

# chapter:

# 7

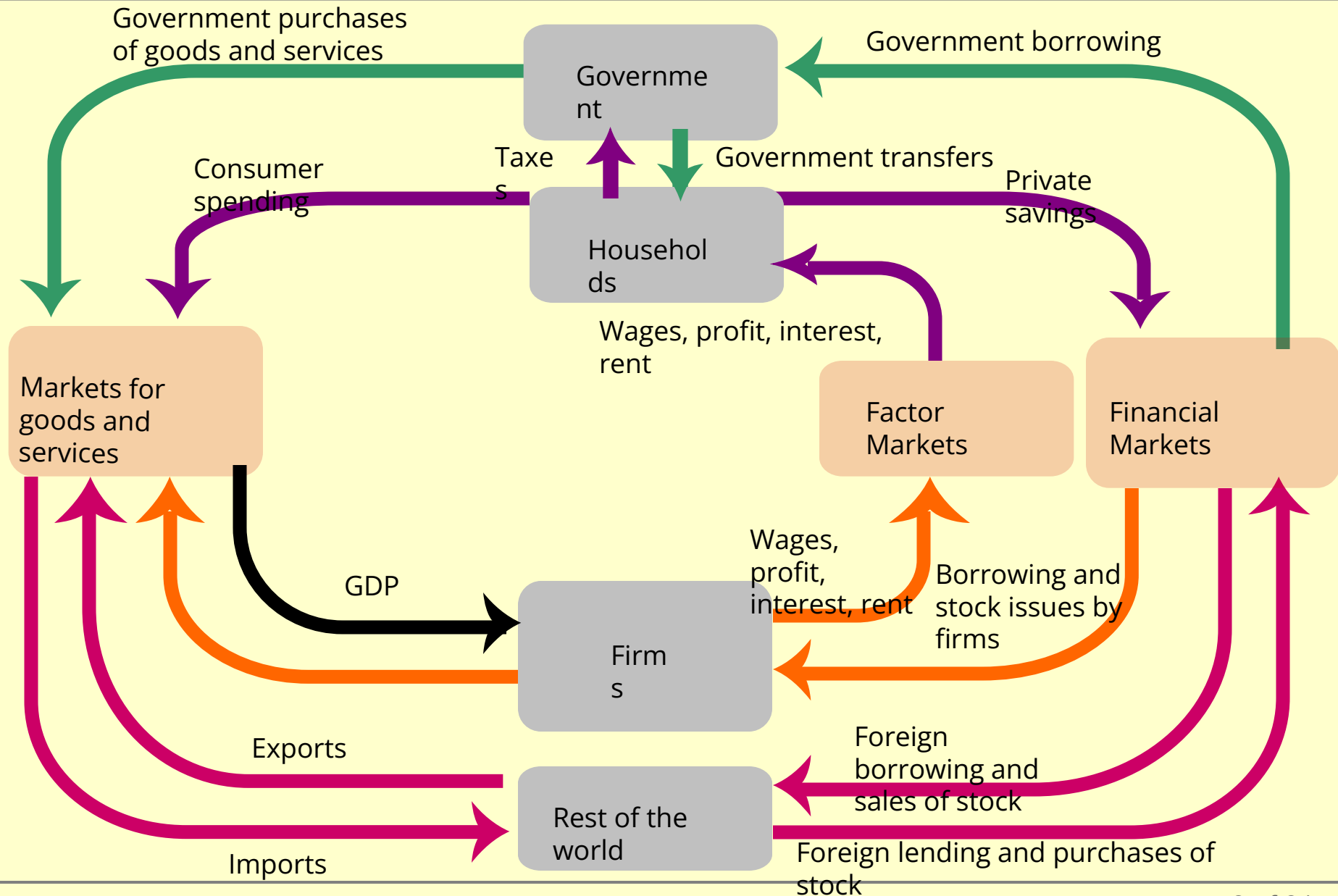
## >> **Tracking the Macroeconomy**

**Krugman/Wells**

# WHAT YOU WILL LEARN IN THIS CHAPTER

- How economists use aggregate measures to track the performance of the economy.
- What **gross domestic product** , or **GDP**, is and the three ways of calculating it.
- The difference between **real GDP** and **nominal GDP** and why real GDP is the appropriate measure of real economic activity.
- What a **price index** is and how it is used to calculate the **inflation rate**.

# An Expanded Circular-Flow Diagram



# The National Accounts

- Almost all countries calculate a set of numbers known as the ***national income and product accounts***.
- The national income and product accounts, or national accounts, keep track of the flows of money between different parts of the economy.

# The National Accounts

- Households earn income via the factor markets from **wages**, interest on **bonds**, **dividends** on **stocks**, and **rent** on land.
- A **stock** is a share in the ownership of a company held by a shareholder.
- A **bond** is borrowing in the form of an IOU that pays interest.
- In addition, households receive **government transfers** from the government.
- **Disposable income**, total household income minus taxes, is available to spend on consumption or to save.

# The National Accounts

- **Private savings**, equal to disposable income minus consumer spending, is disposable income that is not spent on consumption.
- The banking, stock, and bond markets, which channel private savings and foreign lending into investment spending, government borrowing, and foreign borrowing, are known as the **financial markets**.

# The National Accounts

- ***Government purchases of goods and services*** (G) is paid for by tax receipts as well as by ***government borrowing***.
- ***Exports*** (X) generate an inflow of funds into the country from the rest of the world, while ***imports*** (IM) lead to an outflow of funds to the rest of the world.

# The National Accounts

- Inventories are stocks of goods and raw materials held to facilitate business operations.
- Investment spending is spending on productive physical capital, such as machinery and construction of structures, and on changes to inventories.
- Final goods and services are goods and services sold to the final, or end, user.
- Intermediate goods and services are goods and services—bought from one firm by another firm—that are inputs for production of final goods and services.

# Gross Domestic Product

- **Gross domestic product** or **GDP** measures the total value of all *final goods and services* produced in the economy during a given year. It does not include the value of *intermediate goods*.
- **Aggregate spending**, the sum of consumer spending, investment spending government purchases of goods and services, and exports minus imports, is the total spending on domestically produced final goods and services in the economy.

# Calculating Gross Domestic Product

- GDP can be calculated three ways:
  - Add up the ***value added*** of all producers
  - Add up all spending on domestically-produced final goods and services. This results in the equation: **GDP = C + I + G + X - IM**
  - Add up all income paid to factors of production

# Calculating Gross Domestic Product

*Total spending on domestically produced final goods and services = \$21,500*

|  | American Ore, Inc. | American Steel, Inc. | American Motors, Inc. | Total factor income |
|--|--------------------|----------------------|-----------------------|---------------------|
| <b>Value of sales</b>                              | \$4,200 (ore)      | \$9,000 (steel)      | \$21,500 (car)        |                     |
| <b>Intermediate goods</b>                          | 0                  | 4,200 (iron ore)     | 9,000 (steel)         |                     |
| <b>Wages</b>                                       | 2,000              | 3,700                | 10,000                | \$15,700            |
| <b>Interest payments</b>                           | 1,000              | 600                  | 1,000                 | 2,600               |
| <b>Rent</b>  | 200                | 300                  | 500                   | 1,000               |
| <b>Profit</b>                                      | 1,000              | 200                  | 1,000                 | 2,200               |
| <b>Total expenditure by firm</b>                   | 4,200              | 9,000                | 21,500                |                     |
| <b>Value added per firm</b>                        | 4,200              | 4,800                | 12,500                |                     |
| <b>=</b>   |                    |                      |                       |                     |
| <b>Value of sales – cost of intermediate goods</b> |                    |                      |                       |                     |

*Total payments to factors = \$21,500*

*Sum of value added = \$21,500*

## Our Imputed Lives

- Some economists have produced alternative measures that try to “impute” the value of household. But the standard measure of GDP doesn’t contain that imputation.
- GDP estimates do, however, include an imputation for the value of “owner-occupied housing.” If you buy the home you were formerly renting, GDP does not go down. Statisticians make an estimate of what you would have paid if you rented whatever you live in, whether it’s an apartment or a house.
- To be accurate, estimates of GDP must take into account the value of housing that is occupied by owners as well as the value of rental housing.

## GDP: What's In and What's Out

### ***Included***

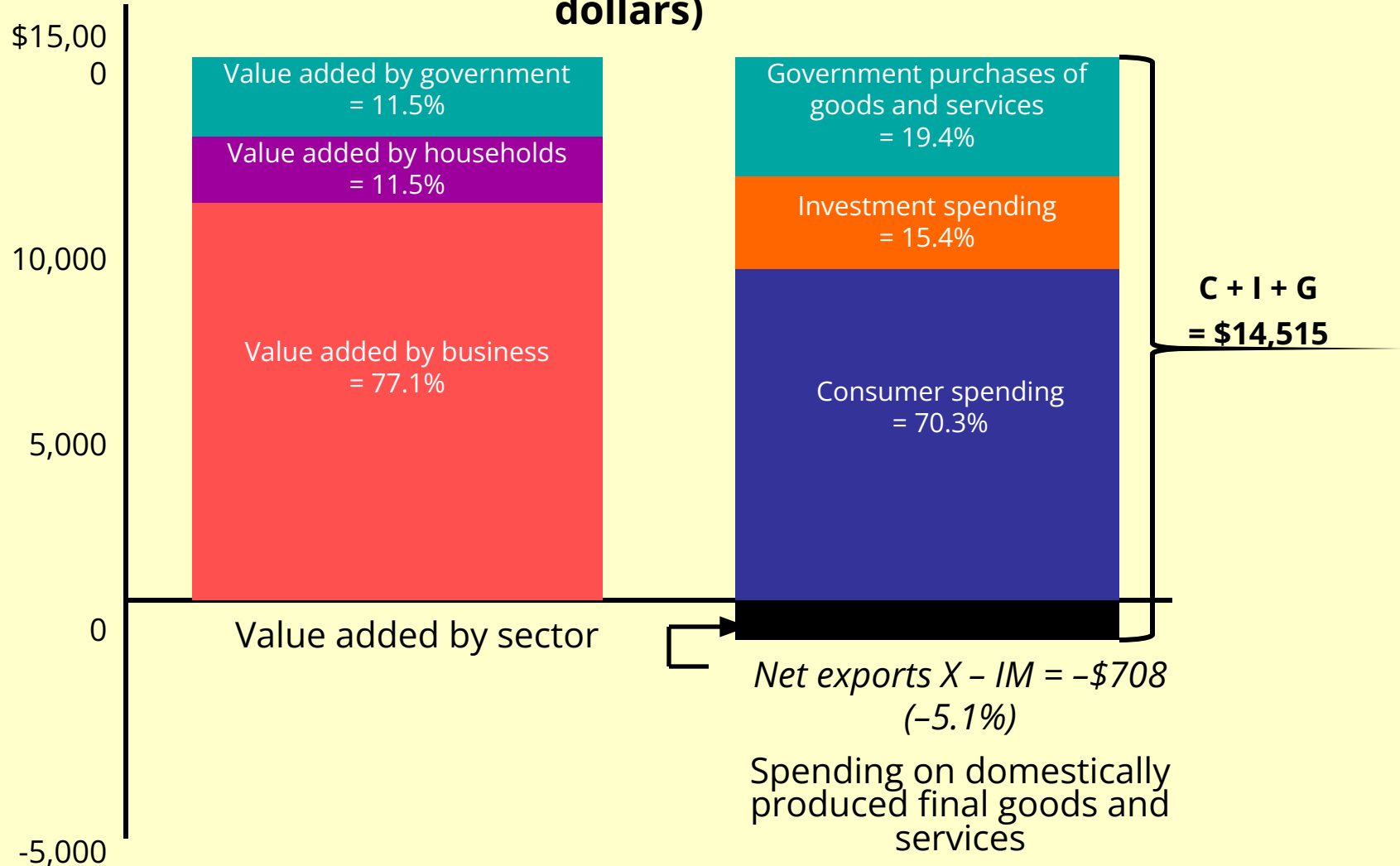
- domestically produced final goods and services (including capital goods)
- new construction of structures
- changes to inventories

### ***Not Included***

- intermediate goods and services
- inputs
- used goods
- financial assets like stocks and bonds
- foreign-produced goods and services

# Calculating Gross Domestic Product

**Components of GDP (billions of dollars)**



## **Creating the National Accounts**

- The national accounts owe their creation to the Great Depression. All government officials had were scattered statistics: railroad freight car loadings, stock prices, and incomplete indexes of industrial production.
- Simon Kuznets developed a set of national income accounts. The first version of these accounts was presented to Congress in 1937 and in a research report titled *National Income*.
- The push to complete the national accounts came during World War II, when policy makers were in even more need of comprehensive measures of the economy's performance. The federal government began issuing estimates of gross domestic product and gross national product in 1942.

# Real vs. Nominal GDP

- ***Real GDP*** is the total value of the final goods and services produced in the economy during a given year, calculated using the prices of a selected base year.
- ***Nominal GDP*** is the value of all final goods and services produced in the economy during a given year, calculated using the prices current in the year in which the output is produced.

# Real vs. Nominal GDP

- Except in the base year, real GDP is not the same as ***nominal GDP***, output valued at current prices.
- ***Chained dollars*** is the method of calculating changes in real GDP using the average between the growth rate calculated using an early base year and the growth rate calculated using a late base year.
- ***GDP per capita*** is a measure of average GDP per person, but is not by itself an appropriate policy goal.

# Real vs. Nominal GDP

## Calculating GDP and Real GDP in a Simple Economy

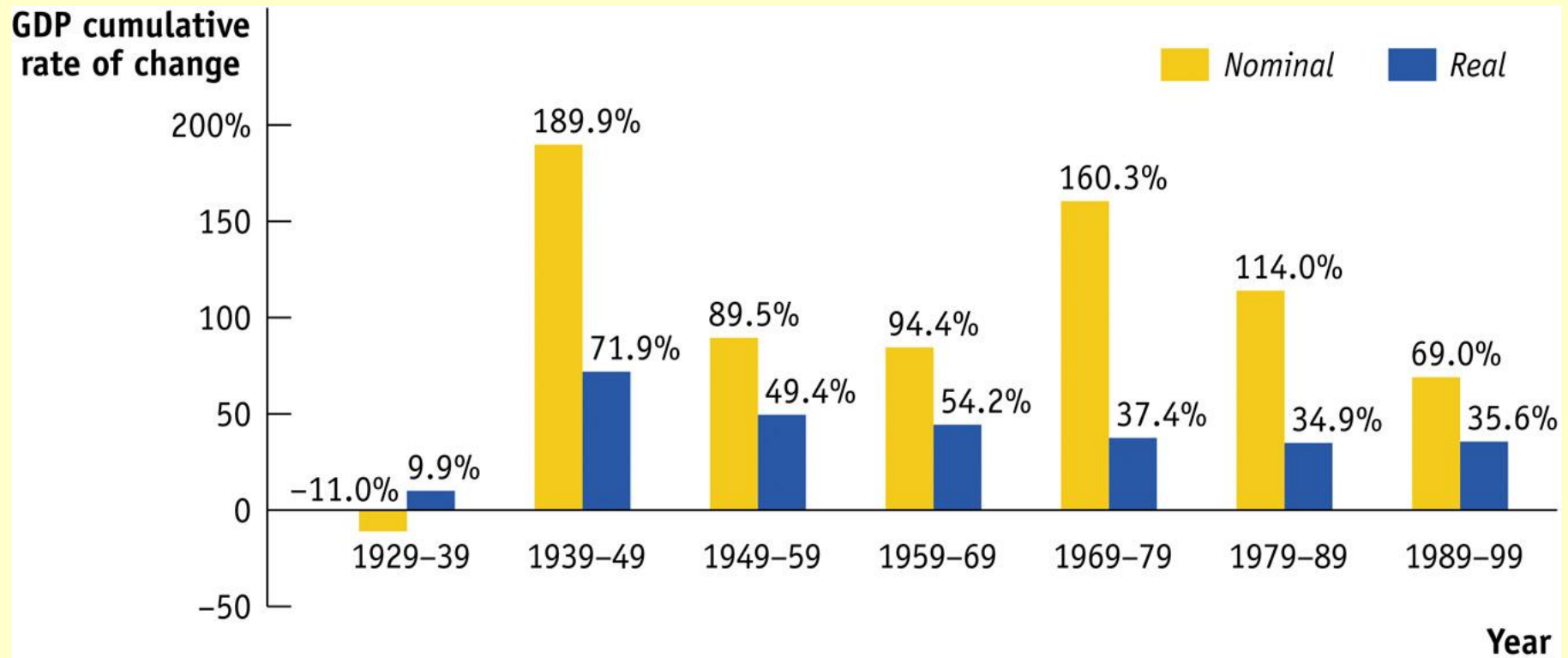
|                                       | Year 1  | Year 2  |
|---------------------------------------|---------|---------|
| Quantity of apples (billions)         | 2,000   | 2,200   |
| Price of apple                        | \$0.25  | \$0.30  |
| Quantity of oranges (billions)        | 1,000   | 1,200   |
| Price of orange                       | \$0.50  | \$0.70  |
| GDP (billions of dollars)             | 1,000   | 1,500   |
| Real GDP (billions of year 1 dollars) | \$1,000 | \$1,150 |

# Real vs. Nominal GDP

## Nominal versus Real GDP in 1993, 2000, and 2007

|      | Nominal GDP (billions<br>of current dollars) | Real GDP (billions of 2000<br>dollars) |
|------|--|--|
| 1993 | \$6,657                                      | \$7,533                                |
| 2000 | 9,817  | 9,817                                  |
| 2007 | 13,808                                       | 11,524                                 |

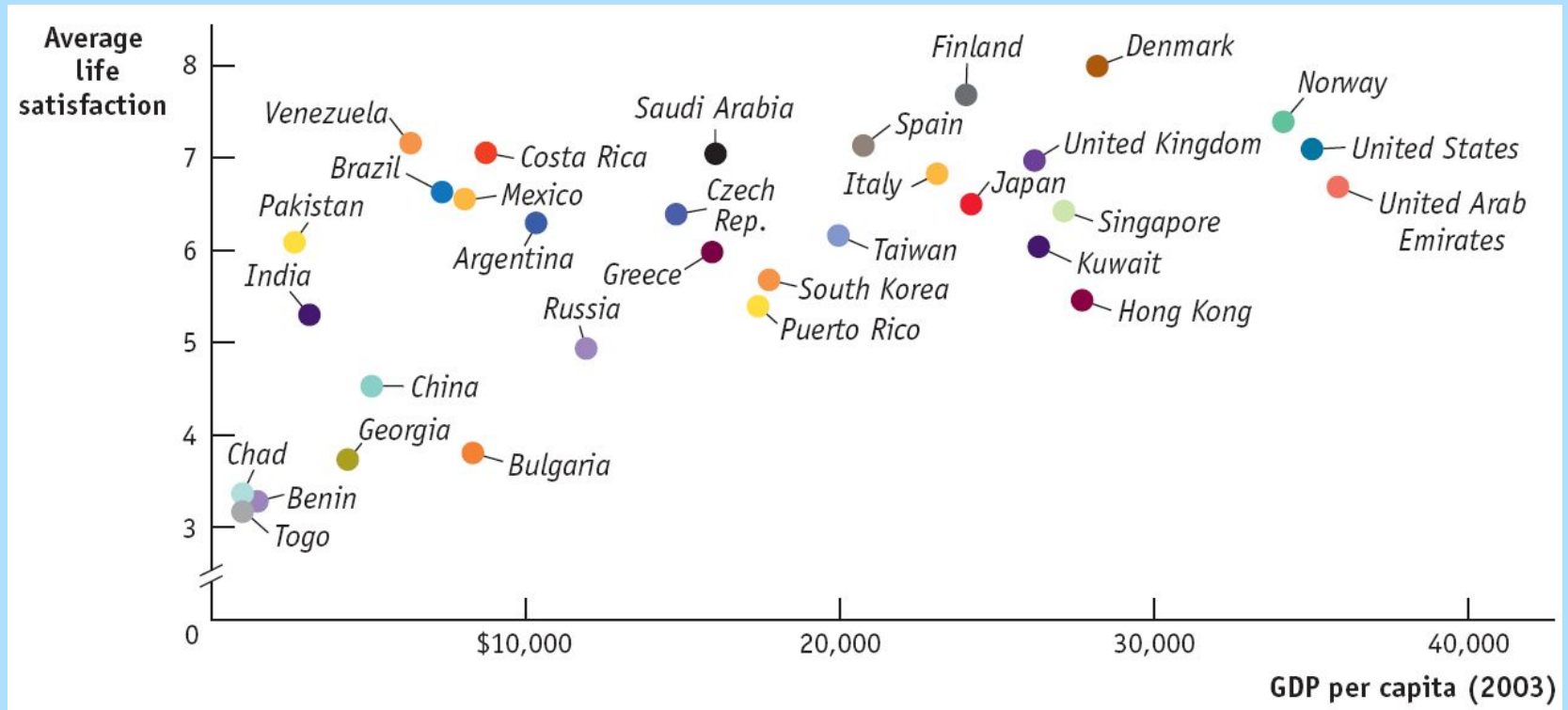
# Real vs. Nominal GDP



# GLOBAL COMPARISON

## GDP and the meaning of life

- Rich is better
- Money matters less as you grow richer
- Money isn't everything

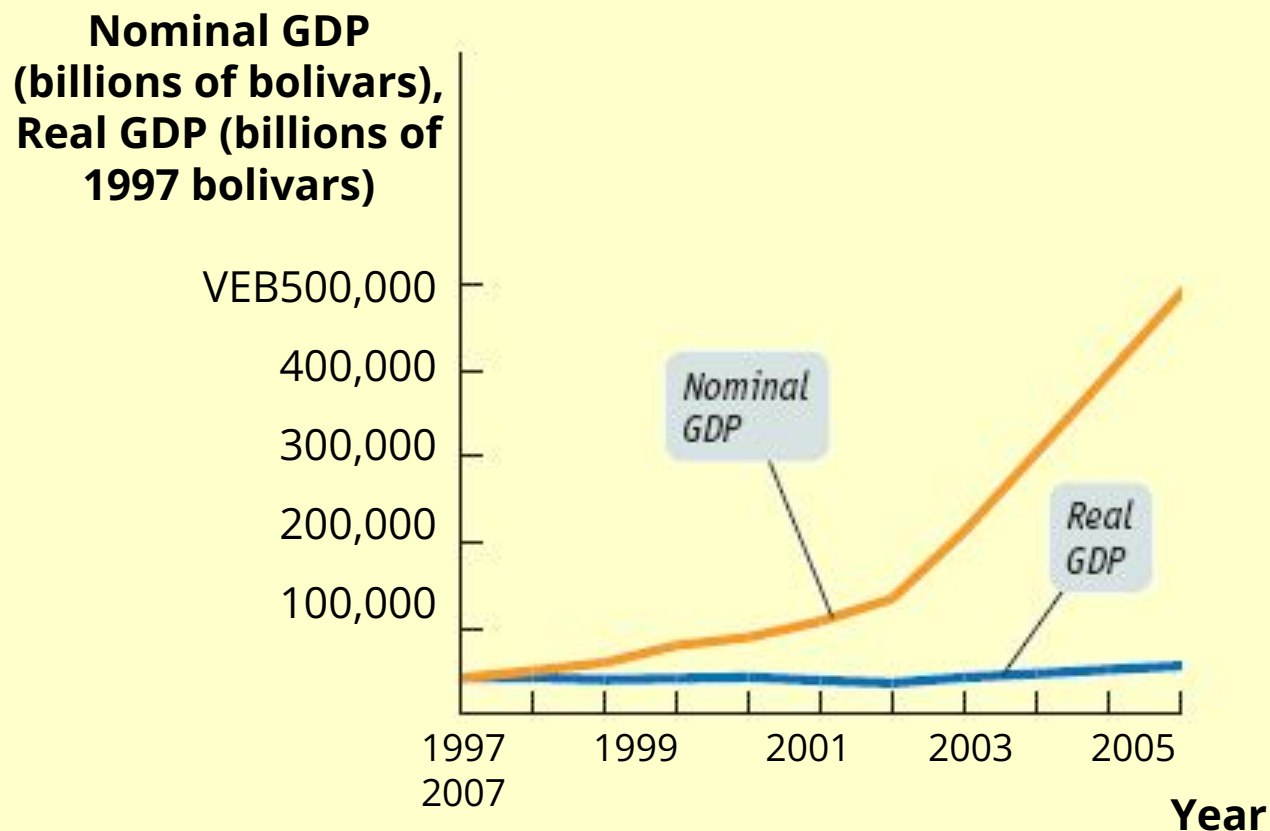


## **Miracle in Venezuela?**

- The South American nation of Venezuela has a distinction that may surprise you: in recent years, it has had one of the world's fastest-growing nominal GDPs. Between 1997 and 2007, Venezuelan nominal GDP grew by an average of 28% each year—much faster than nominal GDP in the United States or even in booming economies like China.
- So is Venezuela experiencing an economic miracle?

## Miracle in Venezuela?

- No, it's just suffering from unusually high inflation.



# Price Indexes and the Aggregate Price Level

- The **aggregate price level** is a measure of the overall level of prices in the economy.
- To measure the aggregate price level, economists calculate the cost of purchasing a **market basket**.
- A **price index** is the ratio of the current cost of that market basket to the cost in a base year, multiplied by 100.

$$\text{Price index in a given year} = \frac{(\text{Cost of market basket in a given year})}{(\text{Cost of market basket in base year})} \times 100$$

# Market Baskets and Price Indexes

## Calculating GDP and Real GDP in a Simple Economy

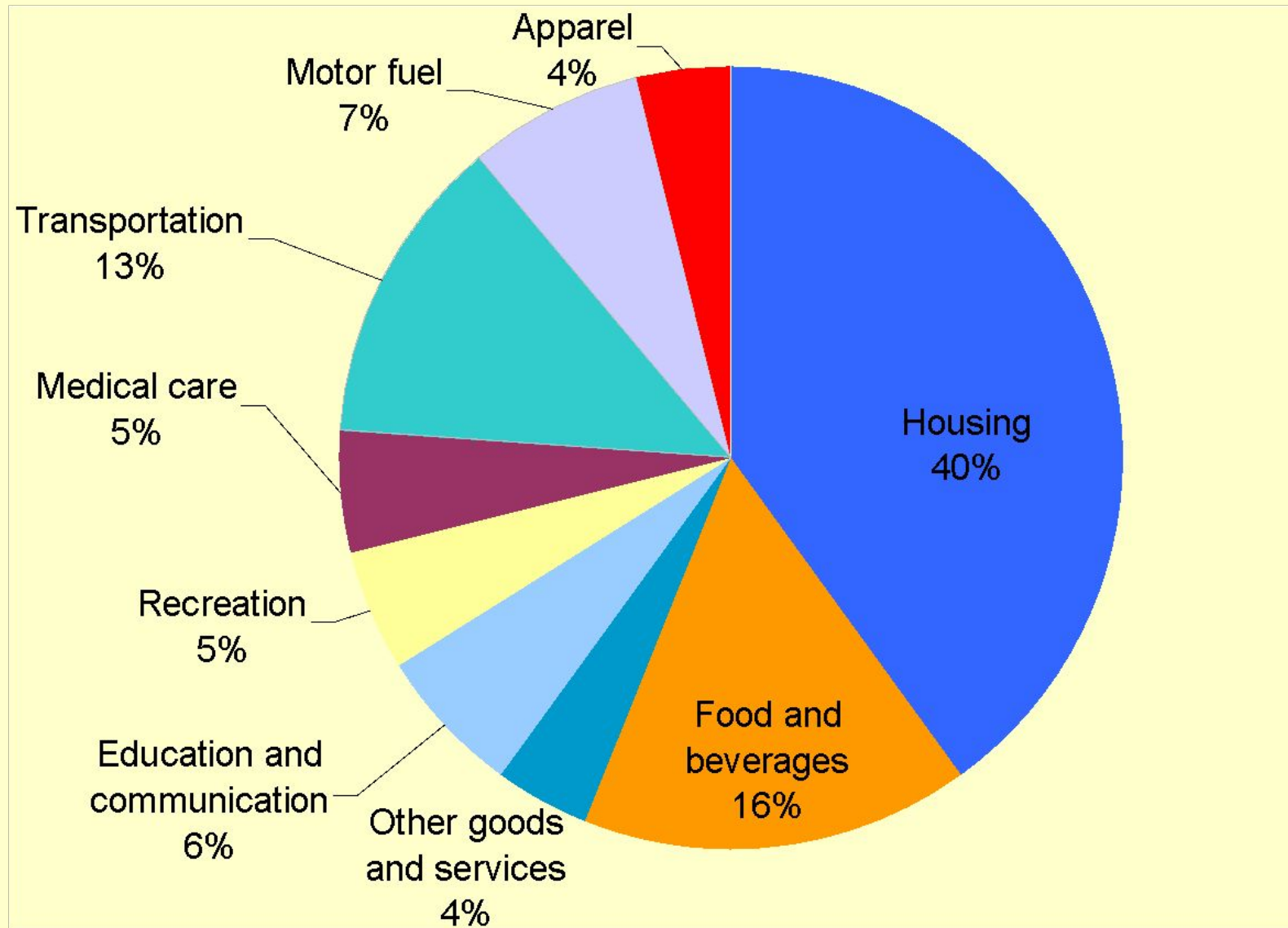
|  | Pre-frost  | Post-frost  |
|--|--|---|
| Price of orange  | \$0.20   | \$0.40  |
| Price of grapefruit  | 0.60   | 1.00  |
| Price of lemon   | 0.25   | 0.45  |
| Cost of market basket<br>(200 oranges, 50 grapefruit,<br>100 lemons) | $(200 \times \$0.20) +$<br>$(50 \times \$0.60) +$<br>$(100 \times \$0.25) = \$95.00$ | $(200 \times \$0.40) +$<br>$(50 \times \$1.00) +$<br>$(100 \times \$0.45) = \$175.00$ |

# Inflation Rate, CPI, and other Indexes

- The ***inflation rate*** is the yearly percentage change in a price index, typically based upon ***Consumer Price Index***, or ***CPI***, the most common measure of the aggregate price level.
- The ***consumer price index***, or ***CPI***, measures the cost of the market basket of a typical urban American family.

$$\text{Inflation rate} = \frac{(\text{Price index in year 2} - \text{Price index in year 1})}{(\text{Price index in year 1})} \times 100$$

# Consumer Price Index



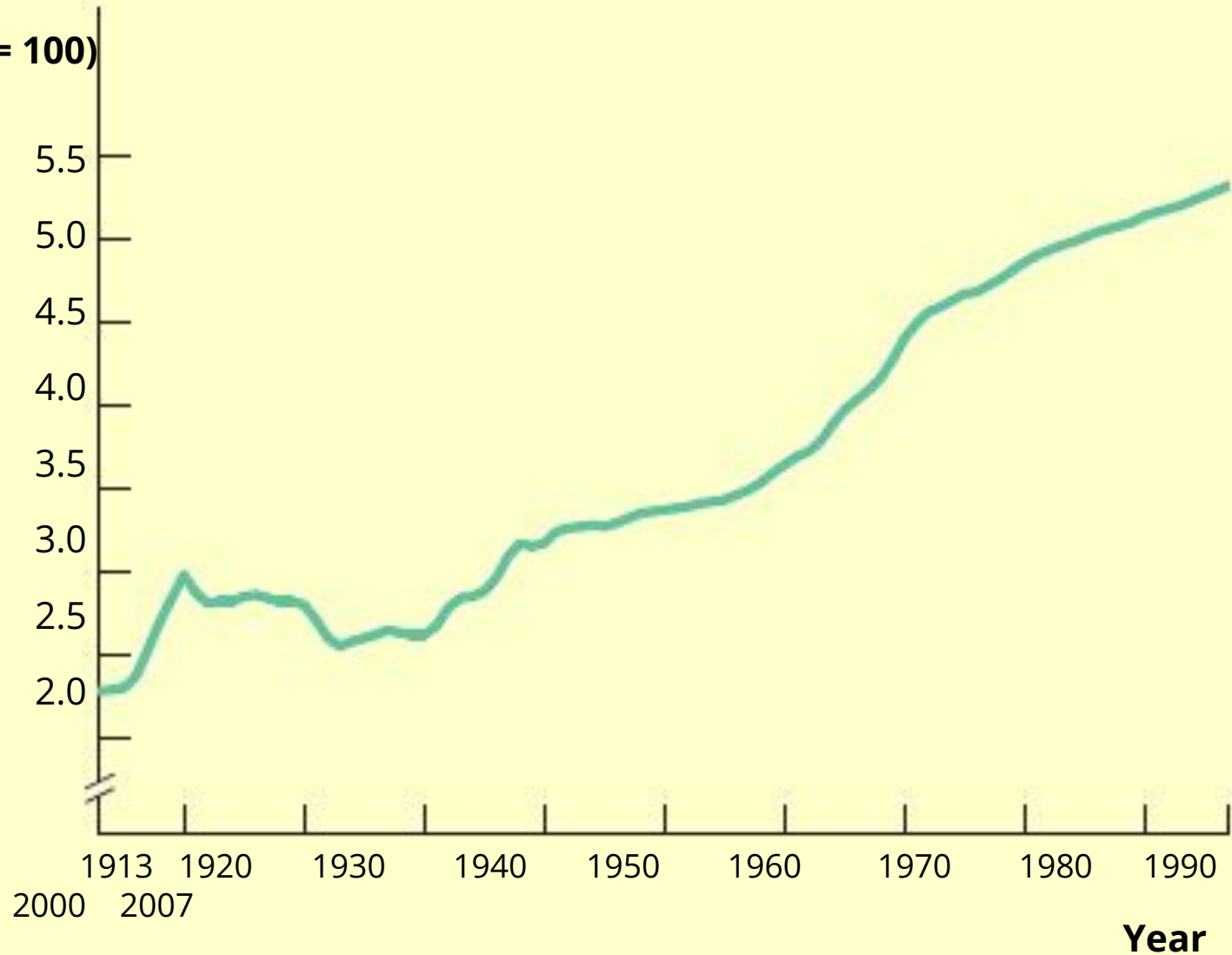
### Is the CPI biased?

- The U.S. government takes considerable care in measuring consumer prices. Nonetheless, many economists believe that the consumer price index systematically **overstates** the actual rate of inflation.
- One reason is the fact that the CPI measures the cost of buying a given market basket. Yet, consumers typically alter the mix of goods and services they buy, reducing purchases of products that have become relatively more expensive and increasing purchases of products that have become relatively cheaper.
- The second reason arises from innovation. By widening the range of consumer choice, innovation makes a given amount of money worth more.

# Consumer Price Index

Log CPI

(1982 - 1984 = 100)

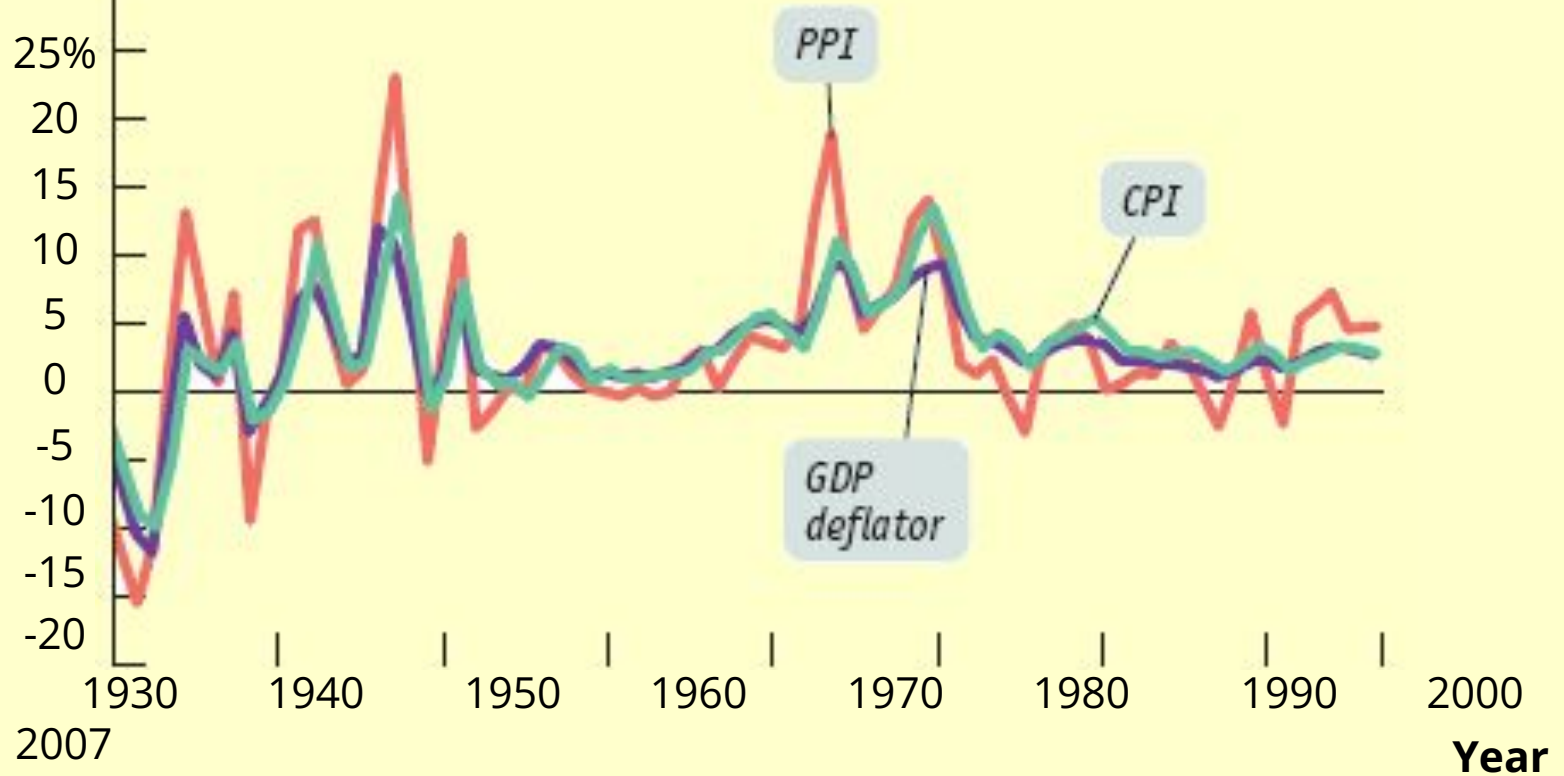


# Other Price Measures

- A similar index to CPI for goods purchased by firms is the ***producer price index***.
- Economists also use the ***GDP deflator***, which measures the price level by calculating the ratio of nominal to real GDP.
- The *GDP deflator* for a given year is 100 times the ratio of nominal GDP to real GDP in that year.

# The CPI, the PPI, and the GDP Deflator

Percent change  
in CPI, PPI, GDP  
deflator



## **Indexing to the CPI**

- The CPI has a direct and immediate impact on millions of Americans. The reason is that many payments are tied, or “indexed,” to the CPI—the amount paid rises or falls when the CPI rises or falls.
- Today, 48 million people receive checks from Social Security. The amount of an individual’s check is determined by a formula that reflects his or her previous payments into the system as well as other factors. In addition, all Social Security payments are adjusted each year to offset any increase in consumer prices over the previous year. The CPI is used to calculate the official estimate of the inflation rate used to adjust these payments yearly.

1. Economists keep track of the flows of money between sectors with the **national income and product accounts**, or **national accounts**. Households earn income via the factor markets from wages. **Disposable income** is allocated to **consumer spending** ( $C$ ) and **private savings**. Via the **financial markets**, private savings and foreign lending are channeled to **investment spending** ( $I$ ), government borrowing, and foreign borrowing. **Government purchases of goods and services** ( $G$ ) are paid for by tax revenues and any **government borrowing**. **Exports** ( $X$ ) generate an inflow of funds into the country from the rest of the world, but **imports** ( $IM$ ) lead to an outflow of funds to the rest of the world.

2. **Gross domestic product, or GDP**, measures the value of all **final goods and services** produced in the economy. It does not include the value of **intermediate goods and services**, but it does include **inventories** and **net exports** ( $X - IM$ ). It can be calculated in three ways: add up the **value added** by all producers; add up all spending on domestically produced final goods and services ( $GDP = C + I + G + X - IM$ ); or add up all the income paid by domestic firms to factors of production. These three methods are equivalent.

3. **Real GDP** is the value of the final goods and services produced calculated using the prices of a selected base year. Except in the base year, real GDP is not the same as **nominal GDP**, the value of **aggregate output** calculated using current prices. Analysis of the growth rate of aggregate output must use real GDP. Real **GDP per capita** is a measure of average aggregate output per person but is not in itself an appropriate policy goal. U.S. statistics on real GDP are always expressed in **chained dollars**.

4. To measure the **aggregate price level**, economists calculate the cost of purchasing a **market basket**. A **price index** is the ratio of the current cost of that market basket to the cost in a selected base year, multiplied by 100.
5. The **inflation rate** is the yearly percent change in a price index, typically based on the **consumer price index**, or **CPI**, the most common measure of the aggregate price level. A similar index for goods and services purchased by firms is the **producer price index**, or **PPI**. Finally, economists also use the **GDP deflator**, which measures the price level by calculating the ratio of nominal to real GDP times 100.

# The End of Chapter 7

coming attraction:

## **Chapter 8: Unemployment and Inflation**