Chapter 2

The Data of Macroeconomics

IN THIS CHAPTER, YOU WILL LEARN:

…the meaning and measurement of the most important macroeconomic statistics:

- gross domestic product (GDP)
- the consumer price index (CPI)
- the unemployment rate

GDP

- GDP: the value of all final goods and services produced in the country within a given period.

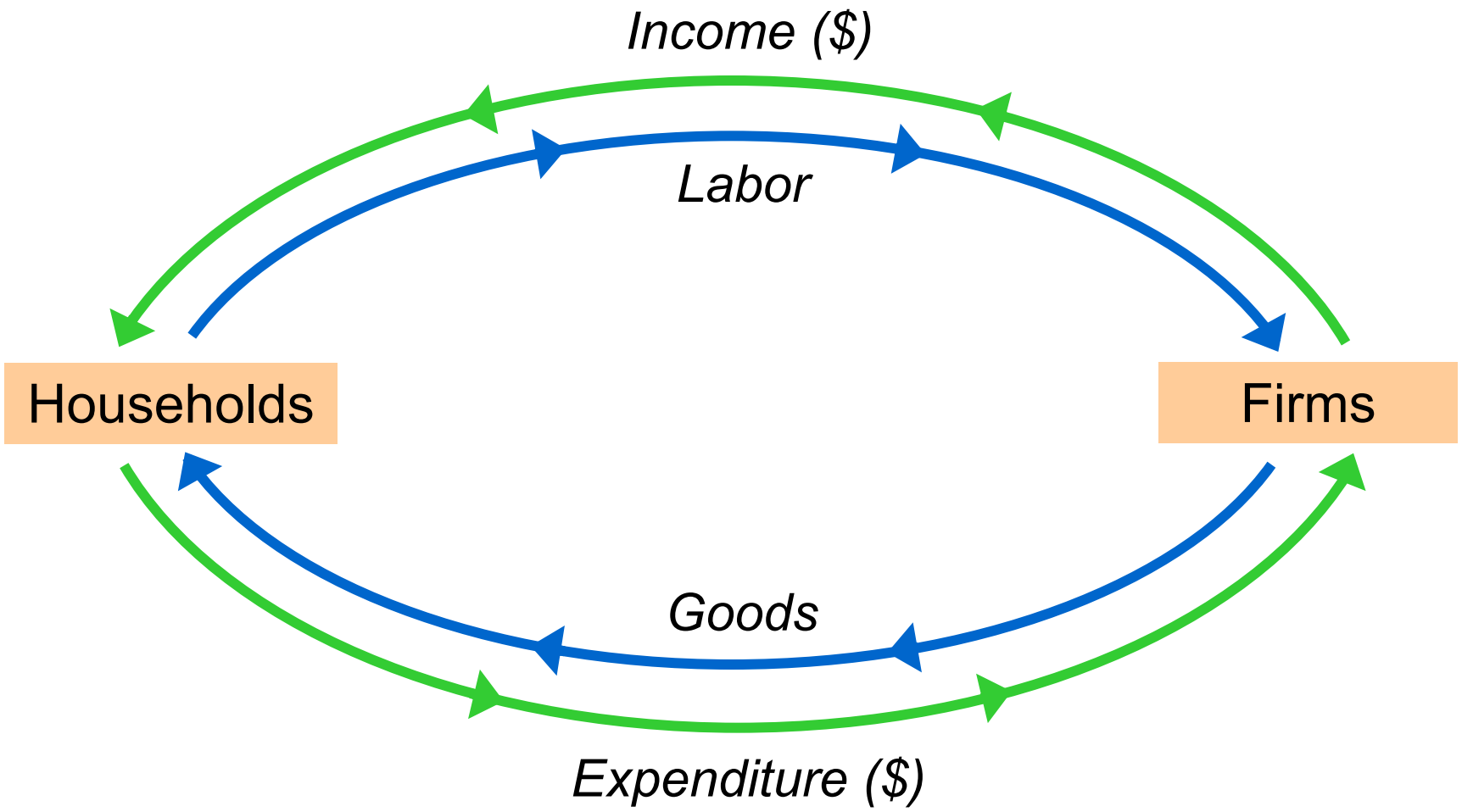
Gross Domestic Product: Expenditure and Income

Two views:

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

Expenditure equals income because every dollar a buyer spends becomes income to the seller.

The Circular Flow



GDP

- Three ways to measure GDP:
- From spenders point
- From producers point
- From income earners point

GDP – (1)

- (1) Spending
- Y = C + I + G +NX

The expenditure components of GDP

- consumption, ***C***
- investment, ***I***
- government spending, ***G***
- net exports, ***NX***

An important identity:

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

value of total output

aggregate expenditure

Consumption (C)

definition: The value of all goods and services bought by households. Includes:

- ***durable goods***
  last a long time
  e.g., cars, home appliances
- ***nondurable goods***
  last a short time
  e.g., food, clothing
- ***services***
  intangible items purchased by consumers
  e.g., dry cleaning, air travel

U.S. Consumption, 2014

	$ billions	*% of GDP*
Consumption	12,002	68.2
Durables	1,320	7.5
Nondurables	2,691	15.3
Services	7,990	45.4

Investment (I)

- Spending on capital, a physical asset used in future production
- Includes:
  - ***Business fixed investment***
    Spending on plant and equipment
  - ***Residential fixed investment***
    Spending by consumers and landlords on housing units
  - ***Inventory investment***
    The change in the value of all firms' inventories

U.S. Investment, 2014

	$ billions	*% of GDP*
Investment	2,905	16.5
Business fixed	2,244	12.8
Residential	566	3.2
Inventory	94	0.5

Government spending (G)

- **G** includes all government spending on goods and services.
- **G** excludes transfer payments (e.g., unemployment insurance payments), because they do not represent spending on goods and services.

U.S. Government Spending, 2014

	$ billions	% of GDP
Govt spending	3,209	18.2
- Federal	1,241	7.1
Nondefense	457	2.6
Defense	784	4.5
- State & local	1,968	11.2

Net exports (NX)

- **NX** = exports – imports
  - **exports**: the value of g&s sold to other countries
  - **imports**: the value of g&s purchased from other countries
- Hence, NX equals net spending from abroad on our g&s

U.S. Net Exports, 2014

	$ billions	% of GDP
Net exports of g&s	–517	–2.9
Exports	2,367	13.4
Goods	1,645	9.3
Services	721	4.1
Imports	2,883	16.4
Goods	2,394	13.6
Services	489	2.8

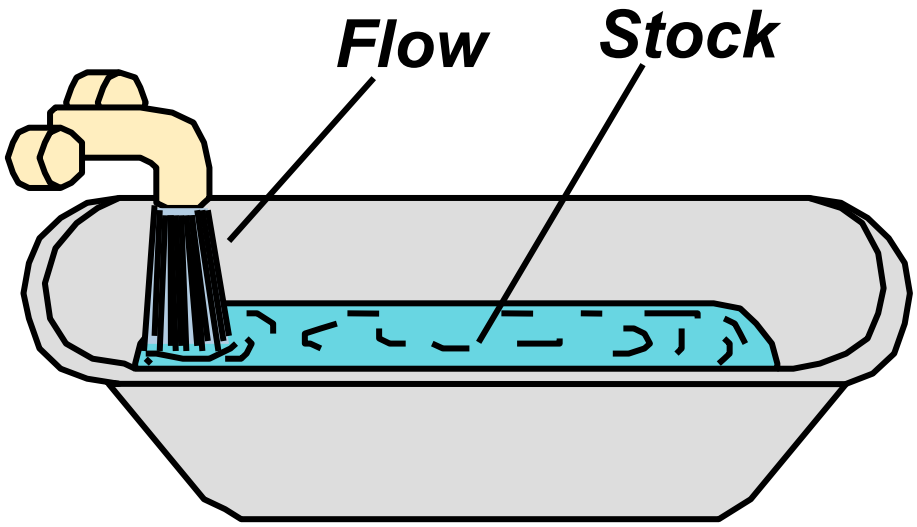
Investment vs. Capital

Note: Investment is spending on new capital.

Example *(assumes no depreciation)*:

- 1/1/2012:
  Economy has $10 trillion worth of capital
- during 2012:
  Investment = $2 trillion
- 1/1/2013:
  Economy will have $12 trillion worth of capital

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."

Stocks vs. Flows - examples

stock	*flow*
a person's wealth	a person's annual saving
# of people with college degrees	# of new college graduates this year
the govt debt	the govt budget (annual budget) deficit

NOW YOU TRY

Stock or Flow?

- the balance on your credit card statement
- the inflation rate
- the unemployment rate

Nominal GDP and Real GDP

- Nominal GDP:
- the value of output in a given period in the price of that period, or in current dollar
-
- Real GDP:
- the value of output in a given period in the price of a base period, or in constant dollar
-

Real GDP controls for inflation

- Changes in nominal GDP can be due to:
  - changes in prices
  - changes in quantities of output produced
- Changes in real GDP can only be due to changes in quantities, because real GDP is constructed using constant base-year prices.

GDP – (2)

- (2) From producers point

- GDP: the sum of the value added by all the firms located in the U.S.

Final goods, value added, and GDP

- GDP = value of final goods produced
  = sum of value added at all stages of production.

- Value added:

the revenue the firm earns – the value of its inputs which are produced by other firms.

Class try this:

- A farmer grows a bushel of wheat and sells it to a miller for $1.00.
- The miller turns the wheat into flour and sells it to a baker for $3.00.
- The baker uses the flour to make a loaf of bread and sells it to an engineer for $6.00.
- The engineer eats the bread.
- *Compute value added at each stage of production and GDP*

GDP and GNP

- GNP: the value of final goods and services produced by domestically owned factors of production within a given period.

- GDP: the value of all final goods and services produced in the country within a given period.

- Some outputs produced within a given country are made by factors of production owned abroad.

GNP vs. GDP (a different angle)

- Gross **national** product (GNP):
  Total income earned by the nation's factors of production, regardless of where located
- Gross **domestic** product (GDP):
  Total income earned by domestically-located factors of production, regardless of nationality

  GDP + factor income from abroad – factor income of foreigners = GNP
- Examples of factor income (or payments): wages, profits, rent, interest & dividends on assets

NOW YOU TRY

An expenditure-output puzzle?

Suppose a firm:

- produces $10 million worth of final goods
- only sells $9 million worth

- Does this violate the
  expenditure = output identity?

GDP:
An important and versatile concept

We have now seen that GDP measures:

- total income
- total output
- total expenditure
- the sum of value added at all stages in the production of final goods

NOW YOU TRY

Discussion Question

In your country, which would you want to be bigger, GDP or GNP?

Why?

GNP vs. GDP in select countries, 2010

Country	*GNP*	*GDP*	*GNP – GDP (% of GDP)*
Bangladesh	109,695	100,357	9.3
Japan	5,601,557	5,458,837	2.6
China	5,957,012	5,926,612	0.5
United States	14,635,600	14,586,736	0.3
India	1,712,645	1,727,111	-0.8
Canada	1,549,652	1,577,040	-1.7
Greece	292,874	301,083	-2.7
Iraq	77,842	82,150	-5.2
Ireland	171,260	206,612	-17.1

GNP and GDP in millions of current U.S. dollars

GNP vs. GDP in Select Countries, 2012

Country	*GNP*	*GDP*	*GNP – GDP (% of GDP)*
Bangladesh	127,672	116,355	9.7
Japan	6,150,132	5,961,066	3.2
China	8,184,963	8,227,103	-0.5
United States	16,514,500	16,244,600	1.7
India	1,837,279	1,858,740	-1.2
Canada	1,821,424	1,779,635	2.3
Greece	250,167	248,939	0.5
Iraq	216,453	215,838	0.3
Ireland	171,996	210,636	-18.3

GNP and GDP in millions of current U.S. dollars.

Real vs. nominal GDP

- GDP is the *value* of all final goods and services produced.
- **Nominal GDP** measures these values using current prices.
- **Real GDP** measure these values using the prices of a base year.

Measuring Inflation:

- Inflation rate: % change in the general price level from one period to the next.
-
- How do you calculate that?
-
- What is the general price level?
- CPI, PPI, GDP deflator, C deflator, I deflator etc.

GDP Deflator

- One measure of the price level: **GDP deflator**

  Definition:

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

NOW YOU TRY

GDP deflator and inflation rate

	Nom. GDP	Real GDP	GDP deflator	Inflation rate
2010	$46,200	$46,200		*n.a.*
2011	51,400	50,000		
2012	58,300	52,000		

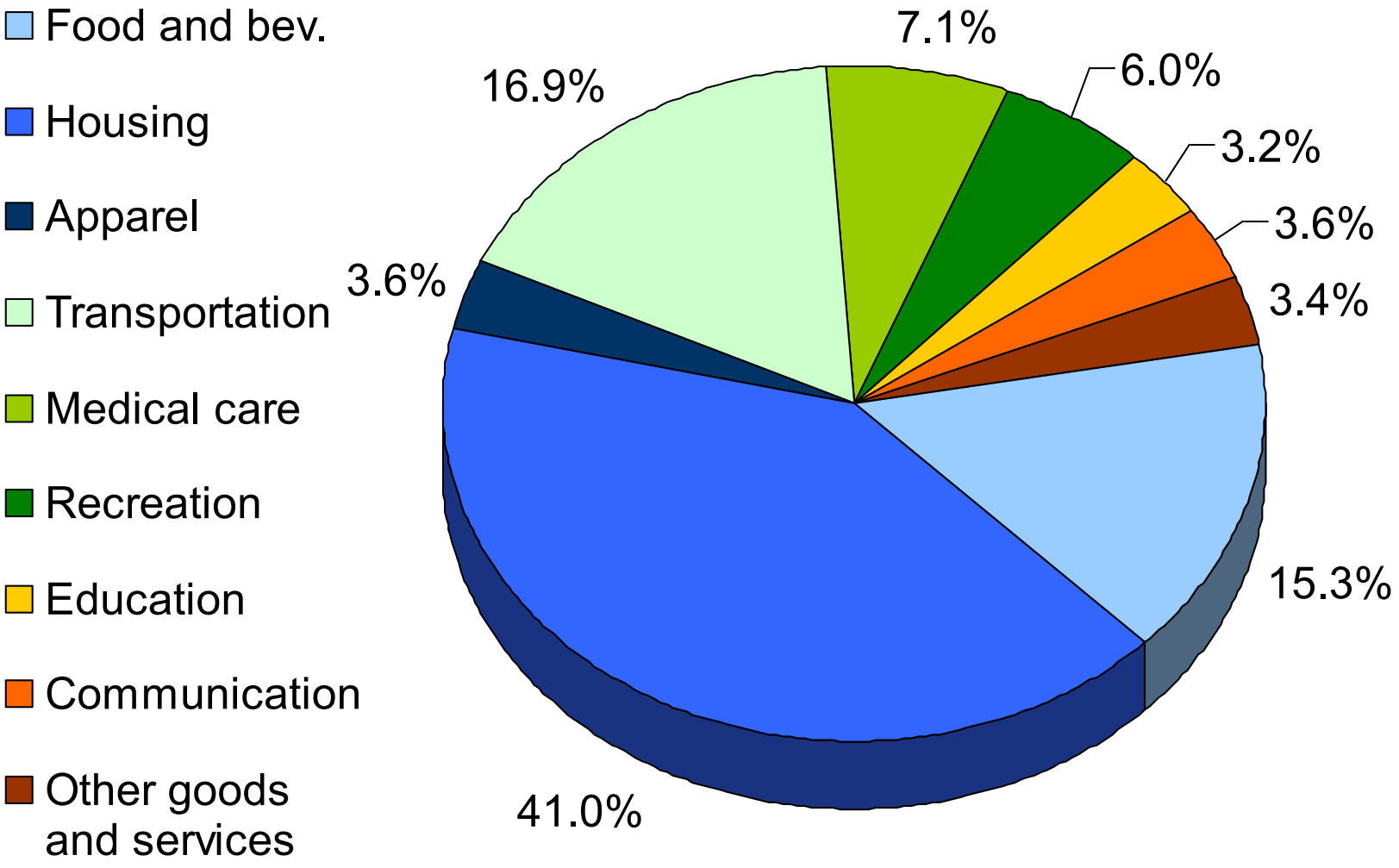
- Use your previous answers to compute the GDP deflator in each year.
- Use GDP deflator to compute the inflation rate from 2010 to 2011, and from 2011 to 2012.

NOW YOU TRY
Answers

	Nom. GDP	Real GDP	GDP deflator	Inflation rate
2010	$46,200	$46,200	100.0	*n.a.*
2011	51,400	50,000	102.8	2.8%
2012	58,300	52,000	112.1	9.1%

- Use your previous answers to compute the GDP deflator in each year.
- Use GDP deflator to compute the inflation rate from 2010 to 2011, and from 2011 to 2012.

The composition of the CPI's "basket"



Why the CPI may overstate inflation

- **Substitution bias**:
  The CPI uses fixed weights, so it cannot reflect consumers' ability to substitute toward goods whose relative prices have fallen.
- **Introduction of new goods**:
  The introduction of new goods makes consumers better off and, in effect, increases the real value of the dollar. But it does not reduce the CPI, because the CPI uses fixed weights.
- **Unmeasured changes in quality**:
  Quality improvements increase the value of the dollar but are often not fully measured.

GDP deflator and CPI

- GDP deflator: shows the average price of the goods and services included in GDP.
- GDP deflator and CPI may not be the same because:
- * GDP deflator measures the prices of a much wider group of goods that those of CPI
- * CPI fixed basket of goods and services
- the basket of goods for GDP deflator changes every year.
- * CPI includes the price of imports while GDP deflator includes only goods produced in the US.

CPI vs. GDP Deflator

Prices of capital goods:

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

Prices of imported consumer goods:

- included in CPI
- excluded from GDP deflator

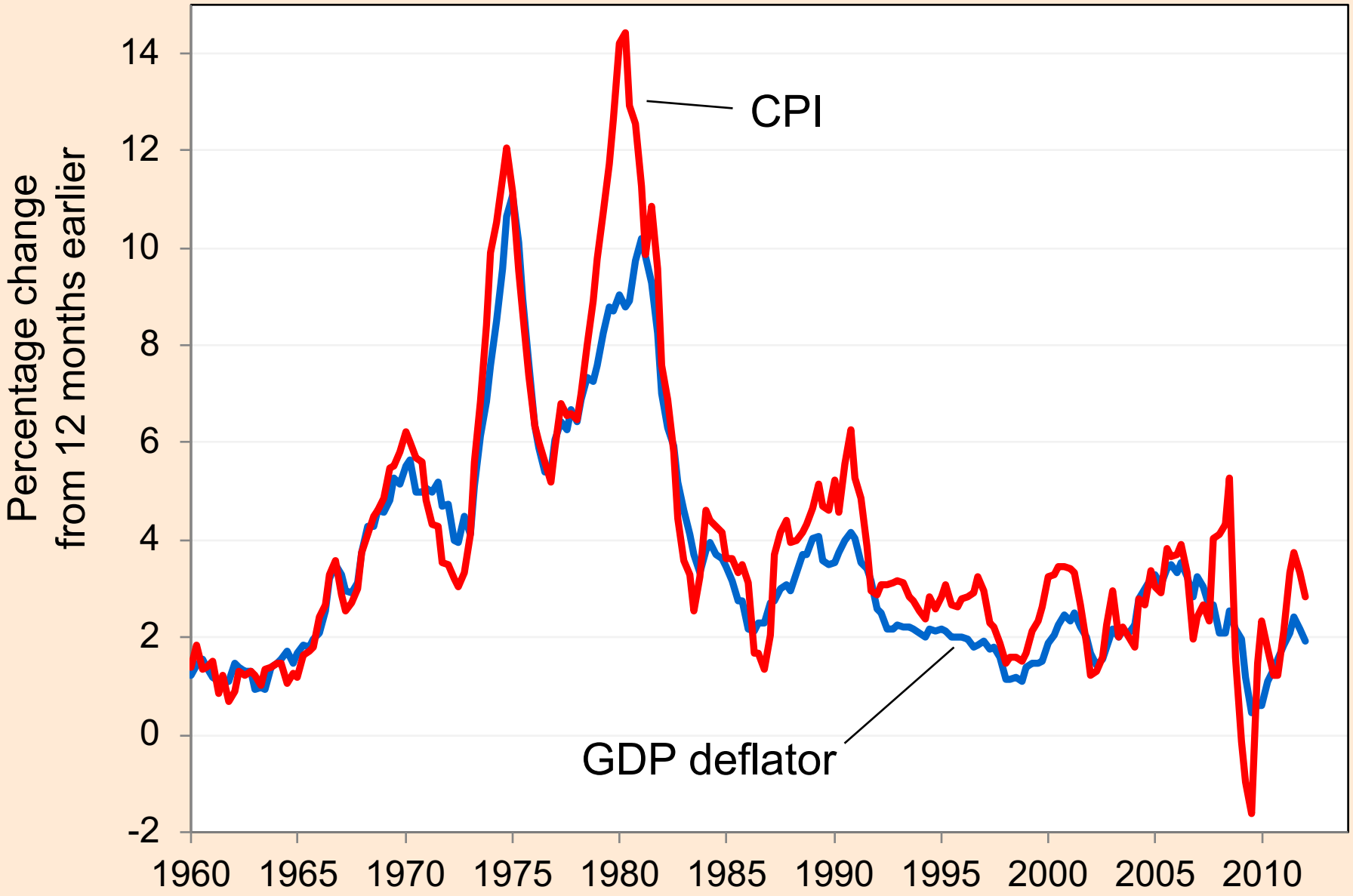
The basket of goods:

- CPI: fixed
- GDP deflator: changes every year

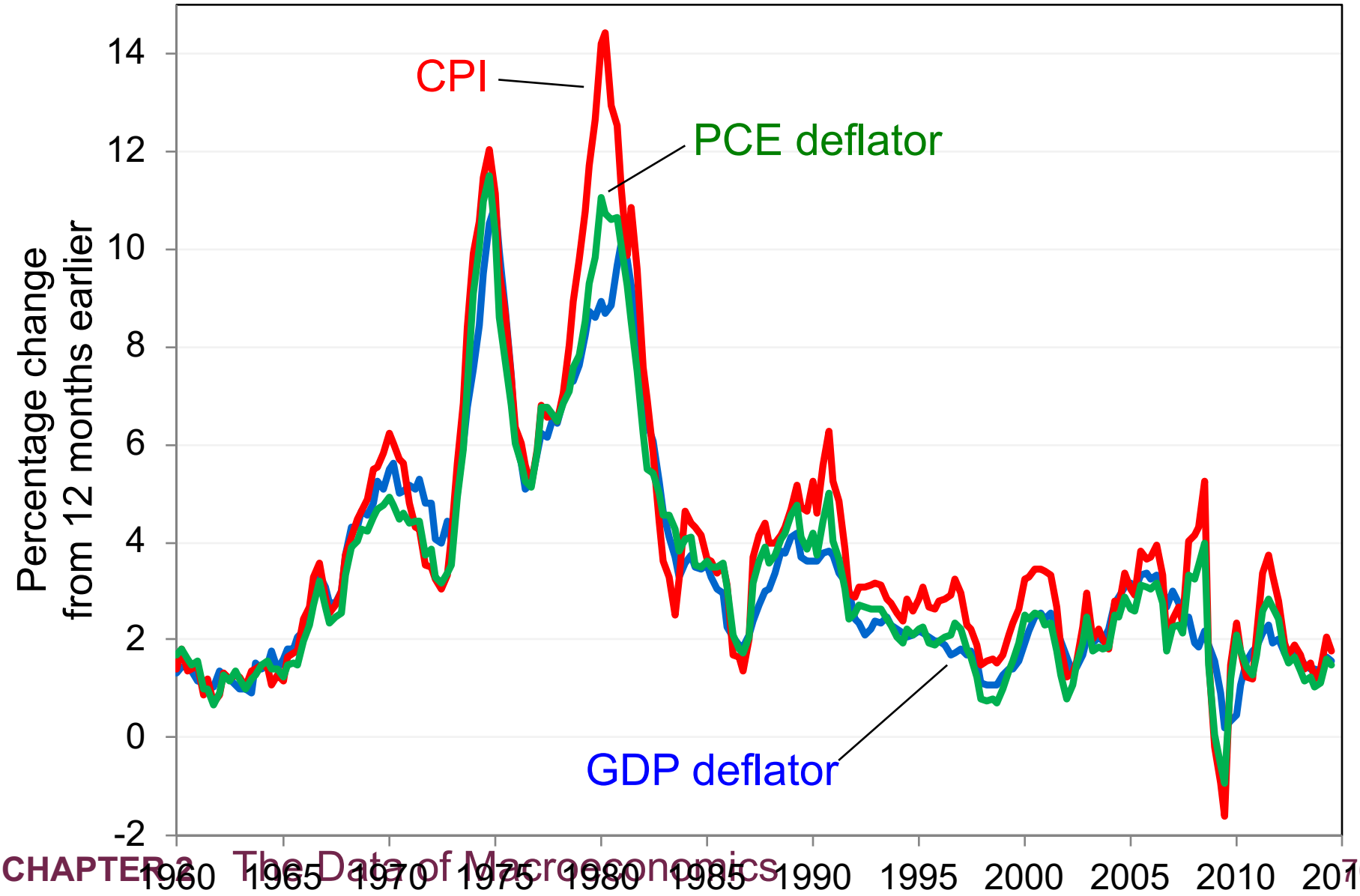
The PCE deflator

- Another measure of the price level:
  Personal Consumption Deflator,
  the ratio of nominal to real consumer spending
- How the PCE is like the CPI:
  - only includes consumer spending
  - includes imported consumer goods
- How the PCE is like the GDP deflator:
  - the "basket" changes over time
- The Federal Reserve prefers PCE.

Two measures of inflation in the U.S.



The GDP deflator, CPI, and PCE deflator



Measures of Labor Market

- Unemployment: the number of people who are looking for jobs but have no jobs.
- Labor force = employment + unemployment
- (those in the population who have a job or are looking for a job)
- Outside the labor force: people who do not have a job and are not looking for a job.
- U rate: Unemployment/labor force

Categories of the population

- **employed**
  working at a paid job
- **unemployed**
  not employed but looking for a job
- **labor force**
  the amount of labor available for producing goods and services; all employed plus unemployed persons
- **not in the labor force**
  not employed, not looking for work

Two important labor force concepts

- **unemployment rate**
  percentage of the labor force that is unemployed
- **labor force participation rate**
  the fraction of the adult population that "participates" in the labor force, *i.e.* is working or looking for work

NOW YOU TRY

Computing labor statistics

U.S. adult population by group, May 2012		
Number employed	=	142.3 million
Number unemployed	=	12.7 million
Adult population	=	243.0 million

Use the above data to calculate

- the labor force
- the number of people not in the labor force
- the labor force participation rate
- the unemployment rate

NOW YOU TRY
Answers

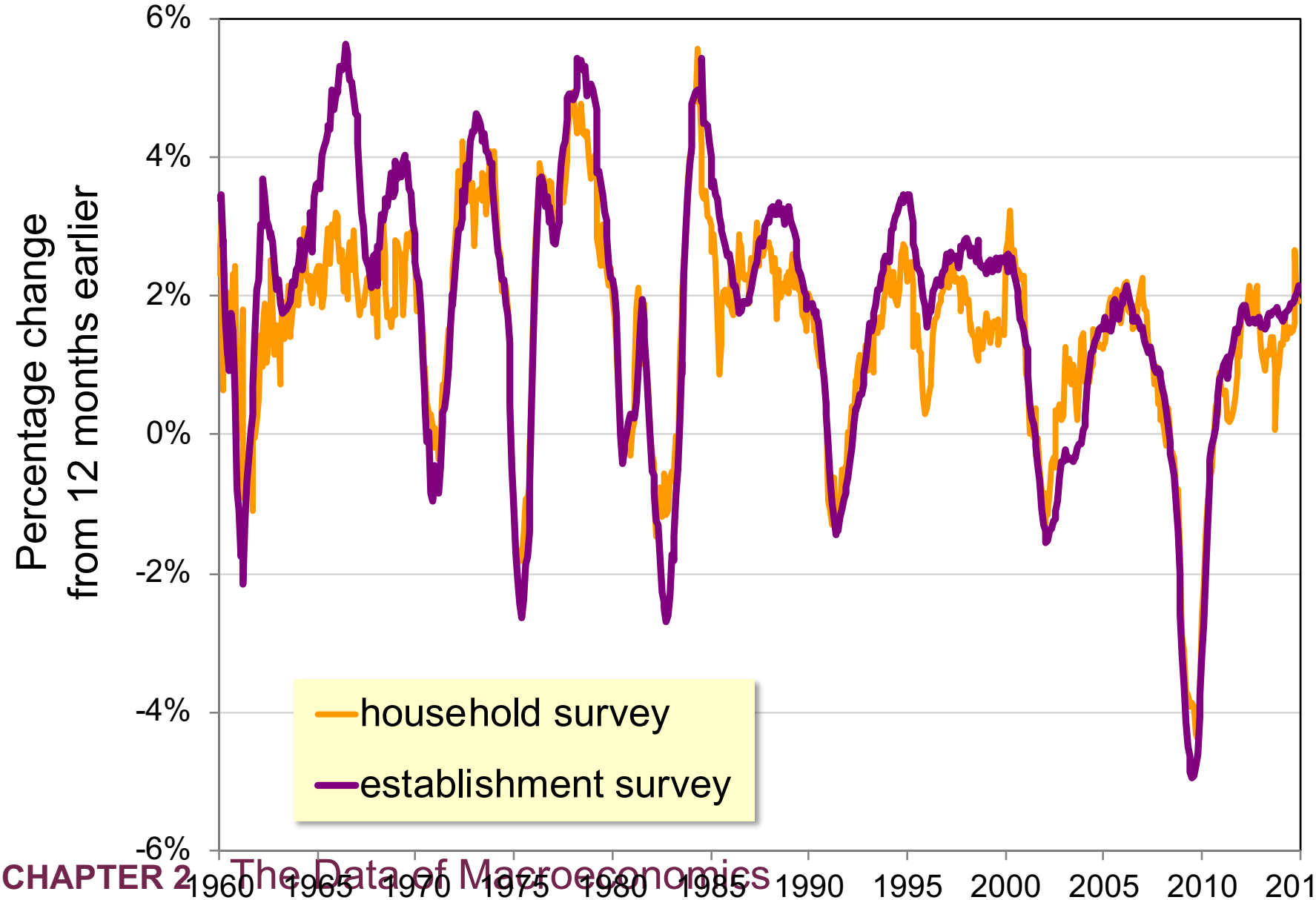
data: ***E*** = 142.3, ***U*** = 12.7, ***POP*** = 243.0

- labor force
  L = ***E*** + ***U*** = 142.3 + 12.7 = 155.0
- not in labor force
  NILF = ***POP*** – ***L*** = 243 – 155 = 88
- unemployment rate
  U/L x 100% = (12.7/155.0) x 100% = 8.2%
- labor force participation rate
  L/POP x 100% = (155/243) x 100% = 63.8%

The establishment survey

- The BLS obtains a second measure of employment by surveying businesses, asking how many workers are on their payrolls.
- Neither measure is perfect, and they occasionally diverge due to:
  - treatment of self-employed persons
  - new firms not counted in establishment survey
  - technical issues involving population inferences from sample data

Two measures of employment growth



CHAPTER SUMMARY

- Gross domestic product (GDP) measures both total income and total expenditure on the economy's output of goods & services.
- Nominal GDP values output at current prices; real GDP values output at constant prices. Changes in output affect both measures, but changes in prices only affect nominal GDP.
- GDP is the sum of consumption, investment, government purchases, and net exports.

CHAPTER SUMMARY

- The overall level of prices can be measured by either:
  - the consumer price index (CPI), the price of a fixed basket of goods purchased by the typical consumer, or
  - the GDP deflator, the ratio of nominal to real GDP
- The unemployment rate is the fraction of the labor force that is not employed.