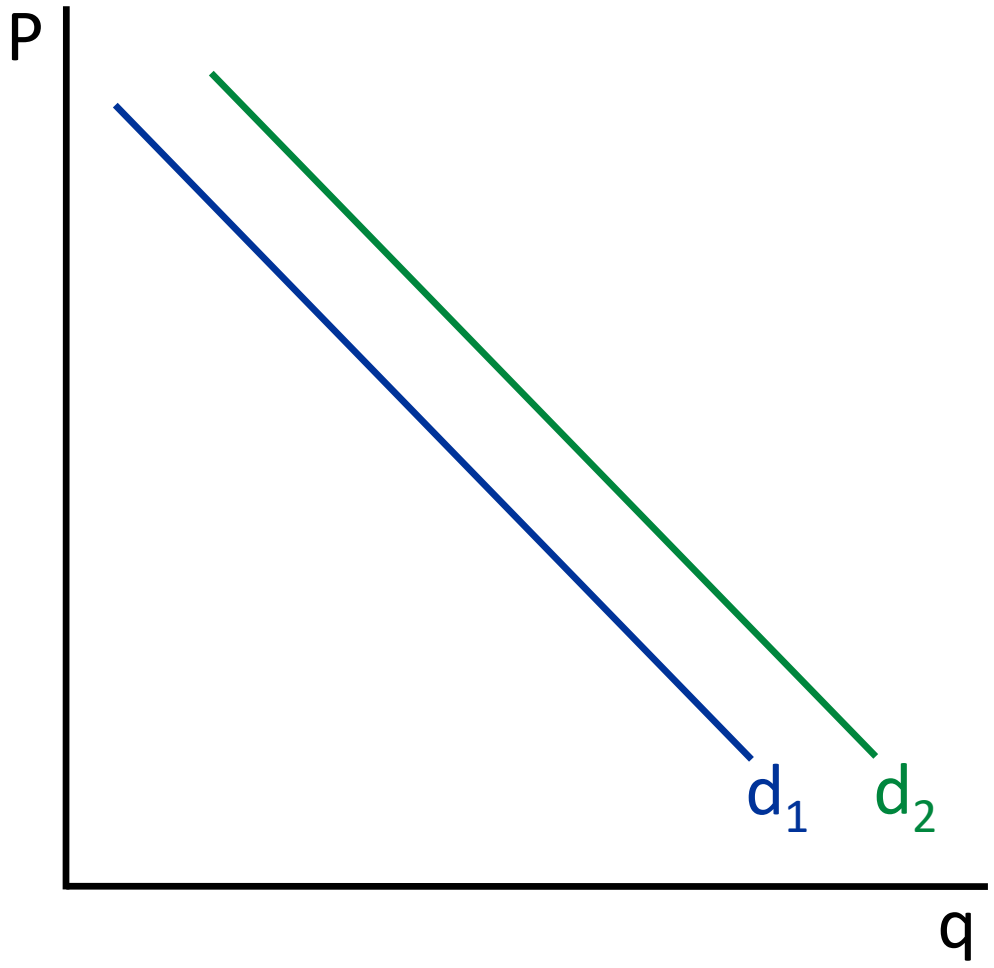
$$\frac{MU_{blueberries}}{P_{blueberries}} = \frac{MU_{everything\ else}}{P_{everything\ else}}$$

- A rise in the $MU_{blueberries}$ causes:

$$\frac{MU_{blueberries}}{P_{blueberries}} > \frac{MU_{everything\ else}}{P_{everything\ else}}$$

- The optimizing consumer will want to consume more blueberries at the same $P_{blueberries}$.

Effect of Positive News on the Demand Curve



V. "Fairness as a Constraint on Profit Seeking" by Kahneman, Knetsch, and Thaler

Behavioral Economics

- Brings the complexity of human behavior into the analysis of economic decision-making.
- Blends psychology and economics.
- *The Undoing Project* by Michael Lewis is a fun book on the birth of the field.

Empirical Strategy of Kahneman, et al.

- Phone surveys.
- Asking people to respond to vignettes.

> Question 1. A hardware store has been selling snow shovels for $15. The morning after a large snowstorm, the store raises the price to $20. Please rate this action as:
>
> Completely Fair Acceptable
> Unfair Very Unfair

Experiments

- Another way to gather information about economic behavior.
- Watch behavior in a controlled laboratory setting.
- Examples of experiments and findings.

Some Findings from Kahneman, et al.

Question 1. A hardware store has been selling snow shovels for $15. The morning after a large snowstorm, the store raises the price to $20. Please rate this action as:

Completely Fair Acceptable Unfair Very Unfair

The two favorable and the two unfavorable categories are grouped in this report to indicate the proportions of respondents who judged the action acceptable or unfair. In this example, 82 percent of respondents ($N = 107$) considered it unfair for the hardware store to take advantage of the short-run increase in demand associated with a blizzard.

Price increases based on a shift in demand are viewed as unfair.

Some Findings from Kahneman, et al.

Question 7. Suppose that, due to a transportation mixup, there is a local shortage of lettuce and the wholesale price has increased. A local grocer has bought the usual quantity of lettuce at a price that is 30 cents per head higher than normal. The grocer raises the price of lettuce to customers by 30 cents per head.

($N = 101$) Acceptable 79% Unfair 21%

Price increases based on increased out-of-pocket costs are viewed as acceptable.

Some Findings from Kahneman, et al.

Question 10. A grocery store has several months supply of peanut butter in stock which it has on the shelves and in the storeroom. The owner hears that the wholesale price of peanut butter has increased and immediately raises the price on the current stock of peanut butter.

($N = 147$) Acceptable 21% Unfair 79%

Price increases based on increased opportunity cost are viewed negatively.

Some Findings from Kahneman, et al.

Question 2A. A small photocopying shop has one employee who has worked in the shop for six months and earns $9 per hour. Business continues to be satisfactory, but a factory in the area has closed and unemployment has increased. Other small shops have now hired reliable workers at $7 an hour to perform jobs similar to those done by the photocopy shop employee. The owner of the photocopying shop reduces the employee's wage to $7.

($N = 98$) Acceptable 17% Unfair 83%

Question 2B. A small photocopying shop has one employee...[as in Question 2A]...The current employee leaves, and the owner decides to pay a replacement $7 an hour.

($N = 125$) Acceptable 73% Unfair 27%

Reference transactions matter.

Some Findings from Kahneman, et al.

Question 4A. A company is making a small profit. It is located in a community experiencing a recession with substantial unemployment but no inflation. There are many workers anxious to work at the company. The company decides to decrease wages and salaries 7% this year.

($N = 125$) Acceptable 38% Unfair 62%

Question 4B. . . . with substantial unemployment and inflation of 12% . . . The company decides to increase salaries only 5% this year.

($N = 129$) Acceptable 78% Unfair 22%

Implications of Findings for Analysis of Household and Firm Optimization

- Need a broad definition of utility.
- There may be important deviations from simple optimizing behavior for some individuals.
- Firms may need to think about customer relationships in figuring out how to maximize long-run profits.
- But basic insights and implications of utility and profit maximization likely still hold.