

Measurement of Economic Performance

Gross Domestic Product

Measuring a Nation's Income

- **Microeconomics** – the study of how individual households and firms make decisions and how they interact with one another in markets
- **Macroeconomics** – the study of the economy as a whole, its goal is to explain the economic changes that

Measuring a Nation's Income

- Macroeconomics answers questions like the following:
 - Why is average income high in some countries and low in others?
 - Why do prices rise rapidly in some time periods while they are more stable in others?
 - Why do production and employment expand in some years and contract in others?

The Economy's Income and Expenditure

- When judging whether the economy is doing well or poorly, it is natural to look at the total income that everyone in the economy is earning
- For an economy as a whole, income must equal expenditure because:
 - Every transaction has a buyer and a seller
 - Every dollar of spending by some

The Measurement of Gross Domestic Product

- *Gross Domestic Product (GDP)*
– a measure of the income and expenditures of an economy
- It is the total market value of all final goods and services produced within a country in a given period of time

The Measurement of Gross Domestic Product

- The equality of income and expenditure can be illustrated with the circular-flow diagram

- Circular-flow diagram is a simple depiction of the macroeconomy.

- Circular-flow diagram illustrates GDP as spending, revenue, factor payments, and income.

- First, some preliminaries:

- **Factors of production** are inputs like labor, land, capital, and natural resources.

- **Factor payments** are payments to the factors of production. (e.g., wages, rent)

- **Households:**

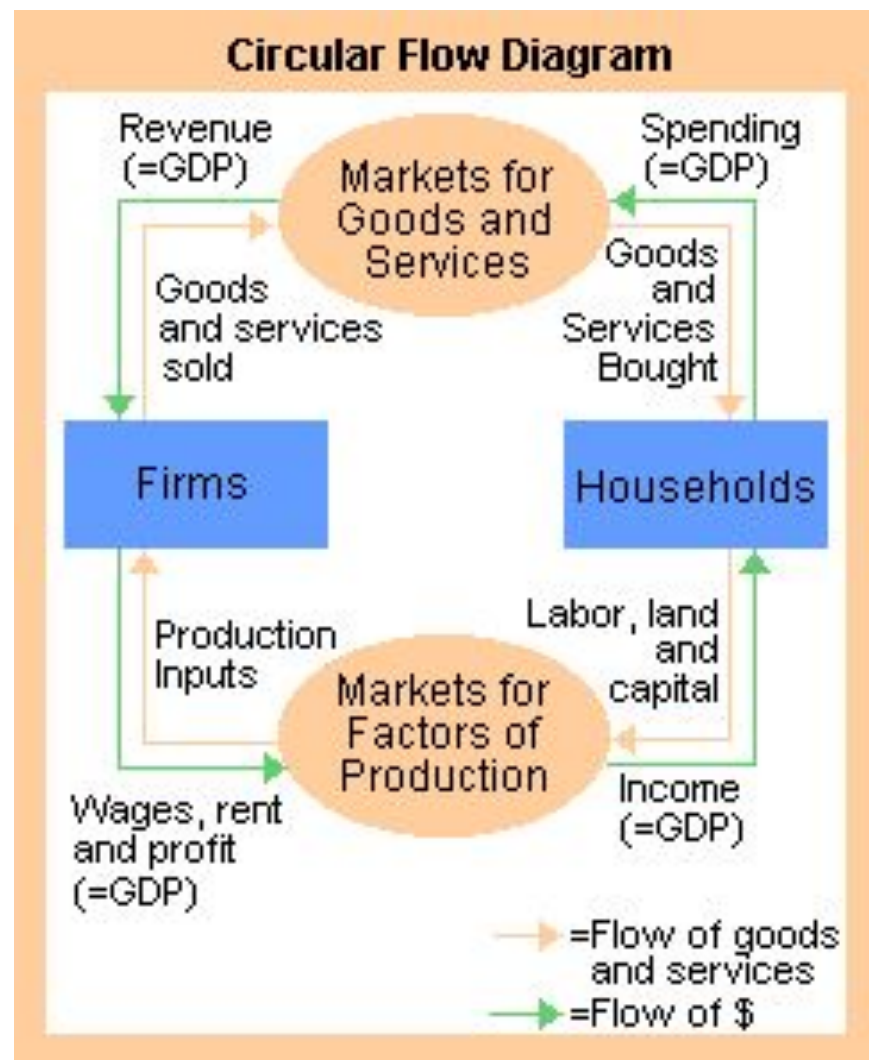
- own the factors of production, sell/rent them to firms for income

- buy and consume g&s

- **Firms:**

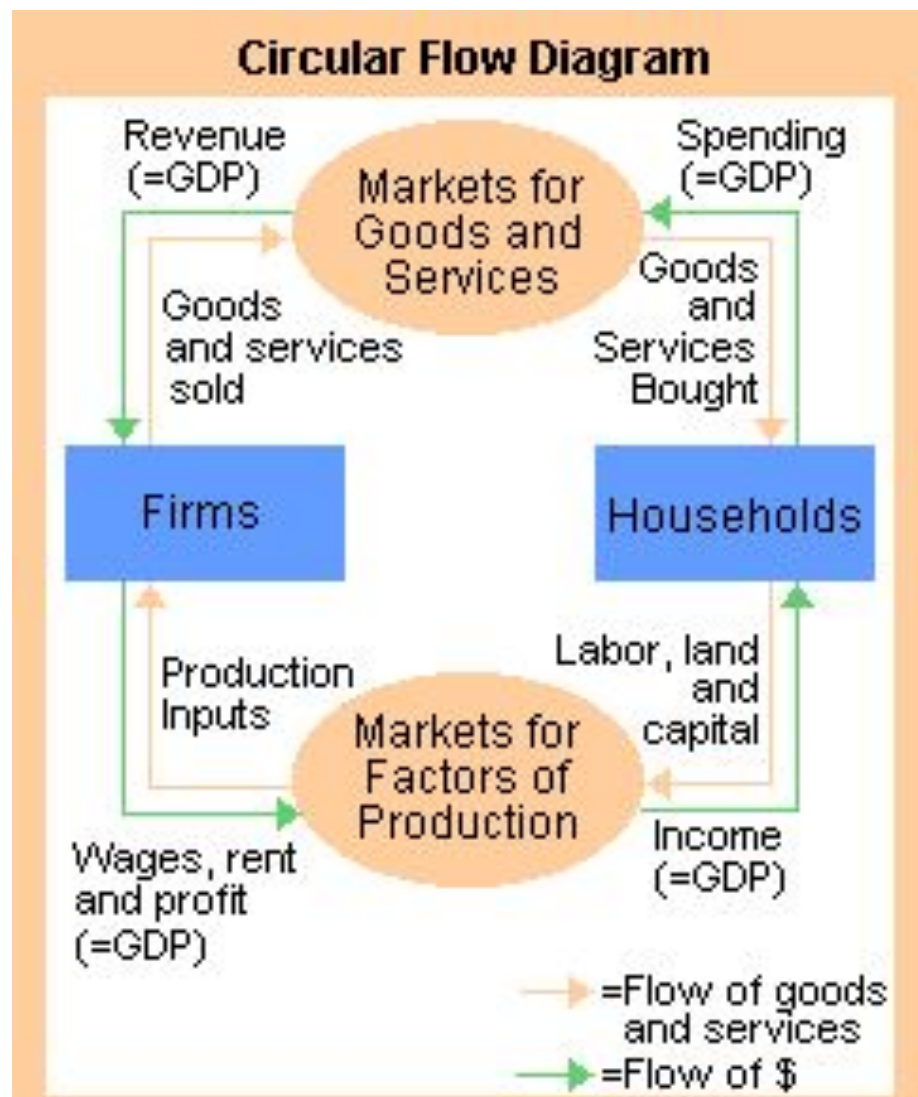
- buy/hire factors of production, use them to produce g&s

- sell g&s



Circular Flow Diagram

- If someone pays someone else \$100 to mow a lawn, the expenditure on the lawn service (\$100) is exactly equal to the income earned from the production of the lawn service (\$100).
- In the simple economy described by this circular flow diagram, calculating GDP could be done by adding up the total purchases of households or summing total income earned by households.
- Note that this simple diagram is somewhat unrealistic as it omits saving, taxes, government purchases and investment purchases by firms. However, because a transaction always has a buyer and a seller, total expenditure in the economy must be equal to total income.



Circular Flow - Leakages

- Leakage is the non-consumption uses of income, including saving, taxes, and imports.
- Savings, taxes, and imports are "leaked" out of the main flow, reducing the money available in the rest of the economy
- Cash leakage refers to the sums of money borrowed from

The Measurement of Gross Domestic Product

- Definition: **GDP** is the market value of all final goods and services produced within a country in a given period of time
- “GDP is the Market Value...”
 - Output is valued at market prices
 - GDP measures all goods using the same units (e.g., dollars in the U.S.), rather than “adding apples to oranges.”
 - Things that don’t have a market value are excluded, e.g., housework you do for yourself.

The Measurement of Gross Domestic Product

“Of All Final ...”

- It records only the value of final goods, not intermediate goods (the value is counted only once) Used goods are NOT counted.
- Final goods are intended for the end user
- Intermediate goods are used as components or ingredients in the production of other goods.
- GDP only includes final goods, as they already embody the value of the intermediate goods used in their production.
- GDP includes all items produced and sold legally in the economy
- The value of housing services is somewhat difficult to measure.
 - If housing is rented, the value of the rent is used to measure the value of the housing services.
 - For housing that is owned (or mortgaged), the government estimates the rental value and uses this figure to value the housing services.
- GDP does not include illegal goods or services or items that are not sold in markets.
 - When you hire someone to mow your lawn, that production is included in GDP

The Measurement of Gross Domestic Product

- “Goods and Services...”
 - It includes both tangible goods (food, clothing, cars) and intangible goods (haircuts, housecleaning, doctor visits)
- “Produced...”
 - It includes goods and services currently produced, not transactions involving goods produced in the past
- “Within a Country...”
 - It measures the value of production within the geographic confines of a country
 - GDP measures the value of production that occurs within a country’s borders, whether done by its own citizens or by foreigners located there.

The Measurement of Gross Domestic Product

- “In a Given Period of Time...”
- It measures the value of production that takes place within a specific interval of time, usually a year or a quarter (three months).

What is not Counted in GDP?

- GDP includes all items produced in the economy and sold legally in markets
- GDP excludes most items that are produced and consumed at home and that never enter the marketplace
- It excludes items produced and sold illicitly, such as illegal drugs

The Components of GDP

- GDP (Y) is the sum of the following:
 - Consumption (C)
 - Investment (I)
 - Government Purchases (G)
 - Net Exports (NX)
- These components add up to GDP (denoted Y):
 - $Y = C + I + G + NX$

The Components of GDP

● Consumption (C)

- The spending by households on goods and services, with the exception
- Note on housing costs:
 - For renters, consumption includes rent payments.
 - For homeowners, consumption includes the imputed rental value of the house, but not the purchase price or mortgage payments.

● Investment (I)

- is total spending on goods that will be used in the future to produce more goods.
- includes spending on
 - capital equipment (*e.g.*, machines, tools)
 - structures (factories, office buildings, houses)
 - inventories (goods produced but not yet sold)
- Note: ***“Investment”*** does not mean the purchase of financial assets like stocks and bonds.

The Components of GDP

- Government Purchases (G)
 - The spending on goods and services by local, state, and federal governments
 - Does not include transfer payments such as Social Security or unemployment insurance benefits because these payments represent transfers of income and are not made in exchange for currently produced goods or services
- Net Exports (NX)
 - Exports minus imports
 - Exports represent foreign spending on the economy's g&s.

U.S. GDP and Its Components, 2005

	billions	% of GDP	per capita
Y	\$12,480	100.0	\$42,035
C	8,746	70.1	29,460
I	2,100	16.8	7,072
G	2,360	18.9	7,950
NX	-726	-5.8	-2,444

ACTIVE LEARNING 1:

GDP and its components

In each of the following cases, determine how much GDP and each of its components is affected (if at all).

- A. Debbie spends \$200 to buy her husband dinner at the finest restaurant in Boston.
- B. Sarah spends \$1800 on a new laptop to use in her publishing business. The laptop was built in China.
- C. Jane spends \$1200 on a computer to use in her editing business. She got last year's model on sale for a great price from a local manufacturer.
- D. General Motors builds \$500 million worth of cars, but consumers only buy \$470 million worth of them.

ACTIVE LEARNING 1:

Answers

A. Debbie spends \$200 to buy her husband dinner at the finest restaurant in Boston.

Consumption and GDP rise by \$200.

B. Sarah spends \$1800 on a new laptop to use in her publishing business. The laptop was built in China.

Investment rises by \$1800, net exports fall by \$1800, GDP is unchanged.

ACTIVE LEARNING 1:

Answers

C. Jane spends \$1200 on a computer to use in her editing business. She got last year's model on sale for a great price from a local manufacturer.

Current GDP and investment do not change, because the computer was built last year.

D. General Motors builds \$500 million worth of cars, but consumers only buy \$470 million of them.

Consumption rises by \$470 million, inventory investment rises by \$30 million, and GDP rises by \$500 million.

Real versus nominal GDP

- *Nominal GDP* – values the production of goods and services at current prices
- *Real GDP* – values the production of goods and services at constant prices
- An accurate view of the economy requires adjusting nominal to real GDP by

EXAMPLE:

	Pizza		Latte	
year	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
2012	\$10	400	\$2.00	1000
2013	\$11	500	\$2.50	1100
2014	\$12	600	\$3.00	1200

Compute nominal GDP in each year: Increase:

$$2012: \$10 \times 400 + \$2 \times 1000 = \$6,000$$

37.5%

$$2013: \$11 \times 500 + \$2.50 \times 1100 = \$8,250$$

30.9%

$$2014: \$12 \times 600 + \$3 \times 1200 = \$10,800$$

EXAMPLE:

	Pizza		Latte	
year	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
2012	\$10	400	\$2.00	1000
2013	\$11	500	\$2.50	1100
2014	\$12	600	\$3.00	1200

Compute real GDP in each

year, using 2012 as the base year:

$$2012: \$10 \times 400 + \$2 \times 1000 = \$6,000$$

$$2013: \$10 \times 500 + \$2 \times 1100 = \$7,200$$

$$2014: \$10 \times 600 + \$2 \times 1200 = \$8,400$$

Increase:

20.0%

16.7%

EXAMPLE:

year	Nominal GDP	Real GDP
2012	\$6000	\$6000
2013	\$8250	\$7200
2014	\$10,800	\$8400

In each year,

- nominal GDP is measured using the (then) current prices.
- real GDP is measured using constant prices from the base year (2012 in this example).

EXAMPLE:

year	Nominal GDP		Real GDP	
2012	\$6000	} 37.5%	\$6000	} 20.0%
2013	\$8250	} 30.9%	\$7200	} 16.7%
2014	\$10,800		\$8400	

- The change in nominal GDP reflects both prices and quantities.
- The change in real GDP is the amount that GDP would change if prices were constant (*i.e.*, if zero inflation).

Hence, real GDP is corrected for inflation.

Nominal and Real GDP in the U.S., 1965-2005

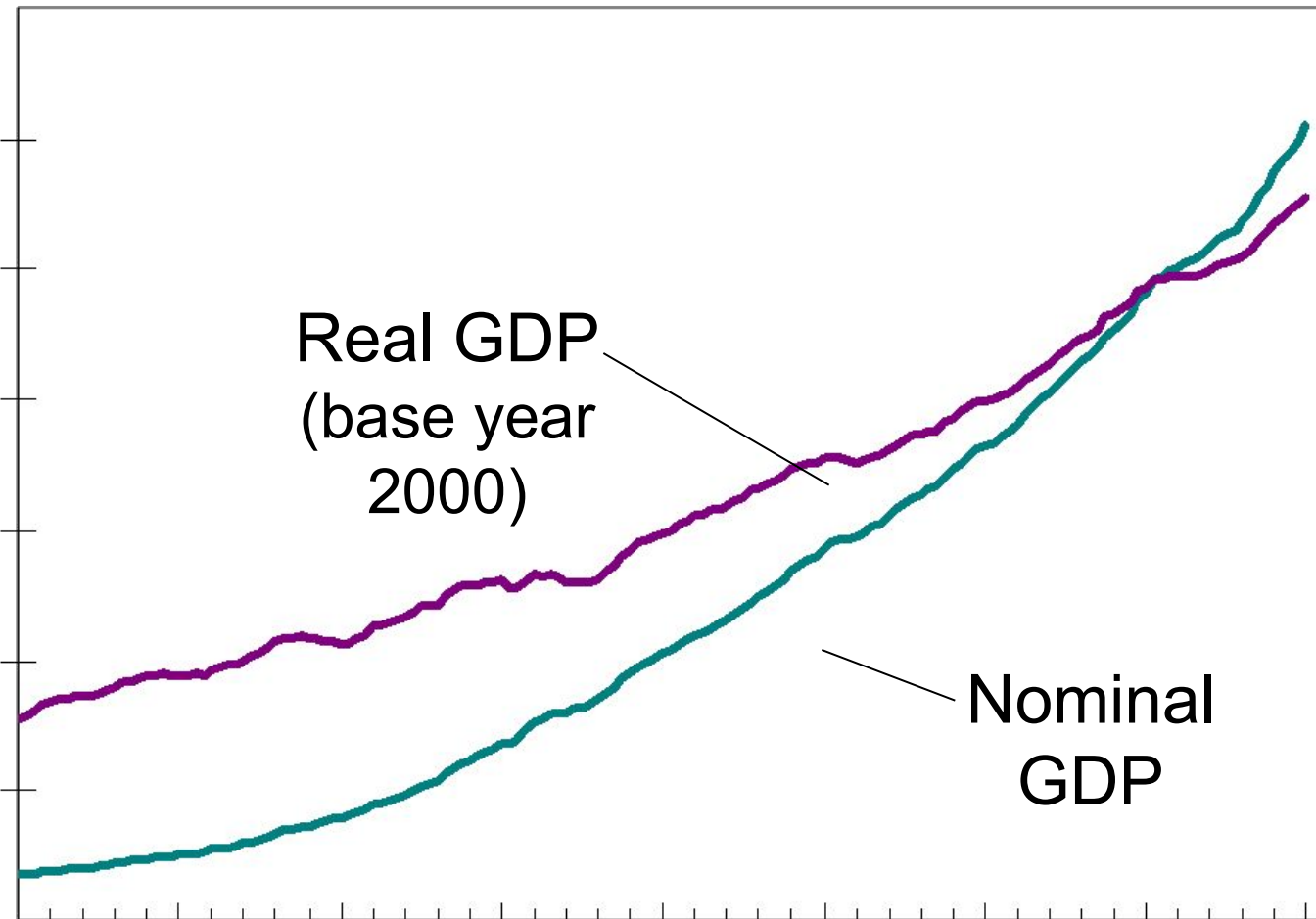
Billions

\$12,000
\$10,000
\$8,000
\$6,000
\$4,000
\$2,000
\$0

Real GDP
(base year
2000)

Nominal
GDP

1965 1970 1975 1980 1985 1990 1995 2000 2005



The GDP Deflator

- The *GDP Deflator* is a measure of the price level calculated as the ratio of nominal GDP to real GDP times 100
- It tells us the rise in nominal GDP that is attributable to a rise in prices rather than a rise in the quantities produced

The GDP Deflator

- The GDP deflator is a measure of the overall level of prices.
- Definition:

$$\text{GDP deflator} = 100 \times \frac{\text{nominal GDP}}{\text{real GDP}}$$

- One way to measure the economy's **inflation rate** is to compute the percentage increase in the GDP deflator from one year to the next.

EXAMPLE:

year	Nominal GDP	Real GDP	GDP Deflator
2012	\$6000	\$6000	100.0
2013	\$8250	\$7200	114.6
2014	\$10,800	\$8400	128.6

14.6%

12.2%

Compute the GDP deflator in each year:

$$2012: 100 \times (6000/6000) = 100.0$$

$$2013: 100 \times (8250/7200) = 114.6$$

$$2014: 100 \times (10,800/8400) = 128.6$$

The GDP Deflator

- Converting Nominal GDP to Real GDP
- Nominal GDP is converted to real GDP as follows:
- $\text{Real GDP} = \text{Nominal GDP} / \text{GDP Deflator} \times 100$

ACTIVE LEARNING 2: Computing GDP

	2014(base yr)		2015		2016	
	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
good A	\$30	900	\$31	1,000	\$36	1050
good B	\$100	192	\$102	200	\$100	205

Use the above data to solve these problems:

- A.** Compute nominal GDP in 2014.
- B.** Compute real GDP in 2015.
- C.** Compute the GDP deflator in 2016.

ACTIVE LEARNING 2:

Answers

	2014(base yr)		2015		2016	
	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
good A	\$30	900	\$31	1,000	\$36	1050
good B	\$100	192	\$102	200	\$100	205

A. Compute nominal GDP in 2014.

$$\text{\$30} \times 900 + \text{\$100} \times 192 = \underline{\text{\$46,200}}$$

B. Compute real GDP in 2015.

$$\text{\$30} \times 1000 + \text{\$100} \times 200 = \underline{\text{\$50,000}}$$

ACTIVE LEARNING 2:

Answers

	2014 (base yr)		2015		2016	
	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
good A	\$30	900	\$31	1,000	\$36	1050
good B	\$100	192	\$102	200	\$100	205

C. Compute the GDP deflator in 2016.

$$\text{Nom GDP} = \$36 \times 1050 + \$100 \times 205 = \underline{\underline{\$58,300}}$$

$$\text{Real GDP} = \$30 \times 1050 + \$100 \times 205 = \underline{\underline{\$52,000}}$$

$$\begin{aligned} \text{GDP deflator} &= 100 \times (\text{Nom GDP}) / (\text{Real GDP}) \\ &= 100 \times (\$58,300) / (\$52,000) = \underline{\underline{112.1}} \end{aligned}$$

GDP and Economic Well-being

- GDP is the best single measure of the economic well-being of a society
- GDP per person tells us the income and expenditure of the average person in the economy
- Higher GDP per person indicates a higher standard of living
- GDP is not a perfect measure of the happiness or quality of

GDP and Economic Well-Being

- Some things that contribute to well-being are not included in GDP
 - The value of leisure
 - The value of a clean environment
 - The value of almost all activity that takes place outside of markets, such as the value of the time parents spend with their children and the value of volunteer work
 - Distribution of income
 - Divorce

GDP and Economic Well-Being

- It does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans.”

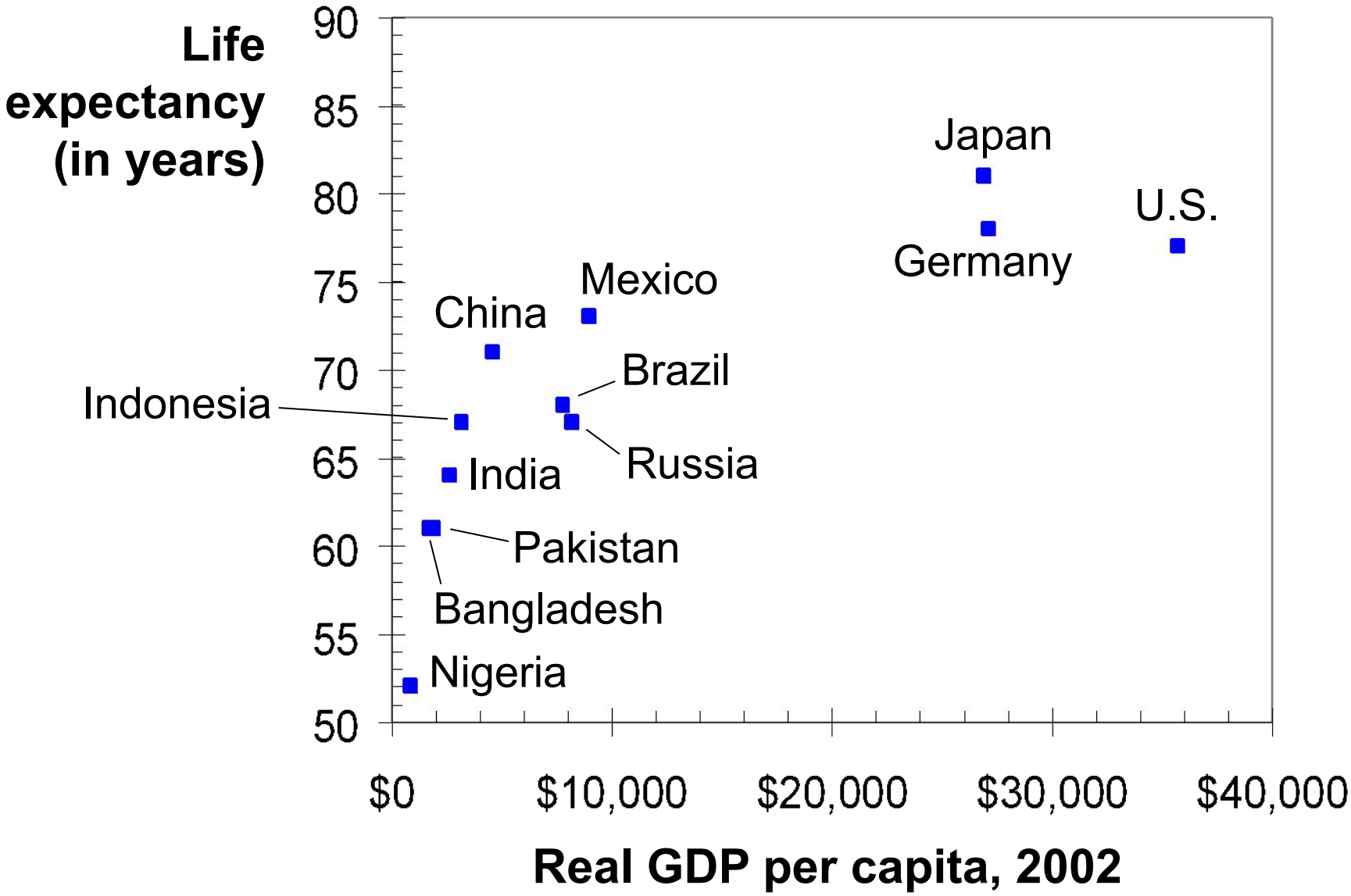


- *Senator Robert
Kennedy, 1968*

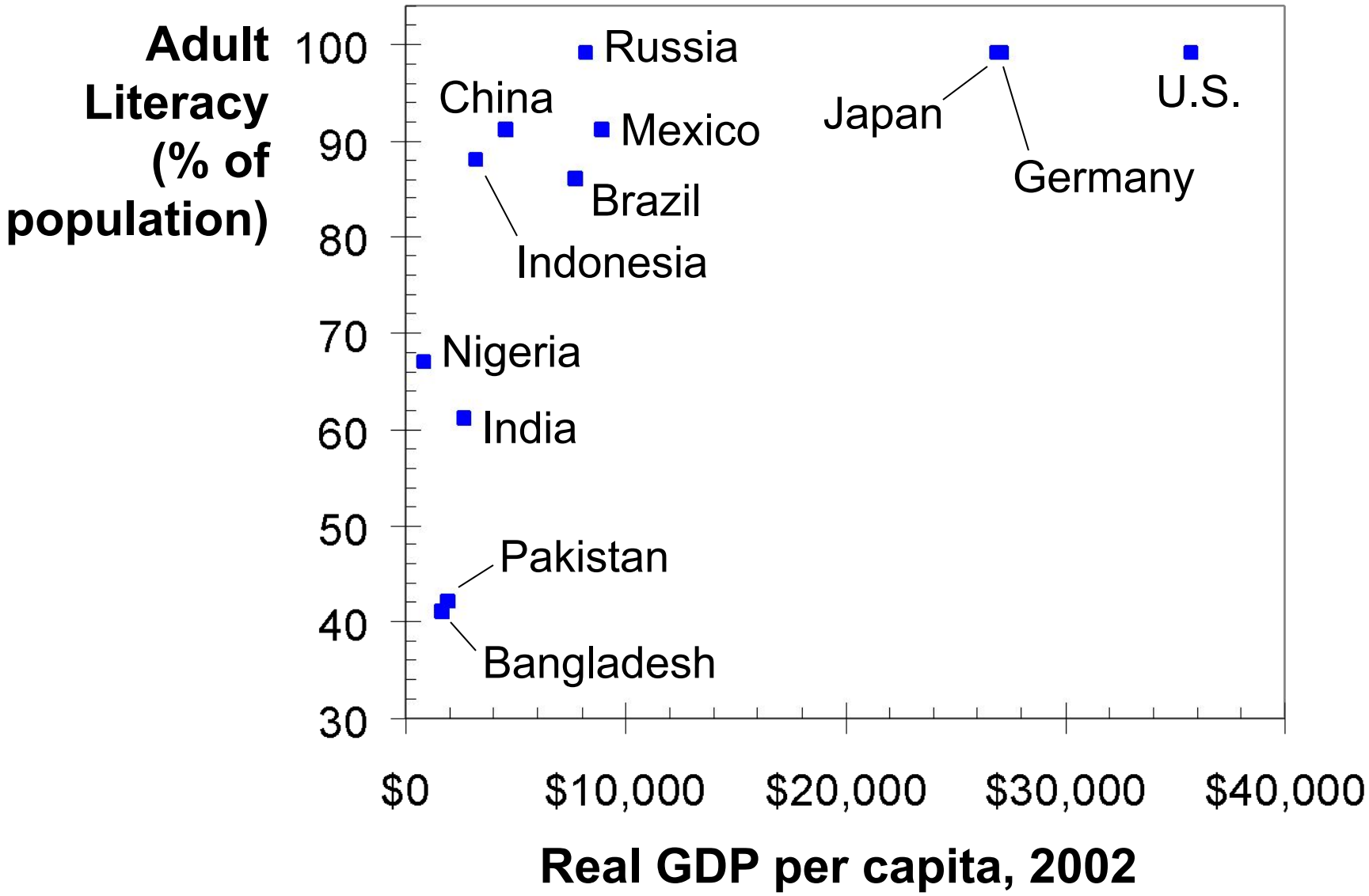
Then Why Do We Care About GDP?

- Having a large GDP enables a country to afford better schools, a cleaner environment, health care, etc.
- Many indicators of the quality of life are positively correlated with GDP. For example...

GDP and Life Expectancy in 12 Countries



GDP and Adult Literacy in 12 Countries



Gross National Product (GNP)

- GNP is the total income earned by a nation's permanent residents.
- Differs from GDP by including income that our citizens earn abroad and excluding income that foreigners earn here.
- Example: when a Canadian citizen works temporarily in the United States, his production is part of U.S. GDP, but it is not part of U.S. GNP (It is part of Canada's GNP)

Other Measures of Income

- Net national product (NNP) – is the total income earned by a nation's residents (GNP) minus losses from depreciation (wear and tear on an economy's stock of equipment and structures)
- Net domestic product (NDP) – equals the Gross Domestic Product (GDP) minus depreciation on a country's capital goods. This is an estimate of how the country is not able to replace the capital stock, lost through depreciation, then GDP will fall. In addition, a growing gap between GDP and NDP indicates increasing obsolescence of capital goods, while a narrowing gap would mean that the condition of capital stock in the country is improving.

Other Measures of Income

- An economy in 2008 produced \$500 billion worth of final goods and services. Of these, \$70 billion were investment goods. During the year, \$25 billion of the capital stock in existence at the beginning of 2004 was replaced or repaired
- NDP for 2008 for this economy is
-----.
- $NDP = GDP - \text{depreciation}$
- $NNP = GNP - \text{depreciation}$

Other Measures of Income

- National Income – the total income earned by a nation's residents in production of goods/services. National income differs from NNP by excluding indirect business taxes (sales tax) and including business subsidies.
- National income = NNP – sales tax
- Personal Income – the income that households and non-corporate businesses receive. It excludes retained earnings, which is income that corporations have earned but have not paid out to their owners.
- Personal income = national income – earnings
- Disposable personal income – the income households and non-corporate businesses have left after satisfying all their obligations to the government. It equals personal income minus personal taxes and certain non-tax

Income Approach

- GDP can also be calculated through three different income approaches: aggregate, national, and personal.
- Aggregate income – the most common income approach and is the total income measured by adding all labor income (wages, salaries, benefits), capital income (interest, profits, and rent), depreciation, indirect business taxes, and net income of foreigners.
- National income – the total income earned by citizens and businesses within a country during one year. It is the sum of labor income and capital income and excludes indirect business taxes, depreciation, and the net income of foreigners.
- Personal income – the total income paid directly to individuals. It includes capital income, labor income, and transfer payments.

Production Approach

- The production approach is the total production of all firms or industries in the economy. In order to avoid double counting, only the value added by each manufacturer is counted. The total value added will be equal to the final price.

Unemployment and its Natural Rate

Unemployment can be divided into two categories

- The economy's natural rate of unemployment refers to the amount of unemployment that the economy normally experiences.
- Full employment is not 100 percent employment, but the level of employment corresponds with the natural rate of unemployment. At full employment there is no cyclical unemployment.
- Cyclical unemployment refers to the year-to-year fluctuations in unemployment around its natural rate

Identify Unemployment

How is Unemployment Measured?

- The Bureau of Labor Statistics (BLS) surveys 60,000 households every month.
- The BLS places each adult (aged 16 or older) into one of three categories: employed, unemployed, or not in the labor force

How is Unemployment Measured?

- **Labor force** – the total number of workers, including both the employed and unemployed
- Labor force = number of employed + number of unemployed
- **Unemployment rate** – the percentage of the labor force that is unemployed
- Unemployment rate = (number of unemployed / labor force) x 100%

How is Unemployment Measured?

- Labor – force participation rate – the percentage of the adult population that is in the labor force
- Labor-force participation rate = (labor force / adult population) x 100%

How is Unemployment Measured?

- Example: data from 2001. In that year, there were 135.1 million employed people and 6.7 million unemployed people.
- Labor force = $135.1 + 6.7 = 141.8$ million
- Unemployment rate = $(6.7/141.8) \times 100\% = 4.7\%$
- If the adult population was 211.9 million, the labor-force participation rate was:
- Labor-force participation rate = $(141.8/211.9) \times 100\% = 66.9\%$

ACTIVE LEARNING 1:

Calculate labor force statistics

Compute the labor force, u-rate, adult population, and labor force participation rate using this data:

Adult population of the U.S. by group, January 2006	
# of employed	143.1 million
# of unemployed	7.0 million
not in labor force	77.4 million

ACTIVE LEARNING 1:

Answers

$$\text{Labor force} = \text{employed} + \text{unemployed}$$

$$= 143.1 + 7.0$$

$$= \mathbf{150.1} \text{ million}$$

$$\text{U-rate} = 100 \times (\text{unemployed}) / (\text{labor force})$$

$$= 100 \times 7.0 / 150.1$$

$$= \mathbf{4.7\%}$$

ACTIVE LEARNING 1:

Answers

$$\begin{aligned}\text{Population} &= \text{labor force} + \text{not in labor force} \\ &= 150.1 + 77.4 \\ &= \mathbf{227.5}\end{aligned}$$

$$\begin{aligned}\text{LF partic. rate} &= 100 \times (\text{labor force}) / (\text{population}) \\ &= 100 \times 150.1 / 227.5 \\ &= \mathbf{66.0\%}\end{aligned}$$

Unemployment and labor-force participation rates for various sub-groups of the U.S. population

- Women have lower labor-force participation rates than men, but have similar rates of unemployment
- Blacks have similar labor-force participation rates to whites, but have higher rates of unemployment
- Teenagers have lower labor-force participation rates than adults, but have higher unemployment rates

Labor Market Statistics for Whites & Blacks

January 2006

Adults (20 yrs & older)		
	u-rate	LF part. rate
White, male	3.6%	76.4%
White, female	3.7	59.7
Black, male	7.5	69.8
Black, female	8.1	64.4

Labor Market Statistics for Whites & Blacks, January 2006

Teens (16-19 yrs)		
	u-rate	LF part. rate
White	13.3	47.1
Black	31.4	30.9

Labor Market Statistics for Other Groups, January 2006

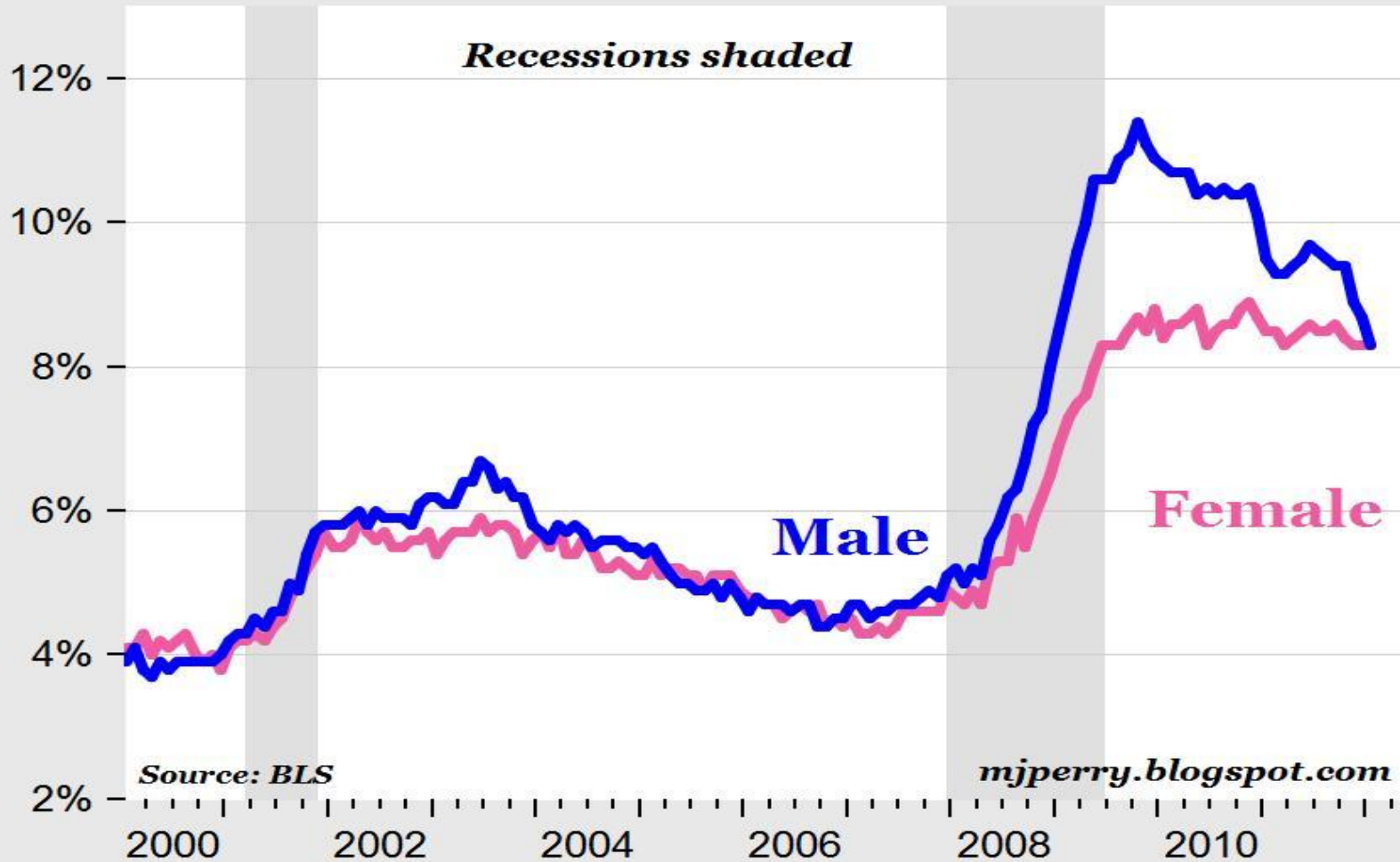
All ages		
	u-rate	LF part. rate
Asian	3.2	65.7
Hispanic	5.8	69.3

Labor Market Statistics by Education Level, January 2006

Adults (25 yrs & older)

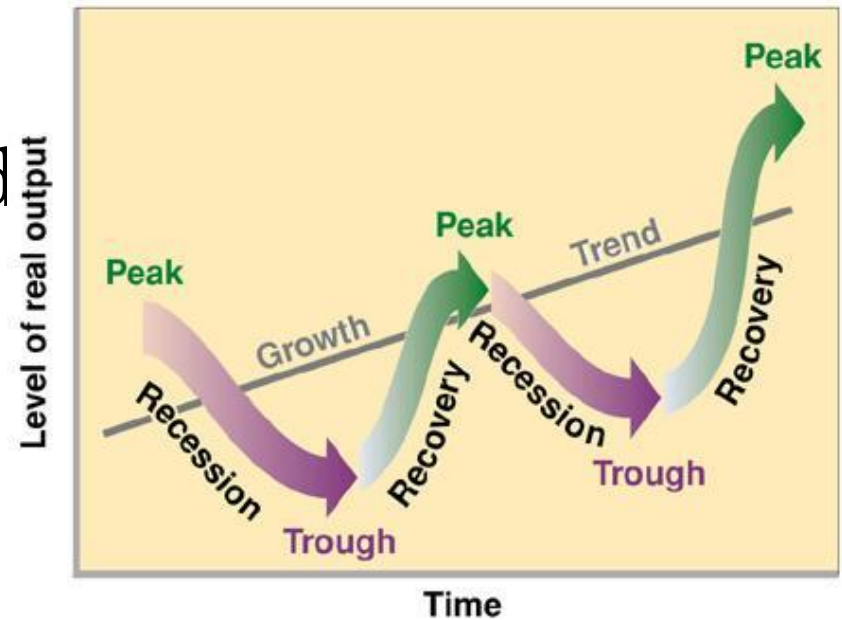
	u-rate	LF part. rate
less than h.s.	7.0%	46.0%
h.s. diploma	4.4	62.5
some college or assoc degree	3.5	72.5
bachelor's degree or more	2.1	78.3

Unemployment Rates: Males vs. Females January 2000 to January 2012



Unemployment

- **Natural rate of unemployment** – the normal rate of unemployment around which the unemployment rate fluctuates
- **Cyclical unemployment** – the deviation of unemployment from its natural rate.



Case Study: Labor-Force

Participation of Men and Women in the U.S. economy

- There has been a dramatic rise in the labor-force participation rates of women over the past 50 years
- The labor-force participation rates for men have actually fallen by a small amount over the same time period.

Does the Unemployment Rate Measure What We Want It To?

- Measuring the unemployment rate is not as straightforward as it may seem.
- There is a tremendous amount of movement into and out of the labor force
 - Many of the unemployed are new entrants or reentrants looking for work
 - Many unemployment spells end with a person leaving the labor force as opposed to actually finding a job

Does the Unemployment Rate Measure What We Want It To?

- There may be individuals who are calling themselves unemployed to qualify for government assistance, yet they are not trying hard to find work. These individuals are more likely not a part of the true labor force, but they will be counted as unemployed.
- **Dishonest workers** – bias the unemployment figures upward. These individuals claim to be unemployed in order to receive unemployment benefits when, in fact, they do not want a job or are working for cash in an unreported job.
- **Discouraged workers** – individuals who would like to work but have given up looking for a job
 - These individuals will not be counted as part of the labor force
 - Thus, while they are likely a part of the unemployed, they will not show up in the unemployment statistics

How Long are the Unemployed without work?

- Another important variable that policymakers may be concerned with is the duration of unemployment
- Most spells of unemployment are short, and most unemployment observed at any given time is long term

Why are there always People Unemployed?

- In an ideal labor market, wages would adjust so that the quantity of labor supplied and the quantity of labor demanded would be equal
- However, there is always unemployment even when the economy is doing well. The unemployment rate is never zero; it fluctuates around the natural rate

Types of Unemployment

- **Frictional unemployment** – unemployment that results because it takes time for workers to search for the jobs that best suit their tastes and skills
- **Structural unemployment** – unemployment that results because the number of jobs available in some labor markets is insufficient to provide a job for everyone who wants one
- Three possible reasons for structural unemployment are minimum-wage laws, unions, and efficiency wages

Types of Unemployment

- Seasonal unemployment – the unemployment that arises because of seasonal weather patterns.
 - Seasonal unemployment increases during the winter months and decreases during the spring and summer.
 - Examples: a fruit picker who is laid off after the fall harvest and who gets rehired the following summer. A lifeguard that works during the summer, but is laid off during the winter.
- Cyclical unemployment – the fluctuating unemployment over the business cycle.
 - Cyclical unemployment increases during a recession and decreases during an expansion.
 - Example: an autoworker who is laid off because the economy is in a recession and who gets rehired some months later when the expansion begins.

Job Search

- Job search – the process by which workers find appropriate jobs given their tastes and skills
- Because workers differ from one another in terms of their skills and tastes and jobs differ in their attributes, it is often difficult for workers to match with the appropriate job



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Why some Frictional Unemployment is Inevitable?

- Frictional unemployment often occurs because of a change in the demand for labor among different firms
 - When workers decide to stop buying a good produced by Firm A and instead start buying a good produced by Firm B, some workers at Firm A will likely lose their jobs
 - New jobs will be created at Firm B, but it will take some time to move the displaced workers from Firm A to Firm B
 - The result of this transition is temporary unemployment
 - The same type of situation can occur across industries as well
 - This implies that, because the economy is always changing, frictional unemployment is inevitable. Workers in declining industries will find themselves looking for new jobs, and firms in growing industries will be seeking new workers

Public Policy and Job Search

- Government programs can help to reduce the amount of frictional unemployment
- These programs include
 - Government-run employment agencies that give out information on job vacancies
 - Public training programs that aim to ease the transition of workers from declining to growing industries and to help disadvantaged groups escape poverty
- Critics of these programs argue that the private labor market will do a better job of matching workers with employers and therefore the government should not be involved in the process of job search.

Unemployment Insurance

- Unemployment insurance – a government program that partially protects workers' incomes when they become unemployed
- Because unemployment insurance reduces the hardship of unemployment, it also increases the amount of unemployment that exists.
- Many studies have shown that more generous unemployment insurance benefits lead to reduced job search effort and, as a result, more unemployment



In the News: German Unemployment

- Unemployment benefits are much more generous in Germany than they are in the United States



Minimum-Wage Laws

- Unemployment can also occur because of minimum-wage laws
- The minimum wage is a price floor
 - If the minimum wage is set above the equilibrium wage in the labor market, a surplus of labor will occur
 - However, this is a binding constraint only when the minimum wage is set above the equilibrium wage
 - Most workers in the economy earn a wage above the minimum wage

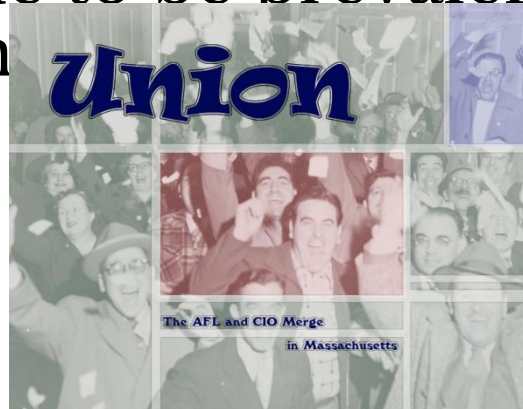


Minimum-Wage Laws

- Anytime a wage is kept above the equilibrium level for any reason, the result is unemployment.
- Other causes of this situation include unions and efficiency wages.
- This situation is different from frictional unemployment where the search for the right job is the reason for unemployment.

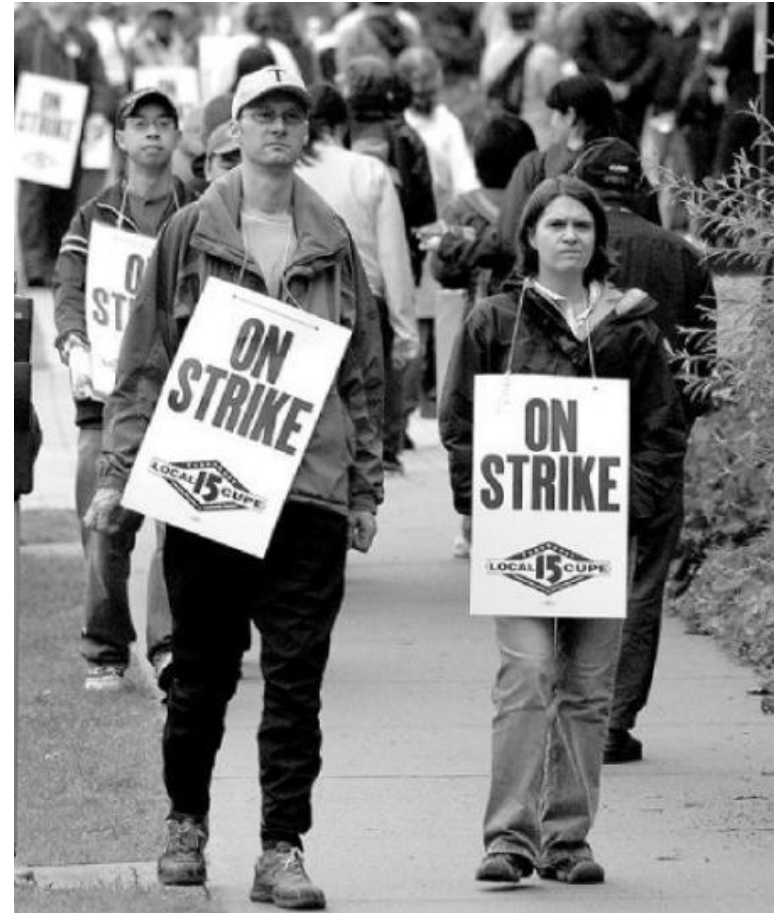
Unions and Collective Bargaining

- **Union** – a worker association that bargains with employers over wages and working conditions
- Unions play a smaller role in the U.S. economy today than they did in the past. However, unions continue to be prevalent in many European countries



The Economics of Union

- **Collective bargaining** – the process by which unions and firms agree on the terms of employment
- Unions try to negotiate for higher wages, better benefits, and better working conditions than the firm would offer if there were no union
- **Strike** – the organized withdrawal of labor from a firm by a union
- Economists have found that union workers typically earn 10 to 20 percent more than similar workers who do not belong to unions



The Economics of Unions

- This implies that unions raise the wage above the equilibrium wage, resulting in unemployment.
- Unions are often believed to cause conflict between insiders (who benefit from high union wages) and outsiders (who do not get the union jobs).
- Outsiders will either remain unemployed or find jobs in firms that are not unionized
- The supply of workers in nonunion firms will increase, pushing wages at those firms down.

Are Unions Good or Bad for the Economy?

- Critics of unions argue that unions are a cartel, which causes inefficiency because fewer workers end up being hired at the higher union wage
- Advocates of unions argue that unions are an answer to the problems that occur when a firm has too much power in the labor market (for example, if it is the only major employer in town)
- In the News: Should you join a Union?
 - Individuals looking for jobs may have to consider whether or not they should join a union



The Theory of Efficiency Wages

- Efficiency wages – above-equilibrium wages paid by firms in order to increase worker productivity
- Efficiency wages raise the wage above the market equilibrium wage, resulting in unemployment.

There are several reasons why a firm may pay efficiency wages.

- **Worker Health**

- Better paid workers can afford to eat better and can afford good medical care.
- This is not applicable in rich countries such as the United States, but can raise the productivity of workers in less-developed countries where inadequate nutrition and health care are more common

- **Worker Turnover**

- A firm can reduce turnover by paying a wage greater than its workers could receive elsewhere
- This is especially helpful for firms that face high hiring and training costs.

There are several reasons why a firm may pay efficiency wages.

- **Worker Effort**

- Again, if a firm pays a worker more than he or she can receive elsewhere, the worker will be more likely to try to protect his or her job by working harder.
- This is especially helpful for firms who have difficulty monitoring their workers.

- **Worker Quality**

- Offering higher wages attracts a better pool of applicants
- This is especially helpful for firms who are not able to perfectly gauge the quality of job applicants

Case Study: Henry Ford and the Very Generous \$5-A-Day Wage

- Henry Ford used a high wage (about twice the going rate) to attract better employees.
- After instituting this higher wage policy, the company's production costs actually fell due to reduced turnover, absenteeism, and shirking.



Unemployment

- High rates of unemployment can cause a personal loss of self-confidence, crime, the breakup of families, and suicide.
- There are also losses to output and income.
- Economists, including the late Arthur Okun, have estimated that for every one percentage point increase in the unemployment rate above the natural rate, output falls by 2 to 3 percentage points. This is called Okun's law.

Weekly Unemployment Claims Four-Week Moving Average Jan. 1, 2000 to Feb. 25, 2012



Source: Dept. of Labor

mjperry.blogspot.com

Inflation and CPI

Consumer Price Index

- **Consumer Price Index** – (CPI) measure of the overall cost of the goods and services bought by a typical consumer
- The basis of cost of living adjustments (COLAs) in many contracts and in Social Security.

How the Consumer Price Index is calculated

- 1) Fix the basket
 - The Bureau of Labor Statistics uses surveys to determine a representative bundle of goods and services purchased by a typical consumer
 - Example: 4 hot dogs and 2 hamburgers
- 2) Find the prices
 - Prices for each of the goods and services in the basket must be determined for each time period

How the Consumer Price Index is calculated

Year	Price of Hot Dogs	Price of Hamburgers
2011	\$1	\$2
2012	\$2	\$3
2013	\$3	\$4

How the Consumer Price Index is calculated

- 3) Compute the basket's cost
 - By keeping the basket the same, only prices are being allowed to change. This allows us to isolate the effects of price changes over time
 - Example:
 - Cost in 2011 = $(\$1 \times 4) + (\$2 \times 2) = \$8$
 - Cost in 2012 = $(\$2 \times 4) + (\$3 \times 2) = \$14$
 - Cost in 2013 = $(\$3 \times 4) + (\$4 \times 2) = \$20$

How the Consumer Price Index is calculated

- 4) Choose a base year and compute the index.
 - The base year is the benchmark against which other years are compared
 - The formula for calculating the price index is:
 - $\text{CPI} = (\text{cost of basket in current year} / \text{cost of basket in base year}) \times 100$
 - Example (using 2011 as the base year):
 - $\text{CPI for 2011} = (\$8) / (\$8) \times 100 = 100$
 - $\text{CPI for 2012} = (\$14) / (\$8) \times 100 = 175$
 - $\text{CPI for 2013} = (\$20) / (\$8) \times 100 = 250$

How the Consumer Price Index is calculated

- 5) Compute the inflation rate
 - **Inflation rate**: the percentage change in the price index from the preceding period
 - The formula used to calculate the inflation rate is:
 - Inflation rate = $[(\text{CPI}_{\text{year2}} - \text{CPI}_{\text{year1}}) / \text{CPI}_{\text{year1}}] \times 100\%$
 - Example:
 - Inflation rate for 2012 = $(175 - 100) / 100 \times 100\% = 75\%$
 - Inflation rate for 2013 = $(250 - 175) / 175 \times 100\% = 43\%$

EXAMPLE

basket: {4 pizzas, 10 lattes}

year	price of pizza	price of latte	cost of basket
2013	\$10	\$2.00	$\$10 \times 4 + \$2 \times 10 = \$60$
2014	\$11	\$2.50	$\$11 \times 4 + \$2.5 \times 10 = \$69$
2015	\$12	\$3.00	$\$12 \times 4 + \$3 \times 10 = \$78$

Compute CPI in each year:

Inflation rate:

$$2003: 100 \times (\$60/\$60) = 100$$

$$2004: 100 \times (\$69/\$60) = 115$$

$$2005: 100 \times (\$78/\$60) = 130$$

} 15%

} 13%

ACTIVE LEARNING 1:

Calculate the CPI

The basket contains 20 movie tickets and 10 textbooks.

The table shows their prices for 2004-2006.

	movie tickets	text-books
2004	\$10	\$50
2005	\$10	\$60
2006	\$12	\$60

The base year is 2004.
A. How much did the basket cost in 2004?

B. What is the CPI in 2005?

C. What is the inflation rate from 2005-2006?

ACTIVE LEARNING 1:

Answers

The basket contains 20 movie tickets and 10 textbooks.

A. How much did the basket cost in 2004?

$$(\$10 \times 20) + (\$50 \times 10) = \$700$$

	movie tickets	text-books
2004	\$10	\$50
2005	\$10	\$60
2006	\$12	\$60

ACTIVE LEARNING 1:

Answers

The basket contains 20 movie tickets and 10 textbooks.

	movie tickets	text-books
2004	\$10	\$50
2005	\$10	\$60
2006	\$12	\$60

B. What is the CPI in 2005?

cost of basket in 2005

$$= (\$10 \times 20) + (\$60 \times 10) = \$800$$

$$\text{CPI in 2005} = 100 \times (\$800/\$700) =$$

114.3

ACTIVE LEARNING 1:

Answers

The basket contains 20 movie tickets and 10 textbooks.

	movie tickets	text-books
2004	\$10	\$50
2005	\$10	\$60
2006	\$12	\$60

C. What is the inflation rate from 2005-2006?

cost of basket in 2006

$$= (\$12 \times 20) + (\$60 \times 10) = \$840$$

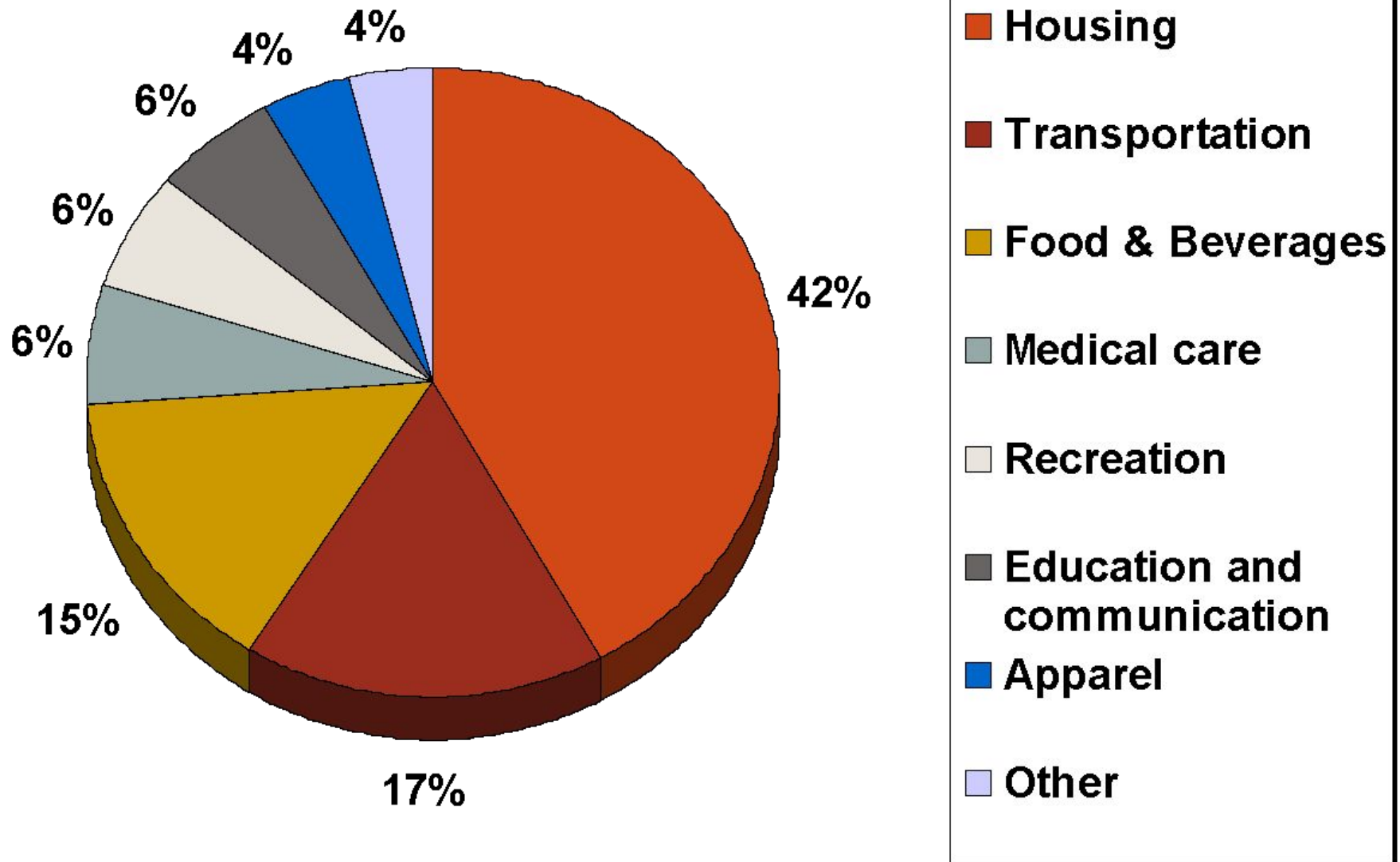
$$\text{CPI in 2006} = 100 \times (\$840/\$700) = 120$$

$$\text{Inflation rate} = (120 - 114.3)/114.3 = 5\%$$

What is in the CPI's Basket?

- Housing 41%
- Transportation 17%
- Food and Beverages 16%
- Education and Communication 6%
- Medical Care 6%
- Recreation 6%
- Apparel 4%
- Other goods and services 4%

What's in the CPI's Basket?



In the News: Shopping for the CPI

- There are approximately 300 employees of the Bureau of Labor Statistics who gather information on prices

The Producer Price Index

- **Producer Price Index** – a measure of the cost of a basket of goods and services bought by firms
- Because firms eventually pass on higher costs to consumers in the form of higher prices on products, the producer price index is believed to be helpful in predicting changes in the CPI

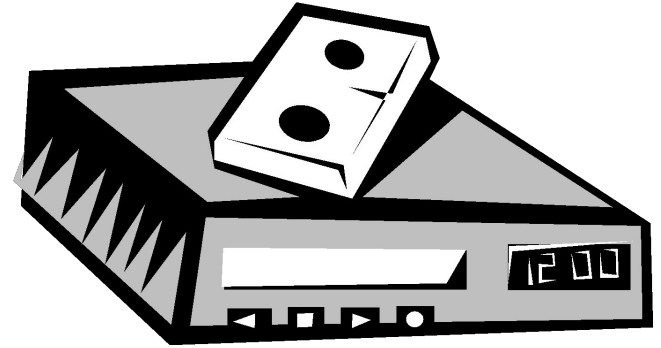
Problems in Measuring the Cost of Living

- Substitution Bias
 - When the price of one good changes, consumers often respond by substituting another good in its place
 - The CPI does not allow for this substitution; it is calculated using a fixed basket of goods and services
 - This implies that the CPI overstates the increase in the cost of living over time

Problems in Measuring the Cost of Living

● Introduction of New Goods

- When a new good is introduced, consumers have a wider variety of goods and services to choose from
- This makes every dollar more valuable, which means that there is an increase in the purchasing power of the dollar
- Because the market basket is not revised often enough, these new goods are left out



Problems in Measuring the Cost of Living

- Unmeasured Quality Change
 - If the quality of a good falls from one year to the next, the value of a dollar falls; if quality rises, the value of the dollar rises
 - Attempts are made to correct prices for changes in quality, but it is often difficult to do so because quality is hard to measure

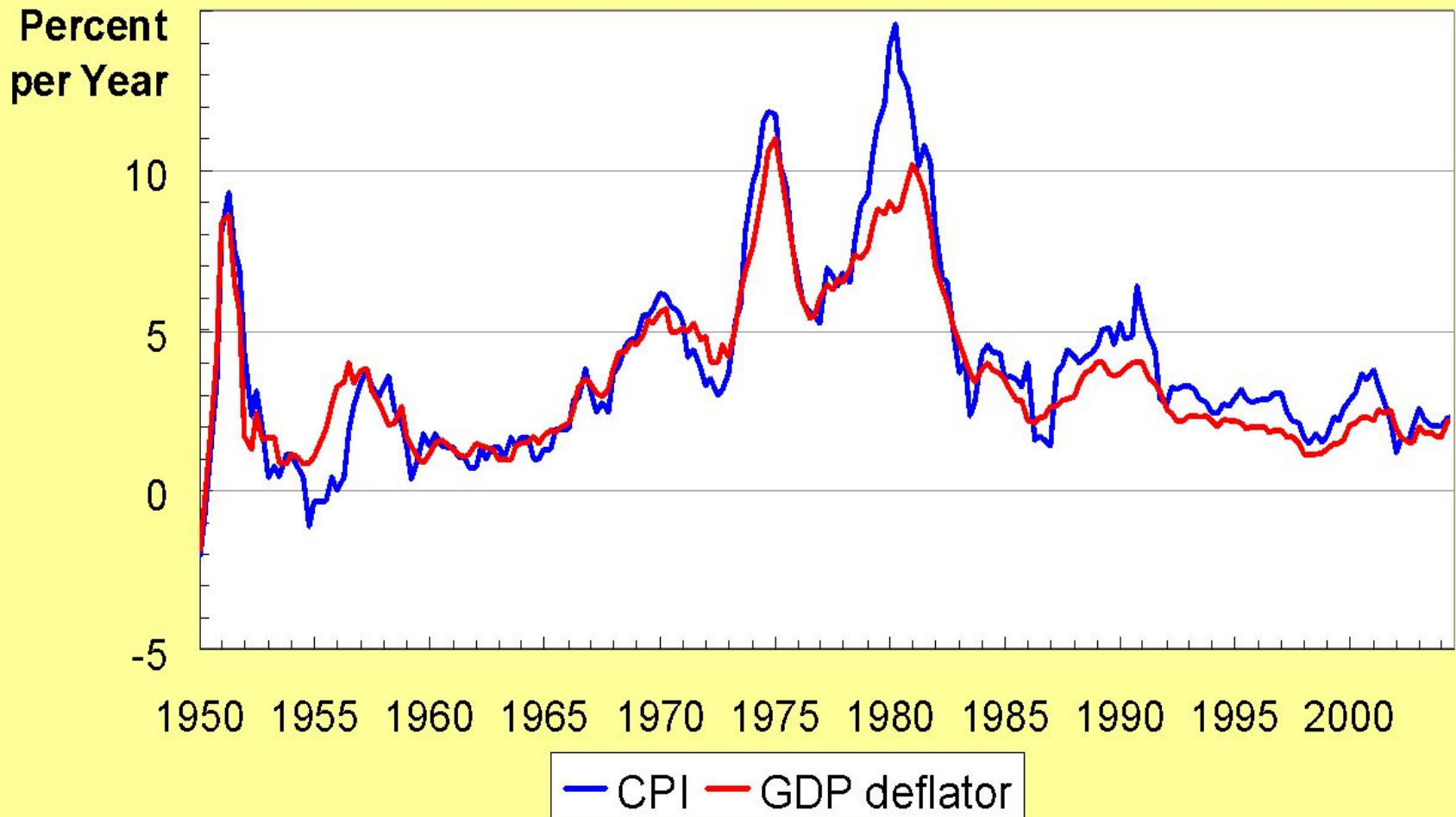
Problems in Measuring the Cost of Living

- The size of these problems is also difficult to measure
- Most studies indicate that the CPI overstates the rate of inflation by approximately 1 percentage point per year
- The issue is important because many government transfer programs (such as Social Security) are tied to increases in CPI

The GDP Deflator versus the Consumer Price Index

- The GDP Deflator reflects the prices of all goods produced domestically, while the CPI reflects the prices of all goods bought by consumers
- The CPI compares the prices of a fixed basket of goods over time, while the GDP deflator compares the prices of the goods currently produced to the prices of the goods produced in the base year. This means that the group of goods and services used to compute the GDP deflator changes automatically over time as output changes

Two Measures of Inflation



Contrasting the CPI and GDP Deflator

Imported consumer goods:

- included in CPI
- excluded from GDP deflator

Capital goods:

- excluded from CPI
- included in GDP deflator (if produced domestically)

The basket:

- CPI uses fixed basket
- GDP deflator uses basket of currently produced goods & services

This matters if different prices are changing by different amounts.

ACTIVE LEARNING 2:

CPI vs. GDP deflator

In each scenario, determine the effects on the CPI and the GDP deflator.

- A.** Starbucks raises the price of Frappuccinos.
- B.** Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.
- C.** Armani raises the price of the Italian jeans it sells in the U.S.

ACTIVE LEARNING 2:

Answers

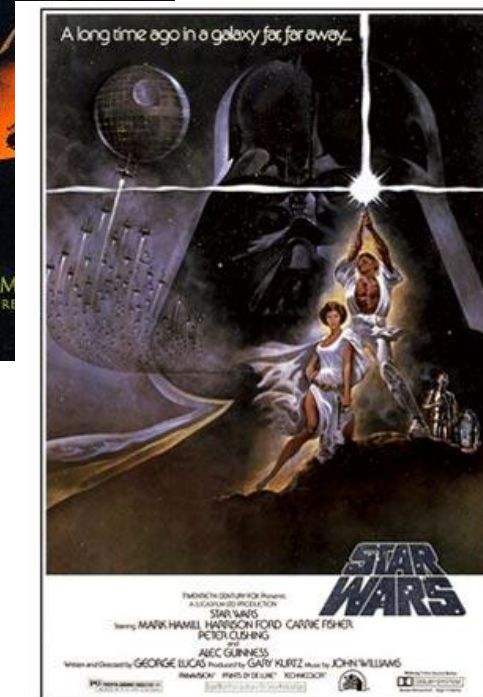
- A.** Starbucks raises the price of Frappuccinos.
The CPI and GDP deflator both rise.
- B.** Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.
The GDP deflator rises, the CPI does not.
- C.** Armani raises the price of the Italian jeans it sells in the U.S.
The CPI rises, the GDP deflator does not.

Correcting Economic Variables for the Effects of Inflation

- Inflation makes it harder to compare dollar amounts from different times.
- We can use the CPI to adjust figures so that they can be compared.
- Dollar Figures from Different Times
 - To change dollar values from one year to the next, we can use this formula:
 - Value in Year 2 dollars = value in year 1 dollars x (price level in year 2/price level in year 1)
 - Example: Babe Ruth's 1931 salary in 1999 dollars:
 - Salary in 1931 = \$80,000; CPI in 1931 = 15.2; CPI in 2001 = 177
 - Salary in 2001 dollars = \$80,000 x (177/15.2)
 - Salary in 2001 dollars = \$931,579

Mr. Index Goes to Hollywood

- Reports of box office success are often made in terms of the dollar values of ticket sales
- These ticket sales are then compared with ticket sales of movies in the past
- However, no correction for changes in the



The Most Popular Movies of All Time, Inflation Adjusted

Film	Year of Release	Total Domestic Gross (millions 2001 dollars)
Gone with the Wind	1939	\$1,002
Star Wars	1977	866
The Sound of Music	1965	695
E.T.	1982	687
Titanic	1997	640
The Ten Commandments	1956	639
Jaws	1975	625
Doctor Zhivago	1965	591
The Jungle Book	1967	519
Snow White and the Seven Dwarfs	1937	518

ACTIVE LEARNING 3:

Exercise

1980: CPI = 90,

avg starting salary for econ majors = \$24,000

Today: CPI = 180,

avg starting salary for econ majors = \$50,000

Are econ majors better off today or in 1980?

ACTIVE LEARNING 3:

Answers

1980: CPI = 90,
avg starting salary for econ majors = \$24,000

Today: CPI = 180,
avg starting salary for econ majors = \$50,000

Solution

Convert 1980 salary into “today’s dollars”

$$\$24,000 \times (180/90) = \$48,000.$$

After adjusting for inflation, salary is higher today than in 1980.

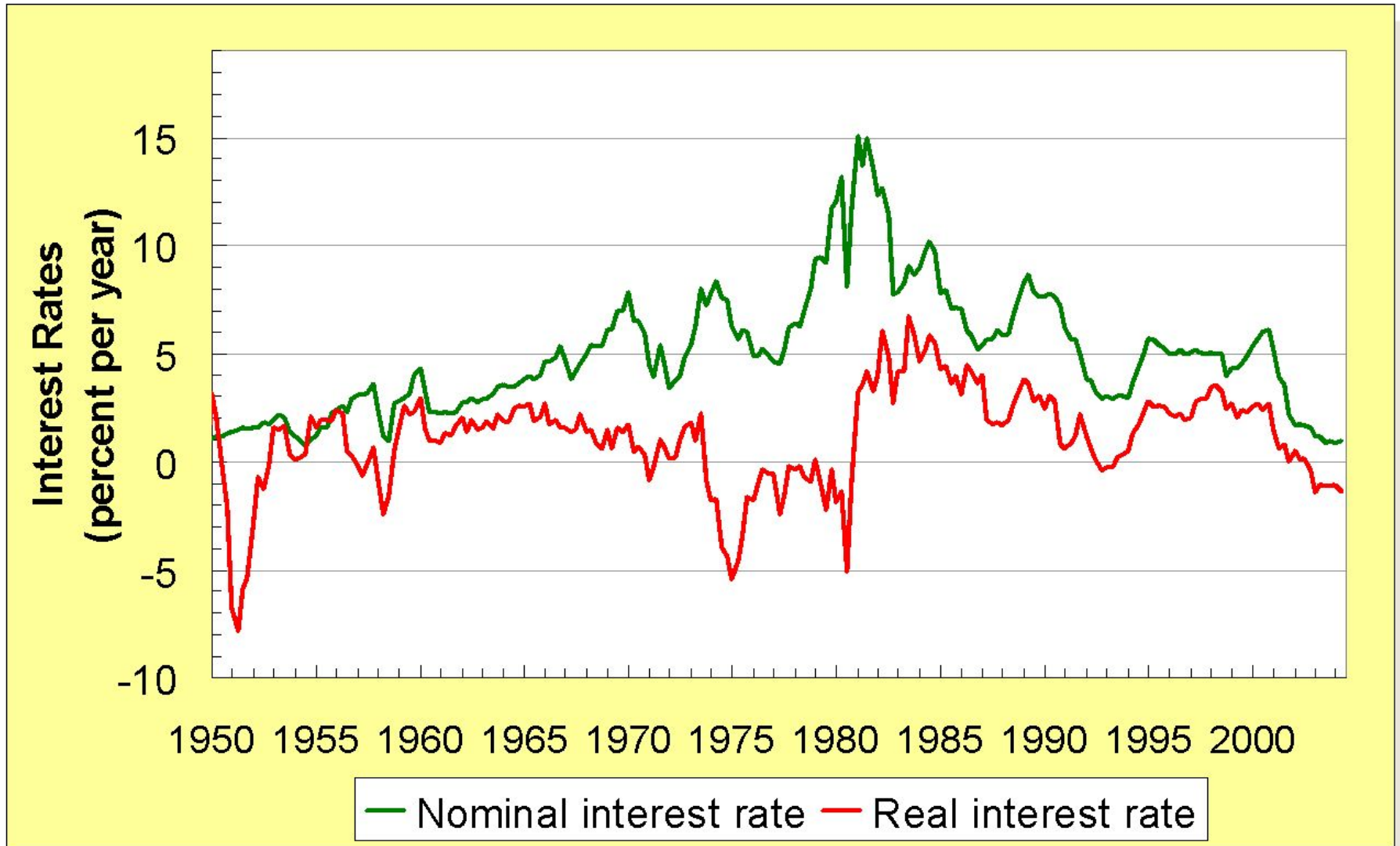
Indexation

- **Indexation** – the automatic correction of a dollar amount for the effects of inflation by law or contract.
- As mentioned above, many government transfer programs use indexation for the benefits. The government also indexes the tax brackets used for federal income tax.
- There are uses of indexation in the private sector as well. Many labor contracts include Cost-of-Living Allowances (COLAs).

Real And Nominal Interest Rates

- **Nominal interest rate** – the interest rate as usually reported without a correction for the effects of inflation.
- **Real interest rate** – the interest rate corrected for the effects of inflation.
- Equation: Real interest rate = nominal interest rate – inflation rate

Real and Nominal Interest Rates in the U.S.



Nominal and Real Interest Rate

- Suppose a student has \$100 in his savings account earning 3 percent interest. What is the real interest rate if prices rise 3 percent during the year?
- Real interest rate = nominal interest rate – inflation rate
- Real interest rate = $3 - 3 = 0$
- What if the inflation rate was 5 percent?
- Real interest rate = $3 - 5 = -2$
- What if the inflation rate was 1 percent?
- Real interest rate = $3 - 1 = 2$

Inflation / Money Illusion

- If all prices, wages, salaries, rents, and so forth increase by the same percentage, the real effects of inflation might be minimal.
- For example, suppose Ted's salary is \$10 per day and he uses it to buy a pizza for \$6 and two mochas for \$2 each. With inflation at the rate of 100 percent per day, all prices and salaries are doubled by the next day. Ted earns \$20, pizzas cost \$12 and mochas cost \$4. In economic terms, Ted's nominal salary (the actual number of dollars) has increased, but his real salary (the purchasing power of the dollars) has remained the same.
- There should be no real effect because Ted can still purchase exactly what he did before with his salary – one pizza and two mochas.
- If Ted notes the increase in his salary but does not