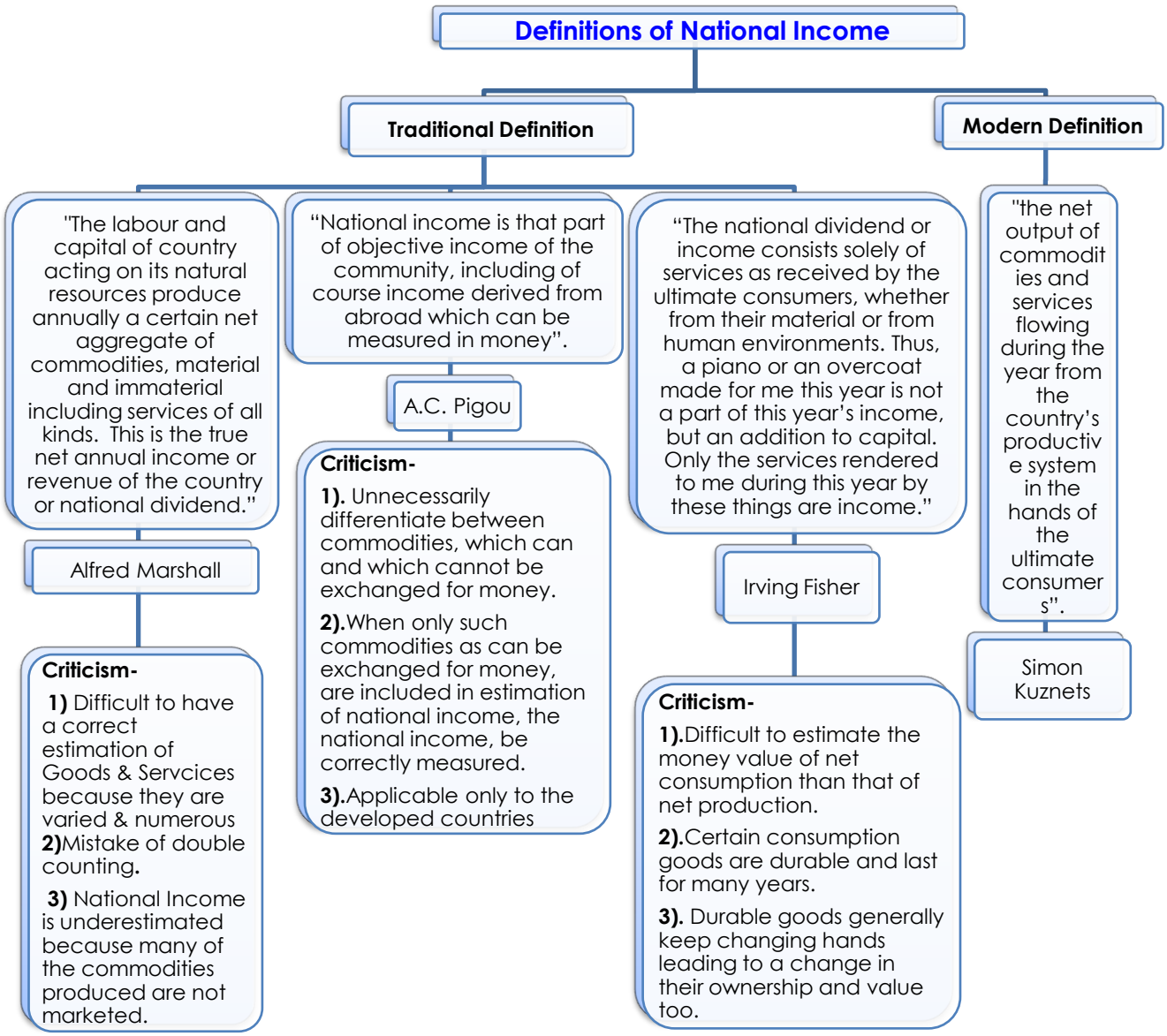
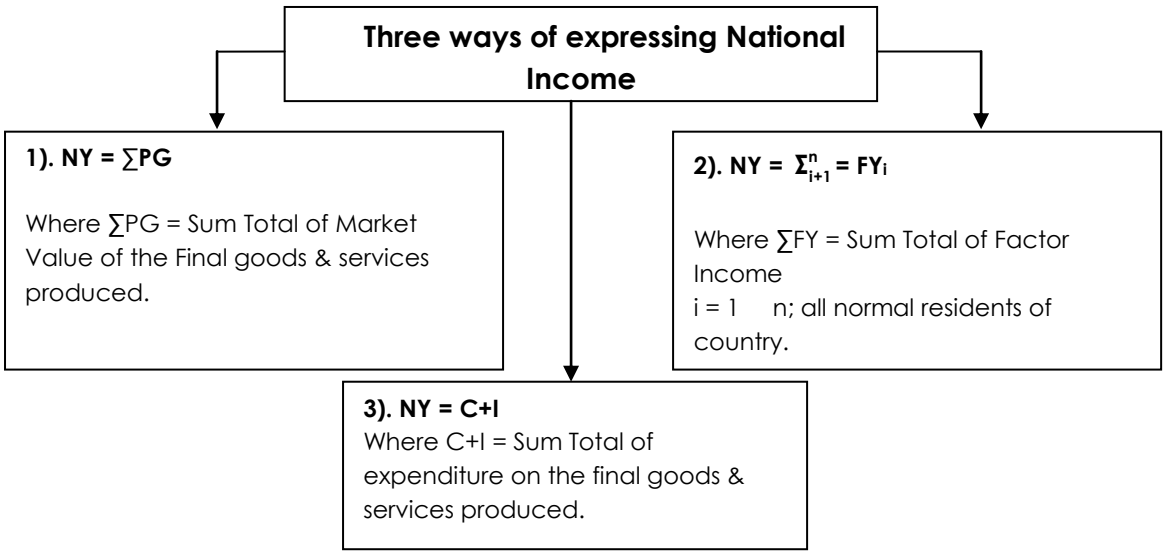
NATIONAL INCOME

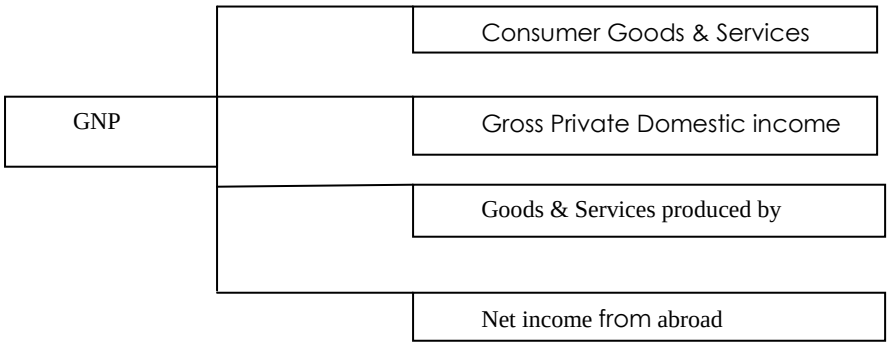
The definitions of national income can be classified into two groups:



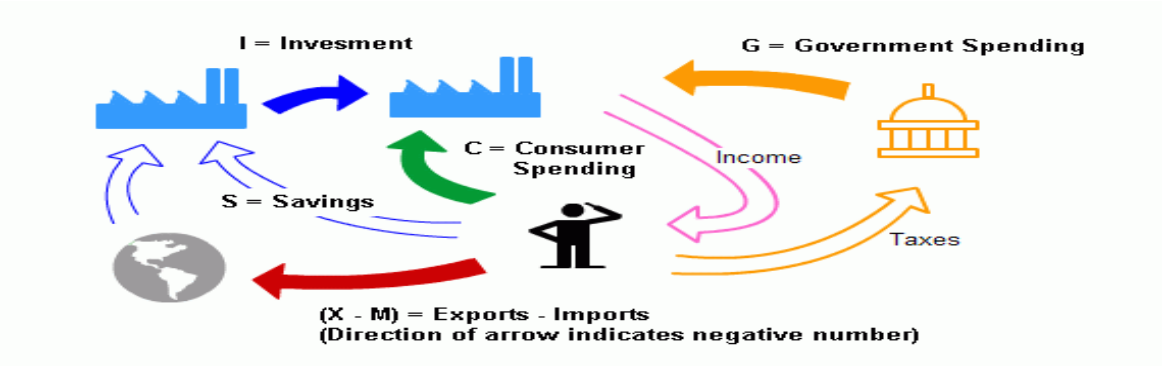


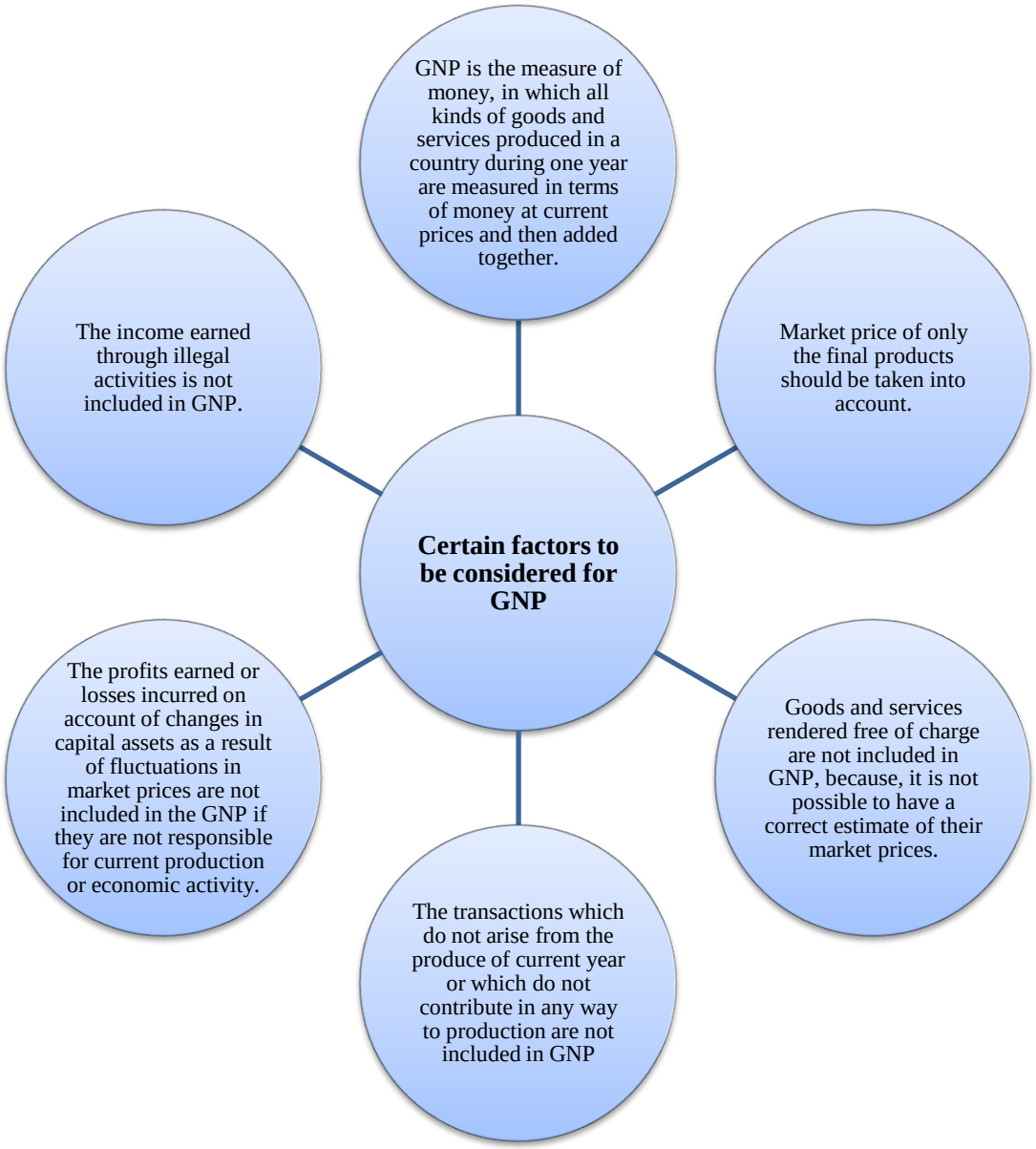
GROSS NATIONAL PRODUCT (GNP)

GNP is the total measure of the flow of goods and services at market value resulting from current production during a year in a country, including net income from abroad, GNP includes four types of final goods and services.



GNP at Market Price = C + I + G + X - M





Gross Domestic Price (GDP)

Gross Domestic Product is the market value of the final goods and services produced within the domestic territory of a country during one year inclusive of depreciation.

In GDP we find different components of income namely

(1) Wages and salaries
(2) Rent
(3) Interest
(4) Dividends
(5) Undistributed Profit
(6) Mixed income
(7) Direct taxes.

GDP at market price (GDP-MP)

GDP at Market Price is estimated by deducting the value of intermediate consumption from the value of output produced by all the producers within the domestic territory of a country. In other words, it is estimated as the sum total of gross value added at the market price.

Value of output Produced by all producing units within the Domestic Territory (1)	–	Value of Intermediate Consumption (2)	=	GDP at Market Price [(1) – (2)]

Gross National Product at Market price (GNP- MP)

GNP at market price is sum total of all the goods and services produced in a country during a year and net income from abroad. GNP is the sum of Gross Domestic Product at Market Price and Net Factor Income from abroad.

(1) Gross Domestic Product at Market Price	+	(2) Net Factor Income from Abroad	=	(3) GNP at Market Price (1+2)

Gross National Product at Factor Cost (GNP-FC)

The gross national product at factor cost is the difference between gross national product and net indirect taxes. It is also called gross national income. Gross national income is the sum total of compensation of employees, operating surplus, mixed income, depreciation and net factor income from abroad. GNP at factor cost refers to income which the factors of production receive in return for their service alone.

GNP at FC	=	GNP at Market Price	–	Net Indirect Taxes	+	Subsidies

Subsidies

Subsidies refer to difference between the Market Price and Cost of Production.

NET NATIONAL PRODUCT (NNP)

In the process of production of goods and services, there will be some depreciation of fixed capital also called as consumption of fixed capital, if the value of depreciation is deducted from the value of gross national product in a year; we obtain the value of net national product. Thus, NNP at market price is gross national product at market price minus depreciation.

GNP	–	Depreciation	=	NNP

NNP at market price

GNP at Market Price	–	Depreciation	=	NNP at Market Price

NNP at Factor Cost

Net National Product at factor cost is also called as national income. Net National Product at factor cost is equal to sum total of value added at factor cost or net domestic product at factor cost and net factor income from abroad.

NNP at Factor Cost = **NNP at Market Price** – **Net Indirect tax**

Net Domestic Product at Market Price

NDP at Market price = **GDP at Market Price** – **Depreciation**

Net Domestic Product at Factor Cost

NDP at Factor Cost = **NDP at Market Price** – **Indirect Tax** + **Subsidies**

Net National Product at Factor Cost

NNP at Factor Cost = **NDP at Factor cost** + **NFIA**

Where NFIA = Net Factor Income from Abroad

RELATED CONCEPTS:

Private Income

Central Statistical Organization defines Private Income as "the total of factor income from all sources and current transfers from the government and rest of the world accruing to private sector" or in other words the private income refers to the income from socially accepted source including retained income of corporation.

NI + **Transfer Payments** + **Interest on Public Debts** + **Social Security** – **Profit & Surplus Public Enterprise**

Personal Income

Prof. Peterson defines Personal Income as "the income actually received by persons from all sources in the form of current transfer payments and factor income." Total income received by the citizens of a country from all sources before direct taxes in a year.

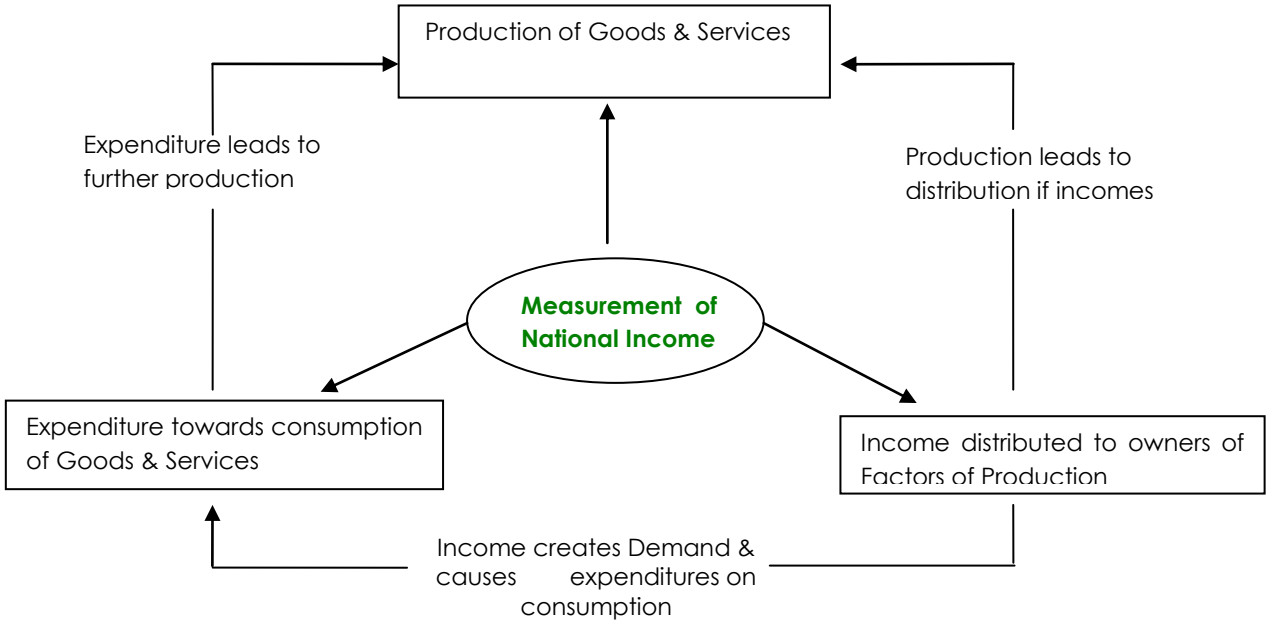
PI = **Private Income** + **Undistributed Corporate Profits** – **Direct Taxes**

Disposable Income

Prof. Peterson defined Disposable Income as "the income remaining with individuals after deduction of all taxes levied against their income and their property by the government." Disposable Income refers to the income actually received by the households from all sources. The individual can dispose this income according to his wish, as it is derived after deducting direct taxes.

DI = **Personal Income** – **Direct Taxes** – **Miscellaneous receipts of the Government**

MEASUREMENT OF NATIONAL INCOME

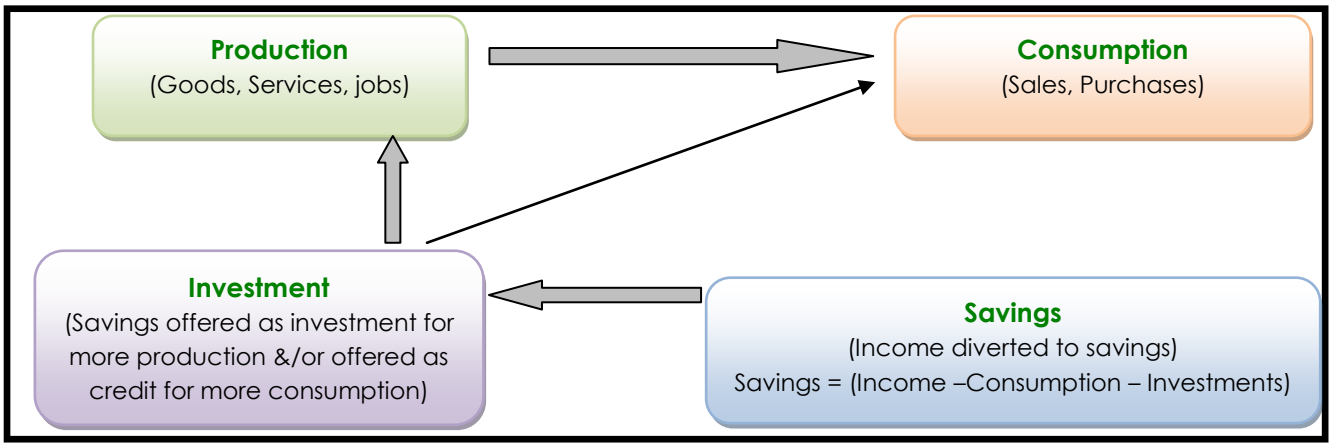


Method	Stage of Measurement	National Income viewed as a-	Suitability
Value Added Method/ Product Method	Phase of Production of Goods & Services	Flow of Goods & Services	Agricultural Sector
Income Method	Phase of Income Distribution	Flow of Incomes	Small Scale Sector
Expenditure/ Outlay Method	Phase of Income disposition i.e, consumption & expenditure	Flow of expenditure on Goods & Services	Construction Sector

Steps to measure National income under various methods are given below:-

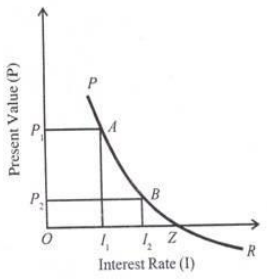
Steps	Product Method	Income Method	Expenditure Method
1.	Various Producing enterprises in a country are classified into- Primary, Secondary & Tertiary Sectors respectively.	Various Producing enterprises in a country are classified into- Primary, Secondary & Tertiary Sectors respectively.	The expenditure by Consumer households & Non Profit making Institutions on – **(a)** Durable consumer goods **(b)**Single use consumer goods **(c)**Services
2.	Estimating Net Value added **NVA =** Value of Output-[Value of Non factor inputs(Intermediate consumption) + Depreciation + Net Indirect Taxes] **Value of Output** =(Sales + Change in Stock) **Change in stock**=(closing stock-opening stock)	All factor payments are classified as follows:- **(a)** Income from work- Wages & Salaries. **(b)** Income from Property- Rent & Interest **(c)** Income from Profit- Dividend, Undistributed Profit & Corporate Taxes **(d)** Mixed Income- Self Employed	The Govt. final consumption expenditure is estimated which includes well being of citizens- education, health, medical care, electricity & water supply etc.
3.	NVA of all sectors of a country is added to obtain NDP at factor cost	Domestic factor income is estimated by adding all factor payments of all enterprises of all the sectors.	The Gross Domestic Capital Formation (GDCF) is estimated. **GDCF=** (Change in stock+ Gross fixed domestic capital formation)
4.	Estimating NFIA & adding the same to NDP to obtain NNP/NI. Thus $\sum NVA=NDP_{FC}$ $NDP_{FC}+NFIA=NNP_{FC}$ $NNP_{FC}=NI$	NFIA is estimated & added to domestic income to arrive at NNP/NI. Thus wage + salary + profit + rent + interest + mixed income= NDP_{FC} $NDP_{FC}=DI+NFIA$ $NNP_{FC}=NI$	Net export of Goods & services is estimated. Net Exports = Export – Import
5.			$NDP_{MP}=\sum$Step1 to Step4
6.			NFIA is estimated & added to NDP_{MP} to get NNP_{MP} / NI_{MP}. $NI_{FC}=NI_{MP}$-Net Indirect Taxes

CONSUMPTION, SAVINGS & INVESTMENTS



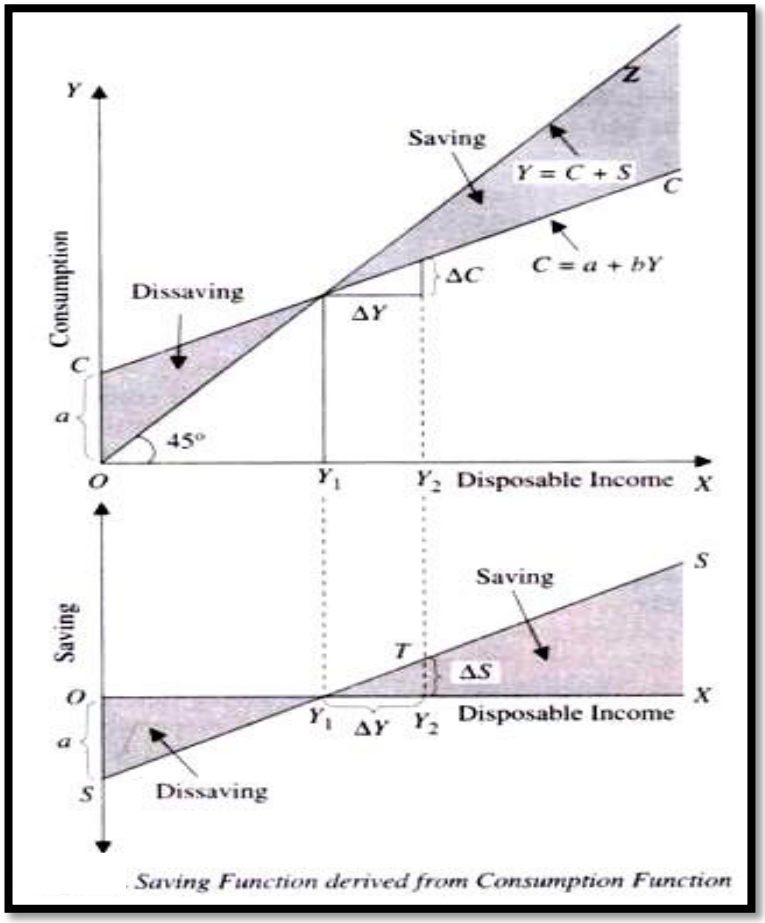
Definition, attributes, functions & related concepts

	Consumption	Savings	Investments
Definition	Keynes held that "men are disposed as a rule and on the average, to increase their consumption as their income increases by not by as much as the increase in their income."	According to Keynesian economics, the amount left over when the cost of a person's consumer expenditure is subtracted from the amount of disposable income that he or she earns in a given period of time.	Investment has dual aspect. It implies the production of new capital goods like plants and equipments. Secondly, a change in inventories or stocks of capital of a firm between two periods.
Determinants	• **Tax Policy –** A higher rate of tax will reduce personal income and to that extent consumption as well. • **The Rate of Interest–** A higher rate of interest may induce more savings and so less consumption. However a higher interest income may raise consumption by raising total income. • **Holding of Assets** If people want to hold more assets, like property. They will curtail consumption. • **Windfall Profits Loss–** Consumption level of those classes of people changes who gain wind profits or incur windfall losses.	• **Income-** The saving income ratio tends to rise with increase in income. People save part of additional income but not the entire income • **Distribution of income** "Demonstration effect", that is man's desire to imitate the superior consumption standard of neighbors or relatives. • **Psychological Factors:-** A man saves or insures as a precaution against future uncertainty and insecurity.	• **Marginal Efficiency of Capital(MEC)-** MEC implies the prospective yield from the capital asset and the supply price of this asset. • **Rate of Interest-** Generally there exists a negative relation between interest rate and investment expenditure. A fall in the rate of interest may induce an increase in investment expenditure whereas a higher rate, investment is likely to be less.

Functions	The propensity to consume shows income consumption relationship C = F(Y). Where, C=Consumption(dependent variable) Y=Income(Independent Variable)	Excess of income over expenditure on consumption. S = Y – C. Savings is functionally related to income S = f(Y).	The investment function is negatively sloped with respect to interest rates. 
Related Concepts	**Average Propensity to consume:-** It implies the ratio of total consumption to total income. APC = c / y **Marginal propensity to consume** It is the ratio of additional consumption to additional income: (MPC = Change in consumption/change in income), MPC < 1. Propensity to consume is a fairly stable function of income.	**Average Propensity to save:-** It implies the ratio if total savings to total income. APS = s / y **Marginal propensity to save (MPS)** is the fraction or proportion of any change in income that is saved. (MPS = change in saving/change in income.)	**Marginal Productivity of Capital (MPC):** • The additional physical product obtained due to the employment of one extra unit of capital (do/dc) per unit of time. **Investment Multiplier:** The multiplier (M) is the number by which the initial investment is to be multiplied to get the resulting change in income. (M = Increase in income / increase in investment) .

Relationship between Savings-Consumption & Savings- Investments

The saving curve (SS) is drawn in the panel at the bottom. The saving curve shows the gap between consumption curve (CC) and the income curve (OZ) in the upper panel of the figure. It will be seen that up to income level OY_1 consumption exceeds income, that is, there is dissaving. Beyond income level OY_1, there is positive saving. It is worth mentioning that as average propensity to consume (APC) falls with the increase in income in the upper panel average propensity to save rises as income increases. Thus in Figure it is seen that with the increase in income not only the absolute amount of saving increases, the average propensity to save also increases.



Saving Function derived from Consumption Function

ECONOMIC GROWTH & FLUCTUATIONS

Definition of Economic Growth

The expansion in the capacity of an economy to produce goods and services over a period of time. An outward shift of production possibilities frontier of an economy. It shows the different maximum possible combinations of quantities of two goods if it employs all its available resources full and given the existing state of technology.

Measurement

One measure is a country's overall capacity to produce goods and services.

⇩

The money value of GNP can change because of change in price.

⇩

It is necessary to measure economic growth rate by using constant Rupees, or real income.

⇩

An increase in real GNP if followed by a higher rate of growth of population may lead to deterioration or no change in the standard of living of the population.

⇩

Real GNP per capital = Real GNP/ Population

⇩

If the numerator (GNP) grows faster than the denominator (Population), real GNP per capita will grow and quality of life will improve.

Components of Economic Growth

⇩

Size of population (P)
- Population helps economic growth by enlarging demand.
- It paves the way for producing large quantity of output

⇩

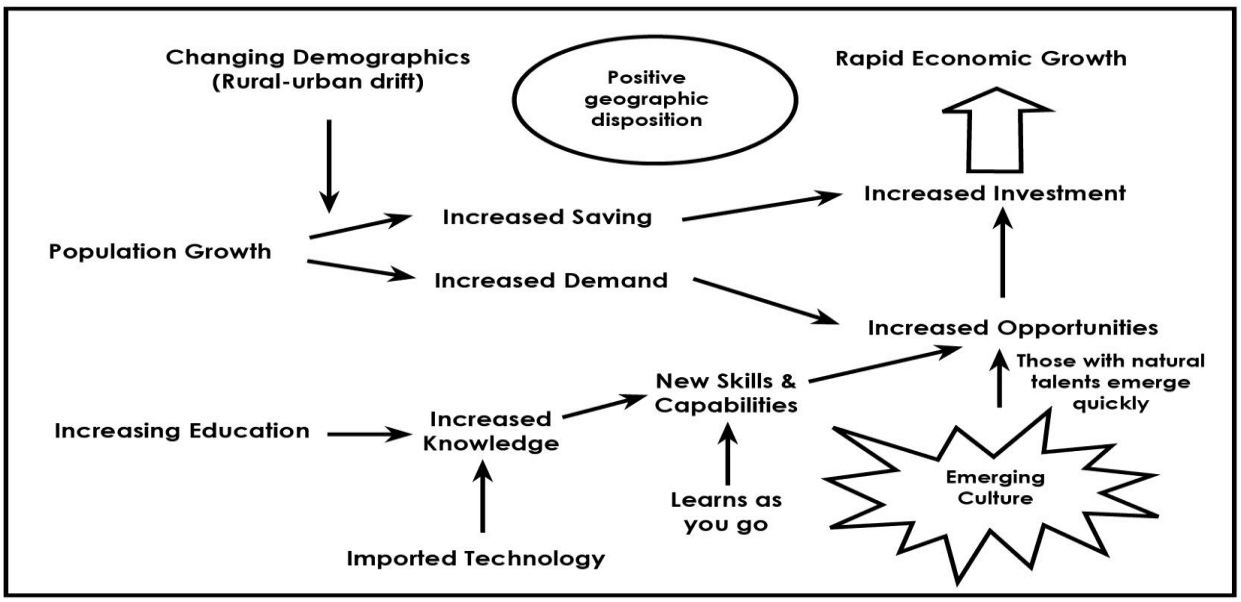
Fraction of population that constitute labour force L/P (L = PX)
- If this proportion (L/P) is high more will be productive capacity of an economy and vice

⇩

The total number of labour hours actually worked by the labour force L x H = P x L/P x H
- The length of the average work hour of the labour force generally seems to have a direct impact on the rate

⇩

Output per labour i.e. labour productivity Q/(L x H)
- Output per labour hour has a direct bearing on the level of GNP.
- The more productive labour, the more will be the total output of an industry.



Examples

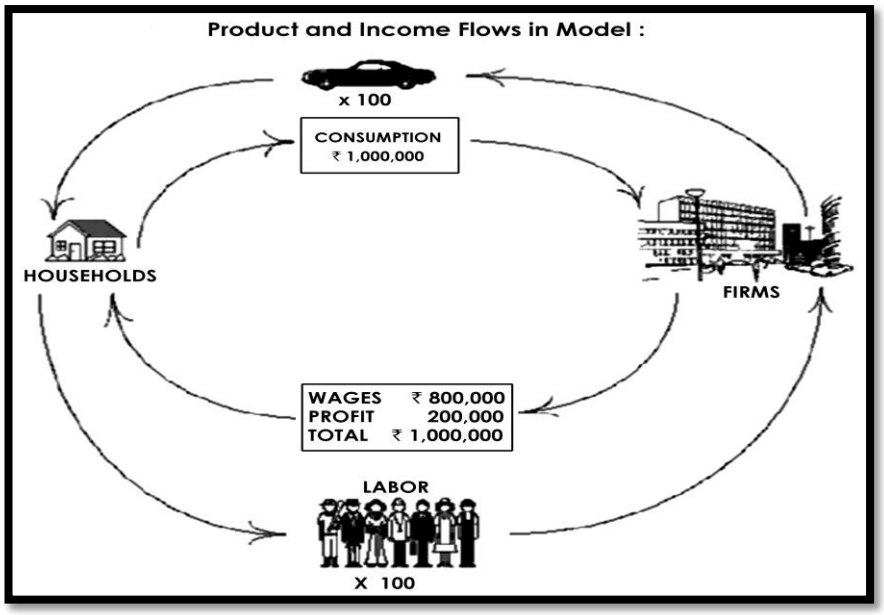
An Economy Producing Consumption Goods: Model I

Let us take an example of an economy that produces only one consumption goods i.e. cars. These cars are produced by firms which are staffed by the households and owned by the households. In other words the two factors of production are labor and capital, and the households own both of them. There is no role for government or for the rest-of-the-world in Model I, so these sectors are omitted.

Let's suppose that the output of cars is one per worker per year. There are 100 workers, so the output of the firms is 100 cars per year. All 100 cars produced are delivered to the households. The market for cars sets the price that households pay for a car, and let's suppose that turns out to be ₹10,000 per car. This implies that the annual consumption expenditure of households in Model I is ₹10,00,000 (= 100 cars * ₹10,000). That spending by households is income to the auto firms which distribute it to the factors of production, labor and capital.

Suppose that in the labor market the wage has been established at ₹8,000 per year, so wages paid by the firms to households total ₹800,000 per year. Profit earned in this case ₹2,00,000. The factor incomes that result from the production of autos are therefore ₹8,00,000 for labour and ₹ 2,00,000 for capital.

The market value of all the goods and services produced by an economy is called the National Product. It is ₹10,00,000 per year for Model I since that is the total expenditure for the cars that are produced. In other words the total of all factor incomes is also called National Income.



Value of Goods Produced		Factor Income	
Consumption Goods	₹10,00,000	Wages Profits	₹ 8,00,000 ₹ 2,00,000
National Product	₹10,00,000	National Income	₹ 10,00,000

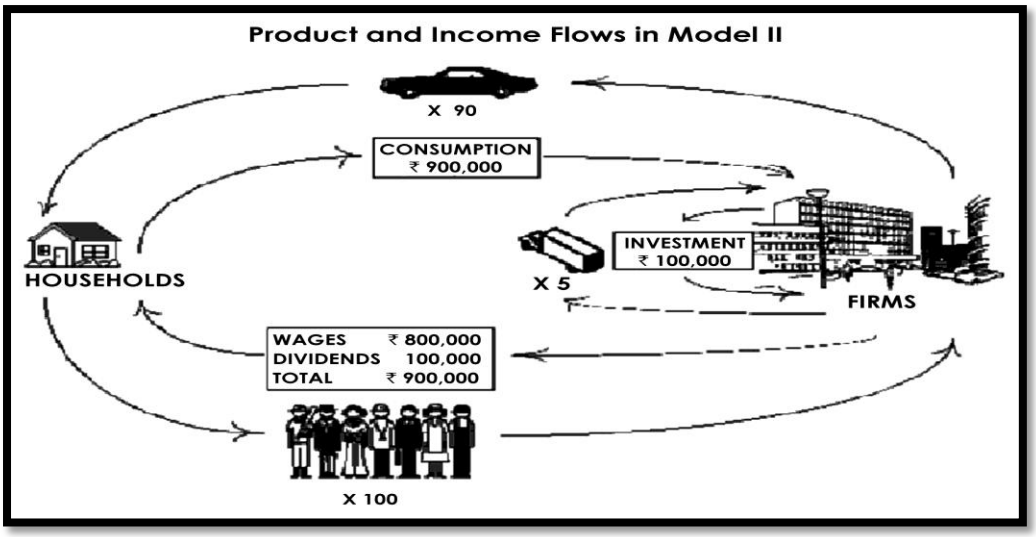
An Economy That Also Produces Capital Goods- Model II

Now let's make our model more realistic by recognizing that factories require capital goods, the equipment used in production. For example, car makers need trucks to deliver the new cars to consumers. These trucks are made by other firms in the business sector which sell their output to the car firms rather than to households. There are still only 100 workers, but now they can be employed making either cars or trucks. Recall that one worker can make one car per year, and we now suppose that it takes two workers to produce one truck per year.

(cars per year * 1) + (trucks per year * 2) = 100 workers.

Car sells for ₹10,000 and a truck for ₹20,000, and that the economy produces 90 cars and 5 trucks. This implies that 90 workers are employed by car firms and the remaining 10 by truck producers. Payments for these flow in the opposite direction, from households to firms to pay for cars, from auto firms to truck firms to pay for trucks, and from firms to households to pay for the factors of production. Sales of cars totals ₹9,00,000 per year (90 cars times ₹10,000 per car) and this is the value of the goods produced by these firms. Incomes to the factors of production include wages for 90 workers (the labor factor) at ₹8,000 per worker, which comes to ₹7,20,000. This leaves a profit of ₹1,80,000 which is the factor income going to capital. This profit belongs to the households that are the shareholders of the car-producing firms. However, not all of the profit will be paid out to the households because the auto firms have to pay for their capital investment in 5 new trucks that they paid ₹20,000 for each, a total of ₹1,00,000. The car firms can pay out the remaining ₹80,000 as a dividend to their owners.

This example illustrates the important distinction between profit and dividends. Profit is the amount left over from sales after deducting the costs of running the firm, while dividends are the amount actually paid out to the firm's owners, the shareholders.



Auto Firms' Product and Factor Income in Model II

Value of Goods Produced		**Factor Incomes**	
Sales to Households: (90 cars @ ₹10,000)	₹9,00,000	Wages: (90 workers @ ₹8,000) Profit of ₹180,000 allocated to - Capital investment: (5 trucks @ ₹20,000) Dividend payment to shareholders	₹7,20,000 ₹1,00,000 ₹ 80,000
Value of Product	₹9,00,000	Total Factor Income	₹9,00,000

Truck Firm's Product and Factor Income in Model II

Value of Goods		**Factor Incomes**	
Sales: 5 trucks @ ₹20,000	₹1,00,000	Wages: 10 workers @ ₹8000 Profit of ₹20,000 allocated to - Dividend payment to shareholders:	₹ 80,000 ₹ 20,000
Value of Product	₹ 1,00,000	Total Factor Income	₹1,00,000

We can also see from the table of National Product and Income that Savings equals Investment in the economy. Savings is what society has left after paying for consumption. In this case it is:

Particulars	**(₹)**
National Income	10,00,00
Less:- Consumption	9,00,000
Savings	**1,00,000**

Notice that Savings is exactly the value of the investment in trucks, ₹100,000 as we have here is a fundamental equality in macroeconomics that holds in any economy. Product consists of consumption goods and Investment goods, but National Product is equivalent to National Income. We can write this equality as:

Consumption + Investment = National Income

Then subtracting consumption from both sides, we get:

National Income - Consumption = Investment

or, in other words,

Savings = Investment.

This fundamental result tells us that if society is to invest in new capital goods to achieve higher productivity in the future, it must give up an equivalent amount of consumption now.

Gross National Product and Net National Product- Model III

In reality, capital goods like trucks wear out over time from use. Depreciation is the decline in the value of capital goods due to usage, and it is a cost to society which we need to account for in computing National Income.

To illustrate, suppose that the auto firms in Model II start the year with a fleet of 20 trucks that are used to deliver new cars to consumers and that during the year two trucks wear out and are scrapped. This loss of two trucks is depreciation and it is a cost of production to the auto firms and to society.

Gross National Product or GNP is the value of all goods and services produced by the economy & Net National Product or NNP is GNP minus depreciation.
The net output of the economy is three trucks and 90 cars after deducting depreciation of two trucks from the *gross* output of 5 trucks and 90 cars. Depreciation of two trucks is ₹40,000.

Particulars	**(₹)**
Gross National Product	10,00,00
Less:- Depreciation	40,000
Net National Product	9,60,000

Auto Firm's Profits in Model III

Particulars		**(₹)**
Sales: 90 cars @ ₹ 10,000		9,00,000
Less:- Wages	(90 workers @ ₹ 8,000)	7,20,000
Less Depreciation	(2 trucks @ ₹ 20,000)	40,000
Profit		**1,40,000**

Auto Firms' Product and Factor Income in Model III

Value of Goods Produced	(₹)	Factor Incomes	(₹)
Sales to Households (90 cars @ ₹ 10,000)	9,00,000	Wages (90 workers @ ₹ 8,000)	720,000
		Profit of ₹ 140,000 allocated to -	
Gross value of product	9,00,000	net investment: purchase 3 new trucks @ ₹ 20,000	60,000
Less:- Depreciation Replace 2 trucks@ ₹ 20,000	40,000		
		Dividend payment to shareholders	80,000
Net Value of Product	**8,60,000**	**Total Factor Income**	**860,000**

Five trucks still flow out of the truck industry bound for the auto industry; two of them replace trucks worn out this year, and the remaining three represent a net addition to the truck fleet. The payment for them is still ₹ 100,000, but ₹ 40,000 of that is depreciation cost for the auto firms while only ₹ 60,000 represents net investment.

National Product and Income in Model III

Value of Goods Produced	(₹)	Factor Income	(₹)
Consumption goods Gross Investment	9,00,000	Wages	8,00,000
GNP	1,00,000	Profits	1,60,000
Less:- Depreciation	10,00,000		
	40,000		
Net National Product	**960,000**	**National Income**	**9,60,000**

Government Spending and Taxation: Model IV

Now we introduce the government sector. It purchases of some of the output of the business sector and collects taxes to pay for it. Government uses trucks for defense purposes & has decided to buy 6 trucks per year. Obviously the economy cannot continue to supply 5 trucks to the business sector and 90 cars to the households sector while, in addition, producing 6 trucks for the Government.

Since it takes one worker to build a car, and two workers to produce a truck regardless of who buys it, the production possibilities frontier for the economy is:-

cars * 1 + business trucks •*2 + Govt. trucks •*2= 100 workers

Production of Cars reduced by 10 and the production of business trucks by one. The capacity freed up by these reductions is sufficient to make room in the economy for the production of 6 trucks for government, since 5 trucks can be produced in place of 10 cars and one less business truck leaves a sixth truck for government.

Government will get the money to pay for 6 trucks by imposing an income tax of 10% on the profits of firms and the income received by households. If this is not enough to cover the full cost then the government will be running a deficit and the Department of the Treasury must borrow what it needs.

Auto Firms' Profits in Model IV

Particulars	**(₹)**
Sales (80 cars @ ₹10,000)	8,00,000
Less:- Wages (80 workers @ ₹8,000) -	6,40,000
Less:- depreciation (2 trucks @ ₹20,000)	40,000
Profit Before Tax	1,20,000
Less:- Income Tax of 10%:	12,000
Profit After Tax	**1,08,000**

Auto Firms' Product and Factor Income in Model IV

Value of Goods Produced	**(₹)**	**Factor Income**	**(₹)**
Sales to Households (80 cars @10,000)	800,000	Wages (80 workers @8,000)	640,000
Gross value of product	800,000	Profit of ₹120,000 allocated to -	
		Net investment:	
		Purchase (2 new trucks* ₹20,000)	40,000
		Dividend payment to shareholder	70,000
Less:- Depreciation (2trucks @ 20,000)	40,000	Income Tax paid	12,000
		Amount borrowed	(2,000)
Net Value of Product	**760,000**	**Total Factor Income**	**760,000**

The consequence of adding only two new trucks to the fleet instead of three as in Model III will be slower gains in productivity in the future. The truck firms have higher sales and profits in Model IV than they did in Model III. With production up to 10 trucks per year the profits of the truck firms will be:

Truck Firms' Profits in Model IV

Particulars	**(₹)**
Sales (10 Trucks @ @20,000)	2,00,000
Less:- wages (20 Workers @ 8,000)	1,60,000
Profit Before Tax	40,000
Les:- Tax @ 10 %	4,000
Profit After Tax	**36,000**

Truck firms now employ more workers and produce more trucks than they did in Model III; factors of production have been shifted away from consumer goods to production of goods for government use.

Truck Firms' Product and Factor Income in Model IV

Value Value of Goods produced	(₹)	Factor Incomes	(₹)
Sales (10 trucks @ ₹20,000	2,00,000	Wages (20 workers @ ₹8,000) Profit of ₹40,000 allocated to - Dividend payment to shareholders Income Tax paid	1,60,000 36,000 4,000
Value of Product	**2,00,000**	**Total Factor Income**	**2,00,000**

Households' Income and Expenses in Model IV

Particulars	(₹)
Wages (100*8000)	8,00,000
Add:- Dividends	1,06,000
Personal Income	9,06,600
Less:- Income Tax @ 10%	90,600
Disposable Income	8,15,400
Less:- Consumption Spending	8,00,000
Personal Savings	**15,400**

One sector remains to be accounted for in Model IV, the Government sector. Recall that the 10 % income tax was introduced by the government to pay for the 6 trucks. Let's see if it is sufficient to pay for them.

Government's Income and Expenses in Model IV

Particulars	(₹)
Income Tax Revenue from -	
Business Sector	16,000
Household Sector	90,600
Total Tax Revenue	1,06,600
Less:- Government Spending	1,20,000
Government Surplus or Deficit -	13,400

Having calculated the income flows for all three sectors of the economy in Model IV, we are now ready to summarize the economy in the usual table of National Product and Income.

National Product and Income in Model IV

Value of Goods Produced	(₹)	Factor Income	(₹)
Consumption Goods Add:-Gross Investment	8,00,000 80,000	Wages Profits	800,000
Add:-Govt. Purchases	120,000		160,000
GNP	10,00,000		
Less:- Depreciation	40,000		
NNP	**960,000**	**National Income**	**960,000**

Another way to look at National Income is as the sum of payments made to each of the three sectors. The Household sector receives wages and dividends which is Personal Income, and then we subtract the income tax to get Disposable Income. Next, the profit recorded by the Business sector is reduced by the dividends paid to the households and the income tax paid to the Government sector. Finally, the income of the Government sector is the sum of the taxes collected from the other two sectors.

Sector Income in Model IV

Particulars	**(₹)**
Households	
Wages	8,00,000
Dividend	1,06,000
Personal Income	9,06,000
Less:- Income Tax	90,600
Disposable Income	8,15,400
Business	
Profits	1,60,000
Less:- Income Tax	16,000
Profits after Tax	1,44,000
Less:- Dividends Paid	1,06,000
Undistributed profits	38,000
Government	
Tax Revenues	1,06,600
National Income	**9,06,600**

The combined incomes of the three sectors are National Income which is equal to NNP. Adding up the three components of NNP and setting them equal to the sum of the incomes of the three sectors we have the simple equation

Consumption + Net **I**nvestment+**G**overnment Purchases**= D**isposable **I**ncome + **U**ndistributed **P**rofit+ **T**axRevenues

Using the bold letters in each of these components as abbreviations, we can rewrite the equation as

C + I + G = DI + UP + T

which we can easily rearrange as follows:

(DI-C) + UP + (T-G) = I

The terms on the left hand side are the savings of each of the three sectors: (DI-C) is personal savings, UP is the savings of the business sector, and (T-G) is the savings of government. This equation shows us that total savings in the economy must be equal to net investment. This fundamental relationship is expressed in words as:

Personal Savings + Undistributed Profits + Government Savings = Net Investment

The values of the components of the "savings = investment" equations for Model IV are:

(DI-C)	+	UP	+	(T-G)	=	I
15,400	+	38,000	+	(-13,400)	=	40,000
Household Savings	+	Business Savings	+	Government Savings	=	Net Investment

ACCOUNTING FOR DEPRECIATION

Straight Line Method

1. **A new smart Phone costs ₹ 6,000 and depreciates at 22% p.a. on a straight-line basis. Determine the value of the smart Phone at the end of each year over a 4 year period.**

Solution:

Calculate depreciation amount
Depreciation=6,000×22/100=1,320
Therefore the Smartphone depreciates by ₹ 1,320 every year.

Year	Value at beginning of year (₹)	Depreciation amount (₹)	Value at end of year (₹)
1	6,000	1,320	4,680
2	4,680	1,320	3,360
3	3,360	1,320	2,040
4	2,040	1,320	720

Value of the Smartphone at the end of the 4th year is ₹720

2. **A car is valued at ₹240 000. If it depreciates at 15% p.a. using straight-line depreciation, calculate the value of the car after 5 years.**

Solution:

Depreciation = 2,40,000 × 15% =₹ 36,000

Year	Value at beginning of year (₹)	Depreciation amount (₹)	Value at end of year (₹)
1	2,40,000	36,000	2,04,000
2	2,04,000	36,000	1,68,000
3	1,68,000	36,000	1,32,000
4	1,32,000	36,000	96,000
5	96,000	36,000	60,000

3. **Sandip buys a Dish TV satellite dish for ₹ 3,000. Due to weathering, its value depreciates simply at 15% on Straight Line Basis per annum. After how long will the satellite dish have a book value of zero?**

Solution:

Depreciation = 3,000 × 15% =₹ 450
Book value will be Zero in the year of
3,000 / 450 = 6.666 i.e. 7 years.
After 7 years using, the book value of Dish TV will be Zero.

4. If the purchase price of Machine is ₹80,000, the expense to be capitalized is ₹ 20,000. The estimated residual value is ₹ 40,000 and expected useful life of the machine is 4 years. Calculate the rate of depreciation on SLM basis.

Solution:

Cost price of the machine ₹ (80,000 + 20,000) = ₹ 1,00,000
Residual Value =₹ 40,000
Useful life of the machine = 4 years
Depreciation amount =

$$\frac{1,00,000 - 40,000}{4}$$

$$= \frac{60,000}{4}$$

$$= ₹\ 15,000$$

The rate of depreciation is $\frac{15,000}{1,00,000} \times 100 = 15\%$

5. Purchase price of Scooter is ₹ 17,000. An expense to be capitalized is ₹ 3,000. The rate of depreciation on SLM basis is 9%. Estimated useful life is 10 years. Determine the estimated residual value.

Solution:

Particulars	Amount (₹)
Purchase price	17,000
Add: Expenses to be capitalized	3,000
	20,000
Less: Depreciation for 10 years [20,000 × 9% × 10]	18,000
Residual Value	**2,000**

6. If an asset is bought on 01.01.09 for ₹ 10,000 and is expected to be sold on 31.12.14 for ₹ 7,000. What would be its annual depreciation?

Solution:

Asset bought on 01.01.2009 and expected to be sold on 31.12.14 i.e. estimated useful life is 6 years.
Amount of Depreciation =

$$\frac{10,000 - 7,000}{6}$$

$$= \frac{3,000}{6}$$

$$= ₹\ 500$$

7.

Dr. Machinery Account Cr.

Date	Particulars	Amount (₹)	Date	Particulars	Amount (₹)
01.01.14	To, balance b/d [M1]	15,000	01.10.14	By, Depreciation A/c [M1]	1,500
01.01.14	To, Bank A/c [M2]	45,000	01.10.14	By, Bank A/c [M1]	12,250
01.04.14	To, Bank A/c [M3]	16,000	01.10.14	By, Profit and Loss A/c [M1]	Q
			31.12.14	By, Depreciation A/c	Q
			31.12.14	By, Balance c/d	Q
		76,000			76,000

Additional Information:
On 31st December every year, depreciation is charged at 10% p.a. on cost price.

You are required:

(i) Determine the amount transferred to profit and loss account for sale of the machinery.
(ii) Calculate the amount of depreciation provided on 31.12.14.
(iii) Compute the balance c/d on 31.12.14.

Solution:

(i) Computation of the amount transferred to profit and loss account for sale of the machinery:

Date	Particulars	Amount (₹)
01.01.14	Balance of Machinery	15,000
01.10.14	Less: Depreciation	1,500
	W.D.V.	13,500
01.10.14	Less: Sale of the Machinery	12,250
	Loss on sale of Machinery	1,250

∴ Amount transferred to Profit and Loss Account is ₹ 1,250

(ii) Calculate the amount of depreciation provided on 31.12.14
[45,000 × 10%] +[16,000 × 10% × 9/12] = 4,500 + 1,200 = 5,700

Therefore the amount of depreciation is ₹ 5,700

(iii) The Balance c/d amount on 31.12.2014
76,000 – [1,500 + 12,250 + 1,250 +5,700] = 76,000 – 20,700 = ₹55,300

Reducing Balance Method

8. A second-hand farm tractor worth ₹ 60 000 has a limited useful life of 5 years and depreciates at 20% p.a. on a reducing-balance basis. Determine the value of the tractor at the end of each year over the 5 year period.

Solution:

Compute the value of the tractor after 5 years of period

Year	Value at beginning of year (₹)	Depreciation amount (₹)	Value at end of year (₹)
1	60,000	60,000 × 20% =12,000	48,000
2	48,000	48,000 × 20% =9,600	38,400
3	38,400	38,400 × 20% = 7,680	30,720
4	30,720	30,720 × 20% = 6,144	24,576
5	24,576	24,576 × 20% = 4,915	19,661

9. The plant and machinery account of a firm had a debit balance of ₹ 1,47,390 as on 31.12.2014. On Jan 1st 2011 company started business and has been following the practice of charging full years depreciation every year on diminishing balance method @ 15%. Determine the cost of machinery.

Solution:

Date	Particulars	Amount (₹)
31.12.14	Balance as on	1,47,390
	Add back: Depreciation for 15% [1,47,390 × 15/85]	26,010
31.12.2013	Balance as on	1,73,400
	Add back : Depreciation [1,73,400 × 15/85]	30,600
31.12.2012	Balance as on	2,04,000
	Add back : Depreciation [2,04,000 × 15/85]	36,000
31.12.11	Balance as on	2,40,000
	Add back: Depreciation [2,40,000 × 15/85]	42,352
01.01.11	Balance as on	**2,82,352**

10. A boiler was purchased from abroad for ₹ 10,000. Shipping and forwarding charges amounted to ₹ 2000, import duty ₹ 7,000 and expenses of installation amounted to ₹ 1,000. It was depreciated for three years @ 10% on diminishing balance method. Compute the balance of Machinery Account at the end of the 3rd year.

Solution:

Cost of the Machineries:
₹[10,000 + 2,000 + 7,000 + 1,000] = ₹ 20,000

Particulars	Amount (₹)

Cost of the Machine	20,000
Less : Depreciation [20,000 × 10%]	2,000
W.D.V. at the end of the 1st year	**18,000**
Less: Depreciation [18,000 × 10%]	1,800
W.D.V. at the end of the 2nd year	**16,200**
Less: Depreciation [16,200 × 10%]	1,620
W.D.V. at the end of the 3rd year	**14,580**

11. A machine is purchased for ₹200. To achieve a residual value of ₹ 128 at the end of the second year (assuming that depreciation is calculated at the end of each year); what is the percentage of depreciation using the reducing balance method?

Solution:

Let, x % is the charge of depreciation.
For 1st year, depreciation is = ₹200 × x% = 2x
So, Written down value for the 1st year = ₹ (200 – 2x)

Similarly,
(200 – 2x) – (200 -2x)× x% = 128

$$200 - 2x - \left[\frac{(200 - 2x) \times x}{100}\right] = 128$$

$$\text{or, } 200 - 2x - \left[\frac{200x - 2x^2}{100}\right] = 128$$

$$\text{or, } \frac{20,000 - 200x - 200x + 2x^2}{100} = 128$$

$$\text{or, } x^2 - 200x + 3,600 = 0$$

$$\text{or, } x^2 - 180x - 20x + 3,600 = 0$$

$$\text{or, } (x - 180)(x - 20) = 0$$

$$\therefore \ x = 180, 20$$

$$x = 20\%$$

Therefore, the % of the machinery is 20%

12. A transport company purchases a truck for ₹2,00,000 on 1st January,2013. It charges 20% depreciation p.a. according to w.d.v method. The truck was sold on 1st July,2014 for a sum of ₹ 1,60,000. Calculate the profit or loss on sale of truck.

Solution:

Particulars	Amount (₹)
Purchase price of the Truck on 01.01.2013	2,00,000

Less: Depreciation @ 20% for the year of 2013	40,000
W.D.V. for 2013	1,60,000
Less Depreciation @ 20% from 01.01.2013 to 30.06.2013 [1,60,000 × 20 % ×6/12]	16,000
W.D.V	1,44,000
Less: Sale price of the Truck	1,60,000
Profit on sale Truck	**16,000**

13. Original cost of a machine was ₹ 2,52,000. Salvage value was ₹ 12,000 . Depreciation for the year @ 10% p.a. under reducing balance method. Determine the value of the depreciation for the 2nd year.

Solution:

Particulars	Amount (₹)
Purchase price of the Machine	2,52,000
Less: Depreciation @ 10% for the year	25,200
W.D.V.	2,26,800
Less Depreciation @ 10% for the 2nd year	22,680
W.D.V	2,04,120

Therefore, the depreciation for the 2nd year will be ₹22,680

14. The net cost of new asset is ₹48,000 and depreciation is charged on W.D.V. basis @ 10% p.a. Determine the amount will be charged on depreciation in the next year.

Solution:

Particulars	Amount (₹)
Cost of the new asset	48,000
Less: Depreciation @ 10%	4,800
W.D.V.	43,200

The next year depreciation will be charged on ₹ 43,200