

Unit -6

National Income Accounting

Learning Objectives

After comprehensive studying of this chapter, learners will be able to:

- meaning and concept of national income.
- difference concepts of national income in terms of market price and factor cost.
- real and nominal GDP.
- concept of GDP deflator and CPI
- the methods to measure national income
- difficulties to measure national income

Introduction

National income is one of the major macroeconomic variables, which deals with annual income of the country. It is the sum of income of all individual in a country during a given period of time. (**income concept**)

It is the income received or paid to the various factors of production. To produce goods and services, a producer has to employ factors of production like land, labour, capital and organization. (**expenditure concept**)

Thus, national income is the summation of all kinds of factors rewards.

Meaning and Definition of National Income

National income is the total income of an economy in a year which is calculated from the total sum of income received by all factors of production. National income can also be calculated according to the origin of market price of produced goods and services in an economy. So, national income is the total value of final goods and services produced by an economy over a period of time, usually in a year. $GDP = \text{Total product of primary sector} + \text{Total product of Secondary sector} + \text{Total product of tertiary sector}$.

Symbolically,

$$GDP = \sum_{i=1}^n P_i \times Q_i$$

$$\text{or, } GDP = (P_1 \times Q_1 + P_2 \times Q_2 + \dots + P_n \times Q_n)$$

● Similarly,

● $GDP = C + I + G + (X - M)$

GDP definition:

- GDP is defined as the market value of final goods and services that are produced within the geographical boundary of an economy within a specified period of time.

Thus,

- GDP is always measured at market prices.
- Only final goods and services are included.
- All output produced within an economy are included whatever the nationality of the producer.
- It is measure in a specific time period such as a year.

Meaning and Definition of National Income

Various economists have been defining about the national income differently.

Marshall's Definition

According to Marshall, "The labour and capital of country acting upon its natural resources produce annually certain net aggregate of commodities, material and immaterial including services of all kinds. This is the true net annual income of the economy."

Features

These are the main features of Marshall's definition:

1. It includes the value of goods and services.
2. It includes the net foreign investment in the country.
3. It includes the depreciation of capital goods.

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Meaning and Definition of National Income

Pigou's Definition

According to Pigou, "National income is that part of objective income of the commodity including, of course, income derived from abroad which can be measured in money."

Features

These are the main features of Pigou's definition:

1. Only those goods and services included which can be measured by the measuring rod of money.
2. All those goods and services which are given as gifts are not included in national income.
3. Pigou's definition is more appropriate as compared to Marshall's definition

Meaning and Definition of National Income

Fisher's Definition

According to **Fisher**, *"The true national income is that part of annual net produce which is directly consumed during that year."*

Features

These are the main features of Fisher's definition:

1. This definition is based on expenditure of net annual product.
2. It focuses on human welfare.
3. It helps to measure peoples' standard of living.

Meaning and Definition of National Income

Simon Kuznet's Definition

According to Simon Kuznets,

“National income is the net output of commodities and services flowing during the year from country's productive system to the hands of the ultimate consumers.”

Features

The main features of Simon Kuznets' definition are:

1. National income is the net output of commodities and services flowing during the year from country's productive system.
2. It is calculated annually.
3. It includes the value of only those goods and services which are in the hands of the ultimate consumers.

Various Concepts of National Income (in terms of Market Price)

While we are going to calculate national income, we have to distinguish between gross and net, domestic and national. The different concept of national income can be explained as follows:

Gross Domestic Product

Gross domestic product is the value of all the final goods and services produced in a given period, usually in a year, in the domestic territory in the country. In other words, the sum of goods and services produced within the boundary of a country during a year is called GDP.

GDP = Total primary product + Total Secondary product + Total product of tertiary sector.

Symbolically,

$$GDP = \sum_{i=1}^n P_i \times Q_i$$

$$\text{or, } GDP = (P_1 \times Q_1 + P_2 \times Q_2 + \dots + P_n \times Q_n)$$

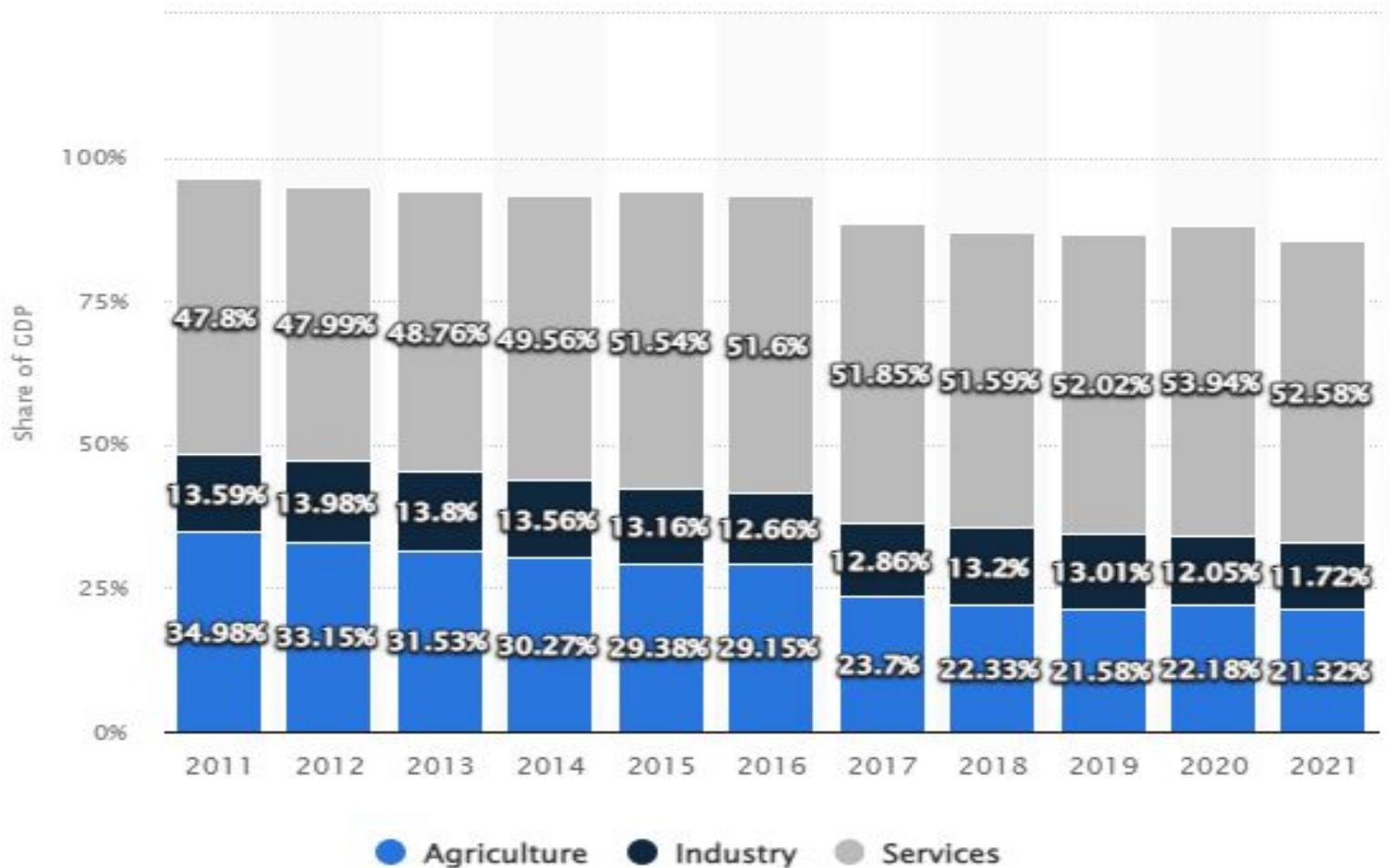
Features of GDP

The features of GDP are as follows:

1. It includes all final goods and services produced within the domestic territory of a country.
2. It includes only new goods and services.
3. It generally includes only those goods and services which coming to the market for transaction.
4. Transfer payments, capital gains are not included in GDP.
5. It includes the income earned by both residents and foreigners in domestic territory.

GDP pattern in Nepal

sectors from 2011 to 2021



GDP at current price in Nepal

	(Rs. in millions)								
Industrial Classification	2071/72	2072/73	2073/74	2074/75	2075/76	2076/77	2077/78	2078/79 R	2079/80 P
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Agriculture, forestry and fishing	642713	665553	729269	771875	832887	862518	958495	1039073	1132751
Mining and quarrying	12746	13582	15668	18450	21999	20443	20448	23254	24185
Manufacturing	129811	127493	149416	169565	192230	174014	207444	239723	249694
Electricity, gas, steam and air conditioning supply	21138	19004	29072	30981	33859	40375	42047	64281	76988
Water supply; sewerage, waste management and remediation activities	17032	18238	18669	19488	19724	20124	20728	21072	21543
Construction	138264	151760	182976	217723	234260	213530	222588	245185	259295
Wholesale and retail trade; repair of motor vehicles and motorcycles	340847	350779	401489	473652	543045	514977	579684	687915	722897
Transportation and storage	128037	160578	184092	197866	215797	180323	196380	256980	318834
Accommodation and food service activities	45907	46276	56149	67315	75650	50433	58779	72243	93051
Information and communication	56513	60398	68468	70276	74122	76956	82693	87953	92614
Financial and insurance activities	107075	127485	158243	186657	207134	241945	253284	291012	346255
Real estate activities	191595	216959	244110	264377	295714	322956	333612	356456	392993
Professional, scientific and technical activities	20929	23294	26961	29784	32722	35351	37098	40769	45497
Administrative and support service activities	12204	14920	16970	19699	25471	27771	29121	30390	33753
Public administration and defence; compulsory social security	135052	137826	184941	193657	218571	276660	287656	318770	382596
Education	143095	161260	197829	219544	251586	288459	296664	337839	385872
Human health and social work activities	31997	33187	41455	44062	49776	60328	65279	74163	89970
Arts, entertainment and recreation; Other service activities; and Activities of households	11654	12811	14787	16050	17933	21363	22933	25066	27704
Gross Domestic Product (GDP) at basic prices	2,186,608	2,341,402	2,720,563	3,011,022	3,342,481	3,428,524	3,714,933	4,212,145	4,696,494
Taxes less subsidies on products	237030	266782	356582	444927	516450	460179	637617	721552	684841
Gross Domestic Product (GDP)	2,423,638	2,608,184	3,077,145	3,455,949	3,858,930	3,888,704	4,352,550	4,933,697	5,381,335

GDP of NEPAL

Gross Domestic Product (at current prices)

(Rs. in millions)

Industrial Classification	2068/69	2069/70	2070/71	2071/72	2072/73	2073/74	2074/75	2075/76	2076/77	2077/78	2078/79 R	2079/80 P
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Agriculture, forestry and fishing	528851	557940	613094	642713	665553	729269	771875	832887	862518	958495	1039073	1132751
Mining and quarrying	9979	10567	12096	12746	13582	15668	18450	21999	20443	20448	23254	24185
Manufacturing	101726	112093	125294	129811	127493	149416	169565	192230	174014	207444	239723	249694
Electricity, gas, steam and air conditioning supply	16701	20091	20677	21138	19004	29072	30981	33859	40375	42047	64281	76988
Water supply; sewerage, waste management and remediation activities	9997	11029	15532	17032	18238	18669	19488	19724	20124	20728	21072	21543
Construction	107368	115191	129233	138264	151760	182976	217723	234260	213530	222588	245185	259295
Wholesale and retail trade; repair of motor vehicles and motorcycles	242672	274271	313364	340847	350779	401489	473652	543045	514977	579684	687915	722897
Transportation and storage	88359	105919	118207	128037	160578	184092	197866	215797	180323	196380	256980	318834
Accommodation and food service activities	28857	34778	39234	45907	46276	56149	67315	75650	50433	58779	72243	93051
Information and communication	37185	40330	51016	56513	60398	68468	70276	74122	76956	82693	87953	92614
Financial and insurance activities	74193	81161	92890	107075	127485	158243	186657	207134	241945	253284	291012	346255
Real estate activities	154273	174478	186189	191595	216959	244110	264377	295714	322956	333612	356456	392993
Professional, scientific and technical activities	14096	16255	18526	20929	23294	26961	29784	32722	35351	37098	40769	45497
Administrative and support service activities	6687	8403	10392	12204	14920	16970	19699	25471	27771	29121	30390	33753
Public administration and defence; compulsory social security	78612	82627	113472	135052	137826	184941	193657	218571	276660	287656	318770	382596
Education	91215	102201	126552	143095	161260	197829	219544	251586	288459	296664	337839	385872
Human health and social work activities	19944	21280	26740	31997	33187	41455	44062	49776	60328	65279	74163	89970
Arts, entertainment and recreation; Other service activities; and Activities of h	7710	8679	9948	11654	12811	14787	16050	17933	21363	22933	25066	27704
Gross Domestic Product (GDP) at basic prices	1,618,424	1,777,293	2,022,455	2,186,608	2,341,402	2,720,563	3,011,022	3,342,481	3,428,524	3,714,933	4,212,145	4,696,494
Taxes less subsidies on products	139955	172002	210070	237030	266782	356582	444927	516450	460179	637617	721552	684841
Gross Domestic Product (GDP)	1,758,379	1,949,295	2,232,525	2,423,638	2,608,184	3,077,145	3,455,949	3,858,930	3,888,704	4,352,550	4,933,697	5,381,335

Real GDP or GDP at constant price at 2010/11

Industrial Classification	2071/72	2072/73	2073/74	2074/75	2075/76	2076/77	2077/78	2078/79 R	2079/80 P
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Agriculture, forestry and fishing	541758	541301	569312	584167	614292	629229	647154	661655	679710
Mining and quarrying	10546	10263	11761	12867	15134	14797	15485	16854	17041
Manufacturing	101155	91537	106940	116785	124403	113171	122968	131257	128580
Electricity, gas, steam and air conditioning supply	17387	15891	19520	21546	23617	28224	29403	45089	53819
Water supply; sewerage, waste management and remediation activities	13250	14222	14653	15322	15510	15843	16056	16381	16736
Construction	106733	106864	126822	142165	152801	146095	156315	167378	162996
Wholesale and retail trade; repair of motor vehicles and motorcycles	257602	251008	277884	325767	352194	312080	332798	357611	347016
Transportation and storage	100638	100812	105258	117552	127863	112783	117785	123213	124622
Accommodation and food service activities	29799	27420	31092	34887	38348	24245	26847	30231	35843
Information and communication	61795	62840	71416	72942	78084	79662	82589	85998	89497
Financial and insurance activities	80961	88170	96810	105941	112667	112274	117504	125593	134751
Real estate activities	152882	153478	159689	162181	168269	171766	176516	179387	183282
Professional, scientific and technical activities	15620	15922	17309	18165	19184	19476	19769	20461	21340
Administrative and support service activities	9108	10198	11859	14067	14972	15300	15651	15994	16796
Public administration and defence; compulsory social security	79002	80625	87095	91200	95865	101769	105212	109505	115309
Education	93186	99852	107048	113288	120060	123904	128760	134760	140239
Human health and social work activities	20854	21550	23144	24503	26143	27502	29316	31366	33409
Arts, entertainment and recreation; Other service activities; and Activi	8129	8496	8894	9306	9857	10031	10370	10835	11399
Gross Domestic Product (GDP) at basic prices	1700405	1700448	1846506	1982653	2109263	2058149	2150497	2263570	2312383
Taxes less subsidies on products	161.952	169.975	191.831	211053	230480	226150	244320	265.674	263.867
Gross Domestic Product (GDP)	1862357	1870424	2038337	2193706	2339743	2284300	2394818	2529243	2576251

Summary of Macro Economic Indicators

Heading	2068/69	2069/70	2070/71	2071/72	2072/73	2073/74	2074/75	2075/76	2076/77	2077/78R	2078/79P	2079/80P
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21R	2021/22P	2022/23P
Percapita GDP (NRs.)	65484	71627	80941	86700	94398	110357	122815	135889	135692	150495	169038	182683
Annual Change in nominal percapita GDP	11.3	9.4	13.0	7.1	8.9	16.9	11.3	10.6	-0.1	10.9	12.3	8.1
Percapita GNI (NRs.)	65941	72107	82129	87925	95628	111469	123619	137294	137295	151300	170027	184140
Annual Change in nominal percapita GNI	11.5	9.4	13.9	7.1	8.8	16.6	10.9	11.1	0.0	10.2	12.4	8.3
Percapita GNDI (NRs.)	81686	90395	105024	113321	123793	142018	154347	172325	171568	188344	208328	228803
Annual Change in nominal percapita GNDI	15.4	10.7	16.2	7.9	9.2	14.7	8.7	11.6	-0.4	9.8	10.6	9.8
Percapita GDP at constant price (NRs.)	60779	62083	64939	66621	67696	73102	77959	82392	79708	82804	86657	87457
Annual Change in real percapita GDP (%)	3.3	2.1	4.6	2.6	1.6	8.0	6.6	5.7	-3.3	3.9	4.7	0.9
Percapita GNI at constant price (NRs.)	61409	63028	66708	68374	69450	75657	81399	86639	82418	87585	91371	90664
Annual Change in real percapita GNI (%)	3.8	2.6	5.8	2.5	1.6	8.9	7.6	6.4	-4.9	6.3	4.3	-0.8
Percapita GNDI at constant price (NRs.)	76071	79013	85304	88124	89905	96391	101632	108745	102993	109028	111954	112654
Annual Change in real percapita GNDI (%)	7.5	3.9	8.0	3.3	2.0	7.2	5.4	7.0	-5.3	5.9	2.7	0.6
Percapita incomes in US\$												
Nominal Percapita GDP (US\$)	808	814	824	871	888	1039	1177	1204	1167	1277	1399	1399
Nominal Percapita GNI (US\$)	814	820	836	884	899	1049	1184	1216	1180	1284	1407	1410
Nominal Percapita GNDI (US\$)	1008	1028	1069	1139	1164	1337	1479	1527	1475	1598	1724	1752
Final Consumption Expenditure as percentage of GDP	90.9	91.8	90.6	92.4	96.4	87.0	85.2	84.7	94.3	93.6	94.2	93.6
Gross Domestic Saving as percentage of GDP	9.1	8.2	9.4	7.6	3.6	13.0	14.8	15.3	5.7	6.4	5.8	6.4

Summary of Macro Economic Indicators

Heading	2068/69	2069/70	2070/71	2071/72	2072/73	2073/74	2074/75	2075/76	2076/77	2077/78R	2078/79P	2079/80P
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21R	2021/22P	2022/23P
Gross Domestic Saving as percentage of GDP	9.1	8.2	9.4	7.6	3.6	13.0	14.8	15.3	5.7	6.4	5.8	6.4
Gross National Saving as percentage of GDP	33.9	34.4	39.1	38.3	34.8	41.7	40.5	42.1	32.2	31.5	29.0	31.7
Exports of goods and services as percentage of GDP	8.8	9.3	10.1	10.2	8.2	7.8	7.8	7.8	6.8	5.1	6.8	7.2
Imports of goods and services as percentage of GDP	29.2	32.6	35.9	36.5	33.9	36.8	40.6	41.5	34.1	37.9	42.6	36.5
Gross Fixed Capital Formation as percentage of GDP	24.0	24.7	25.3	27.6	28.7	30.6	32.4	33.8	30.5	29.3	28.5	25.2
Resource Gap as percentage of GDP(+/-)	4.3	2.9	4.0	4.5	5.4	-0.3	-7.1	-6.9	-0.9	-7.7	-12.6	-4.1
Workers' Remittances as percentage of GDP	20.4	22.3	24.3	25.5	25.5	22.6	21.85	22.8	22.5	22.1	20.4	22.9
Product Tax as a percentage of GDP	8.0	8.9	9.5	9.8	10.3	11.6	12.9	13.4	11.9	14.7	14.7	12.8
Total Tax as a percentage of GDP	12.0	13.3	14.0	14.7	16.1	17.8	19.1	18.9	18.0	20.0	19.9	17.6
Exchange rate (US\$: NRs)	81.0	88.0	98.2	99.5	106.4	106.2	104.4	112.9	116.3	117.9	120.8	130.6
Population (millions)	26.9	27.2	27.6	28.0	27.6	27.9	28.1	28.4	28.7	28.9	29.2	29.5

Source: National Statistics Office

Table 1**Selected Macroeconomic Indicators**

	Heading	Annual					
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23**
A	Real Sector (growth rate and ratio in percent)						
	Real GDP at basic price	7.4	6.4	-2.4	4.5	5.3	2.2
	Real GDP at producers' price	7.6	6.7	-2.4	4.8	5.6	1.9
	Nominal GDP at producers' price	12.3	11.7	0.8	11.9	13.4	9.1
	Gross National Income (GNI)	11.9	12.1	0.9	11.2	13.4	9.3
	Gross National Disposable Income (GNDI)	9.7	12.7	0.5	10.8	11.6	10.8
	Gross Capital Formation / GDP	39.5	41.4	30.4	35.2	37.4	32.6
	Gross Fixed Capital Formation / GDP	32.4	33.8	30.5	29.3	28.5	25.2
	Gross Domestic Savings / GDP	14.8	15.3	5.7	6.4	5.8	6.4
	Gross National Savings / GDP	40.5	42.1	32.2	31.5	29.0	31.7
	Gross Domestic Product(Current Price) (Rs in billion)	3,455.9	3,858.9	3,888.7	4,352.6	4,933.7	5,381.3

The following table shows the GDP of different countries of the world.

Country	GDP in Billion
United states	\$ 21,439.45
China	\$ 14,140.16
Japan	\$ 5,154.48
India	\$2,935.57
Bangladesh	\$ 317.465
Pakistan	\$ 284.214
Srilanka	\$ 86.566
Nepal	\$ 28.813

Net Domestic Product (NDP)

- Net Domestic product at market price is estimate of net value of final goods and services produced within a country during a year. It differs from GDP to the extent of depreciation.

$$\text{NDP}_{\text{MP}} = \text{GDP}_{\text{MP}} - \text{Depreciation}$$

Gross National Product (GNP)

Gross national product is the total monetary value of all final goods and services produced in a country plus net factor income from abroad.

Net factor income from abroad is the difference between the foreign income earned by our residents from foreign countries and the income earned by the foreign factors from our country.

$$\text{GNP} = \text{GDP} + \text{Net factor income from abroad (NFIA)}$$

Features

The features of GNP are as follows:

1. Net foreign income from abroad are also included in GNP.
2. It is measured monetary term.
3. It includes the money value of only final product.
4. Transfer payment and capital gains are not included in GNP.

Difference between GDP and GNP

GDP	GNP
1. It is the money value of all final goods and services produced within the domestic territory of a country.	It is the money value of all final goods and services produced by citizens of a country within country and abroad.
2. It is a narrow concept.	It is a broader concept.
3. It does not includes ne factor income from abroad (NFIA).	It includes net factor income from abroad (NFIA).
4. It measures the strength of a country's domestic economy.	It measured how the residents are contributing to the country's economy.
5. The GDP can compute by using following formula: $GDP = P_1 \times Q_1 + P_2 \times Q_2 + \dots + P_n \times Q_n$	The GNP can compute by using following formula: $GNP = P_1 \times Q_1 + P_2 \times Q_2 + \dots + P_n \times Q_n + \text{Net factor income from abroad (NFIA).}$

Net National Product (NNP)

Net National Product

The market value of all final goods and services after deducting the value of depreciation is called NNP.

The total monetary value of all final goods and services produced in a country plus net factor income from abroad is called gross national product. By deducting the value of depreciation from the value of gross national product in a year, we get net national product. Depreciation is value of capital that wears out.

Thus, **$NNP = GNP - \text{Depreciation}$**

Gross Domestic Product at factor cost (GDP_{FC})

Gross Domestic Product at factor cost is estimated as the sum of earnings received by various factors of production in terms of rent, wages, interest, profits etc. during a given period usually in a year in the domestic territory in the country.

$$GDP_{FC} = \text{Rent} + \text{wages} + \text{interest} + \text{profits}$$

If we deduct net indirect taxes from GDP at market price, we get GDP at factor cost.

$$GDP_{FC} = GDP_{MP} - \text{Net Indirect Taxes}$$

Where, Net indirect taxes = Indirect taxes - Subsidies

Net Domestic Product at Factor Cost (NDP_{FC})

Net domestic product at factor cost is obtained by subtracting depreciation cost from the gross domestic product at factor cost. It is also known as domestic factor income receipts.

$$\text{NDP}_{\text{FC}} = \text{GDP}_{\text{FC}} - \text{Depreciation}$$

Gross National Product at factor cost (GNP_{FC})

Gross National product at factor cost is sum of total earnings received by factors of production in terms of rent, wages, interest and profits in a country plus net factor income from abroad (NFIA).

Net factor income from abroad is the difference between the foreign income earned by our residents from foreign countries and the income earned by the foreign factors from our country.

$$\text{GNP}_{\text{FC}} = \text{GDP}_{\text{FC}} + \text{NFIA}$$

$$\text{GNP}_{\text{FC}} = \text{GNP}_{\text{MP}} - \text{Indirect Taxes}$$

National Income (NI)

National income (NI) or net national product at factor cost (NNP_{FC}) is estimated as the sum of earnings received by various factors of production in terms of rent, wages, interest, profits etc. with the domestic territory of a country.

Broadly, national income or net national product at factor cost is defined as the sum of domestic factors income and net factors income from abroad minus depreciation. The different stages of calculating NI are as follows:

National Income (NI) or Net National Income at factor cost (NNP_{FC}) = NNP – Net Indirect Taxes

Personal Income (PI)

Personal income is the income earned by the household or individuals during a year. The factors of production do not get all parts of national income. Only that amount left after deducting corporate income tax, undistributed profits, social security contribution from national income is available to them. On the country the government provides transfer payments (old age allowances, unemployment compensation, relief payments etc.) which are included in the personal income.

The personal income is calculated as follows:

$$PI = NI - \text{corporate income taxes} - \text{undistributed profit} - \text{social security contribution} + \text{transfer payment}$$

Disposable Income(DI)

Disposable income is the part of personal income which the households of a country can spend the way they like. It is obtained by deducting the direct taxes (personal taxes) from personal income. All income earned by individual or household is not available for consumption to them, certain part of personal income should pay to government as a direct tax.

$$\text{DI} = \text{PI} - \text{Direct taxes (Personal taxes)}$$

Disposable income is available for households and persons for consumption.

$$\text{Thus, DI} = \text{Consumption} + \text{Saving} = C + S$$

Per Capita income(PCI)

- Per Capita Income is the average income of the people of the country for a specified period of time. It is the national income divided by the total population of a country for respective year.

$$\text{Per capita income (PCI) for 2019} = \frac{\text{National Income of 2019}}{\text{Populations of 2019}}$$

Summary of various concept

- $GDP = P_1 \times Q_1 + P_2 \times Q_2 + P_3 \times Q_3 + \dots + P_n \times Q_n$

- + Net factor income from abroad (NFIA)

- GNP

- depreciation

- NNP

- Net indirect taxes

- NI

- Social security contribution - Undistributed corporate profit - corporate Profit tax + Transfer payments

- PI

- Direct taxes

- DI

Real GDP and Nominal GDP

Nominal GDP Nominal GDP is evaluated at current market prices. Nominal GDP is the total monetary value of total produced products from all productive sectors within the domestic territory in a year. It is calculated in terms of current market price.

$$\text{Nominal GDP} = P_1 \times Q_1 + P_2 \times Q_2 + \dots + P_n \times Q_n$$

Real GDP

Real GDP is measured as one total volume of real output produced with in country for a specific period of time. It is calculated in terms of constant market price, i.e. the prices that prevailed in some specific year in the past. By evaluating current output level on the base of the prices that prevailed in the past, we will able to know what the size of total production of goods and services are changed over a time.

$$\text{Real GDP} = P_o \times Q_1 + P_o \times Q_2 + \dots + P_o \times Q_n$$

Difference between Real and Nominal GDP

Nominal GDP is measure of the annual production of goods and services at current market price whereas Real GDP is measure of annual production of goods and services at constant price.

There are some major difference between Nominal GDP and Real GDP which are as follows:

Nominal GDP	Real GDP
1. Nominal GDP is calculated in terms of current market price of total produced products from all productive sectors within the domestic territory in a year.	1. Real GDP is calculated in terms of constant market price of total produced products from all productive sectors within the domestic territory in a year.
2. <u>Inflation is included into Nominal GDP, so it is called inflation unadjusted GDP.</u>	2. Real GDP takes inflation into account. So, it is called inflation-adjusted GDP.
3. Economic growth cannot be analysed easily.	3. Economic growth can be analysed easily.
4. Nominal GDP is higher since the current market price changes are taken into account.	4. Real GDP is lower since the base year market price is taken into consideration.
5. This concept is less popular than Real GDP.	5. This concept is more popular.

GDP Deflator

- GDP deflator is a device by which we can obtain the real GDP from that of the nominal GDP. In other words, the GDP deflator measures relative changes in the current level of prices in comparison to the level of prices in the base year. GDP deflator is the ratio of nominal GDP to the real GDP of the same year. GDP deflator shows how much a change in GDP relies on changes in the price level.

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

Real Scenario of Nominal GDP, Real GDP and the GDP Deflator of Nepal

Fiscal Year	Nominal GDP (at basic prices)	Real GDP (at 2000/01 prices)	Implicit GDP Deflator	GDP Growth Rates
				Real GDP
2000/01	413429	413429	100	
2009/10	1083415	565759	189.56	4.26
2010/11	1248482	587534	210.34	3.85
2011/12	1387482	614637	224.13	4.61
2012/13	1525221	637771	237.77	3.76
2013/14	1758738	674227	259.18	5.72
2014/15	1899089	694269	272.41	2.97
2015/16	1993560	695688	286.11	0.20
2016/17	2339483	749550	312.24	7.74
2017/18	2625995	797146	330.62	6.35
2018/19	2920974	850928	344.30	6.75
2019/20*	3208519	870245	369.30	2.27

Calculation of Nominal GDP, Real GDP, and GDP Deflator

Example 1

Compute the nominal GDP, Real GDP deflator and rate of inflation for an economy which purchase only two goods X and Y.

Year	P_X	Q_X	P_Y	Q_Y
2017	Rs. 30	1500	Rs. 10	1000
2018	Rs. 40	2000	Rs. 20	1500

● Computation of Nominal GDP

- In 2017, Nominal GDP = $30 \times 1500 + 10 \times 1000 = \text{Rs. } 55,000/-$
- In 2018, Nominal GDP = $40 \times 2000 + 20 \times 1500 = \text{Rs. } 110,000/-$

● Computation of Real GDP

- In 2017, Real GDP = $30 \times 1500 + 10 \times 1000 = \text{Rs. } 55,000/-$
- In 2018, Real GDP = $30 \times 2000 + 10 \times 1500 = \text{Rs. } 75,000/-$

Calculation of Nominal GDP, Real GDP, and GDP Deflator

Computation of GDP deflator,

$$\text{In 2017, GDP deflator} = \frac{55000}{55000} \times 100 = 100$$

$$\text{In 2018, GDP deflator} = \frac{110000}{75000} \times 100 = 147$$

Computation of rate of inflation in 2018,

$$= \frac{\text{Change in GDP deflator}}{\text{Previous year GDP deflator}} \times 100$$

$$= \frac{147 - 100}{100} \times 100$$

$$= 47\%$$

Measurement of National Income

Generally, there are three methods of measuring national income. The methods are as follows:

1. Product Method

Product method measure the national income by adding total market value of all the final goods and services produced in a country during a year. Product method measures the output of the country. The main components of product methods are as follows:

- a. **Primary Sector Product:** It includes agro-product, fishery, forestry, mining and so on. This sector produces commodities by exploiting natural resources like coal, iron ore and other minerals.
- b. **Secondary Sector Product:** It includes manufacturing, construction, electricity, water supply and so on.
- c. **Tertiary Sector Product:** It includes banking and insurance, transport and communication, trade and commerce, health, education and other services.
- d. **Net Factor Income from Abroad:** It is the difference between receipts from foreign countries and payments to foreign countries.

1. Product Method

This method is very popular in application but it is not free from problem double counting. In order to solve this problem, we can use the following two methods. Which are as follows:

a. Final Product Method

Final product method is the money value of final goods and services produced during a year. So, national income is measured by finding the market value of all final goods and services produced in the economy during a year. First of all, we find monetary value of final product of primary sector, secondary sector, and tertiary sector and add these values. This gives GDP at market price.

GDP calculation by Final Product Method

GDP = Total Product of Primary sector + Secondary sector + Tertiary Sector

$$\text{GDP} = P_1 \times Q_1 + P_2 \times Q_2 + P_3 \times Q_3 + \dots + P_n \times Q_n$$

$$= \sum_{i=1}^n P_i \times Q_i$$

GNP = GDP + Net Factor Income from Abroad (NFIA)

NNP = GNP - Depreciation

NI (NNP_{FC}) = NNP - Net Indirect Taxes

Product Method

b. Value Added Method

In this approach, national income is measured by adding the additional value of each stage of production. Where, the value added at different stages of production is calculated and then added for estimating national income.

Thus, **Value added = sales value of output – cost of intermediate goods.**

Stage of Production	Sales value of output	Cost of intermediate goods	Gross value added
Wheat	2000	-	2000
Flour	2500	2000	500
Bread	3050	2500	550
Trade	3500	3050	450
Total	11050	7550	3500

Value added method

- In the **table**, there are four unit's farmer, miller, baker and trader. Farmer is primary producer. He produces wheat and sells his product to the miller by charging Rs. 2000. Thus, the gross value added by farmer equals Rs. 2000. The miller uses wheat as intermediate goods and converts wheat into flour. He sells the total quantity of flour to the baker by charging Rs. 2500.

2. Income Method

Income method measures GDP from a flow of cost approach. The payments made by the producers to the resource's suppliers are income of the factors. The production of a nation's output generates income.

GDP = Compensation of employees + Rents + interest + profit + Mixed Income + Depreciation + Net indirect taxes

GNP = GDP + Net Factor Income from Abroad (NFIA)

NNP = GNP – Depreciation

NI or NNP_{FC} = NNP - Net indirect Tax

The main components of income methods are as follows:

- a. **Rent:** Rent includes payment made to the use of land, houses, factories etc.
- b. **Wages:** It includes the wages and salaries received by the employees during a year plus certain supplements like provident fund and other income.
- c. **Interest:** Interest payments are income received from lending money to business firms or individuals.
- d. **Profit:** It consists of corporate profits with inventory valuation and capital consumption adjustments.

3. Expenditure Method

The expenditure method measures the national income from the side of expenditure on final products in an economy during an accounting year. The total income generated in the economy can be spent either consumption goods or investment goods.

The calculation of national income by this method involves following steps:

$$\text{GDP} = C + I + G + (X - M)$$

$$\text{GNP} = \text{GDP} + \text{NFIA}$$

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

$$\text{NI (NNP}_{\text{FC}}) = \text{NNP} - \text{net indirect taxes}$$

The components of national income in expenditure method are as follows:

- a. **Private Consumption Expenditure (C):** It includes the consumption expenditure made by individual consumer for both durable goods and non-durable goods and services.
- b. **Gross Private Domestic Investment (I):** It includes expenditure incurred by private enterprises on new investment and replacement of old capital.
- c. **Government Expenditure (G):** It includes government expenditure on national defence and non-defence expenditure.
- d. **Net Exports (X – M):** Net exports mean the difference between export earnings (X) and import expenses (M).

GDP calculation in Nepal: Gross value added Approach

- GDP can be measured by using production, expenditure as well as income approaches. However, in underdeveloped countries such as Nepal, reliable data on expenditures as well as income is very difficult to be collected.
- Thus, Nepal uses **Gross Value Added Approach (production approach)** to measure GDP. However, after finding the value of GDP, estimates regarding expenditure as well as income components are also produced.
- Nepal currently uses SNA 2008 methodology to estimate the value of GDP

Difficulties in Measurement of National Income

Difficulties in Measurement of National Income

To estimate the national income of a country is very difficult. It is quite a complicated task

1. **Problems of Double Counting:** Only final goods and services should be included in the national income accounting. But it is very difficult to distinguish between final goods and intermediate goods.
2. **Services of House Wives:** National income includes the value of only those goods and services which have money value. There are many services for which no payment is made in monetary terms.
3. **Calculation of Depreciation:** Estimation of depreciation is very difficult task. Depreciation of a price of capital can be estimated at its original cost or at its replacement cost.
4. **Change in Price Level:** National income is the money value of goods and services. Money values depend on market price which offers changes.
5. **Lack of Occupational Specialization:** There is lack of occupational specialization in developing countries. The different works are done to earn income.
6. **Statistical Problems:** There are statistical problems in measurement of national income. Statistical data may not be perfectly reliable, when they are compiled from various sources.
7. **Illegal Activities:** Income earned through illegal activities such as gambling, illegal production of wine etc. are not included national income.

Difficulties of Measuring National Income in developing countries like Nepal

The developing countries like Nepal face different conceptual and practical problems in national income accounting. Some of them are:

1. **Non-monetized Sector:** In developing countries like Nepal, most of the people live in rural areas where there is still use barter system.
2. **Illiterate and backward people:** In developing countries like Nepal, people are illiterate. They do not use proper accounting system to record the business.
3. **Inadequate Database:** Due to different problems, the authorities of national income accounting cannot adopt full fledge census method.
4. **Lack of Occupational Specialization:** In the developing countries like Nepal, due to lack of occupational specialization, people receive income partly from farming, partly from business activities and industrial work.
5. **Lack of Efficient and trained manpower:** due to inefficient people and lack of trained manpower frequently change job resulted difficulty in estimation of NI. Lack of trained manpower for estimation of NI resulted to calculate NI difficulty.

Need/ Importance of National Income Analysis

National income is very important concept performance of the economy as a whole. National income expresses the current achievements of the national economy in terms of money. The following are the main importance of national income accounting.

1. **To Compare Standard of Living:** Per-capita income is an important concept related to the national income. It is very useful for measuring the country's economic condition.
2. **To Measure Growth Rate:** Economic growth is measured in terms of per capita national income and the national income figures are used to measure the rate of growth of a country.
3. **To Forecast Business Activities:** National income data also helps to derive the idea for business man. It can be used to forecast the level of business activity at later dates and to find out trends in other annual data.
4. **To Examine Production Possibilities:** Concept of national income is helpful to derive the direction of production possibility for different goods.
5. **Basis of Economic Planning:** The national income statistics are used for planned economic development of a country.

Measurement of Inflation

- Inflation is the persistent and appreciable rise in general price level.
- There are two common methods of measuring inflation: (i) percentage change in Price Index Numbers (PIN), and (ii) change in GNP Deflator.
- Under percentage change in Price Index Number (PIN), widely used indexes are Consumer Price Index (CPI) and Wholesale Price Index (WPI), also called Producer Price Index (PPI). WPI is used to measure the general rate of inflation and CPI is used to measure the change in the cost of living
- Consumer Price Index
- **Consumers price index (CPI)**
- Weighted average of prices of a specified basket of goods and services. which are purchased by the consumers.
- The most well-known indicator of inflation is the *Consumer Price Index (CPI)*, which measures the percentage change in the price of a basket of goods and services consumed by households. It is a weighted average of prices of a specified basket of goods and services, which are purchased by the consumers. The CPI keeps a track of the changes in the price of a specified basket of consumer goods and services. By observing the changes in this index, inflation can be measured

Methods of Constructing Consumer Price Index

Methods of Constructing Consumer Price Index

The CPI can be calculated in two ways:

1. Aggregate expenditure method or weighted aggregate method: The weight of the quantities consumed in the base year is used in this method. The following is the formula for this method:

$$CPI = \frac{\sum P_1 q_0}{\sum P_0 q_0} \times 100$$

2. Family budget method: The price relatives of all commodities are calculated first, and then weighted, in this method. The following is the formula for this method:

$$CPI = \frac{\sum \left(\frac{P_1}{P_0} \times 100 \right) P_0 q_0}{\sum P_0 q_0} = \frac{\sum Pw}{\sum w}$$

Where,

$$P = \frac{P_1}{P_0} \times 100 \text{ (Price relative)}$$

$$w = P_0 q_0 \text{ (Value of the commodity consumed)}$$

Consumer Price Index is calculated by the following Process/ Steps.

- 1. Selecting the CPI basket:** In this step a basket of goods that a typical consumer buys is selected with appropriate weight assigned to it according to its importance. The idea is to make the relative importance of the items in the CPI basket the same as for a typical consumer. For example, because people spend more on apples than on shoes, the CPI places more weight on the price of an apple than on the price of a shoe.
- 2. Compute the cost of a basket:** It is the process of calculating the cost of a basket at different time periods. It is calculated by multiplying the quantity by their respective prices at different periods. Here the changes in prices are only considered keeping the quantity of goods constant.
- 3. Choose the base year and compute the index:** one year is taken as a base year to compare the changes in price and then the CPI is calculated as follows:

Consumer Price Index is calculated by the following Process/ Steps.....

$$\text{CPI} = \frac{\text{Cost of CPI basket at current year prices}}{\text{Cost of CPI basket at base year prices}} \times 100$$

- **Calculation of Inflation**
- After calculating CPI the inflation can be calculated as below:

$$(\text{Inflation rate})_t = \frac{\text{CPI}_t - \text{CPI}_{t-1}}{\text{CPI}_{t-1}} \times 100\%$$

Wholesale Price Index/ Producers Price Index (WPI/PPI)

The process of calculating WPI is same as in calculating CPI.

● WPI is calculated as:

$$\text{WPI} = \frac{\text{Cost of WPI basket at current year prices}}{\text{Cost of WPI basket at base year prices}} \times 100$$

After calculating WPI the inflation can be calculated as below:

$$(\text{Inflation rate})_t = \frac{\text{WPI}_t - \text{WPI}_{t-1}}{\text{WPI}_{t-1}} \times 100\%$$

Where,

WPI_t = WPI for the period 't'

WPI_{t-1} = WPI for the period 't- 1'.

$(\text{Inflation rate})_t$ = inflation for the period 't'.

Example

- If cost of WPI basket at current year price is Rs.3500 and cost of WPI basket at base year price is Rs.2000, find the inflation rate of current year.

SOLUTION

We know,

$$\begin{aligned}\text{WPI} &= \frac{\text{cost of WPI basket at current year prices}}{\text{cost of WPI basket at base year prices}} \times 100 \\ &= \frac{3500}{2000} \times 100 \\ &= 175\end{aligned}$$

After calculating WPI the inflation can be calculated as below:

$$\begin{aligned}(\text{Inflation rate})_t &= \frac{\text{WPI}_t - \text{WPI}_{t-1}}{\text{WPI}_{t-1}} \times 100\% \\ &= \frac{175 - 100}{100} \times 100\% \\ &= 75\%\end{aligned}$$

Numerical Illustrations

Example 1

Calculate GDP_{FC} from the following data:

GDP at MP = Rs. 3,000 billion

Indirect taxes = Rs. 500 billion

Subsidies = Rs. 300 billion

Solution

Given,

Net indirect taxes = indirect taxes - Subsidies

$$= 500 - 300$$

$$= \text{Rs. } 200 \text{ billion}$$

$$GDP_{FC} = GDP_{MP} - \text{Net indirect taxes}$$

$$= 3,000 - 200$$

$$= \text{Rs. } 2,800 \text{ billion}$$

Numerical Illustrations

Example 2

If personal income is Rs. 12,400 crore personal taxes (direct taxes) are Rs. 1,500 crore and total consumption expenditure of private sector is Rs. 10,000 crore, find out disposable income and personal saving.

Solution

As we know that,

Disposable Income (DI) = PI - Personal taxes

$$= 12,400 - 1,500$$

$$= \text{Rs. } 10,900 \text{ crores}$$

Personal Saving = DI - Consumption

$$= 10,900 - 10,000$$

$$= \text{Rs. } 900 \text{ crores}$$

Example 3

If GDP_{MP} is Rs. 200 crore and NFIA is Rs. 20 crores. Find GNP_{MP} .

Solution

As we know that, $GNP_{MP} = GDP_{MP} + NFIA$

$$GNP_{MP} = 200 + 20 = \text{Rs. } 220 \text{ crores.}$$

Assignment

Brief Answer Questions

1. Define circular flow of income and expenditure in two-sector economy.
2. Define GNP at factor cost.
3. What is GDP deflator?
4. What is meant by personal income?
5. What is the different between market price and factor cost?

Assignment

● Descriptive Answer Questions

1. Explain the differences between Gross National Product (GNP) and Gross Domestic Product (GDP).
2. Define Nominal GDP, Real GDP, and GDP deflator with suitable examples.
3. Define National income. Explain its uses.

● Analytical Answer Questions

1. What do you mean by national income? Explain the problems or difficulties in measurement of national income?
2. Explain the various concepts of National Income.

Any Queries?





End of Unit-2

Thank
You...