UNIT VI

GDP, Growth, and Instability: Measuring Domestic Output and National Income(9 Hours)

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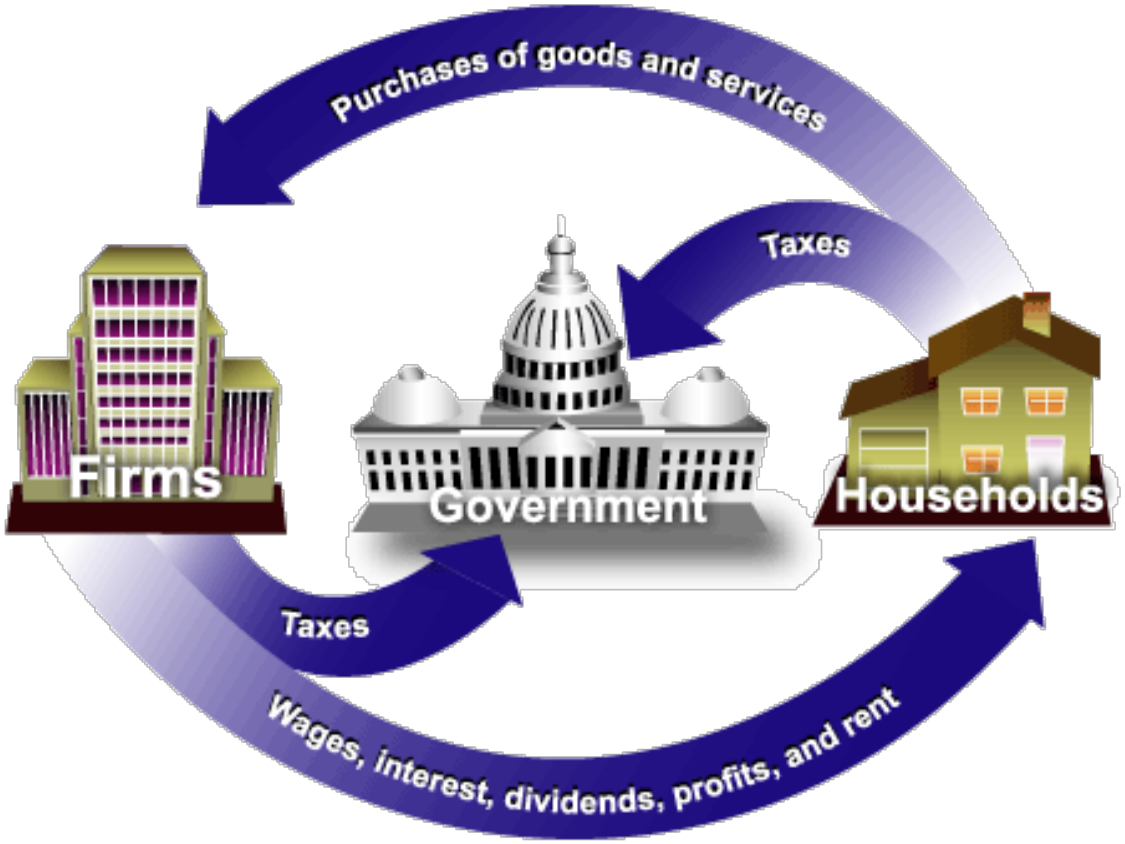
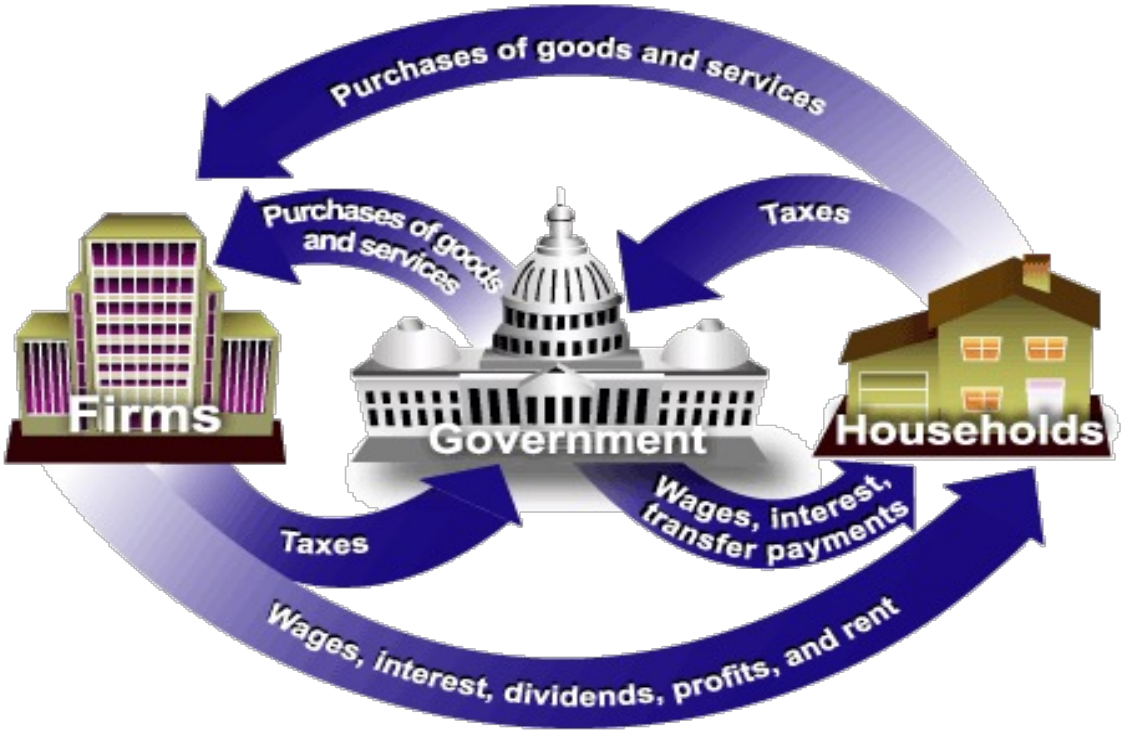
- Other National Accounts: Net Domestic Product, National Income, Personal Income, Disposable Income, The Circular Flow Revisited, Nominal GDP versus Real GDP: Adjustment Process in a One-Product Economy, An Alternative Method, Real-World Considerations and Data.

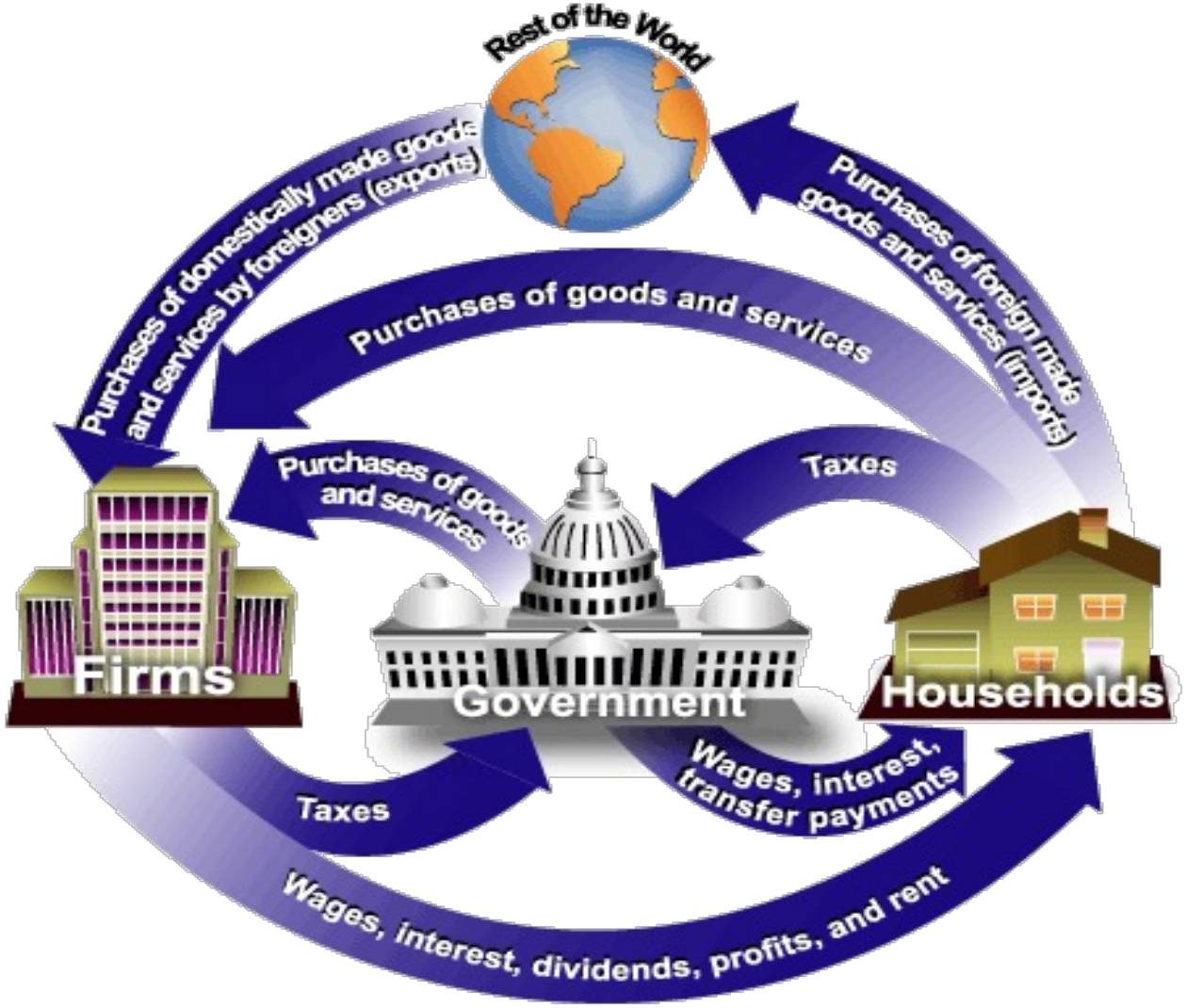
Classical or two Sector Economic Model



Keynesian or Three-Sector Economic Model



Four Sector Macroeconomic Model or Real Business Cycle Economic Model



The Government and the Circular flow in Modern Economy

C+S= I

C+I+G

M

X

Rest of World

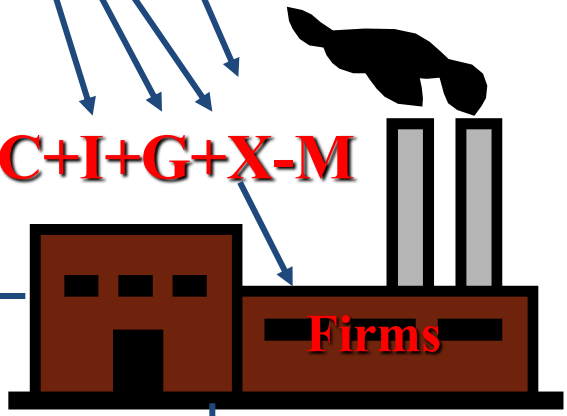
G

C+S

S C

Government

C+I+G+X-M



Te

Firms

Households

B Td

Y(DI)

Y+B-Td

Y (Income)

THE GOVERNMENT …

Where;

G = Government

B = Transfer payment

Td = Direct tax

Te = Indirect tax

Y = Income

C = Consumption

S = Saving

I = Investment

DI = Disposable income

X-M = Net export

House Hold Activities

Δ income $\rightarrow$ Δ consumption + change in saving.

or; $\Delta Y = \Delta C + \Delta S$

If increase in income, an increase in consumption, and, an increase in saving, and vice versa

Thus, $Y = C + S$ and, $S = I$

National Income

- National income (NI) is the aggregate value of goods and services produced annually in a country.
- National income includes payment made of all resources in the forms of wages, interest, rent, and profit.
- It is the sum total of goods and services produced by a nation in a year and national income is the total monetary value of all final goods and services produced in an economy over some period of time usually a year.
- National income means the performance of the national economy, which is the total monetary value of the final product.

Definitions of National Income

- There are different approaches to the national income among them,
- Professor A. Marshall: British Economist
- Professor A.C. Pigou: English Economist
- Professor Fisher: Irving Fisher was an American Economist.
- Simon Kuznets: Simon Smith Kuznets was an American economist and statistician. (American, Russian)

Professor A. Marshall,

- Marshall's definition is broad as it includes all types of goods and services which enter or do not enter the market transaction (including mother care).
- The important feature of Marshall's definition is its emphasis on the need for deducting the depreciation of machines from the value of output to get net value.
- Marshall points out that income from abroad should be added to the national income.

Professor A.C. Pigou

- National income is that part of the objective income of the community, including of course income derived from abroad which can be measured in money.
- This definition is better than the Marshallian definition.

Professor Fisher

- Fisher adopted ‘consumption’ as the criterion of national income whereas Marshall and Pigou regarded it to be production.
- According to Fisher, “The National dividend or income consists solely of services as received by ultimate consumers, whether from their material or from the human environments.
- Thus, a piano, or an overcoat made for me this year is not a part of this year’s income, but an addition to the capital.
- Only the services rendered to me during this year by these things are income.”

Simon Kuznets

- **Simon Kuznets** defines national income as "the net output of commodities and services flowing during the year from the country's productive system in the hands of the ultimate consumers."

Gross Domestic Product (GDP)

- GDP is the *total market value* of all *newly/currently produced* (not necessarily sold) *final* goods and services within the geographical boundary of a country during a fixed period of time, generally in one-year.
- A number of features of this definition require clarification.

Currently produced goods and services

- GDP excludes:
- (i) previously produced any items such as houses, cars, or factories as well as resold goods, and
- (ii) any transaction in which money is transferred without any direct exchange of goods or services
- These transactions do not directly involve the current production of goods or services and are therefore not included in GDP.
- GDP is a flow measure of output per time period, for example per year, and includes goods and services produced during this interval.

GDP

- Suppose an economy produces $x_1, x_2, x_3, \ldots, x_n$ types of final goods and services within the economy in a year and let $p_1, p_2, p_3, \ldots, p_n$ be the corresponding prices of the products. Then:

$$GD_t = p_{1t}x_{1t} + p_{2t}x_{2t} + p_{3t}x_{3t} + \ldots + p_{nt}x_{nt}$$

$$\text{That is,} \quad \text{GDP}_t = \sum_{i=1}^{n} p_{it}x_{it}$$

- where 't' is a time index.

GDP

- GDP is the single most-used economic measure or the broadest quantitative measure of the aggregate economic activities that occur within a country.
- In the production of GDP, both domestic and foreign-owned factors of production make a contribution.

Assessing the Economy's Performance

- National Income Accounting measures the economy's overall performance
- Economic Analysis compiles National Income and Product Accounts
  - Assess the health of the economy
  - Track long run course
  - Formulate policy

GDP

- The measure of aggregate output
- Monetary measure
- Avoid multiple counting
  - Market value final goods
  - Ignore intermediate goods (**Products used to produce a final good**)
  - Count value added

GDP

- Exclude financial transactions
  - Public transfer payments
  - Private transfer payments
  - Stock (and bond) market transactions
- Exclude second hand sales
  - Sell used car to a friend

Income Relationships: Example

Gross Domestic Product (**GDP**)	**$ 14,256**
Less: Consumption of Fixed Capital	1864
Equals: Net Domestic Product (**NDP**)	**$ 12,392**
Less: Statistical Discrepancy	209
Plus: Net Foreign Factor Income	105
Equals: National Income (**NI**)	**$ 12,288**
Less: Taxes on Production and Imports	1090
Less: Social Security Contributions	967
Less: Corporate Income Taxes	315
Less: Undistributed Corporate Profits	418
Plus: Transfer Payments	2528
Equals: Personal Income (**PI**)	**$ 12,026**
Less: Personal Taxes	1102
Equals: Disposable Income (**DI**)	**$ 10,924**

Methods of Measuring National Product and Income

- Expenditure Approach
- Income Approach
- Production/Value-Added Approach

Expenditures

- Personal consumption expenditures (C)
  - Durable consumer goods
  - Nondurable consumer goods
  - Consumer expenditures for services
  - Domestic plus foreign goods produced

Expenditures Approach

- Gross private domestic investment (I_g)
  - Machinery, equipment, and tools
  - All construction
  - Changes in inventories (**Inventory** is the raw materials used to produce goods as well as the goods that are available for sale.)
- Creation of new capital assets
- Noninvestment transactions excluded (**An expenditure for stocks, bonds, or secondhand capital goods**)

Expenditures Approach

- Government purchases (*G*)
  - Expenditures for goods and services
  - Expenditures for publicly owned capital
  - Excludes transfer payments
- Net exports (X_n)
  - Add exported goods
  - Subtract imported goods
  - X_n = exports – imports
- **GDP = $C + I_g + G + X_n$**

GDP and GNP by final demand/expenditure (current price in millions of NRs.)

Description	1999/00	2000/01	2001/02	2002/03	2003/04
1. Private Consumption, C	287947	309107	329199	355535	383978
2. Total Investment, I	92272	99301	102174	118020	130993
3. Public Consumption, G	33964	40150	42327	46362	50381
4.Exports of Goods and Net Factor Services, X	88360	91821	77068	77280	89543
5.Imports of Goods and Net Factor Services, M	123055	129104	127961	140522	158150
Equals Gross Domestic Product (at Producers' Price)	379488	411275	422807	456675	496745
6. Net Factor Income from Abroad, NFIA	13125	16172	18375	16194	11155
Gross National Product, GNP	392613	427447	441182	472869	509700

***Source**: Ministry of Finance, Government of Nepal. (2006).*

Income Approach

- This method measures GDP from a flow-of-cost approach. In other words, the factor income approach measures GDP by adding together all the incomes received by suppliers of resources of production over a fixed period of time, normally in one year.
- Factor inputs like labor, land, and physical and financial capital are used in the process of producing goods and services.

Income Approach

- Compensation of employees
- Rents
- Interest
- Proprietor's income
- Corporate profits
  - Corporate income taxes
  - Dividends
  - Undistributed corporate profits
- Taxes on production and imports

Income Approach

- From national income to GDP
  - Subtract net foreign factor income
  - Statistical discrepancy (the difference between demand and supply in national accounts.)
  - Consumption of fixed capital
- Other national accounts
  - Net domestic product (NDP)
  - National income (NI)
  - Personal income (PI)
  - Disposable income (DI)

National Income by Income Approach (billions of current US dollars)

S. N.	Descriptions	Amount
1	Compensation of employees	6,186
2	Proprietors' income	846
3	Rental income	164
4	Net interest	582
5	Corporate profits (with adjustments)	1,059
6	Depreciation	1,308
7	Production taxes	739
8	Statistical discrepancy and miscellaneous	100
	Gross domestic product	**10,984**

Production Method

- The National Income/Product of an economy can also be computed by adding up the production of goods and services of all industries operating in the economy.
- Different firms or industries of an economy get involved in the production of diverse goods and services.
- Some firms produce final goods while others produce intermediate goods. Intermediate goods are used in the production of other goods.

Production Method

- National income accounting should incorporate the output contribution of both final goods and intermediate goods-producing industries simultaneously.
- Under the production approach, national product and income can be measured either by **Final Product** or **Value Added** method.
- Each of them is introduced in order.
- *Value added* means the addition to the value of raw materials and other inputs during the process of production.

Production Method

Final Product Method

(i) **Primary industrial sector:** The economic activities of the economy which concentrate on the production of agricultural products and the extraction of raw materials are put into the primary industrial sector.

(ii) **Secondary industrial sector:** This is the manufacturing portion of the economy, which uses raw materials and intermediate producer goods to produce final goods or other intermediate products.

(iii) **Tertiary industrial sector:** This sector is the services and commerce segment of an economy, that is, the tertiary industrial sector covers ***commercial*** and ***professional*** services.

Gross Value Added by Industrial Origin in Nepal (At Current Prices of millions of NRs.)

Industrial Sectors	1999/00	2000/01	2001/02	2002/03	2003/04
1.Agriculture,Fisheries and Forestry	145131	151059	160144	171104	183117
2.Mining and Quarrying	1815	1924	2056	2188	2377
3.Manufacturing	33550	35495	32805	34337	36634
4.Electricity ,Gas and Water	5942	7432	8635	10905	11355
5.Construction	37382	39584	42290	45068	49029
6.Trade, Restaurants , and Hotels	42895	44572	40772	43978	46718
7.Transport,Communication and Storages	29336	33297	34652	38286	43668
8.Financial and Real Estate	36919	41634	43882	47719	51940
9.Community and Social Services	33281	39055	40902	43961	47081
Total GDP at Factor Cost	366251	394052	406138	437546	474919
10. Less imputed value of banking services	10708	11912	12624	13911	15135
11. equals Total GDP at Factor Cost	355543	382140	393514	423635	459784
12.plus Net Indirect Taxes	23945	29135	29293	33040	36961
13.equals GDP at producers'/market price	379488	411275	422807	456675	496745

Value Added Method

- The value-added method estimates national income and product by considering the values of both intermediate and final output simultaneously.
- Output is the transformation of inputs from one form to another.
- Final output should pass through different stages of production before being transformed into ultimately consumable/usable form.
- At each stage of production, a particular *value* is *added* or *created* by the producer.

Value-Added Method in Output Measurement (Value in NRs.)

Producer	Production stage and product	Sales value of output(A)	Cost of intermediate goods(B)	Gross value added(A-B)
Farmer	Wheat	1,500	-	1500
Miller	Flour	2,800	1,500	1300
Baker	Bread/Bakery	4,000	2,800	1200
Total		8,300	4,300	4000

Nominal vs. Real GDP

- GDP is a dollar measure of production
- Using dollar values creates problems
- Nominal GDP
  - Use prevailing price
- Real GDP
  - Reflect changes in price
  - Use base year price

Nominal, Real, and Potential GDP

- Nominal GDP is a measure of the value of the output of goods and services in terms of current market prices.
- GDP calculated in terms of the normal market price is called nominal GDP.
- Any **change** in **nominal GDP** reflects the combined effects of **changes** in **quantities** and changes in **prices**.
- The current market price GDP is sensitive to changes in the average price level in the market.

Nominal, Real, and Potential GDP

- To correct the national income accountants calculate ***real GDP*** which is a measure of the value of the output of goods and services in terms of base year price (base year is the reference year of the index used).
- When the current price of GDP is adjusted for inflation, it is real GDP.
- Real GDP is also called constant price GDP.
- Constant prices are values taken at a base year to remove the effects of inflation.
- The measure of GDP over different periods by using a common set of base-period prices reflects only the changes in real output.

Nominal vs. Real GDP

- Nominal GDP and real GDP are linked by the following expression:

Real GDP (Constant price GDP) =

$$\frac{Current/MArketPriceGDP}{GDP\ Deflator} \times 100$$

A deflator is a statistical factor designed to remove the effect of inflation; inflation-adjusted variables are in constant price.

The GDP deflator

- The **GDP deflator** is a price index measuring changes in the overall prices of all newly produced final goods and services within the geographical territory of a country.
- It is the quantity by which nominal GDP must be divided, or "deflated" to obtain real GDP.
- GDP deflator is used as an indicator of average prices in the economy.
- The percentage change in the value of the GDP deflator is one of the measures of the rate of inflation in a country.

Nominal vs. Real GDP

- Current price or Nominal GDP is sometimes called "money GDP"
- Real GDP is termed "inflation-corrected GDP" or "GDP in base-year prices".
- Differences between nominal GDP and real GDP arise only because of changes in prices.
- A glimpse of the nominal and real GDP and the GDP deflator of Nepal for the period 1999/00 - 2003/04 is given in Table 1. The year 1994/95 is taken as the base year.

Current and Constant Price GDP of Nepal (NRs. in millions)

Year	Nominal GDP (at Factor Cost)	Real GDP	GDP Deflator	GDP Growth Rates	
				Nominal	Real
1999/00	366251	267096	137.1	11.0	6.1
2000/01	394052	280106	140.7	7.6	4.9
2001/02	406138	279169	145.5	3.1	-0.3
2002/03	437546	287689	152.1	7.7	3.1
2003/04	474949	298023	159.4	8.5	3.6

***Source**: Ministry of Finance, Government of Nepal, 2006*

Current and Constant Price GDP of Nepal

- For the base year current and constant price GDP figures will be the same because for that year GDP deflator will be 100.
- But for other years, there is a difference between nominal and real GDP figures due to changes in the overall price level.
- The growth rate of current price GDP is positive for the selected period but the growth rate of real GDP is negative in the year 2001/02.
- So, the year 2001/02 was a growth tragedy year for Nepal. The decline in GDP lowers people's per capita income and unemployment rises.

Potential GDP

- Potential output/GDP is the output that the economy would produce if all factors of production were fully employed.
- It is the full employment GDP.
- Potential output is not the maximum output the economy could produce, but the output that would be produced if all the markets (e.g., labor market, capital market, product market) were in equilibrium.
- When an economy is operating at its potential, there are high levels of utilization of the labor force and capital stock.
- Actual GDP equals potential GDP only if there is no unemployment or underemployment of resources.

Shortcomings of GDP

- Nonmarket activities (activities primarily undertaken for the purpose of self-consumption.)
- Leisure (GDP does not capture leisure, health, a cleaner environment, or the possibilities created by new technology)
- Improved product quality
- The underground economy
- GDP and the Environment
- Composition and distribution of the output
- Noneconomic sources of well-being (courtesy, crime reduction, etc., are not covered in GDP.)

Difficulties in the Measurement of National Income and Product

- **Nonmarket Transactions**: In GDP calculation only the goods and services evaluated at market prices are included and non-market production is left out. For example, the services of housewives (cooking, washing, child caring, etc.)
- **Underground Activities/Black Economy:** The underground economy refers to the market transactions which do not come into the net of legal registration.
- **Depreciation valuation:** Depreciation of physical capital goods is to be deducted to find the net national product (NNP).

Underground Economy

Country	% of GDP
USA	7.3
Switzerland	7.5
Japan	9.6
Singapore	10.4
China	12.7
Nepal	33.2
Afganisation	72
Zimbawa	64.1
Haiti	55.1
India	43.1
Bhutan	22.8
Pakistan	35.6
Sri Lanka	31.1
Bangladesh	30.2

Difficulties in the Measurement of National Income and Product

- **Value of public services:** Government provides public services like general administration, and defense (police, and army).
- **Government transfer payment:** Government pays a pension to retired civil servants, police, and army men; provides unemployment allowance and pays interest on public loans.
- **Data Deficiency:** In developing and least-developed countries like Nepal, the task of national income accounting is also affected by the lack of data.

Top 10 Countries by Nominal GDP at Current U.S. Dollar Exchange Rates and Nepal

Country	Nominal GDP (in trillions)	PPP Adjusted GDP (in trillions)	Annual Growth (%)	GDP Per Capita
United States	$23.0	$23.0	5.7%	$69,287
China	$17.7	$27.3	8.1%	$12,556
Japan	$4.9	$5.4	1.6%	$39,285
Germany	$4.2	$4.8	2.9%	$50,801
United Kingdom	$3.2	$3.3	7.4%	$47,334
India	$3.2	$10.2	8.9%	$2,277
France	$2.9	$3.4	7.0%	$43,518
Italy	$2.1	$2.7	6.6%	$35,551
Canada	$2.0	$2.0	4.6%	$52,051
South Korea	$1.8	$2.4	4.0%	$34,757
Nepal	$ 39.0 bil.	141.1 bil.	4.25	$1293