Lecture 2 GDP: Measuring Total Production and Income

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How to Measure Total Production?

- **Gross domestic product (GDP)**: most common measure of aggregate economic activity
  - GDP measures market values, not quantities
  - GDP includes final goods and services, not intermediate (e.g. tire v.s. truck)
  - GDP includes current production (typically one year), not used
- An important identity

  production = expenditure = national income
- GDP/GNP are only approximate measures of above

Example 1: Calculating GDP

Product	Quantity	Price per Unit
Eye examinations	100	$50.00
Pizzas	80	$10.00
Shoes	20	$100.00
Cheese	80	$2.00

- Assume all cheese is used to produce pizzas
- Calculate GDP for this simple economy

$$100 \times \$50 + 80 \times \$10 + 20 \times \$100 = \$7800$$

Example 2: Calculating GDP

Table 8.1 Calculating Value Added

Firm	Value of Product	Value Added	
Cotton farmer	Value of raw cotton = $1	Value added by cotton farmer	= $1
Textile mill	Value of raw cotton woven into cotton fabric = $3	Value added by textile mill = ($3 = $1)	= $2
Shirt company	Value of cotton fabric made into a shirt = $15	Value added by shirt company = ($15 – $3)	= $12
L.L.Bean	Value of shirt for sale on L.L.Bean's Web site = $35	Value added by L.L.Bean = ($35 – $15)	= $20
	Total Value Added		**= $35**

- Value added: market value firm adds to product
- Final selling price = sum of values added at each stage

The Road Ahead...

- Components of GDP
- Shortcomings of GDP
- Real versus nominal GDP
- National income accounting

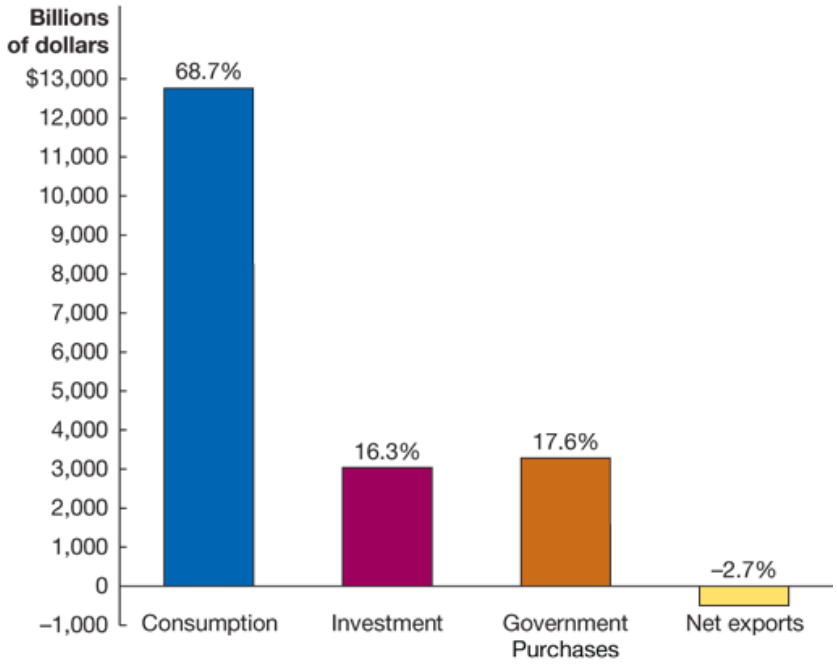
Components of GDP

- Bureau of Economic Analysis (BEA) divides GDP into four categories of expenditures
  - consumption (C): expenditure by consumers
  - actual investment (I): expenditure by firms, including unplanned changes in inventories
  - government purchases (G): expenditure by gov't, not including transfer payments
  - net exports (NX): net expenditure by foreigners, exports (EX) – imports (IM)
- National income identity

$$\underbrace{Y}_{\text{GDP}} = \underbrace{C+I+G}_{\text{domestic expenditure}} + \underbrace{EX-IM}_{\text{net foreign expenditure}}$$

Components of GDP (Cont'd)

COMPONENTS OF GDP (billions of dollars)		
Consumption		$12,758
Durable goods	$1,403	
Nondurable goods	2,696	
Services	8,660	
Investment		3,036
Business fixed investment	2,309	
Residential investment	706	
Change in business inventories	21	
Government purchases		3,277
Federal	1,245	
State and local	2,032	
Net Exports		–501
Exports	2,232	
Imports	2,734	
Total GDP		$18,569



- Components of GDP in 2016 (source: BEA)
- Consumption is largest component of U.S. GDP

Shortcomings of GDP

- As measure of total production, GDP ignores
  - household production, e.g. childcare
  - underground economy, e.g. drugs
- As measure of well-being, GDP ignores
  - value of leisure
  - negative effects of production, e.g. pollution
  - social problems, e.g. crime
  - income distribution

Real versus Nominal GDP

- BEA calculates two values of GDP
  - nominal GDP: value of final goods and services evaluated at current-year prices
  - real GDP: value of final goods and services evaluated at base-year prices, e.g. chained (2009) dollars
- Real GDP separates price changes from quantity changes
- How to measure average price level

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

- Why achieving price stability is important

Example 3: Calculating Real GDP

Product	2009		2019	
	Quantity	Price	Quantity	Price
Eye examinations	80	\$40	100	\$50
Pizzas	90	\$11	80	\$10
Shoes	15	\$90	20	\$100

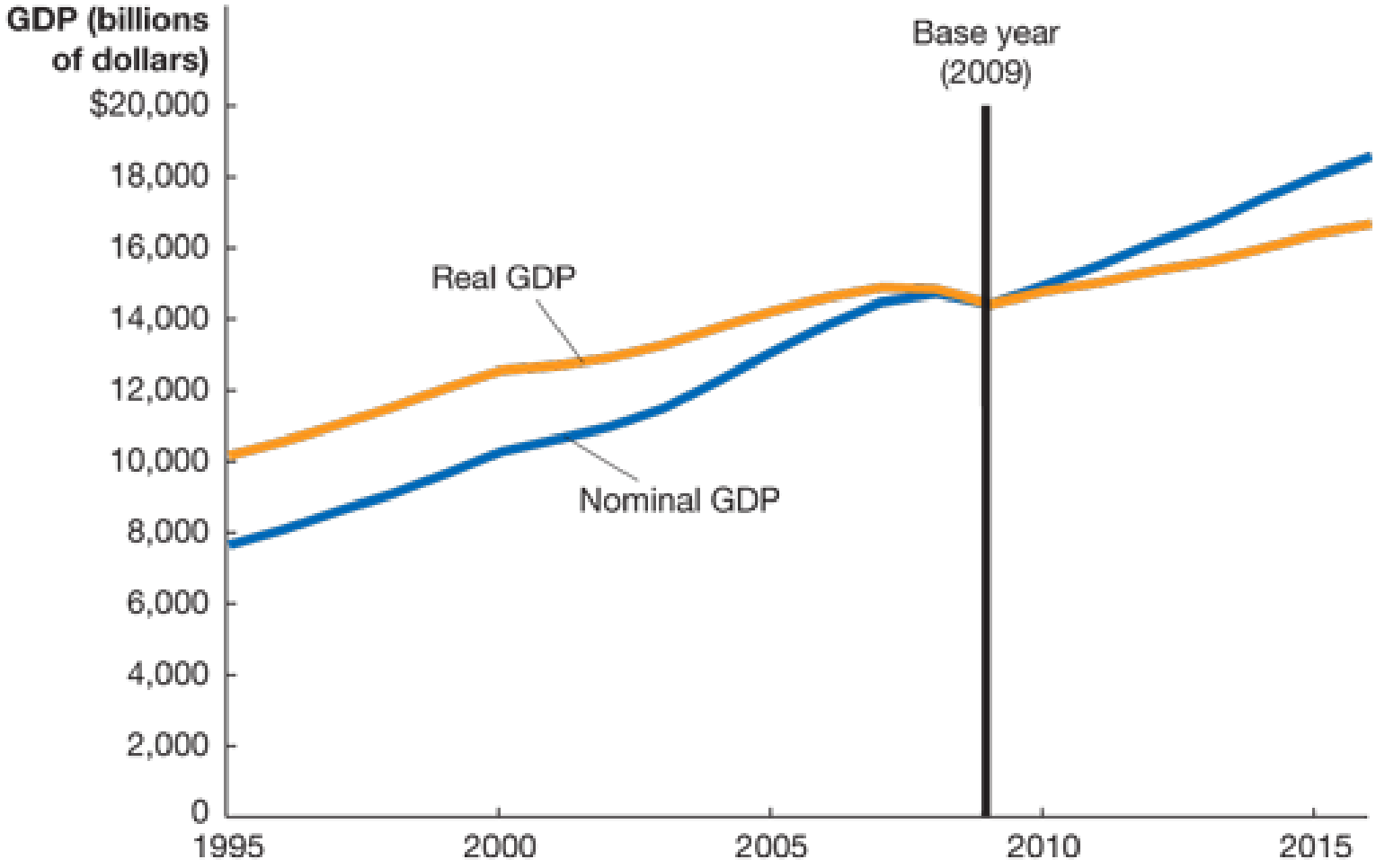
- Assume base year is 2009
- Calculate real & nominal GDP for year 2019

real: $100 \times \$40 + 80 \times \$11 + 20 \times \$90 = \$6680$

nominal: $100 \times \$50 + 80 \times \$10 + 20 \times \$100 = \$7800$

- GDP deflator for 2019: $7800/6680 \times 100 \approx 116.77$

Real versus Nominal GDP (Cont'd)



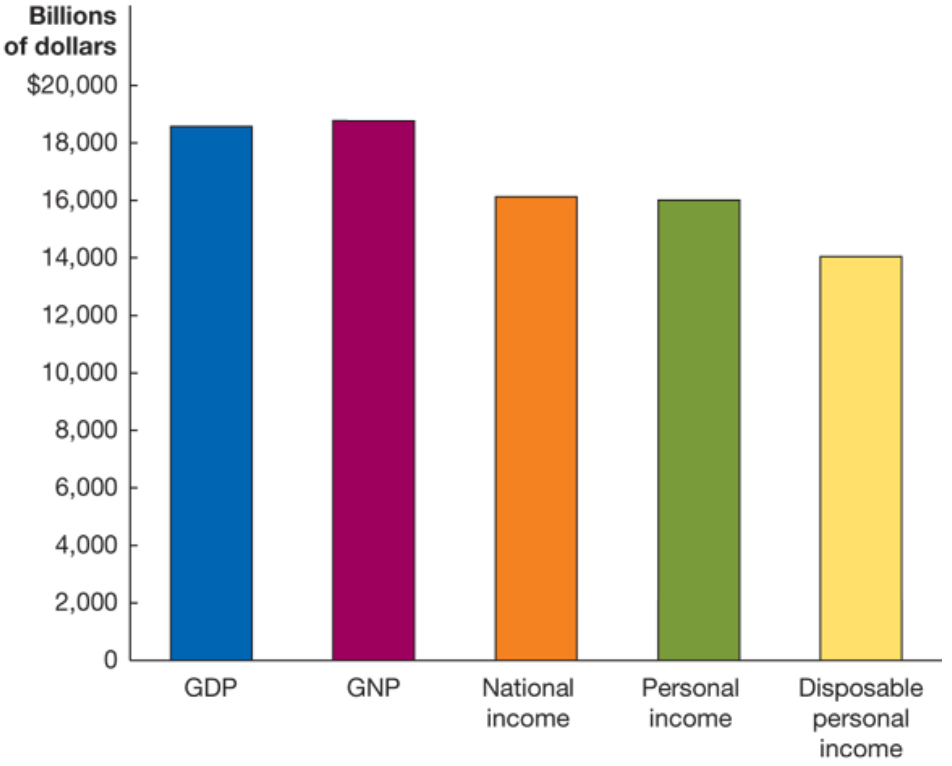
- Real and nominal GDP, 1995-2016 (source: BEA)
- Base year: real GDP = nominal GDP, GDP deflator = 100

National Income Accounting

- Methods to track total production/income, summarized in National Income and Product Accounts (NIPA)
  - Gross National Product (GNP): production by a nation's citizens, including overseas
  - National Income: GDP minus depreciation
  - Personal Income: income received by households, including gov. transfer, excluding firms' retained earnings
  - Disposable Personal Income: personal income minus personal tax payments

National Income Accounting (Cont'd)

Measure	Billions of dollars
GDP	$18,569
GNP	18,776
National income	16,130
Personal income	16,012
Disposable personal income	14,046



- Measures of total production/income, 2016 (source: BEA)

Readings & Exercises

- Readings
  - HO: chapter 8
  - BJ: lecture 1 (sec. 1, 6), 2 (sec. 1) (supplementary)
- Exercises
  - HO: problem 1.4, 1.11, 3.4 (in-class quiz), D8.1