

MGM 112

Introduction to Economics

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Lecture 10

Measuring a Nation's Income: I- GDP measurement



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Syllabus

System of National
Accounts:
an overview

II-National Income
Accounting: The
Measurement of
Production,
Income, and
Expenditure

III-GDP
Measurement and
National Accounts

IV- GDP vs. GNP

V- GDP per capita
and the PPP

VI-Net National
Product vs
National Income

System of National Accounts: an overview

The System of National Accounts (SNA) is the internationally agreed standard set of recommendations on how to compile measures of economic activity.

The SNA describes a coherent, consistent and integrated set of **macroeconomic accounts** in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules.

There are many kinds of indicators of economic well-being of society: **Gross national product (GNP), Gross Domestic Product (GDP), Net National Product (NNP), National Income (NI), Personal income (PI), Disposable income (DI)...**

System of National Accounts: an overview

In this chapter, we'll look for the answers to these questions:

- What is Gross Domestic Product (GDP)?
- What are other measures of macroeconomic activity?
- How is GDP related to a nation's total income and spending?
- What are the components of GDP?
- How is GDP corrected for inflation?
- Does GDP measure society's well-being?

The national income accounts is an accounting framework used in measuring current economic activity.

- The **Product approach** measures the amount of output produced, excluding output used up in intermediate stages of production.
- The **Income approach** measures the incomes received by the producers of output.
- The **Expenditure approach** measures the amount of spending by
 - the ultimate purchasers of output.



I-National Income Accounting

- Why are the three approaches equivalent?

They must be, by definition:

- Any output produced (product approach) is purchased by someone (expenditure approach) and results in income to someone (income approach)
- The fundamental identity of national income accounting:

$$\text{Total Production} = \text{Total Income} = \text{Total Expenditure}$$

I-National Income Accounting

I-2-The Circular-Flow Diagram

- It's a simple depiction of the macroeconomy
- It illustrates GDP as spending, revenue, factor payments, and income
- Preliminaries:
 - **Factors of production** are inputs like labor, land, capital, and natural resources.
 - **Factor payments** are payments to the factors of production (*e.g.*, wages, rent).

I-National Income Accounting

Firms

Firms:

- buy/hire factors of production, use them to produce goods and services
- sell goods & services

Households:

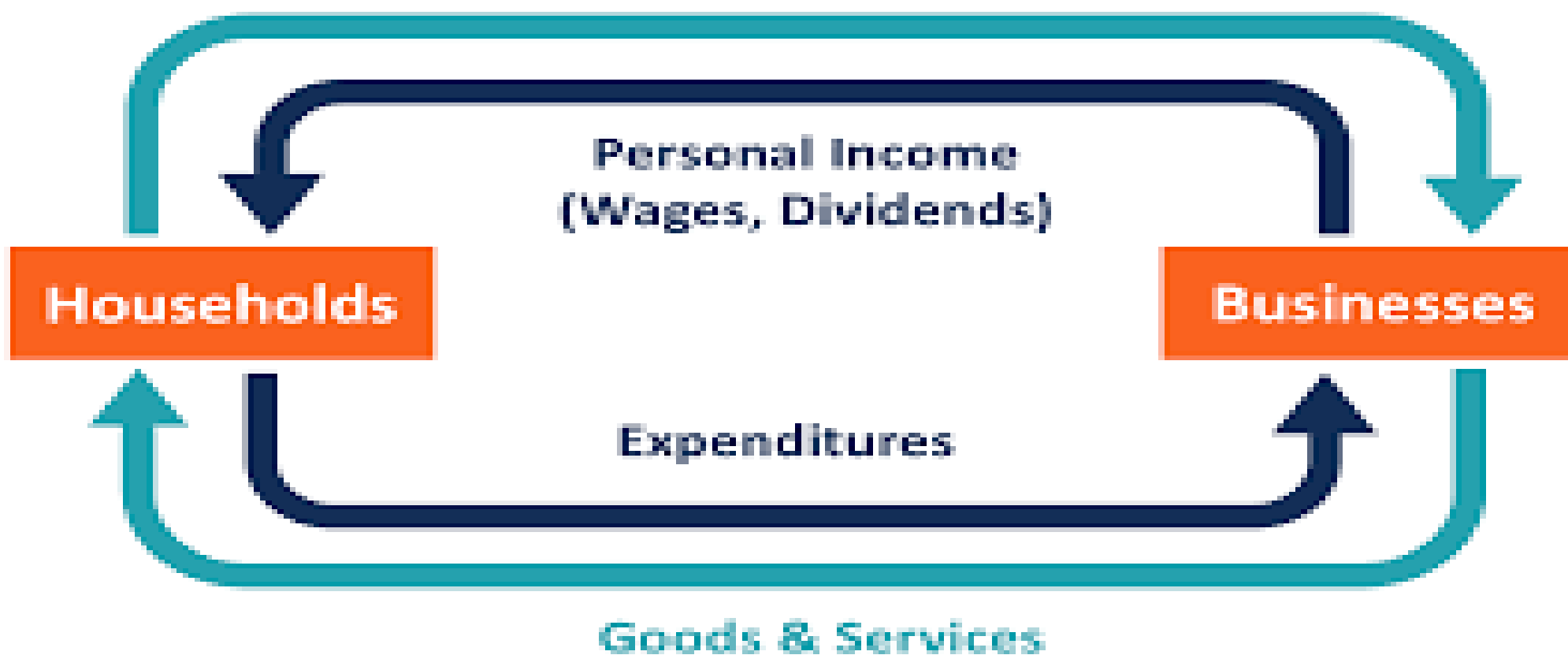
- own the factors of production, sell/rent them to firms for income
- buy and consume goods & services

Households

I-National Income Accounting

Two-Factor Circular Flow Model

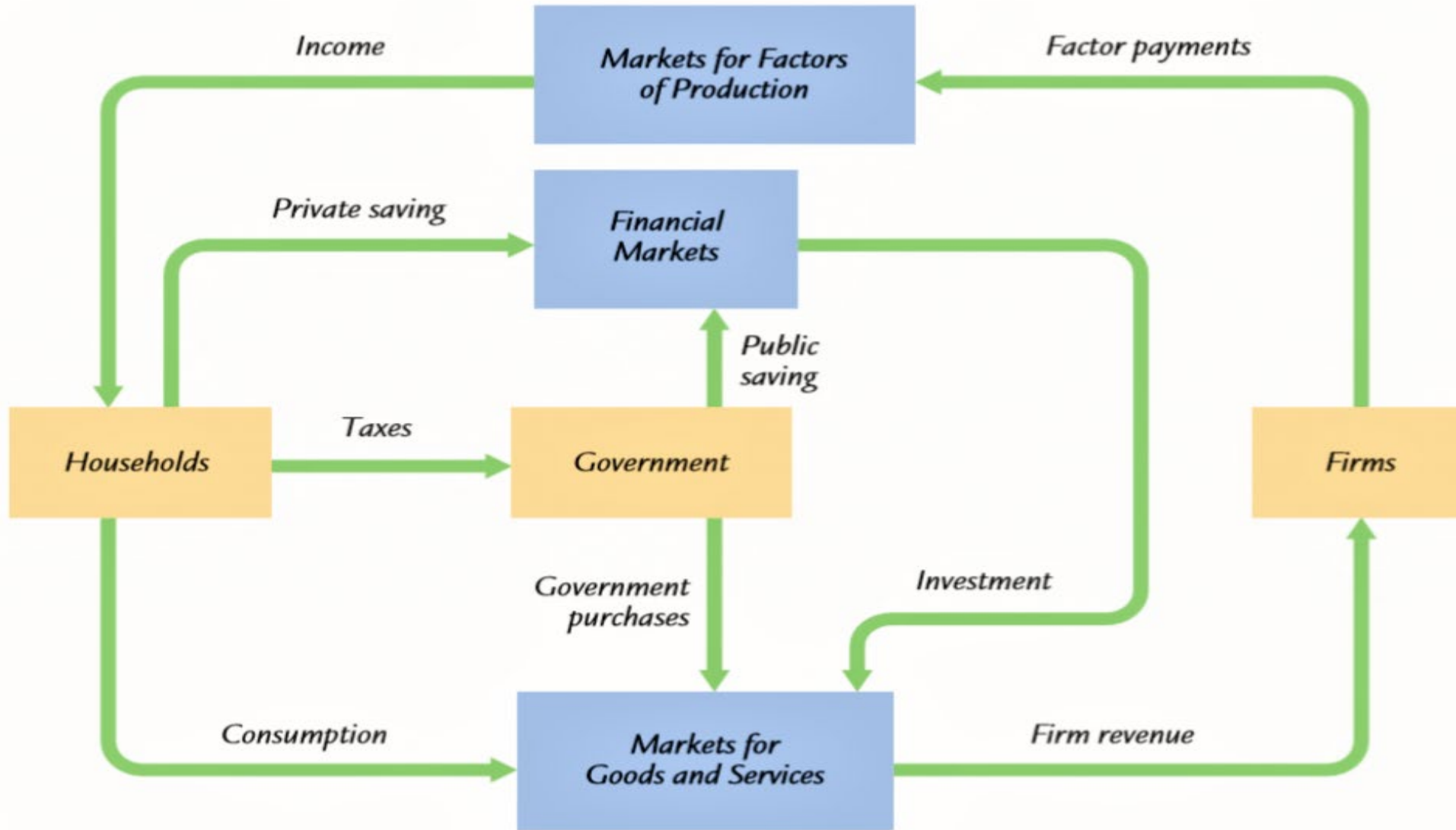
Factor for Production (Labor)



**A- The
Circular-Flow
Diagram:**

**The Simple
Model**

I-National Income Accounting



**B- The
Circular-
Flow
Diagram:**

**The
Realistic
Model**

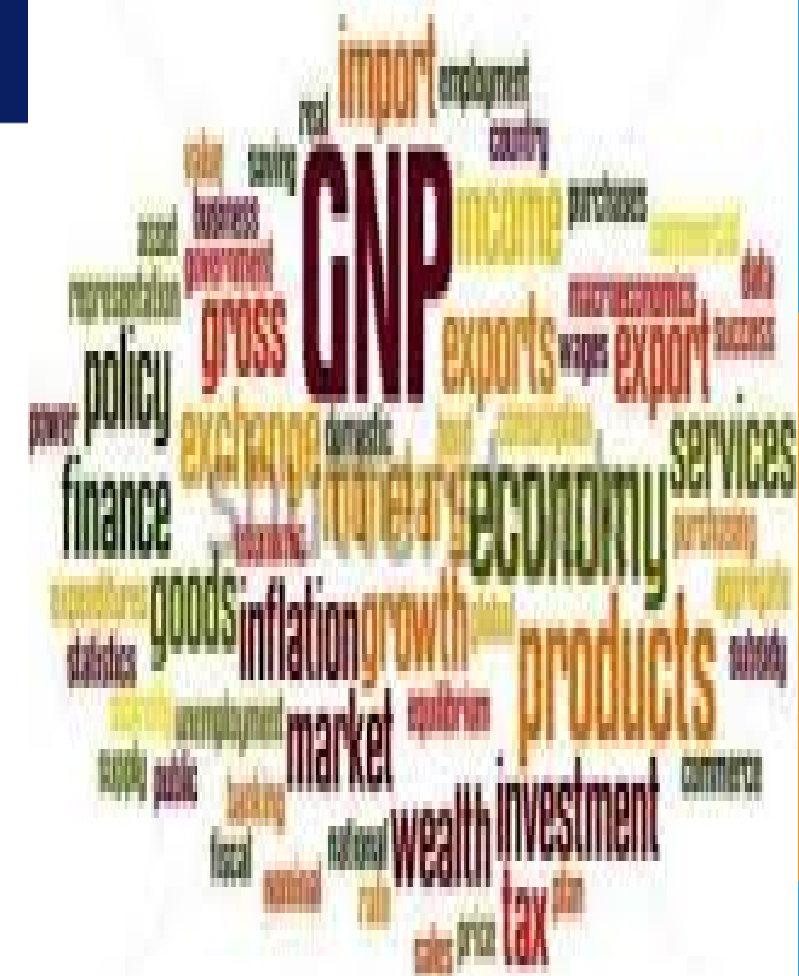
II-GDP MEASUREMENT and NATIONAL ACCOUNTS

III-1- Definition of the GDP

III-2-The Components of GDP

III-3-Real GDP vs Nominal GDP

III-4-The virtue of Real GDP



II-GDP Measurement and National Accounts

III-1- Definition of the GDP

- **Gross Domestic Product** (GDP) is the market value of the final goods and services produced within a country in a given time period (typically one year) without regard for the ownership of inputs.



II-GDP Measurement and National Accounts

III-2-The Components of GDP

Recall: GDP is total spending.

- Four components:
 - Consumption (**C**)
 - Investment (**I**)
 - Government Purchases (**G**)
 - Net Exports (**NX**)
- These components add up to GDP (denoted **Y**):

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

III-2-1-The Consumption (C)

- It is the total spending by households on goods & services.
- Note on housing costs:
 - For renters:
consumption includes rent payments.
 - For homeowners:
consumption includes the imputed rental value of the house, but not the purchase price or mortgage payments.

III-2-2-The Investment (I)

- is total spending on goods that will be used in the future to produce more goods.
- includes spending on
 - capital equipment (e.g., machines, tools)
 - structures (factories, office buildings, houses)
 - inventories (goods produced but not yet sold)

*Note: “**Investment**” does not mean the purchase of financial assets like stocks and bonds.*

II-GDP Measurement and National Accounts

III-2-3-The Government Purchases (G)

- is all spending on the g&s purchased by govt at the federal, state, and local levels.
- **G** excludes **transfer payments**, such as Social Security or unemployment insurance benefits. They are not purchases of g&s.

III-2-4-Net Exports (NX)

- **NX** = exports – imports
- Exports represent foreign spending on the economy's g&s.
- Imports are the portions of **C**, **I**, and **G** that are spent on g&s produced abroad.

II-GDP Measurement and National Accounts

Adding up all the components of GDP gives:

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

III-GDP Measurement and National Accounts

III-3-Real GDP vs Nominal GDP

- Inflation can distort economic variables like GDP, so we have two versions of GDP: ***One is corrected for inflation, the other is not.***
- **Inflation** is the decline of purchasing power of a given currency over time.

It's a quantitative estimate of the rate at which the decline in purchasing power occurs can be reflected in the increase of an average price level of a basket of selected goods and services in an economy over some period of time.

The rise in the general level of prices, often expressed as a percentage, means that a unit of currency effectively buys less than it did in prior periods.

III-GDP Measurement and National Accounts

- **Real GDP** is the value of final goods and services produced in a given year when valued at the prices of a reference **base year**. Real GDP is corrected for inflation (**GDP in fixed prices**).
- **Nominal GDP** is the value of final goods and services produced in a given year when valued at the prices of that year. It is not corrected for inflation. (**GDP in current prices**).

III-GDP Measurement and National Accounts

ACTIVE LEARNING

1:

Computing
GDP

	Corn		Tea	
<i>year</i>	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
2005	\$10	400	\$2.00	1000
2006	\$11	500	\$2.50	1100
2007	\$12	600	\$3.00	1200

Compute **nominal GDP** in each year:

$$2005: \$10 \times 400 + \$2 \times 1000 = \$6,000$$

$$2006: \$11 \times 500 + \$2.50 \times 1100 = \$8,250$$

$$2007: \$12 \times 600 + \$3 \times 1200 = \$10,800$$

Nominal GDP Growth Rate:

37.5%

30.9%

Percentage Change in Nominal GDP

$$= \left(\frac{\text{Nominal GDP}_{\text{Later Year}} - \text{Nominal GDP}_{\text{Earlier Year}}}{\text{Nominal GDP}_{\text{Earlier Year}}} \right) \times 100$$

III-GDP Measurement and National Accounts

ACTIVE LEARNING G 1:

Computing GDP

	Corn		Tea	
year	P	Q	P	Q
→ 2005	\$10	400	\$2.00	1000
2006	\$11	500	\$2.50	1100
2007	\$12	600	\$3.00	1200

Compute **Real GDP** in each year, using **2005 as the base year**:

Real GDP Growth Rate

$$\begin{array}{lcl}
 \text{2005:} & \$10 \times 400 + \$2 \times 1000 & = \$6,000 \\
 \text{2006:} & \$10 \times 500 + \$2 \times 1100 & = \$7,200 \\
 \text{2007:} & \$10 \times 600 + \$2 \times 1200 & = \$8,400
 \end{array}
 \left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} 20.0\% \\ 16.7\% \end{array}$$

Percentage Change in Real GDP

$$= \left(\frac{\text{Real GDP}_{\text{Later Year}} - \text{Real GDP}_{\text{Earlier Year}}}{\text{Real GDP}_{\text{Earlier Year}}} \right) \times 100$$

III-4-The Virtue of Real GDP

- By comparing the value of production in the two years at the same prices, we reveal the change in production.
- Changes in nominal GDP are driven not only by changes in physical production but also by changes in prices.
- Changes in real GDP are driven solely by changes in physical production.

- Real GDP vs. Nominal GDP: Which Is a Better Indicator?

Real Gross Domestic Product (GDP) is a more accurate reflection of the output of an economy than nominal GDP.



By eliminating the distortion caused by [inflation](#) or [deflation](#) or by fluctuations in currency rates, real GDP gives economists a clearer idea of how the total national output of a country is growing or contracting from year to year.

IV- GDP vs. GNP

IV-1-Definitions

IV-2-GDP vs GNP comparative table

IV- GDP vs. GNP

IV-1-Definitions

- **GDP** (or **Gross Domestic Product**) and **GNP** (**Gross National Product**) measure the size and strength of an economy but are calculated and used in different ways.
- **GDP** notion is based on the **LOCATION** of inputs.
- **GNP** notion is based on the **OWNERSHIP** of inputs.
- For majority of countries the difference between GDP and GNP is small (e.g. for US economy it is smaller than 1%).

IV- GDP vs. GNP

Gross National Product Formula

$$\text{GNP} = \text{C} + \text{I} + \text{G} + \text{X} + \text{Z} \quad \text{or} \quad \text{GNP} = \text{GDP} + \text{Z}$$

Where:

C = Consumption

I = Investment

G = Government Expenditure

X = Net Exports (Value of imports - value of exports)

Z = Net Income (Net income inflows from abroad - net income outflows to foreign countries)

IV- GDP vs. GNP

IV-2-GDP vs GNP comparative table

Gross Domestic Product (GDP) vs. Gross National Product (GNP)

GDP Location > Nationality	GNP Nationality > Location
All income generated within a country Regardless of producer nationality	All income generated by a country's residents Regardless of resident location
Excludes income from investments in other countries	Excludes income generated by foreign producers within country borders

IV-3- The GDP Deflator

- The **GDP deflator** is a measure of the overall level of prices.
- Definition:

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

- One way to measure the **economy's inflation rate** is to compute the percentage increase in the GDP deflator from one year to the next.

Example:

<i>year</i>	<i>Nominal GDP</i>	<i>Real GDP</i>	<i>GDP Deflator</i>	
2005	\$6000	\$6000	100.0	} 14.6%
2006	\$8250	\$7200	114.6	
2007	\$10,800	\$8400	128.6	} 12.2%

Compute the GDP deflator in each year:

2005: $100 \times (6000/6000) = 100.0$

2006: $100 \times (8250/7200) = 114.6$

2007: $100 \times (10,800/8400) = 128.6$

V- GDP per capita and the PPP

V-1-GDP per capita

V-2- PPP GDP per capita

V-3- What is under control in PPP GDP per capita measurement

V-4- What is NOT under control in PPP GDP per capita measurement

V- GDP per capita and the PPP

V-1-GDP per capita

- **GDP per capita** = the gross income received by the average resident of a country

$$\text{GDP per capita} = \text{GDP} / \text{number of residents}$$

V- GDP per capita and the PPP

V-2- PPP GDP per capita

- **PPP GDP per capita**: GDP per capita presented on a purchasing power parity basis.
- **Purchasing Power Parity (PPP)**: an economic theory that estimates the amount of adjustment needed on the exchange rate between countries in order for the exchange to be equivalent to each currency's purchasing power.

V- GDP per capita and the PPP

V-3- What is under control in PPP GDP per capita measurement

- Differences in currencies among countries
- Differences in prices among countries

V- GDP per capita and the PPP

V-4- -What is NOT under control in PPP GDP per capita measurement

- Division of income in the society
- Non-official production / underground economy Transactions that do not take place in organized markets
- **Negative externalities of production** (exist when individuals bear a portion of the cost associated with a good's production without having any influence over the related production decisions).

VI-Net National Product (NNP) vs National Income (NI)

V-1- The Net national product (NNP)

The Net national product (NNP) is gross national product (GNP), the total value of finished goods and services produced by a country's citizens overseas and domestically, minus depreciation.

$$\text{NNP} = \text{GNP} - \text{depreciation}$$

- Depreciation is the estimate of the amount of capital (invested in assets of the economy) that will wear out or will be used up in producing GNP.

VI-Net National Product (NNP) vs National Income (NI)

V-2- The National Income (NI)

$$\text{NI} = \text{NNP} - \text{indirect taxes}$$

Indirect taxes are subtracted because they have no equivalent in production.

- **Direct taxes:** taxes put on income directly (income taxes)
- **Indirect taxes:** taxes put on income indirectly (sales and excise taxes)



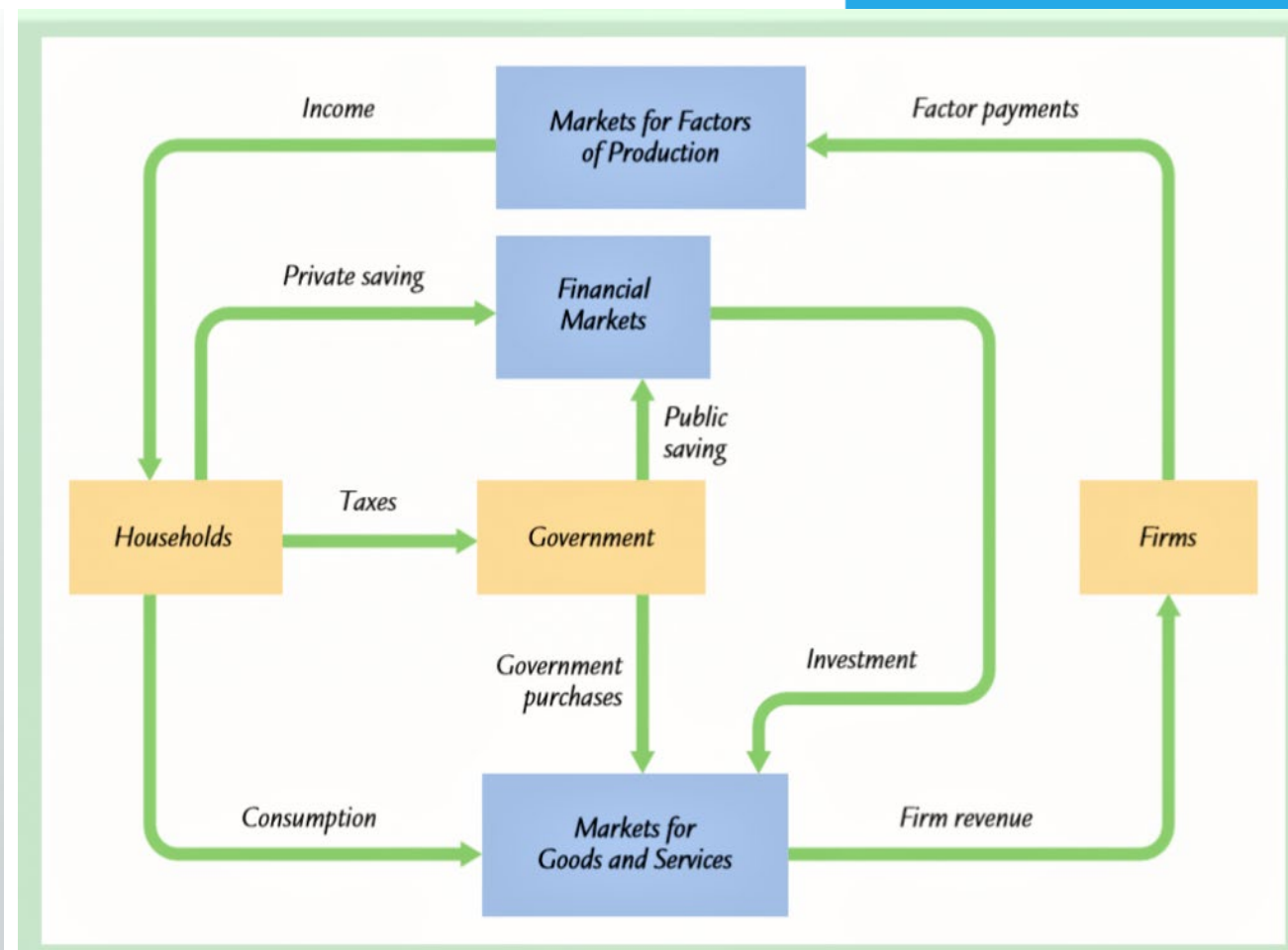
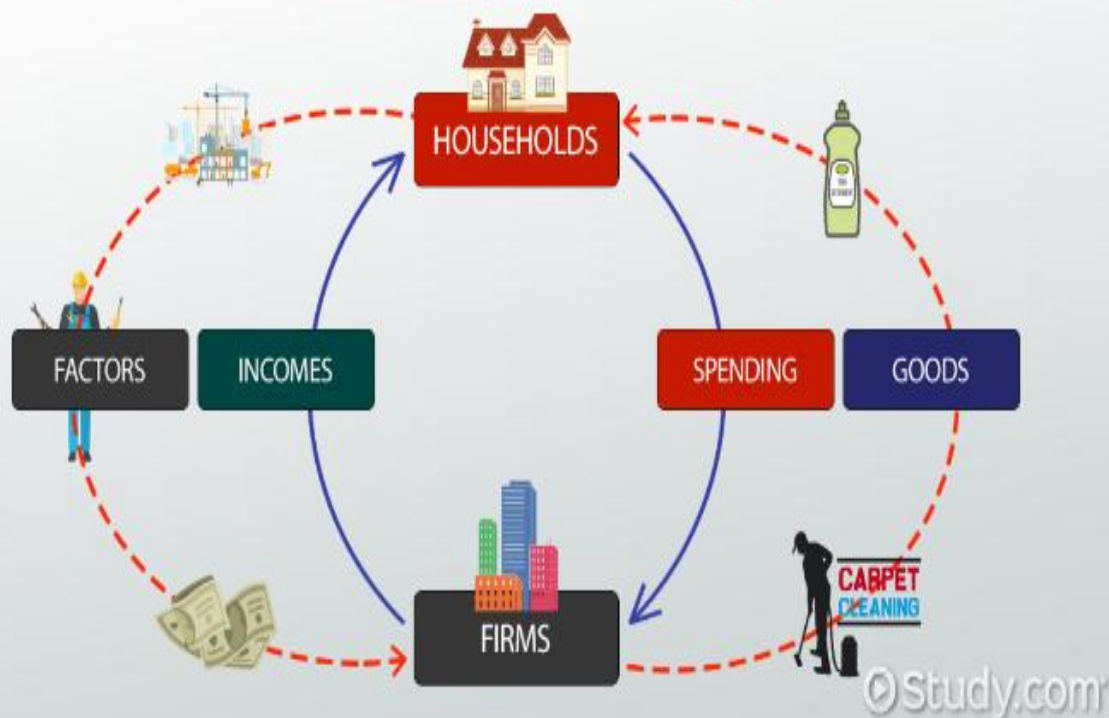
SUMMARY!

Lecture 10

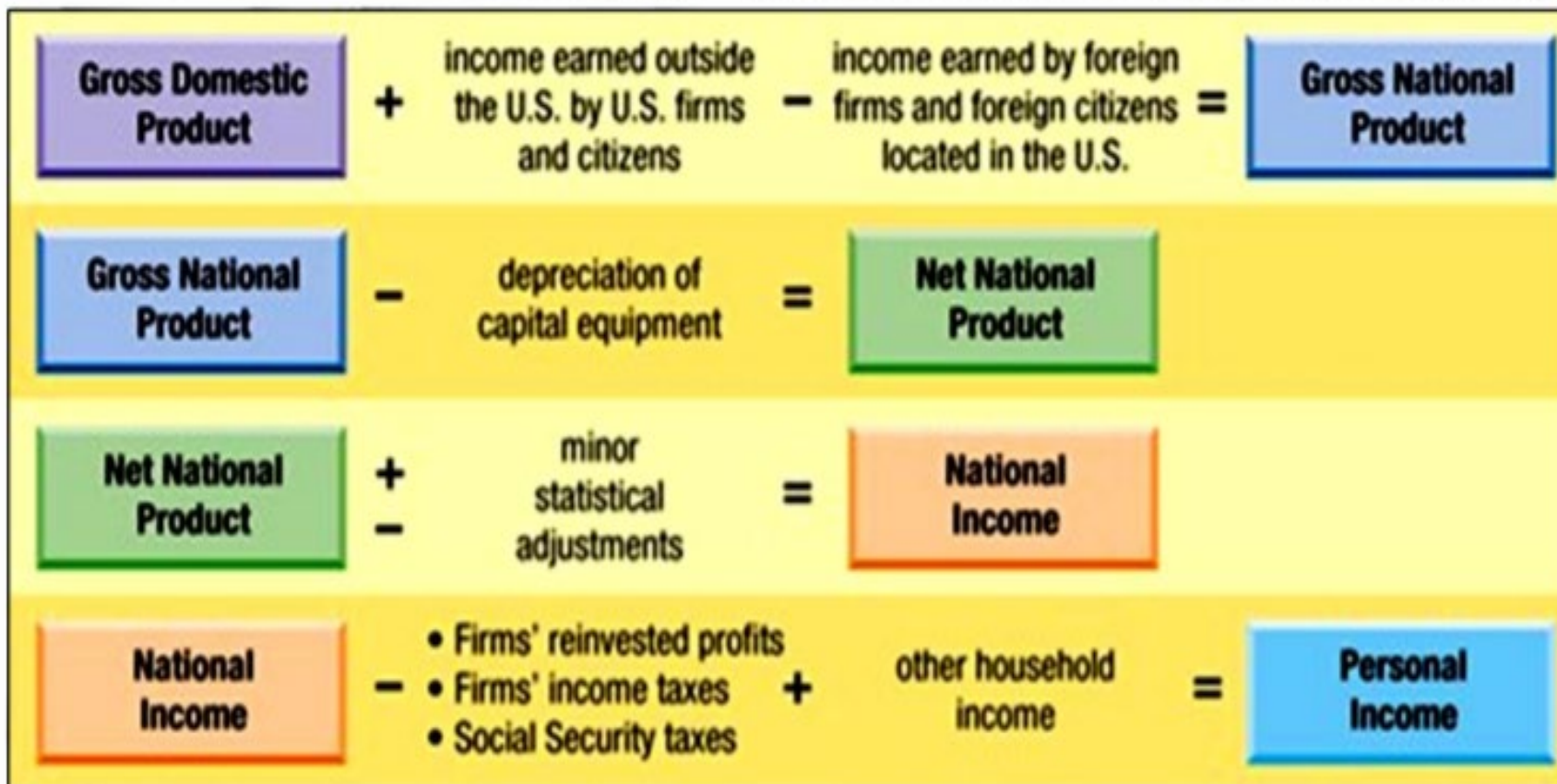
Circular flow Diagram: Simple & Realistic Model

LESSON SUMMARY

Circular Flow Diagram



GRAPHIC SUMMARY: *Measurements of the Macroeconomy*



Various measures are used by economists to track changes in the nation's economy.

GDP GNP NNP NI



Inflation rate Growth rate

Inflation rate and growth rate is a percent change

Percentage Change in Nominal GDP

$$= \left(\frac{\text{Nominal GDP}_{\text{Later Year}} - \text{Nominal GDP}_{\text{Earlier Year}}}{\text{Nominal GDP}_{\text{Earlier Year}}} \right) \times 100$$

Percentage Change in Real GDP

$$= \left(\frac{\text{Real GDP}_{\text{Later Year}} - \text{Real GDP}_{\text{Earlier Year}}}{\text{Real GDP}_{\text{Earlier Year}}} \right) \times 100$$

Inflation Rate

$$= \left(\frac{\text{Price index}_{\text{Later Year}} - \text{Price Index}_{\text{Earlier Year}}}{\text{Price Index}_{\text{Earlier Year}}} \right) \times 100$$

The PPP rate is difficult to calculate



Our staple foods are soy milk, olive oil, fish and rice.

Public transport is good and free. Cars and gasoline are heavily taxed.



Our staple foods are milk, butter, beef and potatoes.

Public transport is poor. Cars and gasoline are subsidized.

**Shopping habits
are different**

**Economic policies
are different**

A red pushpin is pinned to the top center of the yellow sticky note.

THANK
YOU!

