

N. GREGORY

MANKIW

PRINCIPLES OF

# ECONOMICS

*Eight Edition*



CHAPTER

23

## Measuring a Nation's Income

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# Economics

- **Microeconomics**
  - Study of how households and firms
    - Make decisions
    - Interact in markets
- **Macroeconomics**
  - Study of economy-wide phenomena
    - Including inflation, unemployment, and economic growth



# Economy's Income & Expenditure, Part 1

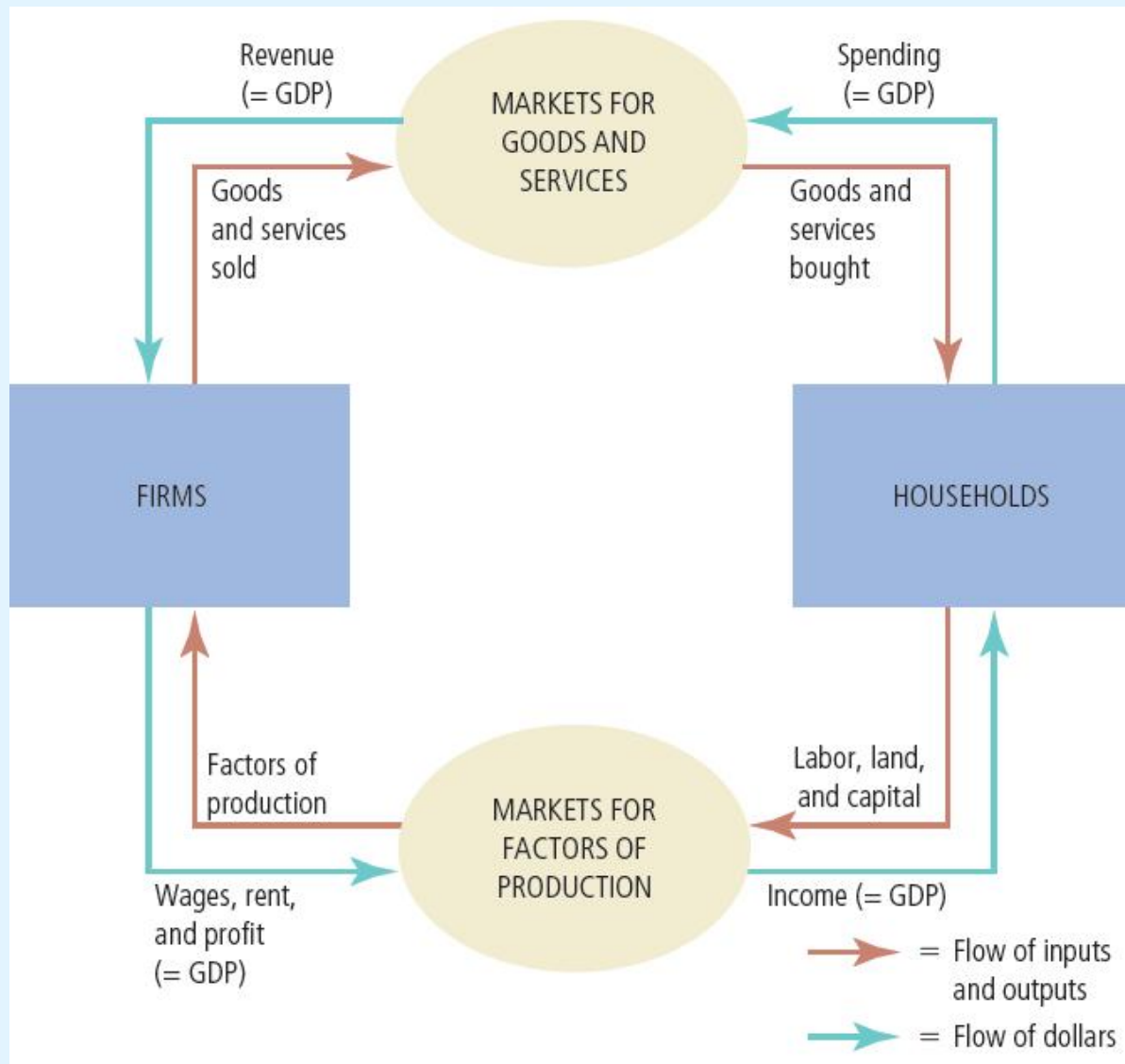
- Gross Domestic Product (GDP)
  - Measures the total income of everyone in the economy
  - Measures the total expenditure on the economy's output of goods and services
- For an economy as a whole
  - Income must equal expenditure



# Economy's Income & Expenditure, Part 2

- Circular-flow diagram – assumptions:
  - Markets
    - Goods and services
    - Factors of production
  - Households
    - Spend all of their income
    - Buy all goods and services
  - Firms
    - Pay wages, rent, profit to resource owners

# Figure 1 The Circular-Flow Diagram



Households buy goods and services from firms, and firms use their revenue from sales to pay wages to workers, rent to landowners, and profit to firm owners. GDP equals the total amount spent by households in the market for goods and services. It also equals the total wages, rent, and profit paid by firms in the markets for the factors of production.





# The Measurement of GDP, Part 1

- Gross domestic product (GDP)
  - Market value of all final goods and services
  - Produced within a country
  - In a given period of time
- “GDP is the market value...”
  - Market prices – reflect the value of the goods



# The Measurement of GDP, Part 2

- “... of all...”
  - All items produced in the economy
    - And sold legally in markets
  - Excludes most items
    - Produced and sold illicitly
    - Produced and consumed at home



# The Measurement of GDP, Part 3

- “... final...”
  - Value of intermediate goods is already included in the prices of the final goods
- “... goods and services...”
  - Tangible goods & intangible services
- “... produced...”
  - Goods and services currently produced





# The Measurement of GDP, Part 4

- “... within a country...”
  - Goods and services produced domestically
    - Regardless of the nationality of the producer
- “... in a given period of time”
  - A year or a quarter



# The Components of GDP, Part 1

- Identity:  $Y = C + I + G + NX$ 
  - $Y = \text{GDP}$
  - $C = \text{consumption}$
  - $I = \text{investment}$
  - $G = \text{government purchases}$
  - $NX = \text{net exports}$



# The Components of GDP, Part 2

- Consumption, C
  - Spending by households on goods and services
    - Goods: durable goods, nondurable goods
    - Services: intangibles, spending on education
  - Exception: purchases of new housing



# The Components of GDP, Part 3

- Investment, I
  - Purchase of (capital) goods that will be used to produce other goods and services in the future
    - Business capital: business structures, equipment, and intellectual property products
    - Residential capital: landlord's apartment building; a homeowner's personal residence
    - Inventory accumulation



# The Components of GDP, Part 4

- Government purchases, G
  - Government consumption expenditure and gross investment
  - Spending on goods and services
  - By local, state, and federal governments
  - Does not include transfer payments



# The Components of GDP, Part 5

- Net exports,  $NX = \text{Exports} - \text{Imports}$ 
  - Exports
    - Spending on domestically produced goods by foreigners
  - Imports
    - Spending on foreign goods by domestic residents



# The components of U.S. GDP

2015, GDP of the U.S.: almost \$18 trillion

- GDP per person = \$55,822
  - Consumption = \$38,218 per person
    - 68% of GDP
  - Investment = \$9,402 per person
  - Government purchases = \$9,919 per person
  - Net exports = - \$1,657 per person
    - Americans spent more on foreign goods than foreigners spent on American goods

# Table 1 GDP and Its Components

	Total (in billions of dollars)	Per Person (in dollars)	Percent of Total
Gross domestic product, Y	\$17,938	\$55,882	100%
Consumption, C	12,268	38,218	68
Investment, I	3,018	9,402	17
Government purchases, G	3,184	9,919	18
Net exports, NX	-532	-1,657	-3

Source: U.S. Department of Commerce. Parts may not sum to totals due to rounding.

This table shows total GDP for the U.S. economy in 2015 and the breakdown of GDP among its four components. When reading this table, recall the identity

$$Y = C + I + G + NX.$$



# Real versus Nominal GDP, Part 1

- Total spending rises from one year to the next
  - Economy — producing a larger output of goods and services
  - And/or goods and services are being sold at higher prices
- Nominal GDP
  - Production of goods and services
  - Valued at current prices



# Real versus Nominal GDP, Part 2

- Real GDP
  - Production of goods and services
  - Valued at constant prices
  - Designate one year as base year
  - Not affected by changes in prices
- For the base year
  - Nominal GDP = Real GDP

# Table 2 Real and Nominal GDP

Prices and Quantities				
Year	Price of Hot Dogs	Quantity of Hot Dogs	Price of Hamburgers	Quantity of Hamburgers
2016	\$1	100	\$2	50
2017	\$2	150	\$3	100
2018	\$3	200	\$4	150
Calculating Nominal GDP				
2016	(\$1 per hot dog $\times$ 100 hot dogs) + (\$2 per hamburger $\times$ 50 hamburgers) = \$200			
2017	(\$2 per hot dog $\times$ 150 hot dogs) + (\$3 per hamburger $\times$ 100 hamburgers) = \$600			
2018	(\$3 per hot dog $\times$ 200 hot dogs) + (\$4 per hamburger $\times$ 150 hamburgers) = \$1,200			
Calculating Real GDP (base year 2016)				
2016	(\$1 per hot dog $\times$ 100 hot dogs) + (\$2 per hamburger $\times$ 50 hamburgers) = \$200			
2017	(\$1 per hot dog $\times$ 150 hot dogs) + (\$2 per hamburger $\times$ 100 hamburgers) = \$350			
2018	(\$1 per hot dog $\times$ 200 hot dogs) + (\$2 per hamburger $\times$ 150 hamburgers) = \$500			
Calculating the GDP Deflator				
2016	(\$200/\$200) $\times$ 100 = 100			
2017	(\$600/\$350) $\times$ 100 = 171			
2018	(\$1,200/\$500) $\times$ 100 = 240			

This table shows how to calculate real GDP, nominal GDP, and the GDP deflator for a hypothetical economy that produces only hot dogs and hamburgers.



# Real versus Nominal GDP, Part 3

- The GDP deflator
  - Ratio of nominal GDP to real GDP times 100
  - Is 100 for the base year
  - Measures the current level of prices relative to the level of prices in the base year
  - Can be used to take inflation out of nominal GDP (“deflate” nominal GDP)





# Real versus Nominal GDP, Part 4

- Inflation
  - Economy's overall price level is rising
- Inflation rate
  - Percentage change in some measure of the price level from one period to the next

$$\begin{aligned} \text{Inflation in year 2} &= \\ &= \frac{\text{GDP deflator in year 2} - \text{GDP deflator in year 1}}{\text{GDP deflator in year 1}} \times 100 \end{aligned}$$

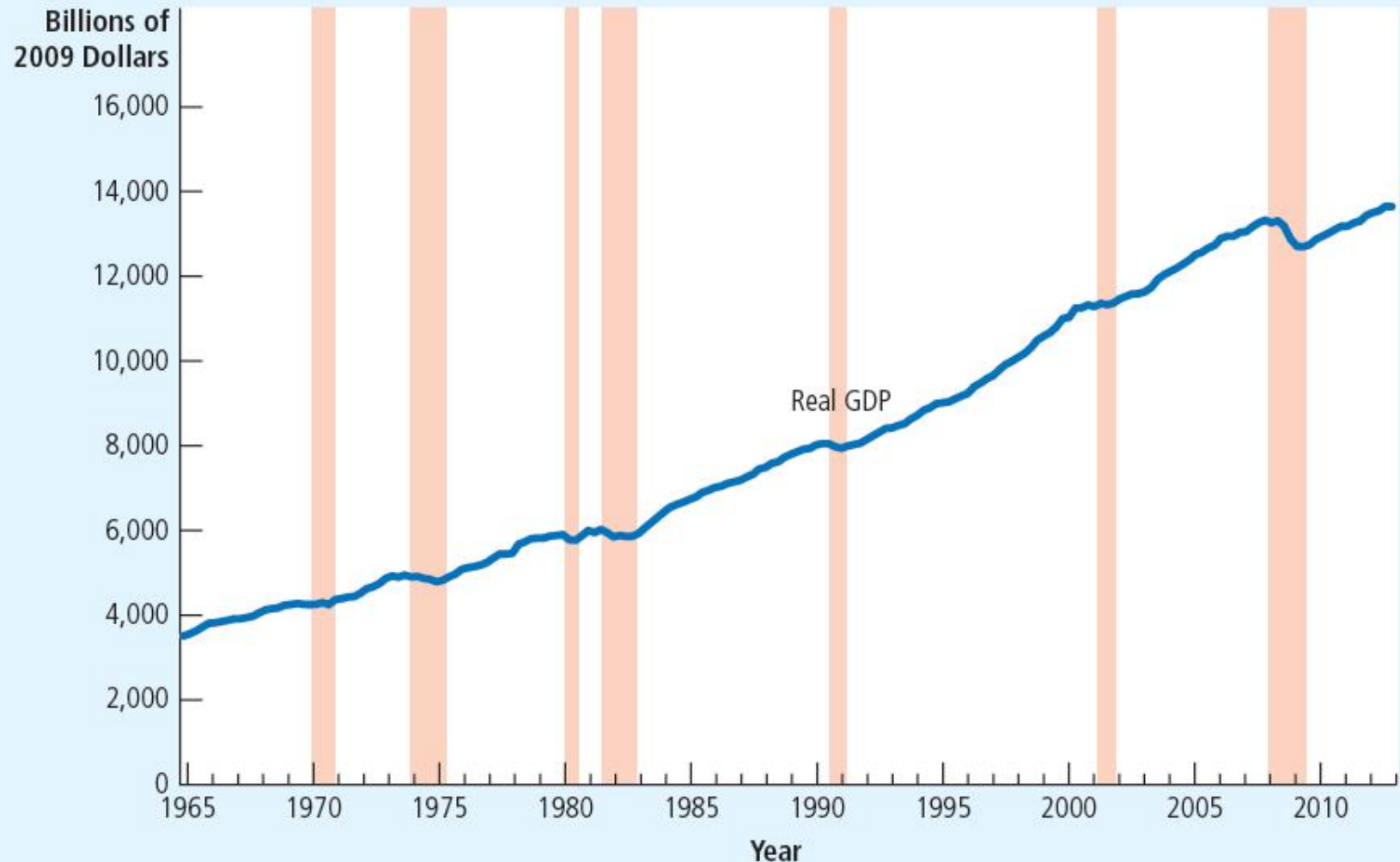


- The GDP data
  - Real GDP grows over time
    - The real GDP of the U.S. economy in 2015 was more than four times its 1965 level
    - Growth – average 3% per year since 1965
  - Growth is not steady
    - GDP growth interrupted by recessions



- Recession
  - Two consecutive quarters of falling GDP
  - Real GDP declines
  - Lower income
  - Rising unemployment
  - Falling profits
  - Increased bankruptcies

# Figure 2 Real GDP in the United States



This figure shows quarterly data on real GDP for the U.S. economy since 1965. Recessions—periods of falling real GDP—are marked with the shaded vertical bars.



# GDP, Part 1

- GDP – “the single best measure of the economic well-being of a society”
  - Economy’s total income
  - Economy’s total expenditure
  - Larger GDP
    - Good life, better healthcare
    - Better educational systems
  - Measure our ability to obtain many of the inputs into a worthwhile life



# GDP, Part 2

- GDP – not a perfect measure of well-being
  - Doesn't include
    - Leisure
    - Value of almost all activity that takes place outside markets
    - Quality of the environment
  - Nothing about distribution of income





- Rich countries — higher GDP per person
  - Better
    - Life expectancy
    - Literacy
    - Internet usage
- Poor countries — lower GDP per person
  - Worse
    - Life expectancy
    - Literacy
    - Internet usage



- **Low GDP per person**
  - More infants with low birth weight
  - Higher rates of infant mortality
  - Higher rates of maternal mortality
  - Higher rates of child malnutrition
  - Less common access to safe drinking water
  - Fewer school-age children are actually in school



- Low GDP per person
  - Fewer teachers per student
  - Fewer televisions
  - Fewer telephones
  - Fewer paved roads
  - Fewer households with electricity

# Table 3 GDP and the Quality of Life

Country	Real GDP per Person	Life Expectancy	Average Years of Schooling	Overall Life Satisfaction (0 to 10 scale)
United States	\$52,947	79 years	13 years	7.2
Germany	43,919	81	13	7.0
Japan	36,927	83	12	5.9
Russia	22,352	70	12	6.0
Mexico	16,056	77	9	6.7
Brazil	15,175	74	8	7.0
China	12,547	76	8	5.2
Indonesia	9,788	69	8	5.6
India	5,497	68	5	4.4
Nigeria	5,341	53	6	4.8
Pakistan	4,866	66	5	5.4
Bangladesh	3,191	72	5	4.6

The table shows GDP per person and three other measures of the quality of life for twelve major countries.