Gross Domestic Product

two definitions

- total expenditure on domestically produced final goods and services.
- total income earned by domestically located factors of production.

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

Y: total value of output

$C + I + G + NX$: expenditure components

C: Consumption

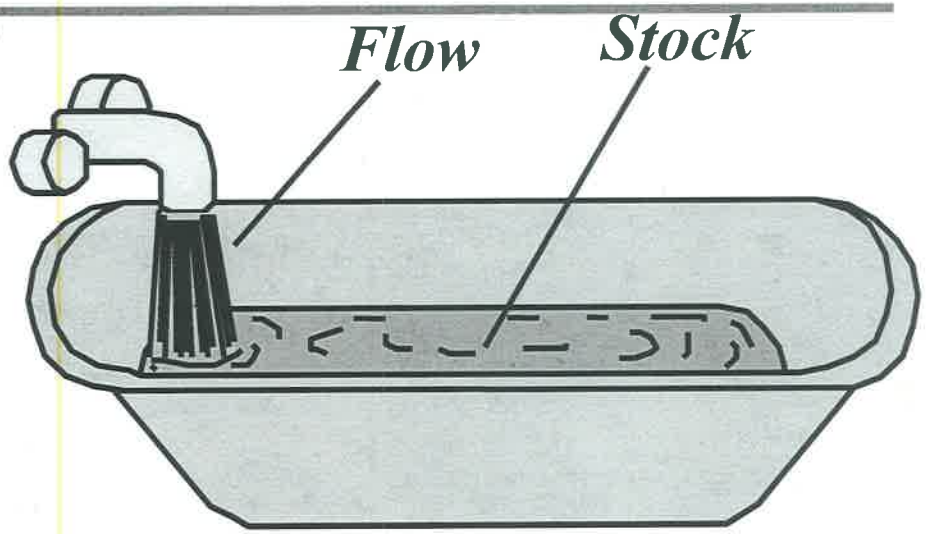
Value of all goods and services bought by households

I: Investment

Spending on capital, a physical asset, used for future production.

This includes inventory investment -- value of goods produced but not sold in the current period.

Stocks vs. Flows



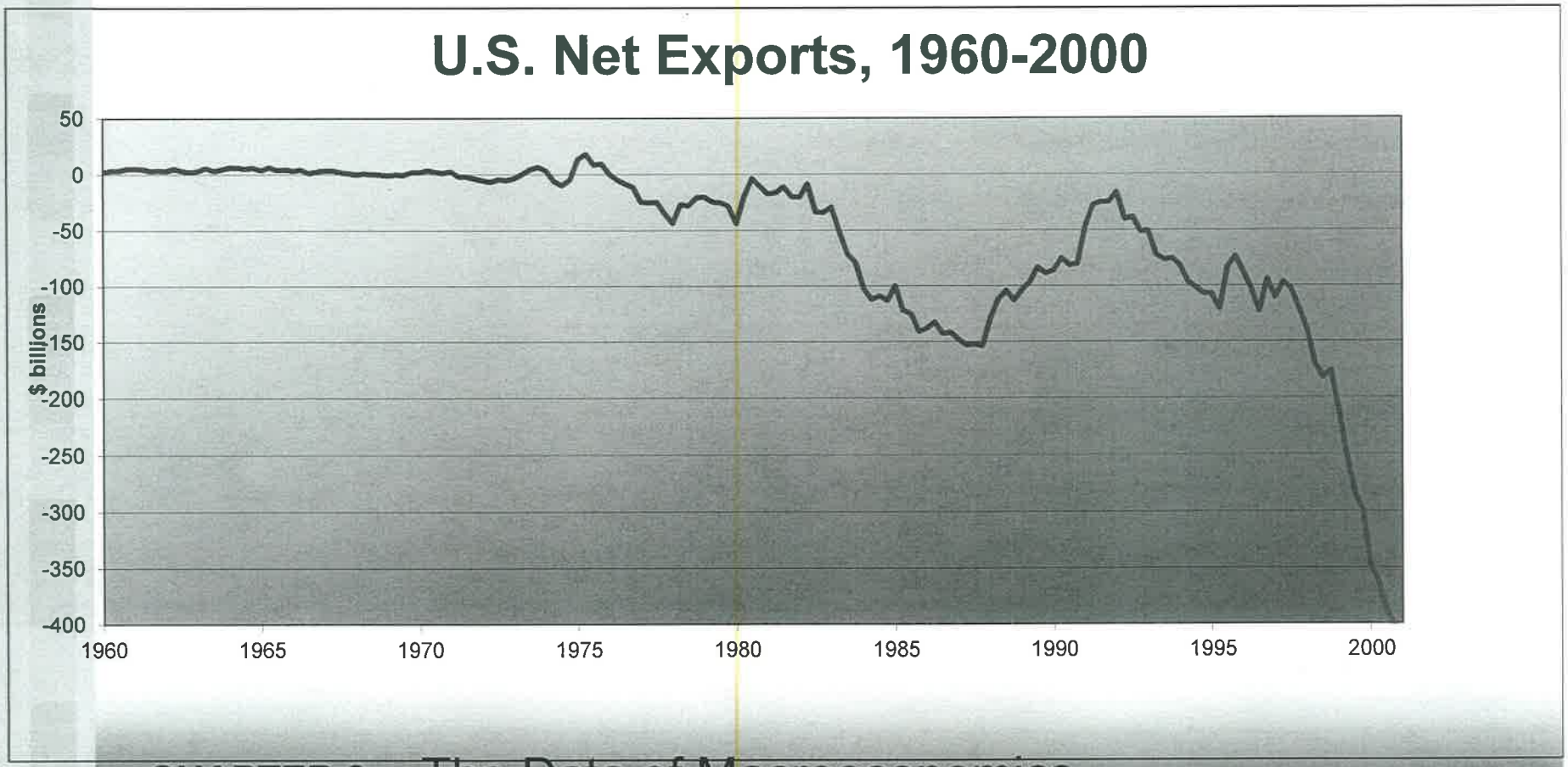
A **stock** is a quantity measured at a point in time.

E.g.,
"The U.S. capital stock was $10 trillion on January 1, 2012."

A **flow** is a quantity measured per unit of time.
E.g., "U.S. investment was $2 trillion during 2012."

Net exports (NX = EX - IM)

def: total exports to other countries (**EX**)
minus the value of total imports (**IM**)



G: government purchases of goods and services
note: excludes transfer payments.

NX: net exports
value of exports minus imports with rest of world.

GNP v. GDP

GNP: Gross National product:
total income earned by the nation's factors of production, regardless of where located.

GDP: ... by domestically-located factors of production, regardless of nationality.

GNP − GDP = (factor payments from abroad) − (factor payments to abroad).

Rank	GDP per capita	GNP per capita
1	Luxembourg	Luxembourg
2	United States	United States
3	Norway	Norway
4	**Ireland**	Switzerland
5	Switzerland	Canada
6	Canada	Denmark
7	Denmark	United Kingdom
8	Netherlands	Netherlands
9	Austria	Belgium
10	Iceland	Iceland
11	Australia	Austria
12	United Kingdom	Australia
13	Belgium	Japan
14	France	France
15	Sweden	Sweden
16	Japan	Finland
17	Finland	**Ireland**
18	Germany	Germany
19	Italy	Italy
20	Spain	Spain

real v. nominal GDP

nominal GDP : total value of all final goods and services using current prices (NGDP)

real GDP : ... using prices from a base year (RGDP)

Practice problem

	2012		2013	
	P	Q	P	Q
good A	$1	10	$2	15
good B	$10	3	$15	4

- Compute nominal GDP in 2012 and 2013
- Compute real GDP in each year using 2012 as the base year.

Answers to practice problem

- Nominal GDP *multiply Ps & Qs from same year*

  2012: \$1 x 10 + \$10 x 3 = \$40

  2013: \$2 x 15 + \$15 x 4 = \$90

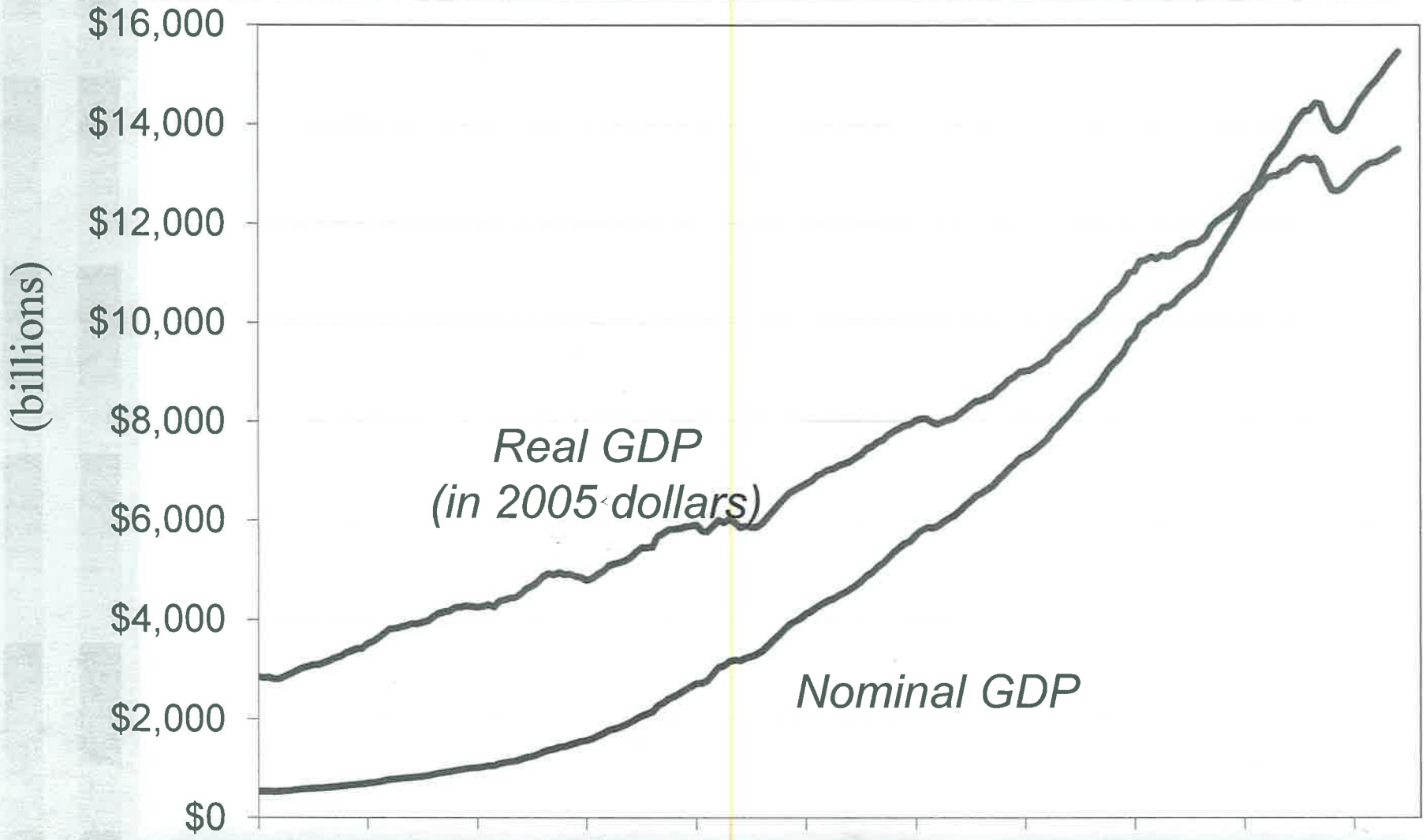
- Real GDP *multiply each year's Qs by 2002 Ps*

  2012: as above: \$40

  2013: \$1 x 15 + \$10 x 4 = \$55 (2012\$)

- So in real terms, GDP did not rise as much as it would seem from nominal terms.

U.S. Nominal and Real GDP, 1960-2012



GDP deflator : one way to measure inflation, the percentage increase in the overall level of prices.

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

Example with 3 goods

For good $i = 1, 2, 3$

P_{it} = market price of good i in month t

Q_{it} = quantity of " " "

$$\text{GDP deflator} = 100 \times \frac{NGDP}{RGDP}$$

$$= 100 \times \frac{P_{1t}Q_{1t} + P_{2t}Q_{2t} + P_{3t}Q_{3t}}{RGDP_t}$$

$$= 100 \times \left[\left(\frac{Q_{1t}}{RGDP_t} \right) P_{1t} + \left(\frac{Q_{2t}}{RGDP_t} \right) P_{2t} + \left(\frac{Q_{3t}}{RGDP_t} \right) P_{3t} \right]$$

This is a weighted average of prices. The weights on each price reflect the good's relative importance in GDP. Note: the weights change over time.

Another way to measure inflation is the consumer price index (CPI)

$$CPI = 100 \times \frac{\text{cost of basket in month } t}{\text{cost of basket in base period}}$$

Example with 3 goods ($i = 1, 2, 3$)

C_i = amount of good i in CPI basket

P_{it} = price of good i in month t

E_t = cost of CPI basket in month t

E_b = cost of basket in base period

$$CPI_t = 100 \times \frac{E_t}{E_b} = 100 \times \frac{P_{1t}C_1 + P_{2t}C_2 + P_{3t}C_3}{E_b}$$

$$= 100 \times \left[\left(\frac{C_1}{E_b}\right) P_{1t} + \left(\frac{C_2}{E_b}\right) P_{2t} + \left(\frac{C_3}{E_b}\right) P_{3t} \right]$$

This is a weighted average of prices

Note: the weights remain fixed over time.

CPI v. GDP deflator:

1) basket of goods
CPI : fixed basket
deflator: changes every year

The fixed weight in the CPI tends to make the CPI overstate inflation, due to...

Substitution bias: fixed weights cannot reflect consumers' ability to substitute away from goods whose prices have risen.

2) capital goods
deflator: includes capital goods
CPI: only consumption goods

3) imported goods
deflator: excluded
CPI: included

measuring unemployment

- employed: working at a paid job
- Unemployed: not employed, but are looking for a job.
- in labor force: all employed + Unemployed
- not in labor force: not employed and not looking for work.

Unemployment rate: percentage of labor force that is unemployed.

(observation)

Okun's ~~Law~~

Okun's Law states that a one-percent decrease in unemployment is associated with two percentage points of additional growth in real GDP