Many of the most important issues in the world today cannot be understood without understanding economics.

The text uses the following icon to emphasize the most important ways in which economics helps us understand the world.
Introduction

- 1787—The British government hired sea captains to transport prisoners to Australia.
  - Their pay was determined by the number of prisoners transported.
  - Result:
    - As many as one third of prisoners died en route.
    - Survivors arrived starved, beaten, and ill.

- There was an outcry in Britain.
  - Newspapers editorialized.
  - Clergy appealed to the captains.
  - Parliament passed regulations.

- Result: Nothing changed.
Incentives in the Prisoner Transport Business

Only when the ship captains began to be paid \textit{per living convict on arrival} did the death rate fall from over 33\% to less than 1\%.

The British prison transport vessel “Success”
This situation eventually changed.

What caused it to change?
  • Incentives changed – How?

This illustrates the first of ten generally accepted principles: incentives matter.

Incentives - rewards and penalties that motivate behavior.
Big Idea Two: Good Institutions Align Self Interest with the Social Interest

- When self interest aligns with the broader public interest, we get good outcomes.
  - Markets channel self-interest of millions of people.
  - Adam smith described this coordination as the “invisible hand”.

- Ways in which people acting in their self interest produce outcomes that are good for all of us are denoted by:
  
  See the Invisible hand
Big idea #2: Good Institutions Align Self-interest with the Social Interest

- Markets magically align your self-interest with social interest (usually)

Because the cheese-monger wants profit; you get your cheese!
“It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest.”

-Adam Smith,
The Wealth of Nations
Markets do not always align self-interest with the social interest

- Sometimes market incentives are too strong.
  - External costs: e.g. pollution
  - Overutilization of commonly held resources (the “tragedy of the commons”)
- Sometimes market incentives are too weak.
  - External benefits.
    - Example: Flu shots
Big Idea Three: Trade-offs Are Everywhere

- September 2004: Merck withdrew Vioxx, an arthritis drug from the market
  - Vioxx could cause strokes and heart attacks.
    - Many people demanded more testing.
    - Economists worried that approved pharmaceuticals could become too safe.

- Huh? How can drugs be too safe?
  - Economists consider two important trade-offs:
    - Drug lag
    - Drug loss
Trade-offs are closely related to opportunity cost.

- **Opportunity cost** - The value of what you give up when you make a choice.

  - Example: The biggest cost of college is forgone income.

Opportunity cost is important for two reasons...

1. Helps us evaluate trade-offs.
2. Helps us understand behavior
Big Idea Three: Trade-offs Are Everywhere

- To understand behavior, you must understand opportunity cost.
  - Application: What would you expect to happen to college enrollment during a recession?
    - The opportunity cost of going to college falls during a recession. Why?
    - The reverse is true—The opportunity cost of going to college rises when the economy is booming.
  - Prediction: college enrollments \( \uparrow \) when unemployment \( \uparrow \) and \( \downarrow \) when unemployment \( \downarrow \).
    - The next figure shows this is true.
Big Idea Three: Trade-offs Are Everywhere

When the Unemployment Rate Increases
The College Enrollment Rate Tends to Increase

Percentage Deviations from Trend, 1960-2000

Note: Enrollment rate of high school completers and January unemployment rate among 16-19 yr olds.
Source: National Center for Educational Statistics and Bureau of Labor Statistics
Big Idea Four: Thinking on the Margin

- Making choices by comparing the extra benefit to the extra cost of an action.
  - We engage in marginal thinking all the time.
    - Example: adjusting our speed while driving. What are the benefits and costs of driving faster or slower?

- Understanding human behavior requires looking at the trade-offs people face.

- Trade-offs usually involve choices about a little bit more or a little bit less.
Big idea #4: Thinking on the Margin

- Actual trade-offs are usually “on the margin.”
- **Marginal** means additional
- Most economic choices are marginal choices
- E.G. Newt Gingrich wanted mandatory executions for drug dealers…
- but the effect would be to reduce the EXTRA penalty for murdering police offers during arrest

Higher punishments for lesser crimes reduce the marginal cost of harsher crimes.
Big Idea Four: Thinking on the Margin

Application

- Say you have graduated and are earning $64,000 a year.
- You are offered another job at a higher salary, but it’s in a different city and you don’t want to move.
- Should you take the job?
  - Depends on…
    - How much of the additional income you get to keep after taxes (marginal benefit).
    - What you give up to move i.e. friends, family, lower cost of living (marginal cost).
Big Idea Five: The Power of Trade

- Both people involved in voluntary exchange are better off.
- The power to increase production through specialization.
  - Why is it unlikely that Martha Stewart irons her own clothes even though she is likely very good at ironing?
  - Specialization is important for countries as well as individuals.
- Allows us to take advantage of economies of scale.
Big Idea Six: The Importance of Wealth and Economic Growth

- 2007—more than half a billion people contracted malaria.
  - About a million—mostly children—died.
  - Malaria was once common in the U.S.
    - Wealth ended it

- Lesson: Wealthier countries have...
  - Lowest infant mortality rates.
  - Greatest access to sanitation facilities, antibiotics, education, fulfilling jobs and careers.

- In short: Wealth matters...understanding economic growth is crucial
Big idea #6: The Importance of Wealth and Economic Growth

Hans Rosling's famous lectures combine enormous quantities of public data with a sport's commentator's style to reveal the story of the world's past, present and future development. (4:48 minutes)

http://www.youtube.com/watch?v=jbkSRLYSojo
Big Idea Seven: Institutions Matter

- What makes a country rich?
  - Most proximate causes:
    - large amounts of physical and human capital.
    - Things are produced in a relatively efficient manner.
    - Use of the latest technological knowledge.

- Why do some countries have more physical and human capital organized well using the latest technology?

- Answer: Differences in incentives.
Big Idea Seven: Institutions Matter

- How do incentives help create wealth?
  - Entrepreneurs, investors, and savers need incentives to save and invest

- Important institutions that support good incentives are…
  - property rights,
  - political stability,
  - honest government,
  - dependable legal system,
  - competitive and open markets.
Can you tell which country has better institutions?
Big Idea Seven: Institutions Matter

- South and North Korea were equally poor in 1950.
  - South Korea - modern developed country with per capita income 10 times greater than North Korea’s.
  - North Korea - starvation is common and people can go months without eating meat.
  - They share the same language and culture and historical background. What’s the difference?
    - Their economic systems and incentives
Big Idea Seven: Institutions Matter

- Macroeconomists are especially interested in the incentives to produce new ideas.
  - New ideas are the lifeblood of economic growth.
  - Without new ideas standards of living worldwide will stagnate.

- Ideas have peculiar properties
  - Ideas can be shared without limit.
    - One apple feeds one man; one idea can feed the world.
  - Ideas are not used up.
Big Idea Eight: Economic Booms and Busts Cannot be Avoided but Can Be Moderated

- No economy grows at a constant pace.
  - Booms and busts are part of the normal response of an economy to changing economic conditions.

- Not all booms and busts are normal.
  - The Great Depression was not normal.
    - National output fell by 30 percent.
    - Unemployment exceeded 20 percent.
    - Stock market fell to less than a third of its original value.
  - The Great Depression did not have to happen.
    - Most economists believe that appropriate monetary and fiscal policy could have made it shorter and less deep.
    - Monetary and fiscal policies were not well understood at the time.
Today, monetary and fiscal policy are much better understood.

- When used appropriately, they can reduce swings in unemployment and GDP.
- When used poorly, they can make recessions worse and the economy more volatile.

Significant task of macroeconomic theory.

- To understand the promise and limits of monetary and fiscal policy.
Big Idea Nine: Prices Rise When the Government Prints Too Much Money

- **Inflation** - an ↑ in the general level of prices.
  - One of the most common problems of macroeconomics.

- Inflation is caused by a sustained increase in the money supply.
  - In the U.S. the money supply is controlled by the Federal reserve.
    - Low inflation since the early 1980s is a testament to successful Fed policy.
  - In Zimbabwe the government was printing money so rapidly that in 2009 prices were rising by billions of percent per month!
Big idea #10: Central Banking Is a Hard Job

- The Federal Reserve is the U.S.'s central bank.
- “The Fed” is in charge of money supply
  - Helping the economy be stable
  - Balancing inflation and unemployment
  - Preventing banking crises?

Ben Bernanke, Chairman of the Fed, wondering where the nearest aspirin supply is.
Big Idea Ten: Central Banking Is a Hard Job

- The Federal Reserve Bank ("the Fed") is often called on to combat inflation.
  - A challenge because there is a lag between when the Fed makes a decision and when the effects of the decision on the economy are known.
  - It is difficult to make the right guess about where the economy is going.
    - If the Fed gets it wrong, it can make things worse.
  - It is wise to think of the Fed as a highly fallible institution that faces a very difficult job.
The Biggest Idea of All: Economics is Fun

- It teaches us how to make the world a better place.
- It’s about the difference between…
  - Wealth and poverty,
  - Work and unemployment,
  - Happiness and squalor.
- Increases our understanding of the distant past, present events, and future possibilities.
- It is linked to everyday life.
  - Job
  - Finances
  - How to deal with economic events like inflation, recession, or a bursting stock market bubble.
As land prices near the U.S. coast increase, what changes do you expect to see in burial practices (other things equal)? Think opportunity cost.
   a) Traditional burials will increase and cremation will decrease.
   b) Cremation will increase and traditional burials will decrease.
True or false: As women’s wages have risen over the past 50 years, the opportunity cost of being a stay-at-home mother has risen.

a) True  
b) False
Would you expect to find companies developing cures for rare diseases or common ones? Think about incentives.

a) Rare diseases
b) Common diseases
In which country would a person face a lower opportunity cost for holding cash?

a) Zimbabwe

b) The U.S.
End of Chapter 1
Milton Friedman’s Pencil

Milton Friedman - I, Pencil

Published on Jul 31, 2012
Milton Friedman discusses the market forces involved in creating a single pencil
Chapter Outline

- Trade and preferences
- Specialization, productivity, and the division of knowledge
- Comparative advantage
- Trade and globalization
How is it that farmers in New Zealand wake up at 5 AM to provide you with a Kiwi for your fruit salad?

Answer: Economic cooperation resulting from trade.

We focus on three benefits of trade

1. Trade makes people better off.
2. Trade increases productivity - specialization
3. Trade increases productivity - comparative advantage.

Let’s look at these in turn.
Three benefits of trade

1. Trade makes people better off when preferences (or opportunities) differ.
2. Trade increases productivity through specialization and the division of knowledge.
3. Trade increases productivity through specialization according to comparative advantage.
1. Trade and Preferences

Broken 5mw green laser pointer pen ultra powerful beam

Item condition: For parts or not working
Ended: Aug 14, 2011 09:35:11 PDT
Bid history: 0 bids

Starting bid: US $5.49
2. Specialization, Productivity, and the Division of Knowledge

- True power of trade: specialization
- Reinforcing cycle
  - Trade allows specialization.
  - Specialization increases productivity and trade.
- Why does trade increase productivity?
  - Trade Increases availability of knowledge.
  - Knowledge increases productivity.
    - In a modern economy, more knowledge is used that could exist in a single brain.
2. Specialization, Productivity, and the Division of Knowledge

- Division of knowledge increases as a market grows.
- Modern growth is mainly due to new knowledge.
- Important turning point:
  - Trade is sufficient to support large numbers of scientists, engineers, and entrepreneurs
- Increase in world trade can lead to an increase the division of knowledge.
  - Fall of the Berlin Wall
  - Opening of China, Russia, and Europe.
Comparative Advantage

- **Comparative advantage** – the ability of a country to produce a good at **lower opportunity cost** than another country.

- **Absolute advantage** - the ability of a country to produce a good using fewer inputs than another country.
  - A country need not have an absolute advantage in anything to benefit from trade.

- To understand why, we need to understand the principle of **comparative advantage**.

*Warning! Understanding comparative advantage takes effort.*
Why Absolute Advantage Doesn’t Matter

Just because a person or country can produce more of a good than others doesn’t necessarily mean it can produce the good cheaper. Even very productive countries gain when they import cheaper goods (instead of being self-sufficient).
Martha Stewart probably hires housecleaners…. Every hour she spends cleaning (instead of writing about how to keep a clean house) is an hour she doesn’t spend running her empire.
Comparative Advantage

- The Production Possibility Frontier (PPF)
  - PPF shows all the combinations of goods that a country can produce given:
    - Productivity
    - Supply of inputs
  - A convenient tool to understand opportunity cost and comparative advantage.

*Let’s apply this tool using an example.*
Suppose

- in Mexico it requires:
  - 2 units of labor to produce 1 shirt.
  - 12 units of labor to produce 1 computer.
- in the U.S. it requires:
  - 1 unit of labor to produce 1 shirt.
  - 1 unit of labor to produce 1 computer.
- Both countries have 24 units of labor each.

These data are reflected in following tables.
Comparative Advantage

<table>
<thead>
<tr>
<th>Country</th>
<th>Computers</th>
<th>Shirts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>United States</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

- The U.S. has an absolute advantage in the production of both goods.
- PPF curves can be derived from this data.
Production Possibilities for Mexico and U.S. w/o Trade

Note:
1. The U.S. has an absolute advantage in both goods.
Now suppose that Mexico and the U.S. devote 12 units of labor to the production of each good.

<table>
<thead>
<tr>
<th>Country</th>
<th>Computers</th>
<th>Shirts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>United States</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Total Production</td>
<td>13</td>
<td>18</td>
</tr>
</tbody>
</table>
Production Possibilities for Mexico and U.S. w/o Trade

No trade: production = Consumption

Note:
1. The U.S. has an absolute advantage in both goods.
2. Each country consumes what they produce.

No trade: production = Consumption

Mexico

United States
### Opportunity Costs and Comparative Advantage

<table>
<thead>
<tr>
<th>Country</th>
<th>Opportunity cost of 1 computer</th>
<th>Opportunity cost of 1 Shirt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>6 shirts</td>
<td>1/6 of a computer</td>
</tr>
<tr>
<td>United States</td>
<td>1 shirt</td>
<td>1 computer</td>
</tr>
</tbody>
</table>

- Mexico has a comparative advantage in shirts.
- U.S. has a comparative advantage in computers
Production Possibilities for Mexico and U.S. w/o Trade

Shirts have lower opportunity Cost in Mexico.

No trade: production = Consumption

Slope = \( \frac{2}{12} = -\frac{1}{6} \)

Computers have lower opportunity Cost in the U.S.

No trade: production = Consumption

Slope = \( \frac{24}{24} = -1 \)
Opportunity Costs and Comparative Advantage

- Theory of comparative advantage
  - A country can increase its wealth by…
    - Specializing in producing goods for which it has a comparative advantage
    - Trading for the goods for which it does not have a comparative advantage.

Let’s continue with our example.
Suppose that Mexico specializes completely in shirts.
U.S. partially specializes partially by producing 14 computers and 10 shirts.

<table>
<thead>
<tr>
<th>Country</th>
<th>Computers</th>
<th>Shirts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>United States</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Total Production</td>
<td>14</td>
<td>22</td>
</tr>
</tbody>
</table>
Opportunity Costs and Comparative Advantage

- With trade the price of both goods will be equal. (assume 1 computer = 3 shirts).
- Assume Mexico now consumes 9 shirts and trades the remaining 3 for 1 computer.
- Assume the U.S. consumes 13 computers and trades the remaining computers for 3 shirts.

<table>
<thead>
<tr>
<th>Consumption in Mexico and U.S. (Specialization and Trade)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
</tr>
<tr>
<td>Mexico</td>
</tr>
<tr>
<td>United States</td>
</tr>
<tr>
<td>Total Production</td>
</tr>
</tbody>
</table>

We can now compare trade with no trade using our PPC.
Opportunity Costs and Comparative Advantage

Conclusion: Trade allows both countries to consume above their PPC.
Opportunity Costs and Comparative Advantage

- Conclusions:
  - Both Mexico and the U.S. gain from trade.
    - True even though the U.S. has an absolute advantage in both computers and shirts.
    - Why?
      - By specializing in goods in which they have a comparative advantage, each country is using their resources more efficiently.
  - Both high productivity and low productivity have some comparative advantage.
    - All countries can benefit from trade.
Comparative Advantage and Wages

- Wages are included in the model
  - Example:
    - Wage rate = Consumption/number of workers
    - Suppose $P_{shirt} = $100 and $P_{computer} = $300

<table>
<thead>
<tr>
<th></th>
<th>Mexico</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Labor</td>
<td>24 units</td>
<td>24 units</td>
</tr>
<tr>
<td>Wage Rate Without Trade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>($300 \times 1) + ($100 \times 6) \over 24</td>
<td>$37.50</td>
<td>($300 \times 12) + ($100 \times 12) \over 24 \over 24</td>
</tr>
<tr>
<td>Wage Rate With Trade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>($300 \times 1) + ($100 \times 9) \over 24</td>
<td>$50</td>
<td>($300 \times 13) + ($100 \times 13) \over 24 \over 24</td>
</tr>
</tbody>
</table>

Conclusion: With trade, wages are higher for both countries!
Some Important Points:

- The wage in Mexico is lower than the wage in the U.S. before and after trade.
  - Why? - Productivity of labor is lower in Mexico.
- The increase in wages resulting from specialization and trade is limited by productivity.

Conclusion: Ultimately wages are determined by productivity.
“It is the maxim of every prudent master of a family never to attempt to make at home what it will cost him more to make than to buy. The tailor does not attempt to make his own shoes, but buys them of the shoemaker. ....If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry employed in a way in which we have some advantage.” - Adam Smith
Globalization - the advance of human progress across national boundaries.

Not new

- Roman Empire – Knit together large parts of the world.
- “Dark ages” – Trade networks collapsed when the empire fell.
- European Renaissance arose from revitalized trade routes.
The Takeaway

- Power of trade occurs when it leads to specialization.
- Specialization leads to increased productivity.
- Specialization and trade...
  - leads to more available knowledge.
  - allows taking advantage of economies of scale.
  - Increases competition
  - Theory of comparative advantage explains how trade can benefit both trading partners.
End of Chapter 2
Chapter 23
Consumer Choice

Tyler Cowen  •  Alex Tabarrok
Chapter Outline

- How to compare apples and oranges
- The demand curve
- The budget constraint
- Preferences and indifferent curves
- Optimization and consumer choices
- The income and substitution effects
- Applications of income and substitution effects
Introduction

In this chapter:

• We take a deeper look at how rational consumers choose.
  ▪ Should they pay a membership fee to shop at Costco, Sam’s Club, or BJ’s?
  ▪ How much labor should a worker supply in response to a lower wage.

• Introduce two tools:
  ▪ Budget constraints
  ▪ Indifference curves
How to Compare Apples and Oranges

- Apples and oranges produce value, or, “utility”
- **Marginal utility** – the change in utility from consuming an additional unit.
- **Diminishing marginal utility** – means that each additional unit of a good adds less to utility than the previous unit.
SEE THE INVISIBLE HAND

Even cupcakes have diminishing marginal utility.
How to Compare Apples and Oranges

- Marginal utilities of apples and oranges
  - How does this help consumers choose?

Let’s see.
The real problem of consumers is to decide how much to spend on each good.

\[
\frac{MU_A}{P_A} \text{ is the marginal utility per dollar spent on apples ("bang per buck").}
\]

\[
\frac{MU_O}{P_O} \text{ is the marginal utility per dollar spent on oranges.}
\]

Total utility will be maximized if:

\[
\frac{MU_A}{P_A} = \frac{MU_O}{P_O}
\]

Let’s see why.
How to Compare Apples and Oranges

- If \( \frac{MU_A}{P_A} > \frac{MU_O}{P_O} \)

  Total utility will ↑ if the consumer buys more apples and fewer oranges.

- If \( \frac{MU_A}{P_A} < \frac{MU_O}{P_O} \)

  Total utility will ↑ if the consumer buys more oranges and fewer apples.
The optimal consumption rule – to maximize utility, a consumer should allocate spending so that the marginal utility per dollar is equal for all purchases:

$$\frac{\text{MU}_A}{P_A} = \frac{\text{MU}_O}{P_O} = \frac{\text{MU}_i}{P_i} = \ldots \frac{\text{MU}_z}{P_z}$$

Let’s see how this works with a diagram.
Using the Optimal Consumption Rule

- If $\frac{MU_A}{P_A} = \frac{MU_O}{P_O} = 50$, buy 6 apples and 4 oranges.
The Demand Curve

- The optimal consumption rule provides a foundation for demand curves.
- Suppose $P_A$ increases:
  \[ \frac{MU_A}{P_A} < \frac{MU_O}{P_O} \]
  the consumer will buy fewer apples and more oranges.
- Consistent with a downward sloping demand curve.
- Explains how the price of a substitute affects the demand for the other good.
The Budget Constraint

- **Budget constraint** – shows all the consumption bundles that a consumer can afford given his or her income and their prices.

\[ P_P \times Q_P + P_G \times Q_G = \text{Income} \]

*It is easier to see using a diagram.*
The Budget Constraint

Income = $100
\( P_G = $2 \) per gallon
\( P_P = $10 \) per pizza

This bundle is unaffordable

Any bundle on the line, or, under it is affordable
Suppose income increases to $140 and prices don’t change.

Conclusion: Increases in income result in a parallel shift to the right and up.
The Budget Constraint

Gasoline (gallons)

Slope = \( \frac{P_P}{P_G} = \frac{50}{10} = \frac{10}{2} = 5 \) (ignoring negative sign)

What happens if \( P_P \) falls to $6.25?

Slope = \( \frac{\$6.25}{\$2.00} = \frac{50}{16} = 3.125 \)

Conclusion: a change in the Price ratio rotates the budget line.

New budget line
Try it!

Which graph represents a budget constrain when income = $100, P(gas) = $3, P(pizza) = $20?

a) A  
b) B
Draw a consumer’s budget constraint when the consumer has an income of $100, \( P_{\text{gas}} = $2 \) and \( P_{\text{pizza}} = $10 \). Now draw the new budget constraint when income = $80.

Draw a consumer’s budget constraint when the consumer has an income of $100, \( P_{\text{gas}} = $2 \), and \( P_{\text{pizza}} = $10 \). Now draw the budget constraint when \( P_{\text{gas}} = $4 \).
In 1970, the price of pizza is $2.50 and the price of a gallon of gas is $0.50. In 2010, the price of pizza is $10 and the price of a gallon of gas is $2. Has the relative price of pizza changed?
Preferences and Indifference Curves

- **Indifference curve** – connects all bundles that give the consumer an equal amount of utility.

- **Marginal rate of substitution (MRS)** – the rate at which the consumer is willing to trade one good for another and remain indifferent.

\[
\text{MRS} = \text{slope of the indifference curve at a point}
\]

*Let’s take a look at some indifference curves.*
An indifference curve connects all the consumption bundles that give the consumer the same utility.

Driving lots but eating little? You’re willing to give up a lot of gas for one more pizza.

Eating lots but driving little? You’re willing to give up very little gas for one more pizza.

Slope = MRS = 15

Slope = MRS = 2.5
Preferences and Indifference Curves

- That’s just one indifference curve (signifying one level of utility).
- How would you show a higher level of utility (assuming more is better)?

```markdown
Gasoline (gallons)

少 utility

More utility

Pizza
```
Optimization and Consumer Choices

- Putting it all together…
- Consumers want the highest total utility they can afford.
- *They want to be on the best indifference curve that’s still affordable.*
Optimization and Consumer Choices

They want to find this....

- **Optimal**
- **Better but not possible**
- **Possible but not optimal**
Show that (1) indifference curves can never cross and (2) indifference curves must have a negative slope.
Assume the consumer is currently at point G. Given the budget constraint shown, the consumer would be able to realize more total utility by choosing point ________, all other things held equal.

a) J  

b) K  

c) I  

d) H
The optimal consumption bundle is on the highest indifference curve but still on the budget constraint.

At this bundle, the slope of the indifference curve is equal to the slope of the budget constraint or:

$$\text{MRS} = \frac{P_{\text{pizza}}}{P_{\text{gasoline}}}$$
Optimization and Consumer Choices

Putting this together with our previous rule:

\[
\frac{MU_{\text{Pizza}}}{P_{\text{Pizza}}} = \frac{MU_{\text{Gas}}}{P_{\text{Gas}}}
\]

we can rearrange:

\[
\frac{MU_{\text{Pizza}}}{MU_{\text{Gas}}} = \frac{P_{\text{Pizza}}}{P_{\text{Gas}}}
\]

or,

\[
MRS = \frac{P_{\text{Pizza}}}{P_{\text{Gas}}}
\]

The optimal consumption is where the slope of the indifference curve is equal (tangent) to the slope of the budget line.
Two interpretations of the optimal consumption rule:

• Slope of indifference curve = slope of the budget line:

  The rate at which the consumer is willing to trade one good for another equals the rate the consumer must trade one good for another.

• At the optimal bundle, the additional utility per dollar spent is equal for all goods, or:

\[
\frac{\text{MU}_{\text{pizza}}}{P_{\text{pizza}}} = \frac{\text{MU}_{\text{gasoline}}}{P_{\text{gasoline}}}
\]
Optimization and Consumer Choice

Suppose $P_{\text{pizza}}$ falls.
The Income and Substitution Effects

- When the price of a good changes, two things happen:
  - **Substitution effect** – the change in consumption caused by a change in the relative price holding utility constant.
  - **Income effect** – the change in consumption caused by the change in purchasing power resulting from a price change.

*We can use our model to identify these effects.*
Income and Substitution Effects

To identify the substitution effect, shift the new budget constraint back to tangency with old indifference curve.

Substitution effect: $A \rightarrow A'$
Income effect: $A' \rightarrow B$

Note: the income effect is small
Applications of the Income and Substitution Effects

- How much should Costco Charge for a Membership?
  • Costco offers low prices, but you need to pay an annual membership fee.
  • Lower prices move customers to a higher indifference curve.
  • Paying a membership fee is equivalent to shifting the new budget line back.

- The maximum fee a customer will be willing to pay is the amount that would shift the new budget line back to the old indifference curve.

*Let’s see this.*
How Much Should Costco Charge for Membership?

**Diagram:**
- **Axes:**
  - Vertical: Ideal membership fee
  - Horizontal: Other Goods
- **Curves:**
  - **U1** (blue): Without Costco membership
  - **U2** (red): With Costco membership
- **Points:**
  - A: Ideal membership fee without Costco
  - A': Ideal membership fee with Costco
  - B: Higher fees without Costco
- **Lines:**
  - Green: Higher fees with Costco
  - Red: With Costco membership line
  - Blue: Without Costco membership line

**Legend:**
- Goods you can buy at Costco
- Without Costco membership
- With Costco membership
- Ideal membership fee
- Higher fees
To maximize utility, allocate dollars such that:

\[
\frac{MU_A}{PA} = \frac{MU_O}{PO} = \frac{MU_i}{P_i} = \ldots \frac{MU_z}{P_z}
\]

Preferences and constraints come together to shape an outcome.

Understanding income and substitution effects are useful for economic analysis.

When a relative price increases, relative demand for that good will fall.
End of Chapter 23