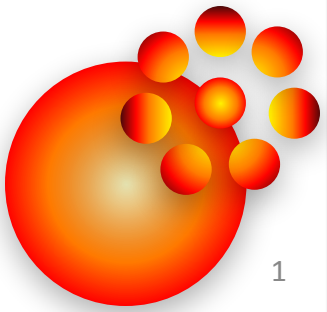
MACROECONOMICS

INTRODUCTION

LECTURE 2

THE DATA OF MACROECONOMICS



Prepared by:
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Outline

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

GDP

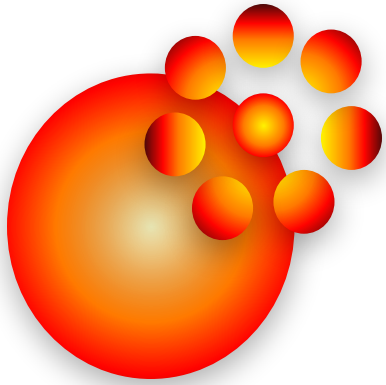
2-2 Measuring the Cost of Living: The Consumer Price Index

CPI

2-3 Measuring Joblessness: The Unemployment Rate

U

2-4 Conclusion: From Economic Statistics to Economic Models



02. The Data of Macroeconomics

It is a capital mistake to theorize before one has data.

Sherlock Holmes

Economists use statistics to

- study the economy

Policymakers use them to

- monitor developments;
- formulate policies.

We focus on the three statistics:

1. **GDP**
   - tells us the nation's **total income** and the **total expenditure** on its output of G&S.
2. **CPI**
   - measures the **level of prices**.
3. **U**

2.1 Gross Domestic Product

Sources of Data

1.
Administrative data,
which are products of government functions

- **tax collection,**
- **education programs,**
- **defense...**

2.
Statistical data,
it comes from government surveys of

- **retail establishments,**
- **manufacturing firms & farms.**

2.1 Gross Domestic Product

There are 2 ways to view GDP statistics.

1	2
The total income of everyone in the economy	**the total expenditure on the economy's output of G&S**

When Baurzhan paints Gaukhar's house for $1,000, that $1,000 is

a. income to Baurzhan and
b. expenditure by Gaukhar.

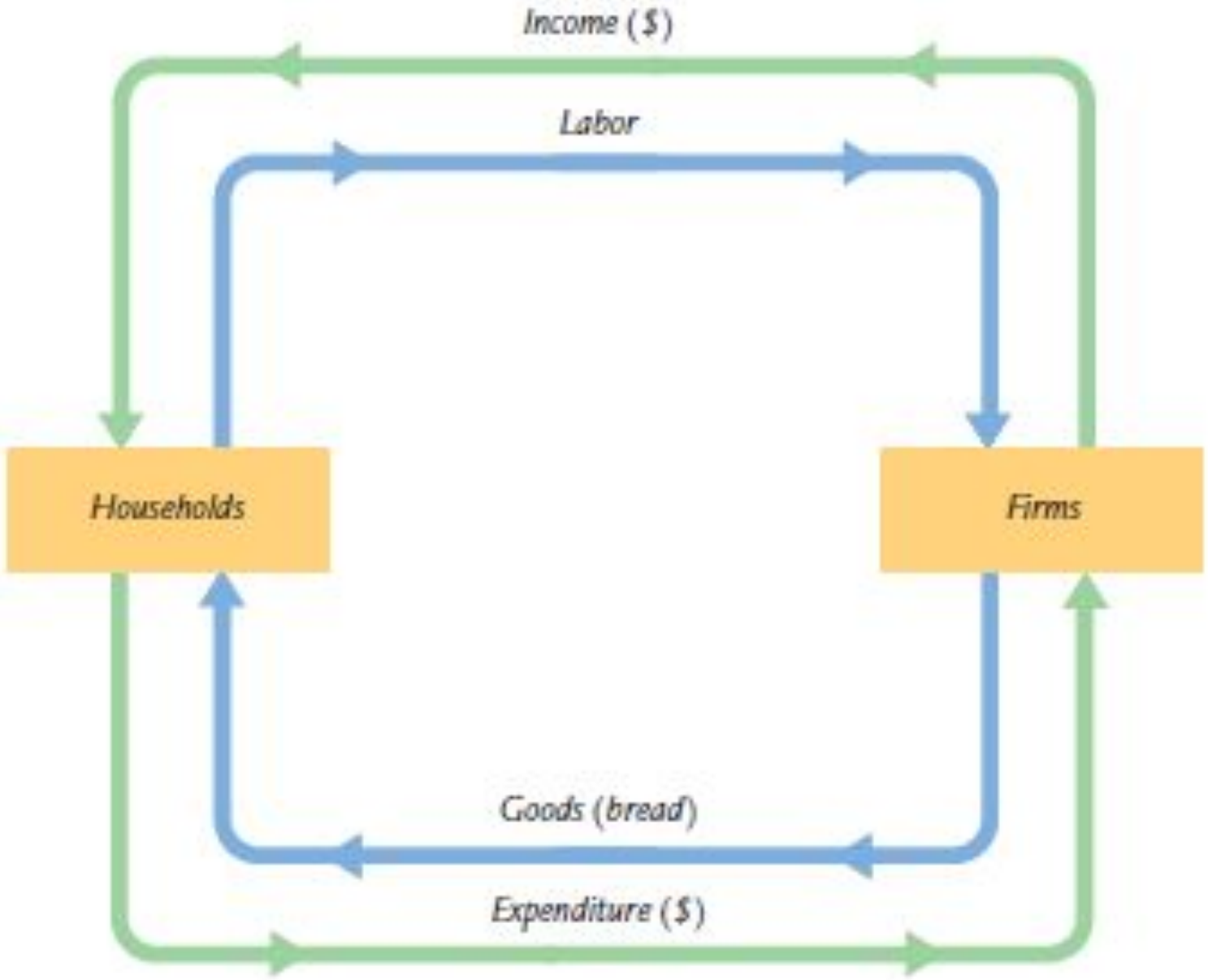
To understand GDP more fully,

we turn to national income accounting:

- **the accounting system used to measure**
- **GDP and**
- **many related statistics.**

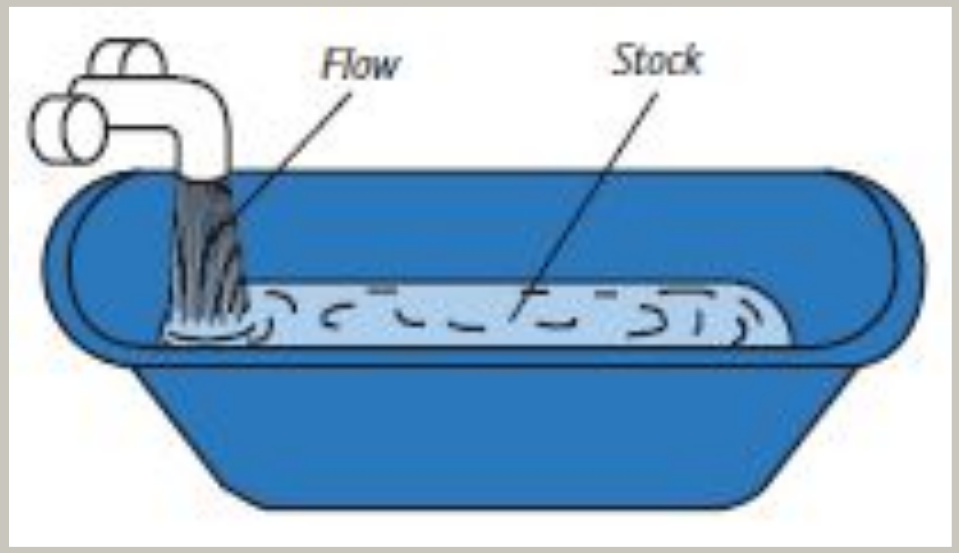
2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Income, Expenditure, and the Circular Flow
- Rules for Computing GDP
- Real GDP Versus Nominal GDP;The GDP Deflator



STOCKS AND FLOWS

- **A stock is a quantity measured** *at a given point in* time,
- **A flow is a quantity** measured *per unit of* time.



We measure stocks and flows in different units.

FYI

- The bathtub contains 50 *gallons **of** water*

but that

- Water is coming out of the faucet at 5 *gallons **per** minute.*

Questions

- A person's **wealth** is a ;
- his **income and expenditure** are .

- The number of **unemployed** people is a ;
- the number of **people losing their jobs** is a .

- The amount of **capital** in the economy is a ;
- the amount of **investment** is a .

- The government **debt** is a ;
- the government **budget deficit** is a .

FYI

Answers

- A person's **wealth** is a stock;
- his **income and expenditure** are flows.

- The number of **unemployed** people is a stock;
- the number of **people losing their jobs** is a flow.

- The amount of **capital** in the economy is a stock;
- the amount of **investment** is a flow.

- The government **debt** is a stock;
- the government **budget deficit** is a flow.

FYI

2.1 Gross Domestic Product

- Income, Expenditure, and the Circular Flow
- Rules for Computing GDP
- Real GDP Versus Nominal GDP;The GDP Deflator

GDP is

1) the market value of
2) all final G&S
3) produced within an economy
4) in a given period of time.

GDP = (Price of Apples × Quantity of Apples)
+ (Price of Oranges × Quantity of Oranges)
= ($0.50 × 4) + ($1.00 × 3) = $5.00.

- ***Used Goods***
  - GDP measures the value of ***currently produced*** *G&S.*
- ***The Treatment of Inventories***
  - If produced G&S spoil, it does not alter GDP.
  - If produced G&S is put into inventory, GDP rises.

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Income, Expenditure, and the Circular Flow
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Intermediate Goods and Value Added

- GDP is the **total value** of **final** G&S produced.

Examle

- A cattle rancher **sells meat** to McDonald's for $1, and then
- McDonald's **sells you a hamburger** for $3.

GDP = $4 (1+3)
or
GDP = $3 ?

The value added of a firm **equals (=)**
the **value of the firm's OUTPUT less (-)**
the **value of the intermediate goods** that the firm purchases

- **The value added of the rancher is $1, and**
- **the value added of McDonald's is $2 or $3 – $1,**
- **Total value added is $1 + $2 = $3.**

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

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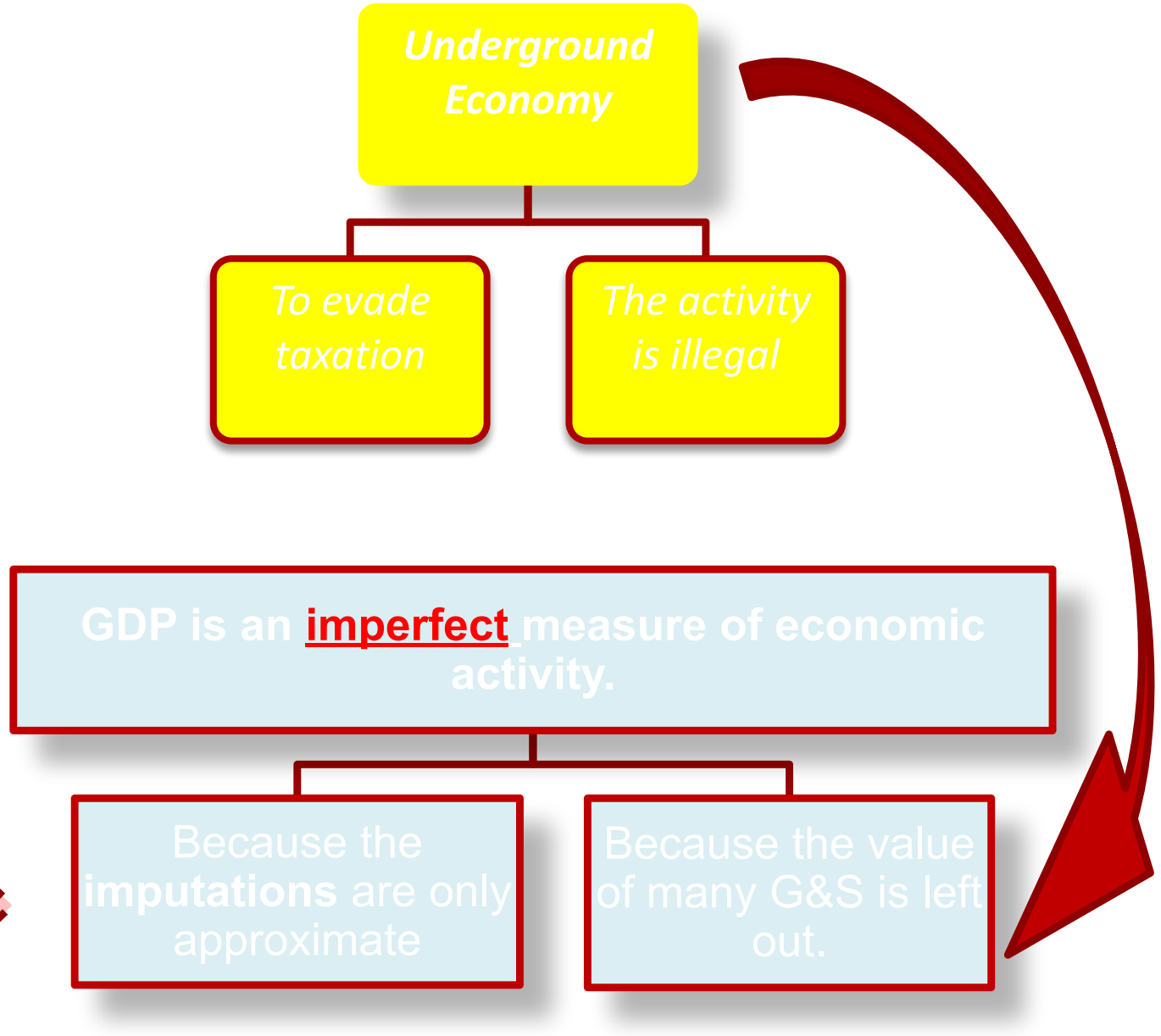
Housing Services and Other Imputations

- Some G&S are
  - ✔ not sold in the **marketplace** and
  - ✔ do not have **market prices**.
- For GDP, we must use an **estimate of their value**.
- Such an estimate is called **an IMPUTED VALUE**.

GDP includes	GDP does NOT include
• **rent on owner-occupied houses,**	• **rent of cars,**
• **government services**	• **jewellery,**
	• **meals, cooked at home**

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Income, Expenditure, and the Circular Flow
- Rules for Computing GDP
- Real GDP Versus Nominal GDP;The GDP Deflator
- Chain-Weighted Measures of Real GDP
- The Components of Expenditure
- Other Measures of Income; Seasonal Adjustment



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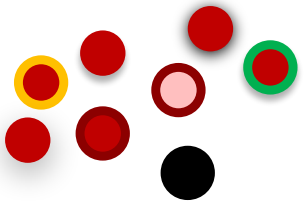
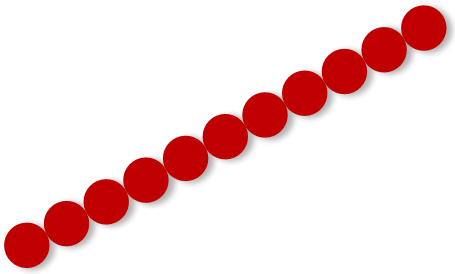
- **The imperfections** are most **PROBLEMATIC** when comparing **standards of living** across **countries**.



- **The imperfections** remains fairly constant over time =>

  GDP is **USEFUL** for **comparing economic activity from year to year.**



2.1 Measuring the Value of Economic Activity: Gross Domestic Product

1. The value of G&S measured at **current** prices is **nominal GDP.**
2. **Real GDP is the value of G&S** measured using a **constant** set of prices.

E X A M P L E

Real GDP in 2011 would be

Real GDP = (2011 Price of Apples × 2011 Quantity of Apples)
+ (2011 Price of Oranges × 2011 Quantity of Oranges).

Real GDP in 2012 would be

Real GDP = (_____ Price of Apples × _____ Quantity of Apples)
+ (2011 Price of Oranges × 2012 Quantity of Oranges).

Real GDP in 2013 would be

Real GDP = (_____ Price of Apples × _____ Quantity of Apples)
+ (_____ Price of Oranges × _____ Quantity of Oranges).

GDP deflator or
implicit price deflator for GDP,
is the ratio of nominal GDP to real GDP:

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}.$$

The GDP **deflator** measures

- **the price of output relative to**
- **its price in the base year.**

A new **base year** updates about **every 5 years**.

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Chain-Weighted Measures of Real GDP
- The Components of Expenditure
- Other Measures of Income
- Seasonal AdjustmenCt

- **Chain-weighted measures of real GDP, 1995**
- The base year changes **continuously over time**.

IN ESSENCE,
average prices in 2011 and 2012 are used to measure real growth from 2011 to 2012,
average prices in 2012 and 2013 are used to measure real growth from 2012 to 2013, and so on.

- This CWM of RGDP is **better** than the more traditional measure **because** -

  it ensures that **the prices are never far out of date.**

TWO ARITHMETIC TRICKS FOR WORKING WITH PERCENTAGE CHANGES

1. The percentage change of a product of 2 variables is approximately the sum of the percentage changes in each of the variables.	2. The percentage change of a ratio is approximately the percentage change in the numerator minus the percentage change in the denominator.
Percentage Change in (P × Y) **≈ (Percentage Change in P)** **+ (Percentage Change in Y).** •***P - GDP deflator ; Y - real GDP***	**Percentage Change in (Y/L)** **≈ (Percentage Change in Y)** **− (Percentage Change in L).** •***Y – GDP; L – population***
For instance, **In 2005**, Y is 100; P is 2; P×Y is 200. **In 2006,** Y is 103; P is 2.1; P×Y is 216.3 ⇒ Y rose by 3% ⇒ P rose by 5%. ⇒ PxY rose by of **8.15%.** *8.15% ≈ 8%*	For instance, **in the first year**, *Y is* 100,000 and *L is 100, so Y/L is 1,000;* **in the second year**, *Y is 110,000 and L is 103, so Y/L is* 1,068. *Notice that the growth in GDP per person (6.8%) is approximately the*

growth in Y+ growth in P=8%

FA

2.1 Gross Domestic Product

- The **national income accounts** divide GDP into four broad categories of spending:

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

This equation is an **national income accounts identity**.

Consumption consists of the G&S bought by households -

- nondurable goods,
- durable goods, and
- services

Investment consists of goods bought for future use:

- business fixed investment,
- residential fixed investment, and
- inventory investment

Government purchases are

- the G&S bought by federal, state, and local governments.

Net exports are

the value of G&S sold to other countries (exports) minus
the value of G&S that foreigners sell us (imports).

WHAT IS INVESTMENT?

The general rule

- investment does NOT include purchases that **reallocate existing assets** among different individuals.

- investment creates a **new** physical asset, called capital, which can be **used in future production**.

FYI

- Smith buys himself a 100-year-old Victorian house.

- Jones builds herself a brand-new contemporary house.

- Gates **buys** $5 million in IBM stock from Buffett on the New York Stock Exchange.

- General Motors sells $10 million in stock to the public and uses the proceeds to build a new car factory.

GDP AND ITS COMPONENTS

Case Study

GDP and the Components of Expenditure: 2010

	Total (billions of dollars)	Per Person (dollars)
Gross Domestic Product	**14,527**	**47,050**
Consumption	**10,246**	**33,184**
Nondurable goods	2,302	7,454
Durable goods	1,086	3,516
Services	6,859	22,214
Investment	**1,795**	**5,814**
Nonresidential fixed investment	1,390	4,502
Residential fixed investment	338	1,095
Inventory investment	67	217
Government Purchases	**3,003**	**9,726**
Federal	1,223	3,961
Defense	819	2,653
Nondefense	404	1,307
State and Local	1,780	5,765
Net Exports	**−517**	**−1,674**
Exports	1,840	5,959
Imports	2,357	7,633

Source: U.S. Department of Commerce.

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Chain-Weighted Measures of Real GDP
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GNP

- ***Gross national product*** **= GDP**

  + Factor Payments from Abroad

  – Factor Payments to Abroad.

  - ***GDP*** measures the total **income produced *domestically*,**
  - ***GNP*** measures the total **income earned by *nationals*** ***(****residents of a nation).*

NNP

- ***Net national product*** **= GNP – Depreciation.**
  - **The depreciation**—the amount of the economy's stock of plants, equipment, and residential structures that ***wears out*** **during the year**
  - Depreciation is also called the ***consumption of fixed capital.***

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Chain-Weighted Measures of Real GDP
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NI

- ***national income ≈NNP***
  - *They two differ by a small correction called the statistical* **discrepancy, which arises because different data sources may not be completely consistent.**
  - **National income** measures how much everyone in the economy has earned.
  - **National income** includes **6 components**, depending on who earns the income.

2.1 Gross Domestic Product

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I - Workers

1 Compensation of employees (63%).

II -Firms

2 Corporate profits (14%).

- *The income of corporations*

3 Proprietors' income (8%).

- *The income of noncorporate businesses*

4 Rental income (3%).

- *The income that landlords receive*

5 Net interest (4%).

- *The interest domestic businesses pay minus the interest* they receive, *plus* interest earned from foreigners.

III - Government

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Chain-Weighted Measures of Real GDP
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Personal Income =

National Income

− Indirect Business Taxes

− Corporate Profits

+ Dividends

− Social Insurance Contributions

+ Government Transfers to Individuals

− Net Interest

+ Personal Interest Income.

Disposable Personal Income

= Personal Income

– Personal Tax and

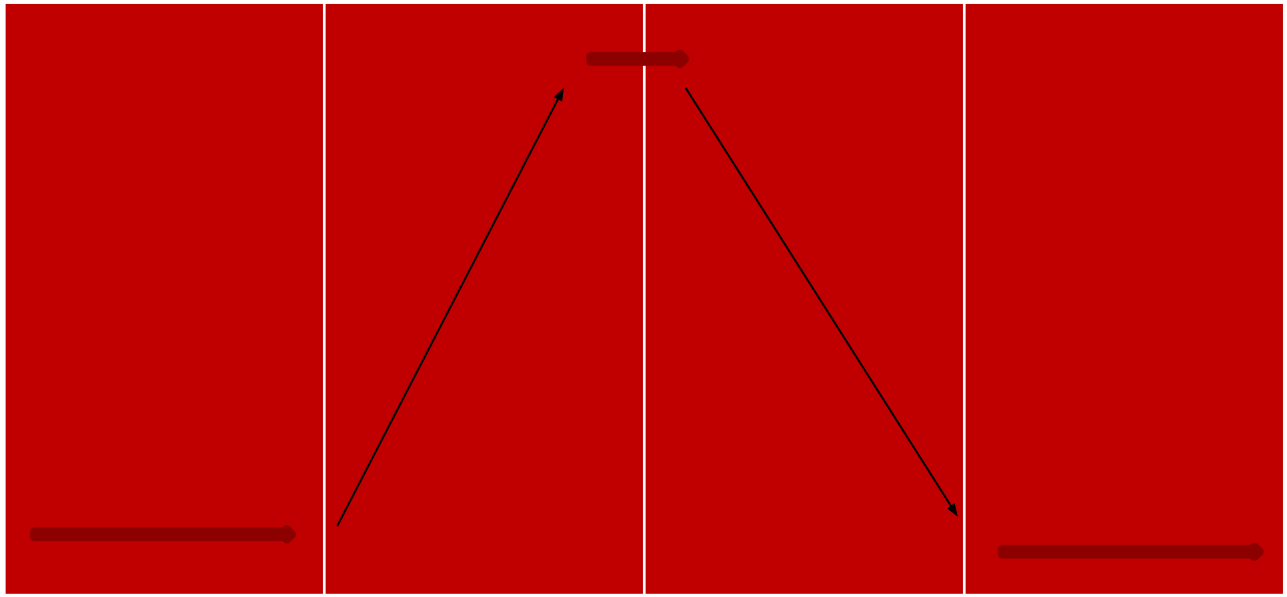
- Nontax Payments.

2.1 Measuring the Value of Economic Activity: Gross Domestic Product

- Chain-Weighted Measures of Real GDP
- The Components of Expenditure
- Other Measures of Income
- Seasonal Adjustment

- Most of the economic statistics reported in the newspaper are **seasonally adjusted.**
  - ***This means that the data have been adjusted*** to remove the regular seasonal fluctuations.

- => **when you observe a rise or fall in real GDP or any other data series, you must look beyond the seasonal cycle for the explanation.**



2-2 Measuring the Cost of Living: The Consumer Price Index

- The Price of a Basket of Goods
- The CPI Versus the GDP Deflator
- Does the CPI Overstate Inflation?

- **The increase in the overall level of prices**, called **inflation.**
- The most commonly **used measure of the level of prices is the consumer price index (CPI).**

- **For example,**

The typical consumer buys 5 apples and 2 oranges every month.

Then the basket of goods consists of 5 apples and 2 oranges, and the CPI is

$$\text{CPI} = \frac{(5 \times \text{Current Price of Apples}) + (2 \times \text{Current Price of Oranges})}{(5 \times \text{2011 Price of Apples}) + (2 \times \text{2011 Price of Oranges})}$$

The index tells us how much it costs now to buy 5 apples and 2 oranges ***relative*** to how much it cost to buy the same basket of fruit in 2011.

2-2 Measuring the Cost of Living: The Consumer Price Index

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1. **The PRODUCER price index,**
   - a typical basket of goods bought by firms.

2. **price indexes for SPECIFIC TYPES of goods,**
   - food, housing, and energy.

3. **CORE INFLATION STATISTIC**
   - a consumer basket that excludes **food and energy** products.

2-2 Measuring the Cost of Living: The Consumer Price Index

- The Price of a Basket of Goods
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- Does the CPI Overstate Inflation?

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

•GDP deflator

•measures the prices of **All** G&S produced

•includes only those goods produced **domestically**

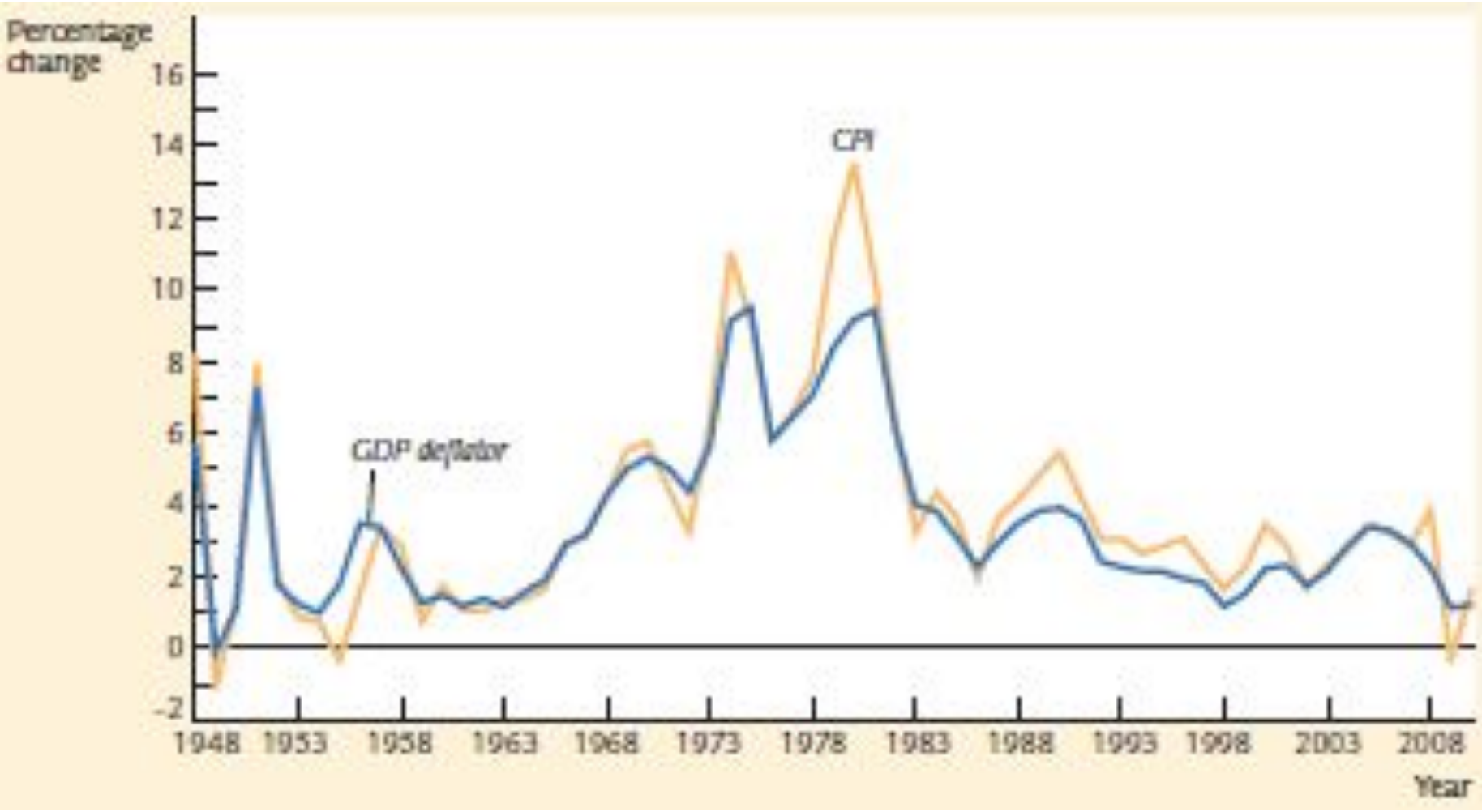
•assigns **changing weights**

•CPI

•measures the prices of only the G&S bought by **consumers**

•Includes goods produced Domestically & **imported goods**

•assigns **fixed** weights to the prices of different goods



The GDP Deflator and the CPI

- This figure shows the % change in the GDP deflator and in the CPI for every year from 1948 to 2010.
- Although these two measures of prices diverge at times, they usually tell the same story about how quickly prices are rising.

2-2 Measuring the Cost of Living: The Consumer Price Index

- The Price of a Basket of Goods
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- Does the CPI Overstate Inflation?

$$I_L = \frac{\Sigma(Q_0 \cdot P_t)}{\Sigma(Q_0 \cdot P_0)}$$

$$I_p = \frac{\Sigma(Q_t \cdot P_t)}{\Sigma(Q_t \cdot P_0)}$$

- **fixed** basket of goods

- **changing** basket

If prices of different goods are changing by different amounts

- It overstates ↑

- it understates ↓

the increase in the cost of living

- consumers have the opportunity to substitute less expensive goods for more expensive ones

- reduction in consumers' welfare may result from such substitutions

2-2 Measuring the Cost of Living: The Consumer Price Index

- The Price of a Basket of Goods
- The CPI Versus the GDP Deflator
- Does the CPI Overstate Inflation?

COLAs (cost-of-living allowances) *use the CPI to adjust for changes in the price level*

Why the **CPI** Overstate Inflation?

1. One problem is the **substitution bias** we have already discussed.
2. A second problem is the **introduction of new goods.**
3. A third problem is **unmeasured changes in quality**

→ economists have suggested revising laws to reduce the degree of indexation

For example

- Social Security benefits could be indexed to CPI inflation **minus** 1%.

THE BILLION PRICES PROJECT

- Cavallo and Rigobon collect data on the prices charged by ONLINE retailers.
- From their offices in Cambridge, Massachusetts, they track about
  - 5 million items sold in
  - 70 countries by
  - 300 online retailers.

+

Quickly,
daily
Less work
Similar to CPI in USA

-

Not all G&S
Significantly different from CPI in some countries

Case Study

2-3 Measuring Joblessness: The Unemployment Rate

- The Household Survey
- The Establishment Survey

The unemployment rate is the statistic that measures the % of those people wanting to work who do not have jobs.

- The ***U*** comes from a survey of households.
  - age 16 and older
  - three categories:

1. **Employed**
   - worked as **paid employees,**
   - worked in their **own business,**
   - Worked as **unpaid** workers in a **family member's business**
   - not working but who had jobs from which they were temporarily absent
     - ✔ vacation,
     - ✔ illness, or
     - ✔ bad weather.
2. **Unemployed**
   - *were not employed,*

   were available for work,

   had tried to find employment during the previous 4 weeks.

2-3 Measuring Joblessness: The Unemployment Rate

- The Household Survey
- The Establishment Survey

- Who wants a job but has given up looking—a **discouraged worker**— is counted as **not being in the labor force**.

The labor force is defined as the sum of the employed and unemployed,

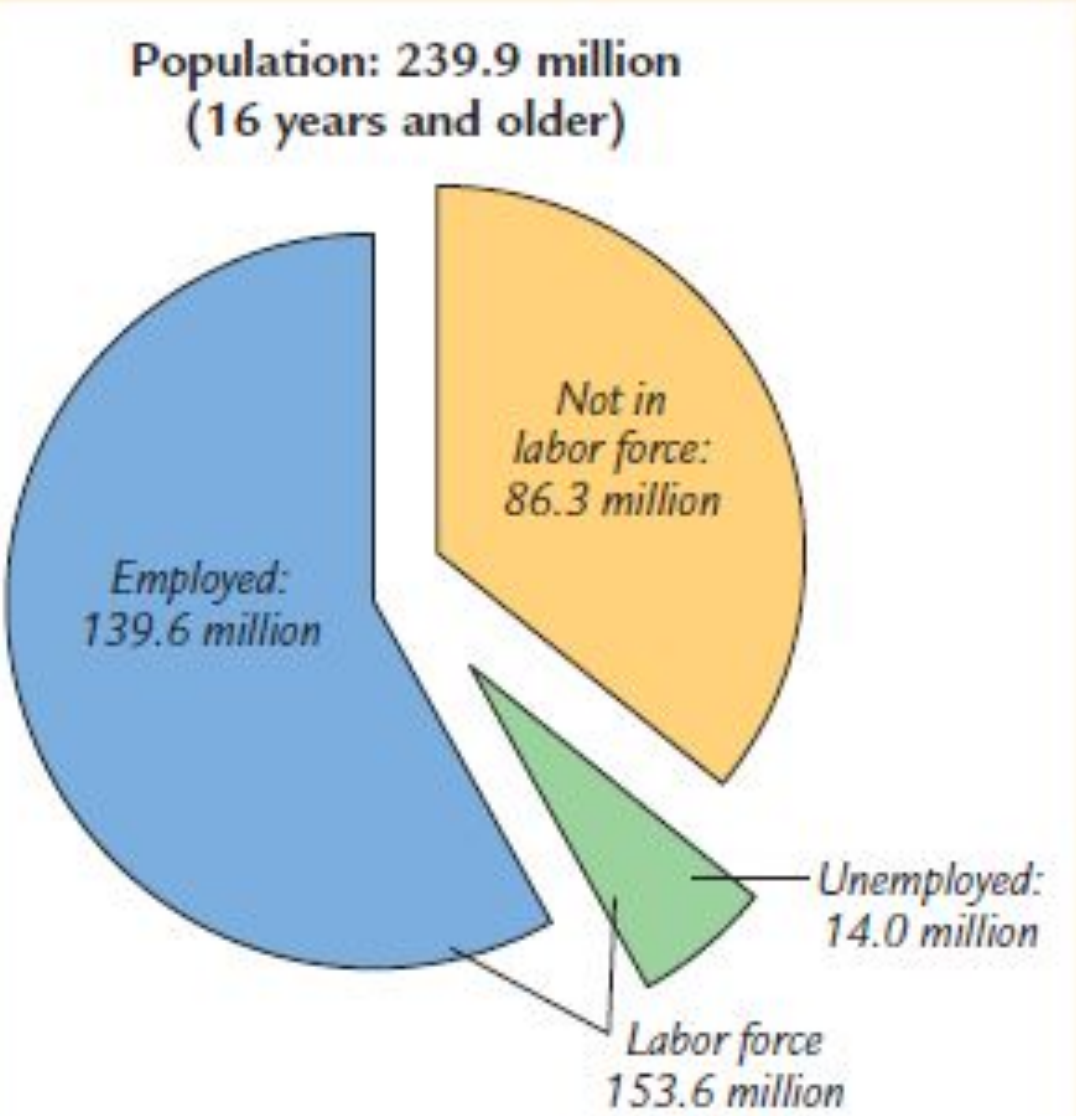
Labor Force = Number of Employed + Number of Unemployed

The unemployment rate is defined as the percentage of the labor force that is unemployed.

Unemployment Rate = Number of Unemployed × 100/Labor Force

A related statistic is **the labor-force participation rate**, the percentage of the adult population:

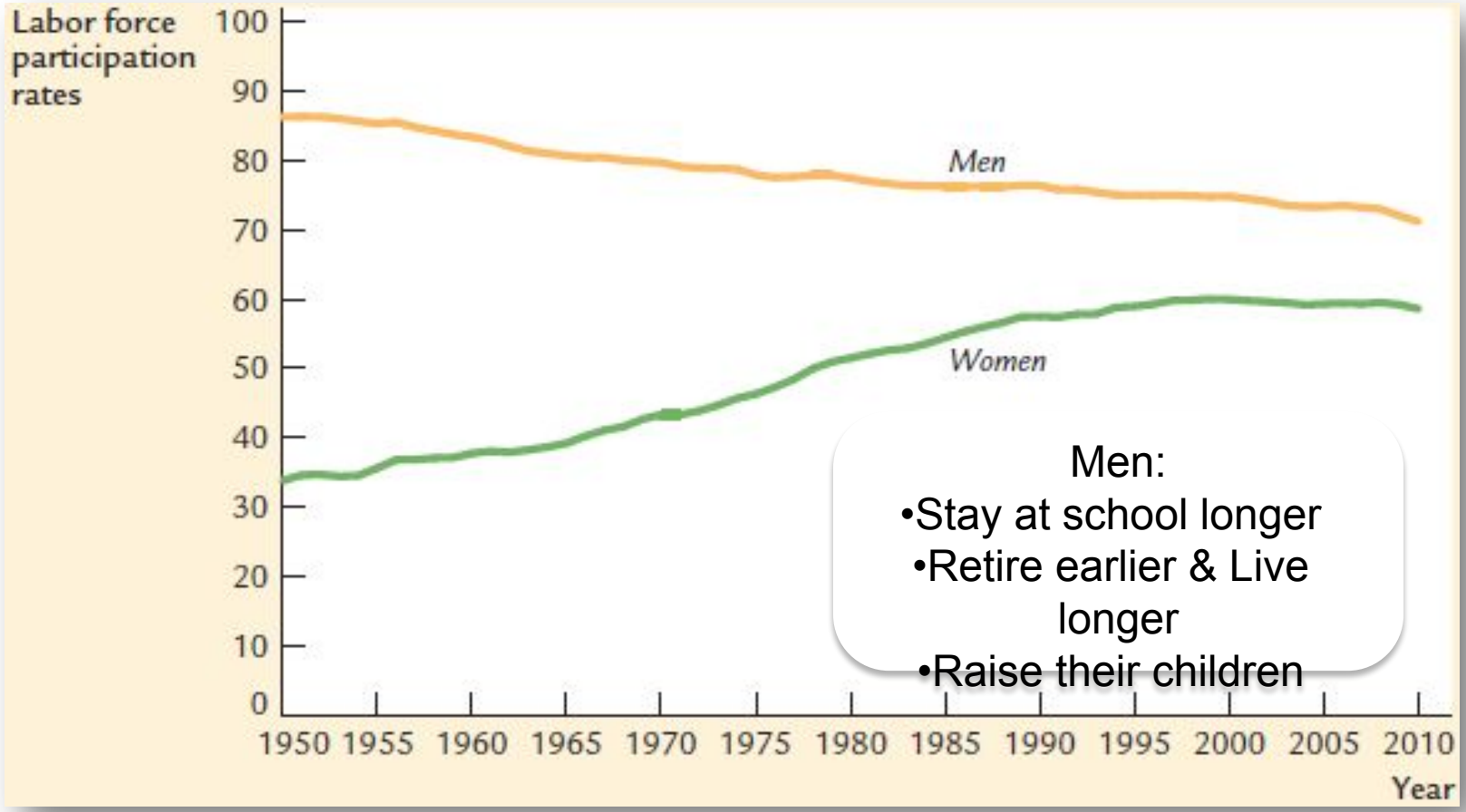
Labor -Force Participation Rate = Labor Force × 100/Adult Population



The Three Groups of the Population When the Bureau of Labor Statistics surveys the population, it places all adults into one of three categories: employed, unemployed, or not in the labor force. This figure shows the number of people in each category in August 2011.

Source: U.S. Department of Labor.

TRENDS IN LABOR-FORCE PARTICIPATION



Labor-Force Participation.
Over the past several decades, the labor-force participation rate for women has risen, while the rate for men has declined.

Case Study

2-3 Measuring Joblessness: The Unemployment Rate

- The Household Survey
- The Establishment Survey

The establishment survey	The household survey
The # of workers firms have on their payrolls	The # of people who say they are working
	Self-employed
	Two jobs
New firms start up	
More accurate	
1 mln. ↓	1,4 mln. ↑
Average???	

2-4 Conclusion: From Economic Statistics to Economic Models

- **The three statistics quantify the performance of the economy:**
  a. gross domestic product,
  b. The consumer price index,
  c. the unemployment rate.

- **These statistics is used**
  a. to monitor changes in the economy
  b. to formulate appropriate policies
  c. to develop and test theories about how the economy works.

We will

d. examine some of these theories,
e. build models that explain how these variables are determined and how economic policy affects them.

THANKS !