

## Sessions 1-2-3

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Macroeconomics,  
Circular Flow of Income,  
Macroeconomic Relationships,  
and National Income Accounting

# Readings

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- 1) N Gregory Mankiw: Macroeconomics, Worth Publishers (OR) Principles of macroeconomics, Cengage Learning.
- 2) Paul Krugman & Robin Wells: Macroeconomics, 4<sup>th</sup> edition, Worth Publishers
- 3) Oliver Blanchard: Macroeconomics, 7<sup>th</sup> Edition, Pearson
- 4) Frederic S. Mishkin: Macroeconomics (Policy & Practice), 2<sup>nd</sup> Edition, Pearson
- 5) H.L. Ahuja: Macroeconomics (Theory & Policy), S. Chand and Company Ltd.
- 6) I. C. Dhingra and V. K. Garg: National Income Accounting, Sultan Chand and Sons
- 7) Rudiger Dornbusch, Stanley Fischer & Richard Startz: Macroeconomics, 13<sup>th</sup> Edition, Tata McGraw Hill Foundation
- 8) Shyamal Roy: Macroeconomic Policy environment, Tata McGraw Hill
- 9) Ha-Joon Chang: Economics, Pelican, 2015
- 10) William A. McEachern and A. Indira: MacroEcon- A South Asian Perspective, Cengage learning
- 11) R. Glenn Hubbard and Anthony Patrick O'Brien: Macroeconomics, Pearson
- 12) Alex M. Thomas: Macroeconomics- An Introduction, Cambridge University Press
- 13) David Romer: Advanced Macroeconomics, 4th Edition, Tata McGraw Hill
- 14) Errol D'Souza: Macroeconomics, 2nd Edition, Pearson (*Author: Director, IIM Ahmadabad*)

# Session Objectives

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- Introduction to Macroeconomics
- Nature of Macroeconomics
- The Circular Flow Models of the Economy
- Measuring Economic Activity
- Income, Output and Expenditure Methods
- Macroeconomic Relationships
- National Income Accounting

# Macroeconomics!!

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- **Macroeconomics** is concerned with the analysis of the behaviour of the economic system in totality. Thus, it is a study of aggregates.

# Major Issues and Concerns of Macroeconomics

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- Determination of National income (or GNP)
- Employment and Unemployment
- General Price Level and Inflation
- Consumption & Investment (in General)
- Business cycles
- Stagflation
- Economic Growth
- Balance of Payments and Exchange Rate

# The Role of Government in the Macroeconomy!

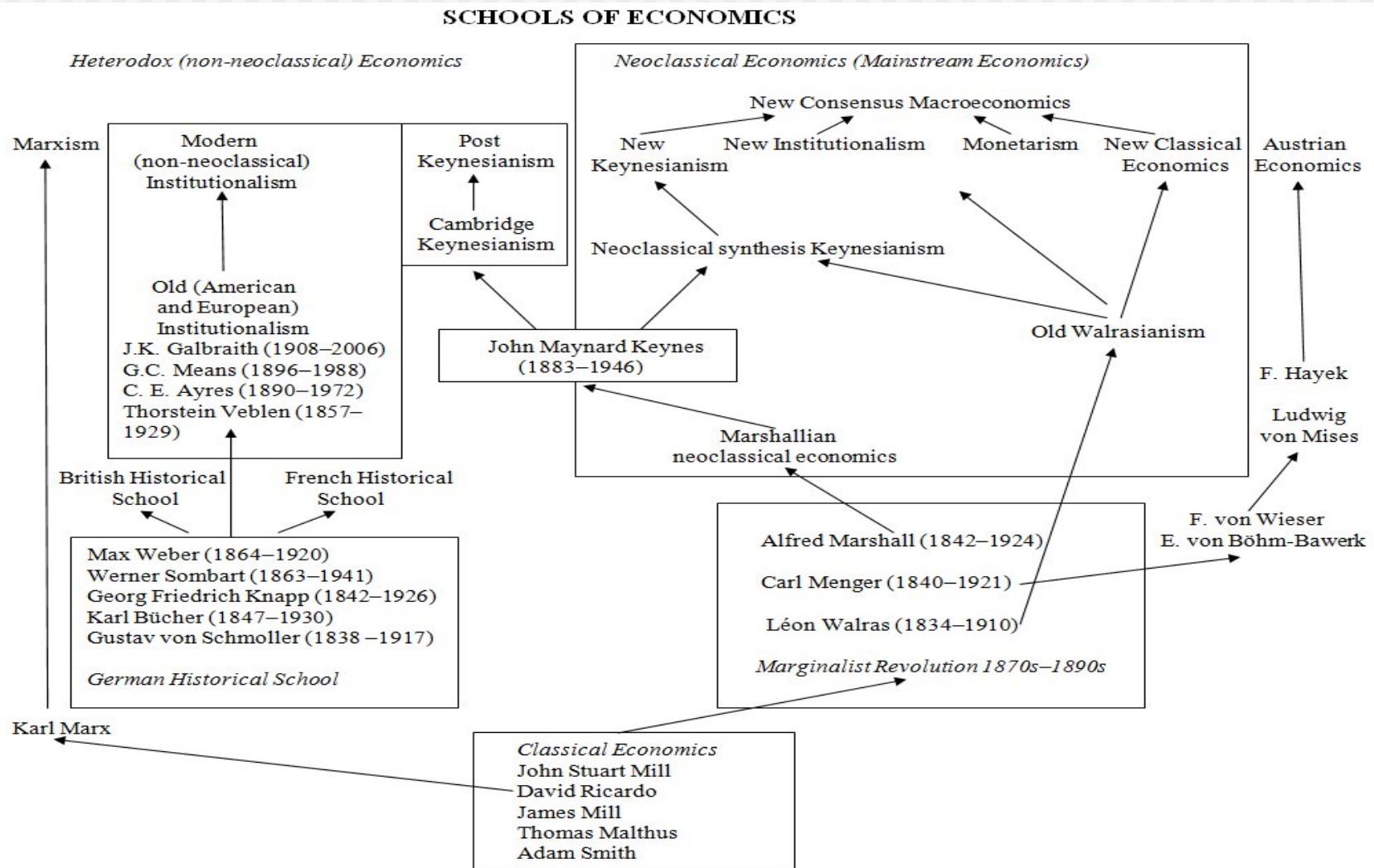
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- Fiscal Policy
- Monetary Policy
- Growth Policies

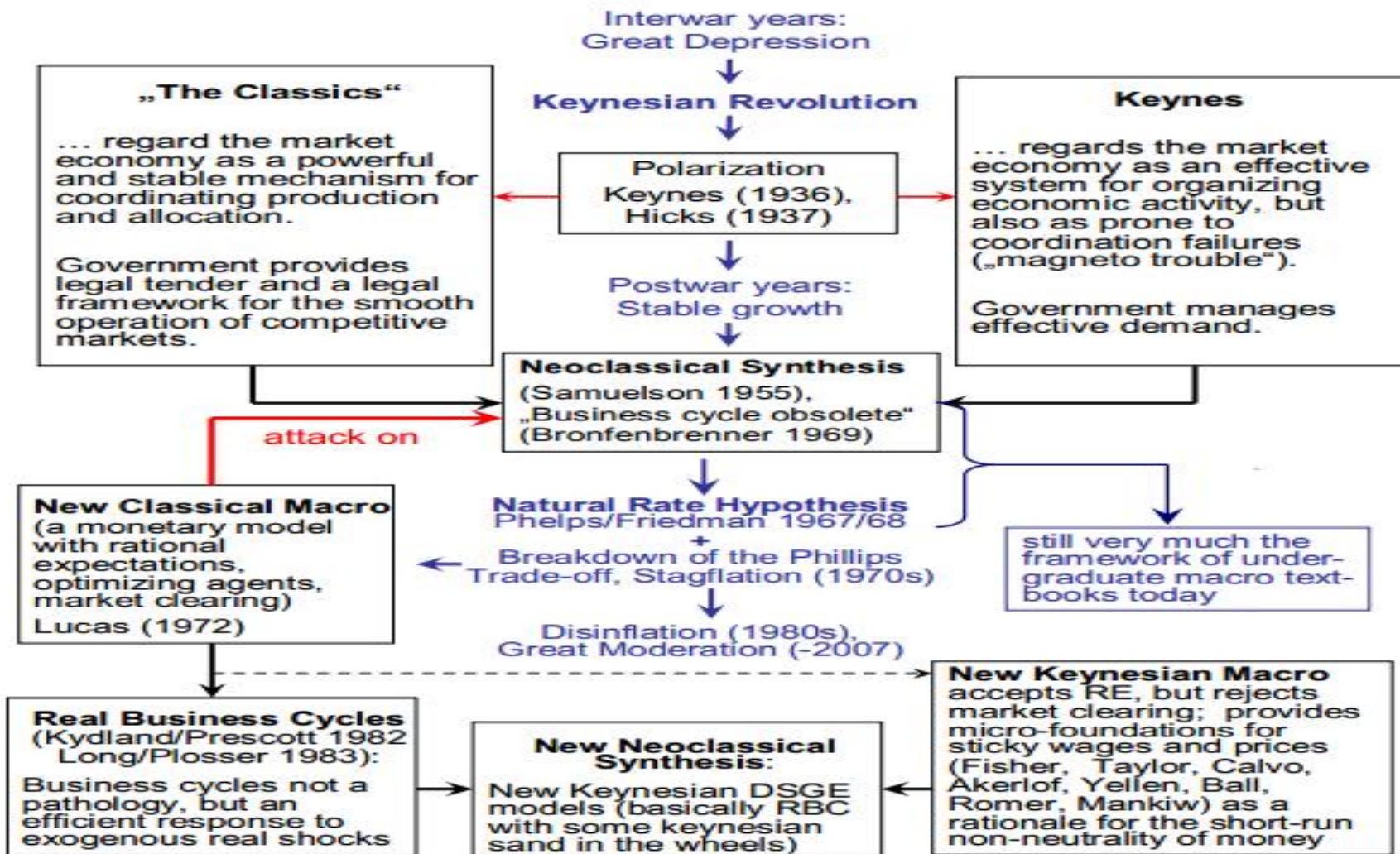
# Why a Separate Study of Macroeconomics?

- **Macroeconomic Paradoxes:** The laws or generalisations which hold good for the behaviour of an individual consumer, firm or industry may be quite invalid and misleading when applied to the behaviour of the economic system as a whole. There is thus a fallacy of composition. This is so because what is true of individual components is not true of the collective whole. These are called macroeconomic paradoxes and it is because of these paradoxes that a separate study of the economic system as a whole is essential.
- **Paradox of Thrift:** It arises because it so happens that when all people in a society try to save more but in fact they are not only unable to do so but actually attempt to save more by all people cause their income or standard of living to decline (Keynes' Macroeconomic Analysis or Effective Demand Theory).
- **Wage-Employment Paradox:** Classical and Neo-classical Economists, especially A. C. Pigou, contended that the cut in money wage at times of depression & unemployment would lead to the increase in employment and thereby eliminate unemployment and depression (true for an industry but not for the economy as a whole).  
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# Schools of Thought



# Schools of Thought (Macroeconomics)



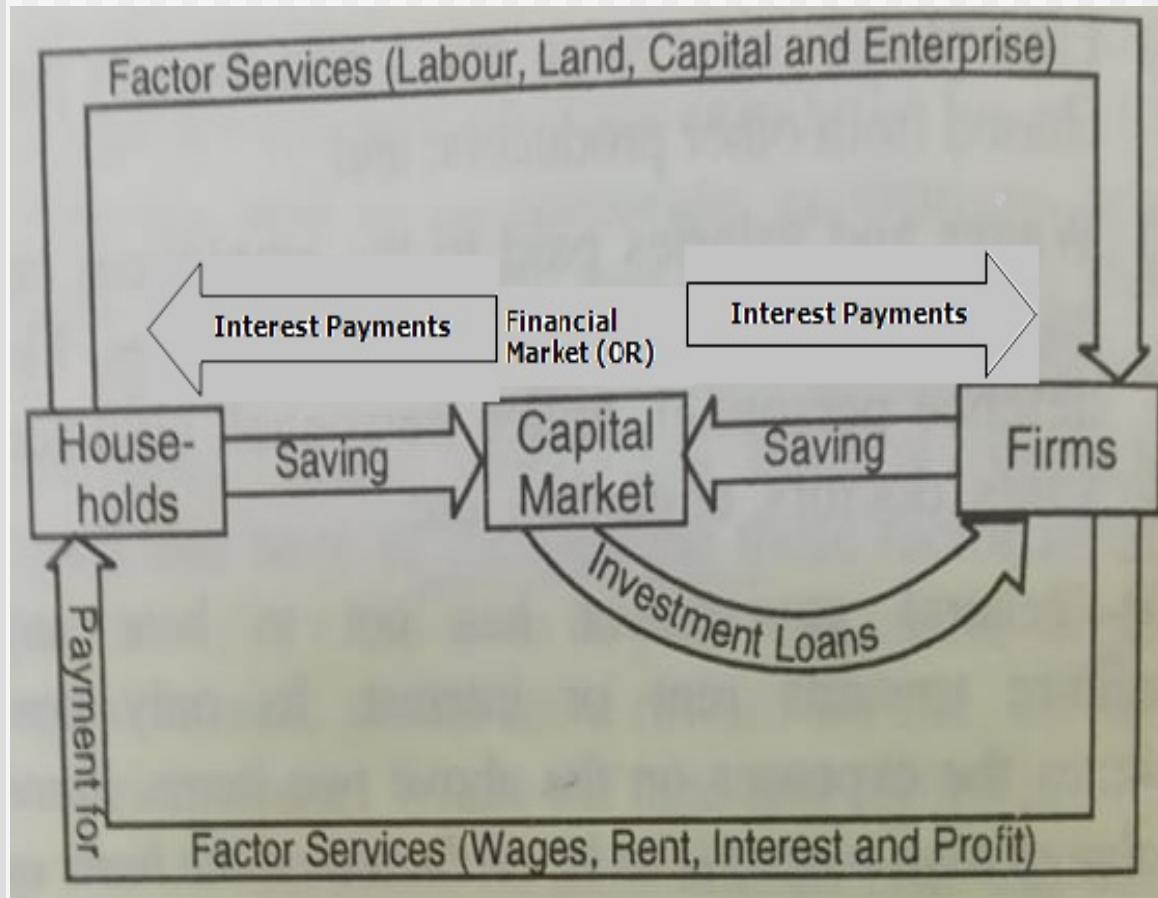
# The Circular Flow of Income

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- The economy can be viewed as a system where there are actions and interactions between
  - *Households (C)*
  - *Firms (I)*
  - *Government (G)*
  - *Financial institutions*
  - *The foreign Sector (X-M)*
- This system has come to be known as the *circular flow of income.*

# Circular Flow of Income

## Saving-Investment Identity in National Income Accounts



In a simple two sector economy, the value of '*output produced (Y)*' is equal to the value of '*output sold.*'

$Y = C + I$  (Aggregate Expenditure)

$Y = C + S$  (Aggregate Income)

In equilibrium,

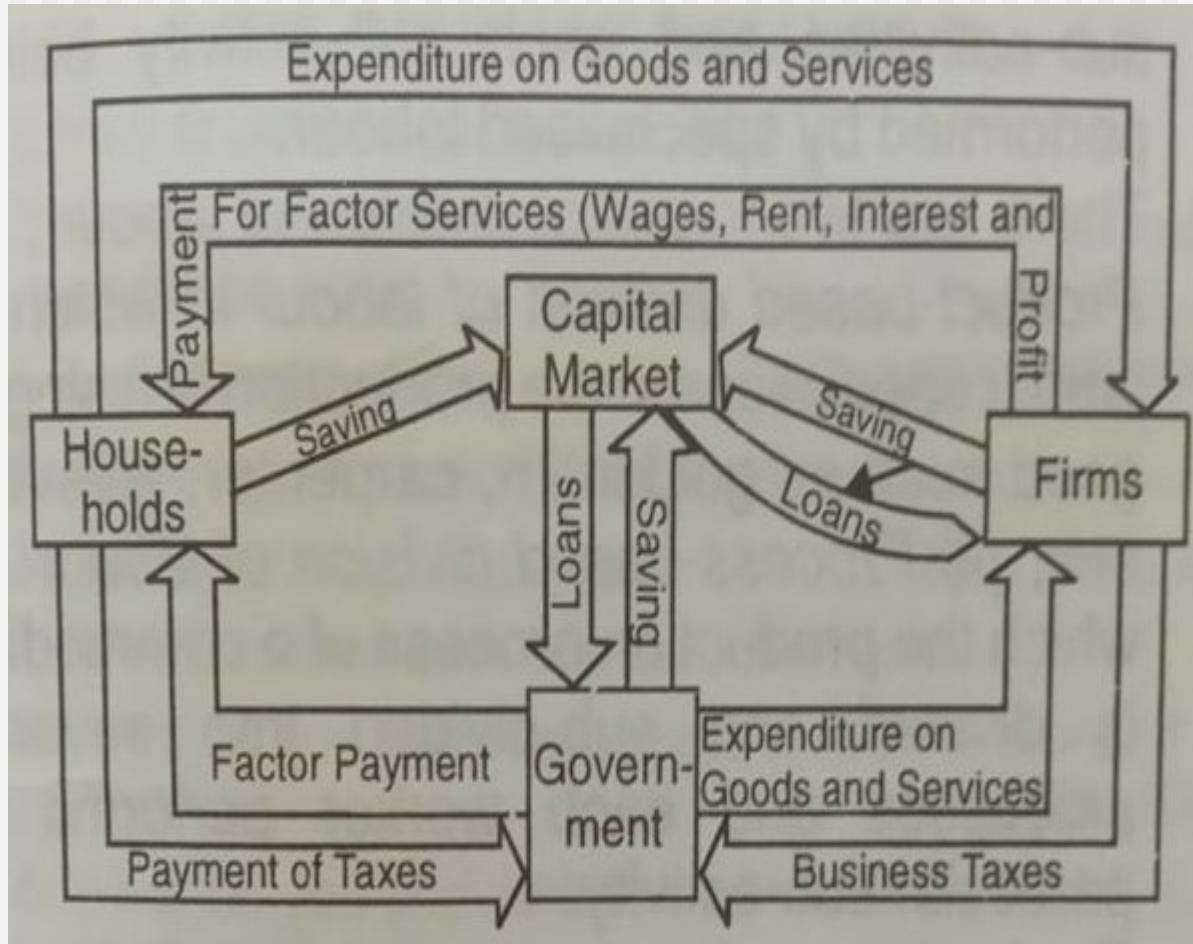
$$C + I = Y = C + S$$

$$I = S$$

- o Ex-post or Actual or Realized Savings and Investment are always equal.
- o See also, Ex-ante or Planned or Intended Savings and Investment
- o The unsold output leads to the increase in the inventories of goods and in national income accounting increase in inventories of goods is treated as a part of actual investment.

Fig. Circular Flow of Income in a Simple Two-Sector Economy <sub>11</sub>

# Circular Flow of Income



**Total Expenditure (E),**

$$E = C + I + G$$

**Total Income (Y),**

$$Y = C + S + T$$

**In Equilibrium,**

$$C + I + G = Y = C + S + T$$

$$I + G = S + T$$

$$G - T = S - I$$

If  $G > T$ , **Deficit Budget** (*Govt. borrowing crowds out private investment*)

$crowds out$   $private investment)$

Fig. Circular Flow of Income in a Three-Sector Economy with Government Sector 12

# Circular Flow of Income

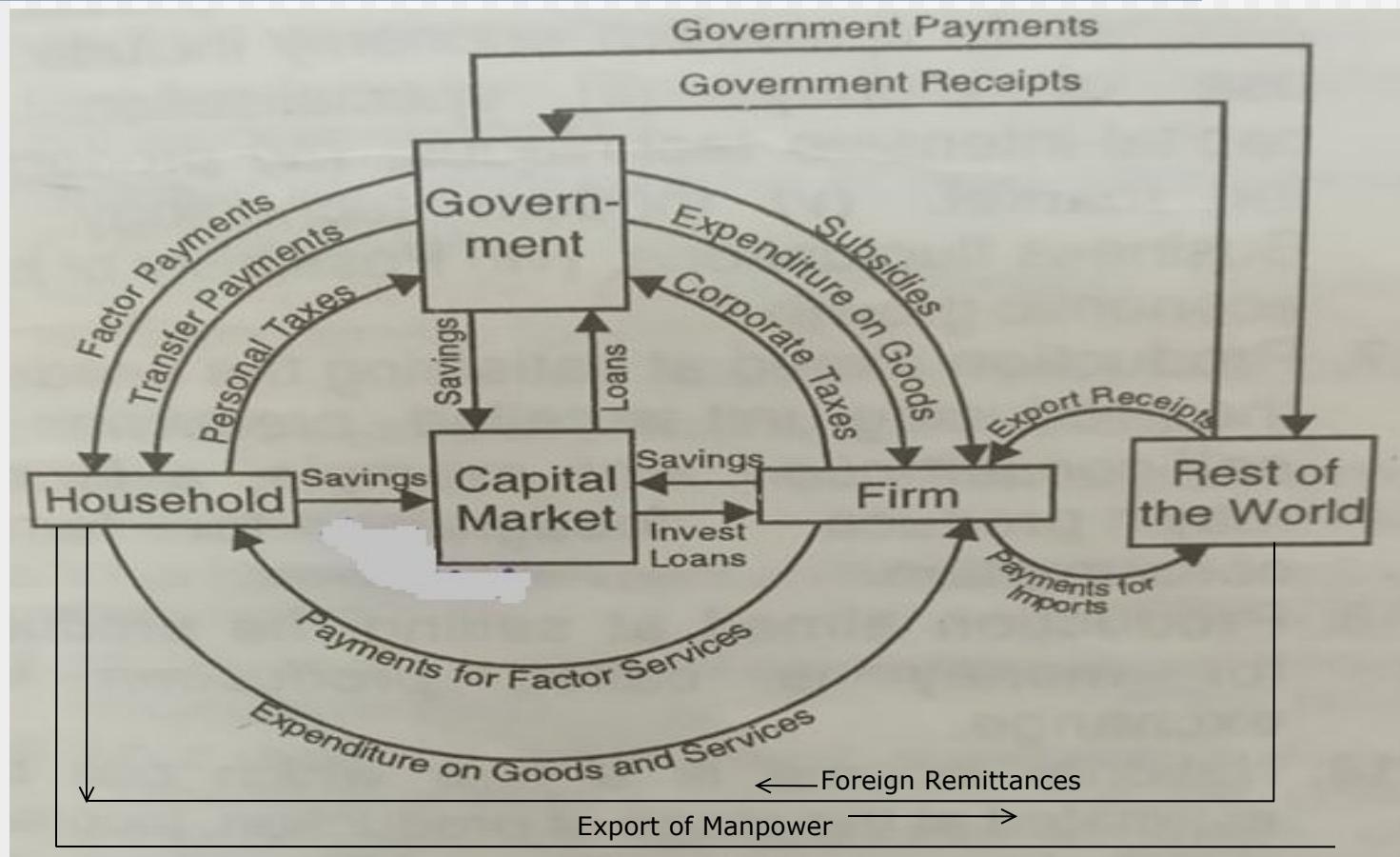


Fig. Circular Flow of Income in a Four-Sector Open Economy: Adding Foreign Sector

# Money Flows in the Four Sector Open Economy: Adding Foreign Sector

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- **In the open economy,**

$$\text{Aggregate Expenditure} = C + I + G + X$$

$$\text{Aggregate Income} = C + S + T + M$$

- **In equilibrium,**

$$C + I + G + X = C + S + T + M$$

$$I + G + X = S + T + M$$

$$I + G + X - M = S + T$$

$$I + G + X_N = S + T$$

(where  $X_N$  represents net exports,  $X - M$ )

- If  $X = M$ , Balance of Trade
- If  $X > M$ , Trade Surplus (Net Capital inflow)
- If  $M > X$ , Trade Deficit (Net Capital outflow)

# Injections and Leakages

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- **Injections** are items which add to the circular flow of income.
  - These are investment (I), government spending (G) and exports (X).
  
- **Leakages** from the circular flow are those items which lead to lower income flows.
  - These are saving (S), taxes (T) and imports (M).

# National Income Accounting and the Circular Flow of Income

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- **Gross Domestic Product (GDP)** is a measure of the *total final output* produced by an economy. It does not include the value of *intermediate goods*. There are three different ways of calculating the level of national output; these are the :
  - *Output Method or Value-Added Method*
  - *Expenditure Method*
  - *Income Method*
- **National income accounting** has a direct relationship to the circular flow of income.
  - First of all, the level of *GDP is an indicator of the strength* of the circular flow of income.
  - Secondly, due to the circular flow, the three methods of calculating GDP should *all produce the same measure*.

# Computation of Value Added for a New Desk

## Output Approach

<b>Stage of Production</b>	<b>(1) Sale Value</b>	<b>(2) Cost of Intermediate Goods</b>	<b>(3) Value Added</b>
Logger	Rs. 20	-	Rs.20
Miller	Rs. 50	Rs.20	Rs. 30
Manufacturer	Rs. 120	Rs. 50	Rs. 70
Retailer	Rs. 200	Rs. 120	Rs. 80
Market value of final good			<b>Rs.200</b>

- q The value added at each stage of production is the sale price at that stage minus the cost of intermediate goods, or column (1) minus column (2).
- q The value added at each stage sum to the market value of the final good.

# Some Important Concepts

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## ■ Domestic *versus* National Product

- $GNP = GDP + NFIA$

## ■ Gross *versus* Net Value Added

- $NDP = GDP - \text{Consumption of Fixed Capital or Depreciation}$

## ■ Market Price *versus* Factor Cost

- National Income or  $NNP_{FC} = NNP_{MP} - \text{Net Indirect Taxes}$
- Net Indirect Taxes = Indirect Taxes - Subsidies

# Various Concepts of National Income

Expenditure Approach to Income Approach

<b>Net Factor Income from Abroad (NFIA)</b>			
$\text{nGross Private Investment or Gross Domestic Capital Formation (I)}$	$\text{nGross Private Investment (I)}$	$\text{nLess Depreciation}$	$\text{Less Net Indirect Taxes}$
		$\text{nNet Private Investment or Net Domestic Capital Formation}$	
$\text{nNet Exports (X}_N\text{)}$	$\text{nNet Exports (X}_N\text{)}$	$\text{nNet Exports (X}_N\text{)}$	$\text{nWages and Salaries} \\ \text{n} +$
$\text{nGovernment Purchases (G)}$	$\text{nGovernment Purchases (G)}$	$\text{nGovernment Purchases (G)}$	$\text{nRent} \\ \text{n} +$
$\text{n(Private Final) Consumption Expenditure (C)}$	$\text{nConsumption Expenditure (C)}$	$\text{nConsumption Expenditure (C)}$	$\text{nInterest} \\ \text{n} +$
$\text{nGNP}_{\text{MP}}$	$\text{nGDP}_{\text{MP}}$	$\text{nNDP}_{\text{MP}}$	$\text{nNDP}_{\text{FC}}$

# From National Income to Disposable Income

<b>Net Factor Income from Abroad (NFIA)</b>			<b>Less Personal Taxes</b>
Profits	<b>Less</b> (i) Undistributed Corporate Profits (ii) Corporate Taxes (iii) Social Security Contributions		Consumption <i>plus</i> Saving $(C + S)$
Interest			
Rent			
Wages and Salaries	<b>Plus</b> Transfer Payments		
<b>National Income (NI or NNP<sub>FC</sub>)</b>		<b>Personal Income (PI)</b>	<b>Disposable Income (DI)</b>

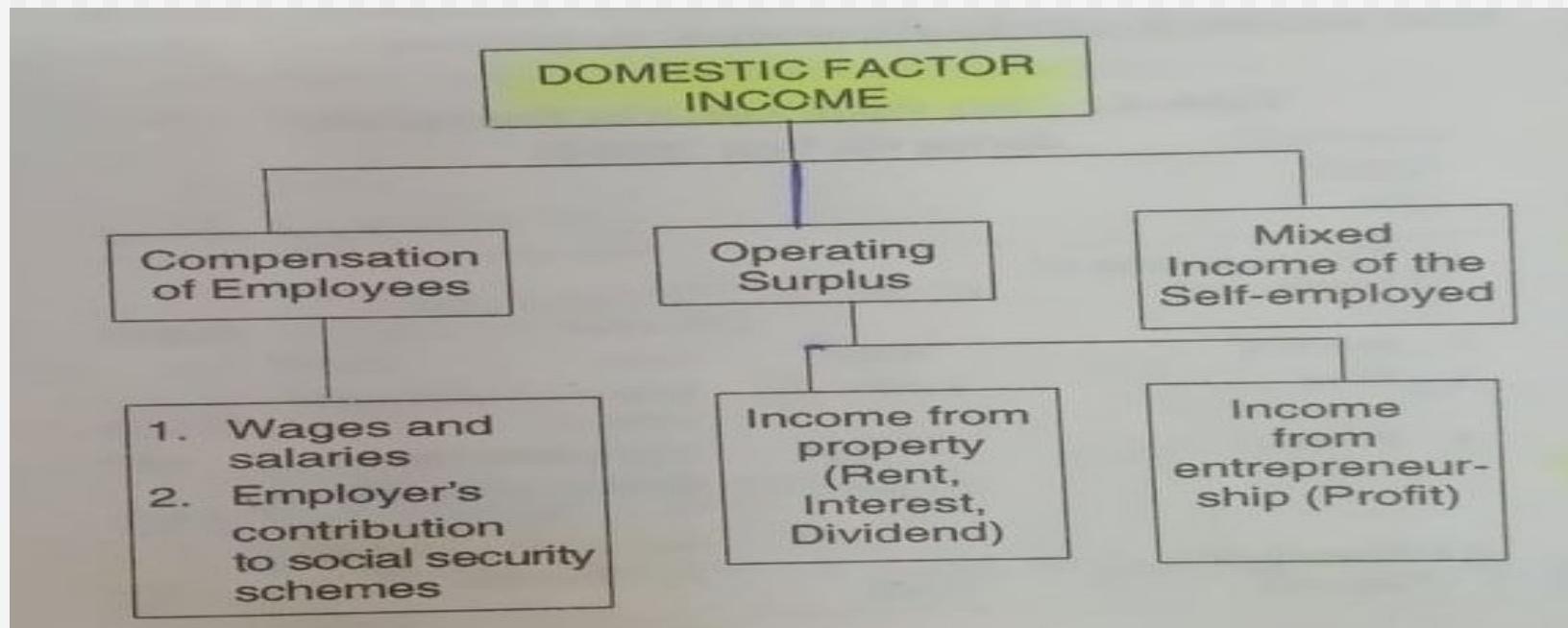
# Various Concepts of National Income

## Income Approach

			Net Indirect Taxes (Indirect Taxes <i>minus</i> Subsidies)
Net Factor Income from Abroad		Consumption of Fixed Capital (Depreciation)	Consumption of Fixed Capital (Depreciation)
Profits	Dividends	Dividends	Profits
	Undistributed Profits	Undistributed Profits	
	Corporate Income Tax	Corporate Income Tax	
Interest	Interest	Interest	Interest
Rent	Rent	Rent	Rent
Mixed Income of Self- employed	Mixed Income of Self- employed	Mixed Income of Self- employed	Mixed Income of Self- employed
Compensation of Employees	Compensation of Employees	Compensation of Employees	Compensation of Employees
<b>National Income (NI or NNP<sub>FC</sub>)</b>	<b>NDP<sub>FC</sub></b>	<b>GDP<sub>FC</sub></b>	<b>GDP<sub>MP</sub></b>

# Domestic Factor Income and Operating Surplus

- **Domestic Factor Income** broadly consists of: (a) Compensation of Employees, (b) Operating Surplus, and (c) Mixed Income of the Self-employed.
- **Operating Surplus** is defined as the total income earned by a firm during the production process from property and enterprises in the form of rent, interest, royalty and profits (dividend, corporation tax, undistributed profits).



# Calculating Gross Domestic Product (GDP) through 3 approaches (Output, Expenditure, & Income)

	American Ore, Inc.	American Steel, Inc.	American Motors, Inc.	Total factor income
<b>Value of sales</b>	\$4,200 (ore)	\$9,000 (steel)	\$21,500 (car)	
<b>Intermediate goods</b>	0	4,200 (iron ore)	9,000 (steel)	
<b>Wages</b>	2,000	3,700	10,000	\$15,700
<b>Interest payments</b>	1,000	600	1,000	2,600
<b>Rent</b>	200	300	500	1,000
<b>Profit</b>	1,000	200	1,000	2,200
<b>Total expenditure by firm</b>	4,200	9,000	21,500	
<b>Value added per firm</b> =	4,200	4,800	12,500	
<b>Value of sales – cost of intermediate goods</b>				
<i>Sum of value added = \$21,500</i>				

*Total spending on domestically produced final goods and services = \$21,500*

*Total payments to factors = \$21,500*

Table: A hypothetical economy consisting of three firms

# Precautions in National Income Accounting

Value-Added Method	Income Method	Expenditure Method
<p><i>Don't Include:</i></p> <ul style="list-style-type: none"> <li>✓ Sale and purchase of second-hand goods</li> <li>✓ Value of services of housewives</li> <li>✓ Value of intermediate goods</li> </ul> <p><i>Include:</i></p> <ul style="list-style-type: none"> <li>✓ Imputed-rent values of self-occupied houses</li> <li>✓ Value of production for self-consumption</li> </ul>	<p><i>Don't Include:</i></p> <ul style="list-style-type: none"> <li>✓ Transfer payments</li> <li>✓ Illegal money (smuggling, hawala, etc.)</li> <li>✓ Windfall gains (prizes, lotteries, etc.)</li> <li>✓ Corporate profit tax (as it is already part of Profits =&gt; avoid <b>double-counting</b>)</li> <li>✓ Death duties, gift tax, wealth tax, tax on lotteries, and the like</li> <li>✓ Sale of second-hand goods</li> </ul> <p><i>Include:</i></p> <ul style="list-style-type: none"> <li>✓ Imputed-rent values of self-occupied houses</li> <li>✓ Value of production used for self-consumption</li> </ul>	<p><i>Don't Include:</i></p> <ul style="list-style-type: none"> <li>✓ Second-hand goods</li> <li>✓ Purchase of old shares and bonds</li> <li>✓ Expenditure on transfer payments</li> <li>✓ Expenditure on intermediate goods</li> </ul> <p><i>Include:</i></p> <ul style="list-style-type: none"> <li>✓ Expenditure on final goods and services (C, I, G)</li> </ul>

# **Relation between National Income (Real GNP) and Net Economic Welfare (NEW)**

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Real GNP

- Depreciation
- +Value of leisure
- +Value of non-market activities (i.e., services of housewives  
and personal services, etc.)
- Environmental Pollution
- Regrettable Costs
- = Net Economic Welfare

# Measuring concepts

There are two ways that GDP can increase:

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1. An increase in the **PRICES** of goods and services.
2. An increase in the **QUANTITY** of goods and services.

We need a method to calculate GDP that *addresses* rising prices.

# Our Simple Economy

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## Prices and Quantities for our Simple Economy

Product	2006 Statistics		2007 Statistics		2008 Statistics	
	Quantity	Price	Quantity	Price	Quantity	Price
Window Washing	90	\$50.00	100	\$60.00	100	\$65.00
Baseballs	75	\$2.00	100	\$2.00	120	\$2.25
Hammers	50	\$30.00	50	\$25.00	65	\$25.00

Suppose an economy produces three goods or services: Window Washing, Baseballs, and Hammers. Data for the past three years can be found above.

# Nominal GDP *versus* Real GDP

## GDP / National Income at Current Prices and at Constant Prices

Calculate Nominal GDP (*The value of final goods and services at current-year prices*) for each year.

Nominal GDP 2006	Nominal GDP 2007	Nominal GDP 2008
$\begin{aligned} \text{NGDP}_{2006} &= Q_{2006} \times P_{2006} \\ &= (90 \times \$50.00) \text{ Window Washing} \\ &+ (75 \times \$2.00) \text{ Baseballs} \\ &+ (50 \times \$30.00) \text{ Hammers} \\ &= \$6,150 \end{aligned}$	$\begin{aligned} \text{NGDP}_{2007} &= Q_{2007} \times P_{2007} \\ &= (100 \times \$60.00) \text{ Window Washing} \\ &+ (100 \times \$2.00) \text{ Baseballs} \\ &+ (50 \times \$25.00) \text{ Hammers} \\ &= \$7,450 \end{aligned}$	$\begin{aligned} \text{NGDP}_{2008} &= Q_{2008} \times P_{2008} \\ &= (100 \times \$65.00) \text{ Window Washing} \\ &+ (120 \times \$2.25) \text{ Baseballs} \\ &+ (65 \times \$25.00) \text{ Hammers} \\ &= \$8,395 \end{aligned}$

For each year, for our example assume 2006 is the *base year*. This means that all values are in what we call “2006 Dollars”, or “*Constant Dollars*”. By using the prices from the base-year, (or holding prices constant over time), we eliminate the impact that rising prices have on GDP, to get a measure of “Real” economic activity.

Real GDP 2006	Real GDP 2007	Real GDP 2008
$\begin{aligned} \text{RGDP}_{2006} &= Q_{2006} \times P_{2006} \\ &= (90 \times \$50.00) \text{ Window Washing} \\ &+ (75 \times \$2.00) \text{ Baseballs} \\ &+ (50 \times \$30.00) \text{ Hammers} \\ &= \$6,150 \end{aligned}$ <p>Note: For the Base-Year Nominal GDP always equals Real GDP.</p>	$\begin{aligned} \text{RGDP}_{2007} &= Q_{2007} \times P_{2006} \\ &= (100 \times \$50.00) \text{ Window Washing} \\ &+ (100 \times \$2.00) \text{ Baseballs} \\ &+ (50 \times \$30.00) \text{ Hammers} \\ &= \$6,700 \end{aligned}$ <p>Note: We use “Current Quantities” and “Constant Prices”.</p>	$\begin{aligned} \text{RGDP}_{2008} &= Q_{2008} \times P_{2006} \\ &= (100 \times \$50.00) \text{ Window Washing} \\ &+ (120 \times \$2.00) \text{ Baseballs} \\ &+ (65 \times \$30.00) \text{ Hammers} \\ &= \$7,190 \end{aligned}$ <p>Note: We still use “Current Quantities” and “Constant Prices”.</p>

# Growth Rate and Per-capita income (PCI)

- Growth in national income is the indicator of the economic growth of an economy (calculated arithmetically as a percentage change over the previous period).

Growth Rate Formula	Growth Rate in Real GDP between 2006 and 2007	Growth Rate in Real GDP between 2007 and 2008
$\text{Percentage Change } (\%) = \frac{(\text{New Value}) - (\text{Old Value})}{(\text{Old Value})} \times 100$ $\text{Percentage Change } (\%) = \frac{X_t - X_{t-1}}{X_{t-1}} \times 100$	<p>% Change or Growth Rate</p> $= \frac{\text{RGDP}_{2007} - \text{RGDP}_{2006}}{\text{RGDP}_{2006}} \times 100$ $= \frac{6,700 - 6,150}{6,150} \times 100$ $= 8.94\%$ <p>That is real GDP grew by 8.94% between 2006 and 2007.</p>	<p>Growth Rate</p> $= \frac{\text{RGDP}_{2008} - \text{RGDP}_{2007}}{\text{RGDP}_{2007}} \times 100$ $= \frac{6,190 - 6,700}{6,700} \times 100$ $= 7.31\%$ <p>That is real GDP grew by 7.31% between 2007 and 2008.</p>

PCI	Growth Rate of PCI	Real Per Capita Income
<p>Per Capita Income (PCI)</p> $= \frac{\text{National Income (Y)}}{\text{Total Population (P)}} \times 100$	$\frac{\text{Rate of Growth of Per Capita Income (PCI)}}{\text{Capita Income (PCI)}}$ $= \left( \text{Rate of Growth of National Income} \right) - \left( \text{Rate of Growth of Population} \right)$	$\frac{\text{Per Capita Income}}{\text{(PCI) at Constant Prices}} \times 100$ $= \frac{\text{Per Capita Income at Current Prices}}{\text{Price Index at Current Prices}} \times 100$

# The Price Level and The GDP Deflator

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

- We can use our calculations of **Nominal GDP** and **Real GDP** to calculate the **Price Level** (*A measure of the average prices of goods and services in the economy.*)
- One example of a measure of the average price level is the GDP deflator.
- The *GDP price index* tracks the *price changes for the entire output*.
- It is a comprehensive inflation measure of all goods & services included in the GDP.

GDP Deflator for 2006	GDP Deflator for 2007	GDP Deflator for 2008
$\text{GDP Deflator}_{2006}$ $= \frac{\text{NGDP}_{2006}}{\text{RGDP}_{2006}} \times 100$ $= \frac{\text{£6,150}}{\text{£6,150}} \times 100$ $= 100$  <i>Note:</i> The GDP Deflator is always equal to 100 in the base-year. The Price Index is “unitless”.	$\text{GDP Deflator}_{2007}$ $= \frac{\text{NGDP}_{2007}}{\text{RGDP}_{2007}} \times 100$ $= \frac{\text{£7,450}}{\text{£6,700}} \times 100$ $= 111.19$	$\text{GDP Deflator}_{2008}$ $= \frac{\text{NGDP}_{2008}}{\text{RGDP}_{2008}} \times 100$ $= \frac{\text{£8,395}}{\text{£7,190}} \times 100$ $= 116.76$

# The Inflation Rate

- We can use the growth rate formula from previous to calculate the Inflation Rate (the Inflation Rate is *The percentage increase in the price level from one year to the next.*)

Calculating Inflation Rate	Inflation Rate from 2006 to 2007	Inflation Rate from 2007 to 2008
Inflation Rate in Year 2 $= \frac{\text{GDP Deflator}_{(\text{Year 2})} - \text{GDP Deflator}_{(\text{Year 1})}}{\text{GDP Deflator}_{(\text{Year 1})}} \times 100$	Inflation Rate Between 2006 and 2007 $\begin{aligned} &= \frac{\text{GDP Deflator}_{2007} - \text{GDP Deflator}_{2006}}{\text{GDP Deflator}_{2006}} \times 100 \\ &= \frac{11.19 - 100}{100} \times 100 = 11.19 \end{aligned}$ <p>That is the inflation rate between 2006 and 2007 was 11.19%.</p>	Inflation Rate Between 2007 and 2008 $\begin{aligned} &= \frac{\text{GDP Deflator}_{2008} - \text{GDP Deflator}_{2007}}{\text{GDP Deflator}_{2007}} \times 100 \\ &= \frac{16.76 - 11.19}{11.19} \times 100 = 5.01 \end{aligned}$ <p>That is the inflation rate between 2007 and 2008 was 5.01%.</p>

# Quick Review: Exercise

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Suppose people only consume 3 different goods. The following table shows the prices and quantities of each good consumed in 2018, 2019, and 2020.

n Year	n Price of Fish	n Quantity of Fish	n Price of Broccoli	n Quantity of Broccoli	n Price of Avocado	n Quantity of Avocado
n 2018	n \$7	n 400	n \$8	n 225	n \$10	n 175
n 2019	n \$8	n 550	n \$7	n 250	n \$12	n 275
n 2020	n \$9	n 900	n \$6	n 275	n \$15	n 275

- a) Calculate nominal GDP in each of the three years.
- b) Calculate Real GDP in each of the three years, using 2018 as the base year.
- c) Calculate the GDP deflator for each of the three years.
- d) Calculate the Rate of Inflation for the years 2019 and 2020.

Sessions 4-5

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# Aggregate Income and Aggregate Expenditure

# Readings

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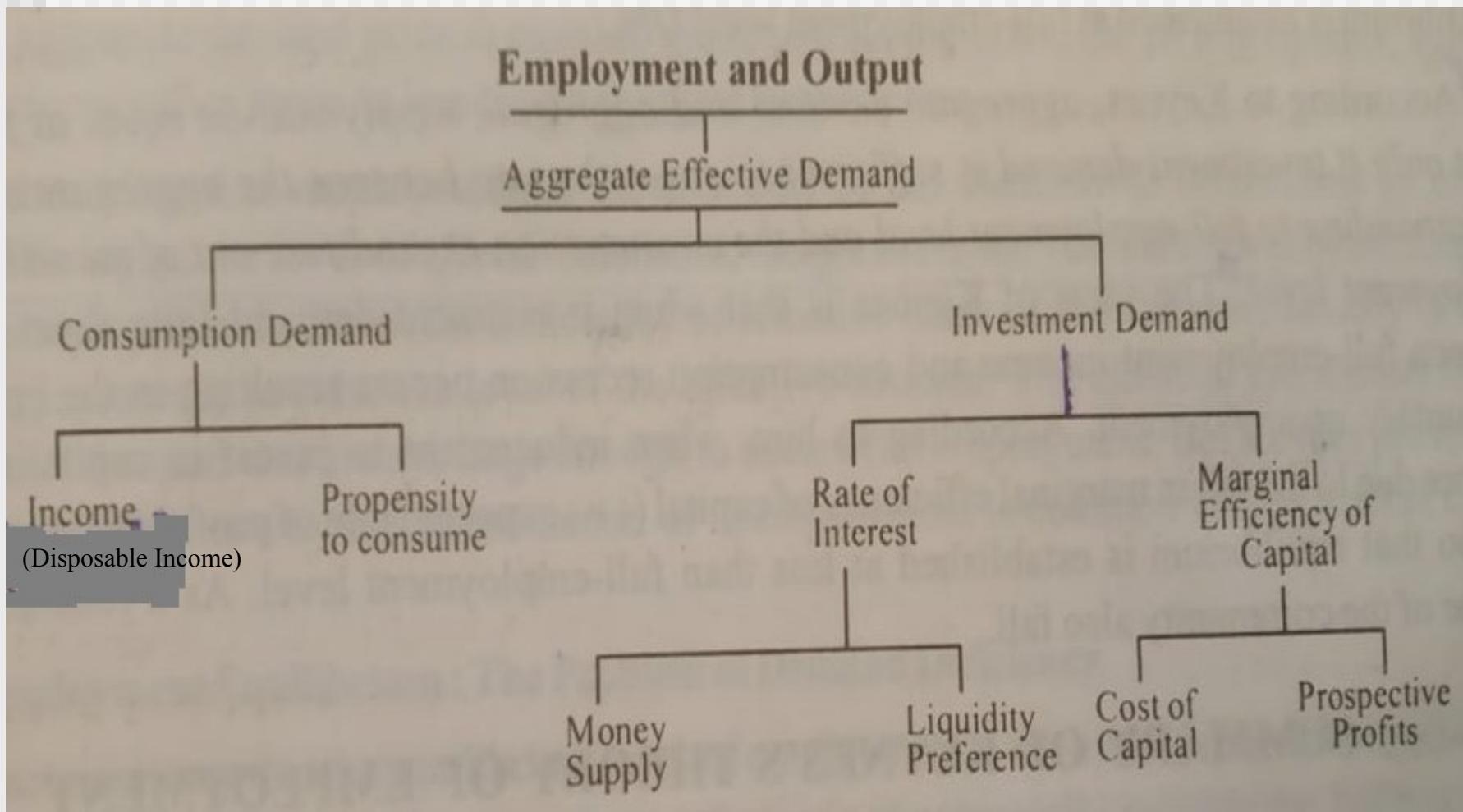
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- Rudiger Dornbusch, Stanley Fischer & Richard Startz: Macroeconomics, 13<sup>th</sup> Edition, Tata McGraw Hill Foundation
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- Shyamal Roy: Macroeconomic Policy environment, Tata McGraw Hill

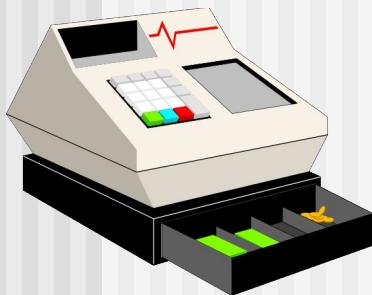
# Session Objectives

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- Consumer Spending
- Theories of Consumption Behaviour
- Investment Spending
- The Multiplier
- The Accelerator
- Income-Expenditure model

# Consumption Demand *versus* Investment Demand Determinants



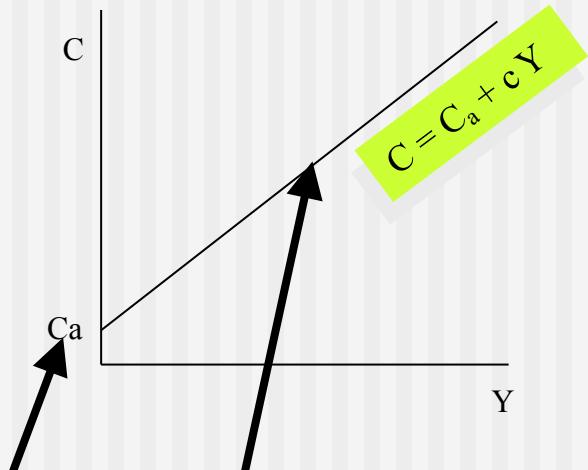
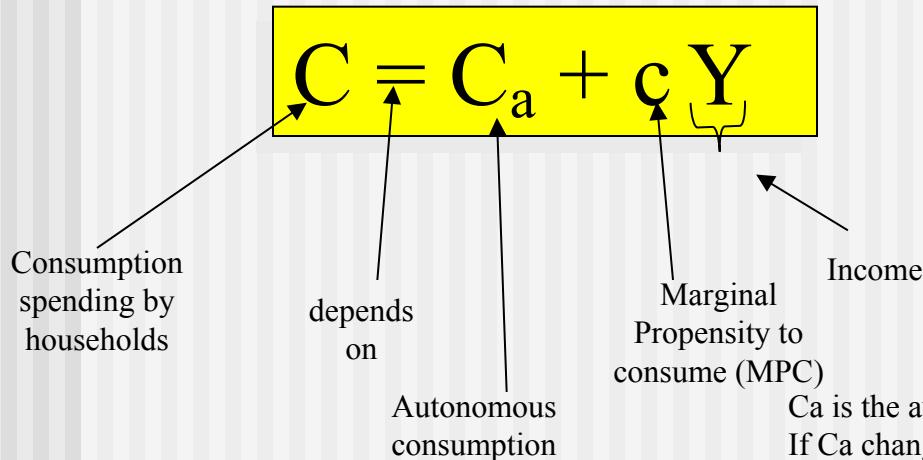


# The Concept of Consumption Function

- The *consumption function* relates the amount of consumption to the level of income. It is the whole schedule which describes the ‘*amounts of consumption*’ at various levels of income. Thus, when the income of a community rises, consumption also rises.

$$C = f(Y)$$

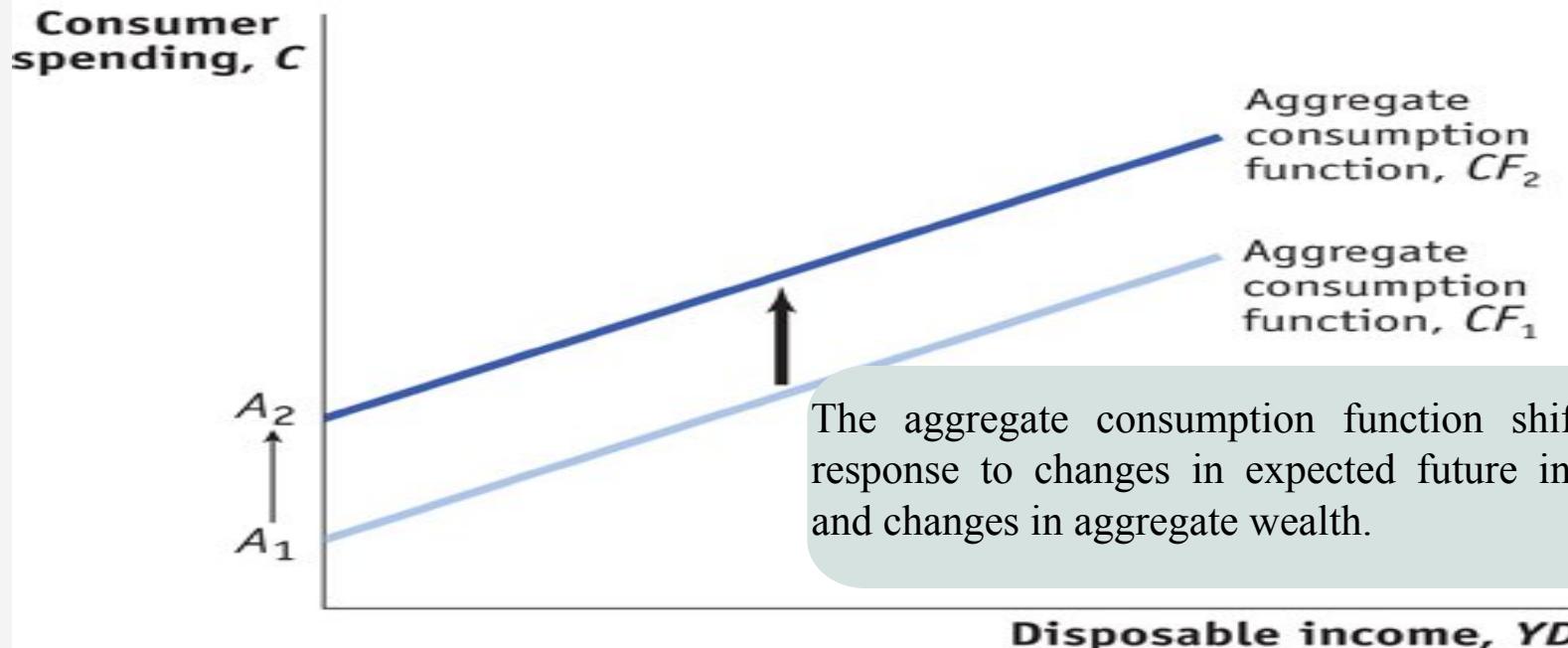
- How much consumption rises in response to a given increase in income depends upon the marginal propensity to consume.



Ca is the autonomous consumption. It does not depend on changes in income.  
If Ca changes, the consumption function shifts upwards / downwards.

The slope of the consumption function is the MPC.  
If MPC changes, the slope of the consumption function changes.

# Shifts in the Aggregate Consumption Function



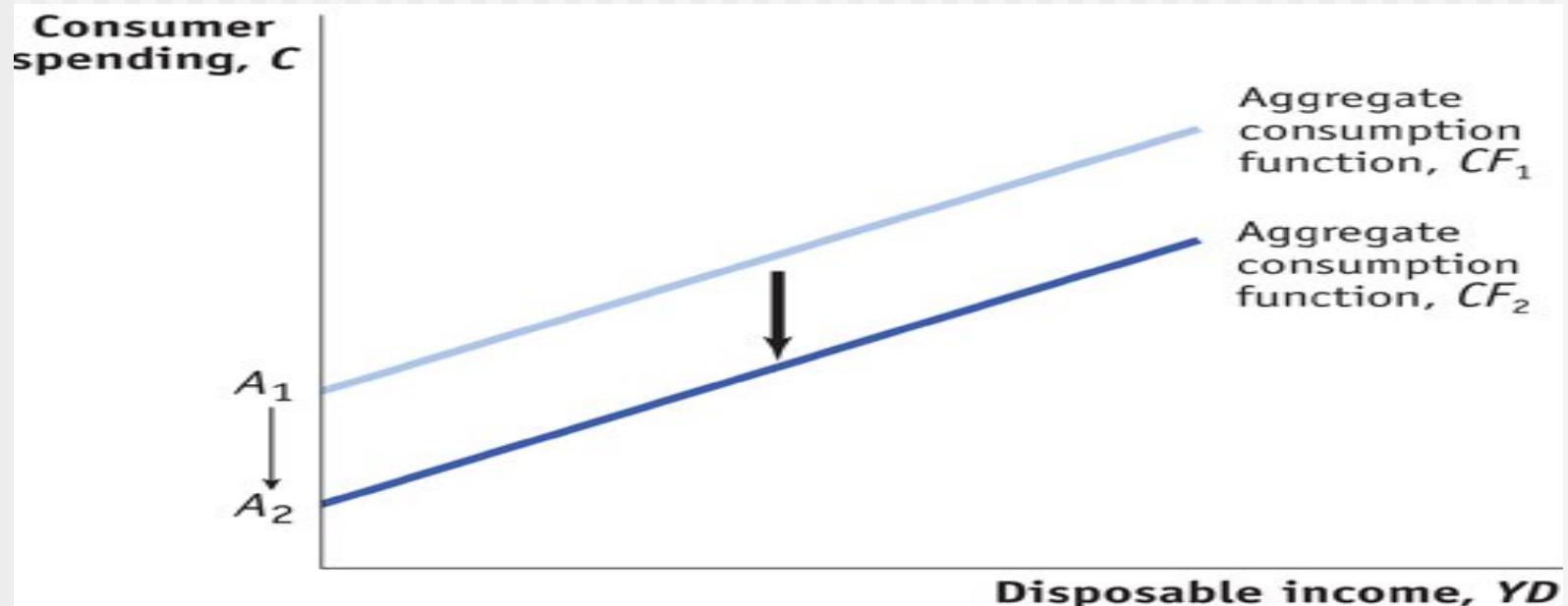
**An Upwards Shift of the Aggregate Consumption Function:** The effect of an increase in expected future disposable income. Consumers will spend more at every given level of current disposable income,  $Y_D$ .

As a result, the initial aggregate consumption function  $CF_1$ , with aggregate autonomous spending  $A_1$ , shifts up to a new position at  $CF_2$  and aggregate autonomous spending  $A_2$ .

An increase in aggregate wealth will also shift the aggregate consumption up.

What will be the other factors which will shift this 'consumption function' upwards?

# Shifts in the Aggregate Consumption Function



**An Downward Shift of the Aggregate Consumption Function:** The effect of a reduction in expected future disposable income.

Consumers will spend less at every given level of current disposable income,  $Y_D$ . Consequently, the initial aggregate consumption function  $CF_1$ , with aggregate autonomous spending  $A_1$ , shifts down to a new position at  $CF_2$  and aggregate autonomous spending  $A_2$ .

A reduction in aggregate wealth will have the same effect.

What will be the other factors which will shift this 'consumption function' downwards?

# Linear Consumption Function

MPC remains same / constant

APC may vary

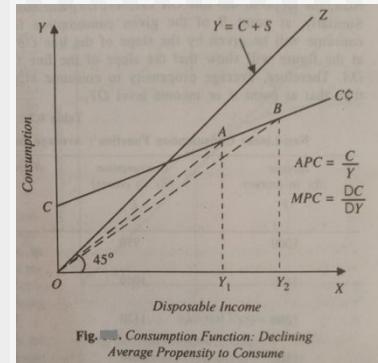
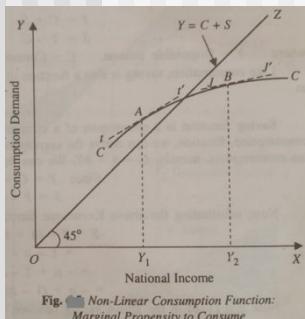


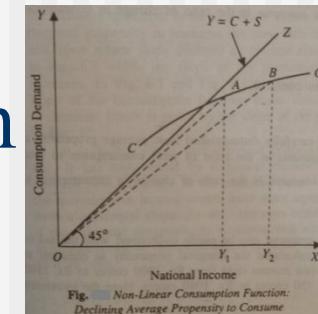
Table ■ Linear Consumption Function

Income (Rs. in crores) $Y$	Consumption (Rs. in crores) $C$	Average Propensity to Consume $\left(\frac{C}{Y}\right)$	Marginal Propensity to Consume $\left(\frac{\Delta C}{\Delta Y}\right)$
1000	750	$\frac{750}{1000} = 0.75$	—
1100	825	$\frac{825}{1100} = 0.75$	$\frac{75}{100} = .75$
1200	900	$\frac{900}{1200} = 0.75$	$\frac{75}{100} = .75$
1300	975	$\frac{975}{1300} = 0.75$	$\frac{75}{100} = .75$
1400	1050	$\frac{1050}{1400} = 0.75$	$\frac{75}{100} = .75$
1500	1125	$\frac{1125}{1500} = 0.75$	$\frac{75}{100} = .75$
1600	1200	$\frac{1200}{1600} = 0.75$	$\frac{75}{100} = .75$



# Non-Linear Consumption Function

## Both APC & MPC changes



### Non-Linear Consumption Function : Average and Marginal Propensity to Consume

Income (Rs. in crores) $Y$	Consumption (Rs. in crores) $C$	Average Propensity to Consume $\frac{C}{Y}$	Marginal Propensity to Consume $\frac{\Delta C}{\Delta Y}$
1000	950	$\frac{950}{1000} = 0.950$	-
1100	1040	$\frac{1040}{1100} = 0.945$	$\frac{90}{100} = 0.9$
1200	1120	$\frac{1120}{1200} = 0.933$	$\frac{80}{100} = 0.8$
1300	1190	$\frac{1190}{1300} = 0.915$	$\frac{70}{100} = 0.7$
1400	1250	$\frac{1250}{1400} = 0.893$	$\frac{60}{100} = 0.6$
1500	1300	$\frac{1300}{1500} = 0.866$	$\frac{50}{100} = 0.5$

# Change in Income

## [MPC+MPS=1]

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- Given that all income is either consumed or saved, it must be the case that any change in income is equal to the sum of the changes in consumption and saving:

$$Y = C + S$$

$$\Rightarrow \Delta Y = \Delta C + \Delta S$$

or  $\frac{\Delta Y}{\Delta Y} = \frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y}$

Where,  $c = MPC$ ;  $s = MPS$

- The marginal propensity to consume and the marginal propensity to save should add up to 1.
- This does not preclude the marginal propensity to consume from exceeding 1, but in this case it would imply that the marginal propensity to save is negative.
- This is possible if there is borrowing or dis-saving, as this could fund extra consumption in excess of the change in income.

# Average Propensity to Consume (APC) and Average Propensity to Save (APS)

[APC+APS=1]

$$APC = \frac{\text{Amount of Consumption, } C}{\text{Level of Income, } Y}$$

$$APS = \frac{\text{Savings, } S}{\text{Disposable Income, } Y}$$

$$Y = C + S$$

$$\frac{Y}{Y} = \frac{C}{Y} + \frac{S}{Y}$$

Thus,  $APC + APS = 1$   
 $\Rightarrow APS = 1 - APC$

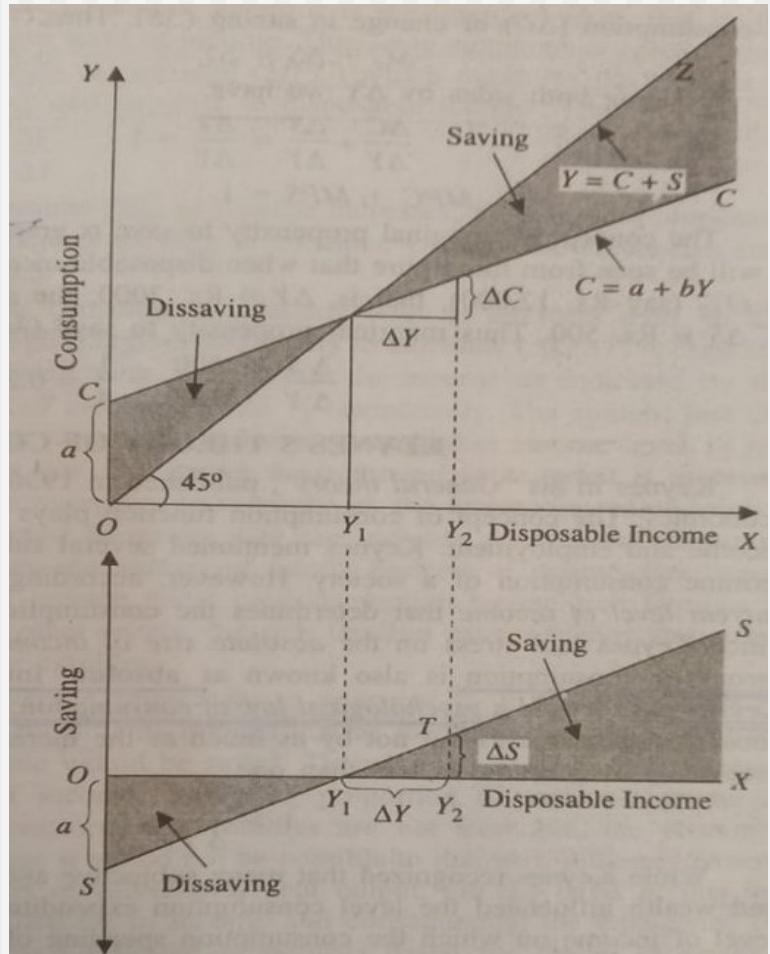


Fig. Saving Function derived from Consumption Function

# Secular Stagnation, Simon Kuznets, and the Consumption Puzzle

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During World War II, on the basis of Keynes' consumption function, economists predicted that the economy would experience what they called *secular stagnation*-- a long depression of infinite duration-- unless fiscal policy was used to stimulate aggregate demand. It turned out that the end of the war did not throw the U.S. into another depression, but it did suggest that Keynes' conjecture that the average propensity to consume would fall as income rose appeared not to hold.

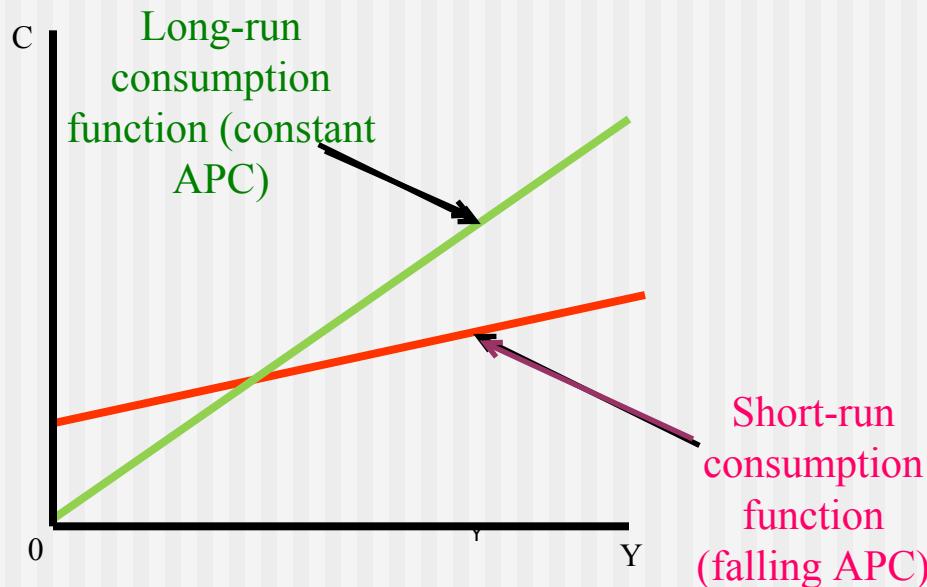
Simon Kuznets constructed new aggregate data on consumption and investment dating back to 1869 and whose work would later earn a Nobel Prize. He discovered that the ratio of consumption to income was stable over time, despite large increases in income; again, Keynes' conjecture was called into question.

- This brings us to the puzzle...

# Short-run *versus* Long-run Consumption Function

## The Consumption Puzzle

- **Consumption Puzzle:** The failure of the secular-stagnation hypothesis and the findings of Kuznets both indicated that the average propensity to consume is fairly constant over time. This presented a puzzle: why did Keynes' conjectures hold up well in the studies of household data and in the studies of short time-series, but fail when long time series were examined?



Studies of household data and short time-series found a relationship between consumption and income similar to the one Keynes conjectured--this is called the *Keynes or short-run consumption function*. But, studies using long time-series found that the APC did not vary systematically with income--this relationship is called the *Kuznets or long-run consumption function*.