

CHAPTER TWO

NATIONAL INCOME ACCOUNTING

I. Introduction

When macroeconomists study an economy, they first look at three variables viz. **Output** (GDP, the gross domestic product, or GNI, gross national income, per capita or its growth rate); the **unemployment rate** and the (price) **inflation rate**. Other important variables may be: interest rates, government deficit (and its ratio to GDP), current accounts (deficit or surplus, and ratio to GDP).

2.1 MEASURING ECONOMIC ACTIVITY: NATIONAL INCOME AND PRODUCT ACCOUNTS (NIPA)

The National Income and Product Accounts (NIPA) are vast accounting schemes used to measuring of aggregate economic activity. Economic activity gives rise to both *output* and *income* earned by the persons and machines involved in the productive activity. Thus the overall level of economic activity can be measured by adding up either the value of output

produced or the levels of income earned. The most common aggregate measure is the product side calculation of Gross Domestic Product (GDP). The product side measures the *expenditures* made by households, firms and the governments and foreigners during a given period of time (usually, quarterly or annually) on final goods and services. The counterpart on the income side of the accounts is National Income (NI), which includes income received by factors of production. In principle, both the expenditure side and the income side should be equal, because for the economy as a whole, income must equal expenditure

Example of Existing assets

If Abebe sells his computer to Belay for Birr 5000, this will not be added in to GDP because this transaction only shows transfer of ownership of the computer. However, if the resale price is greater than the original purchase price, the difference would be included in the computation of GDP.

On the product side, Gross Domestic Product (GDP) is the most comprehensive measure of a nation's total output of goods and services. GDP is defined as the market value of all final goods and services produced in a given time period by labor

and property located within the territory of the country. The key words in this definition are *product*, *final*, and *market value*. By product, we mean the consequences of a current act of production and we exclude the *transfer* of existing assets.

By final product we mean output absorbed by the *ultimate* users of goods and services. This excludes intermediate products that are used as inputs in production processes. Since the market value of the final output already reflects the value of its intermediate products, adding the value of intermediate materials to the value of final output would overstate the true value of production in an economy (one would, in effect, be double

counting). The concept is straightforward, but the measurement problems can be complex. A given product, say, sugar, can be used as a final product or as input into further production processes. In Ethiopia NIPA are mainly prepared by the Central Statistical Agency (CSA). Thus, Central Statistical Agency or Ministry of Finance and Economic Development statisticians must have a mechanism for distinguishing between the sugar bought for household consumption and the sugar purchased by the local bakery for use in its production processes. In the latter case, the final product is the cake sold by the bakery.

The last key phrase is *market value*, which means simply that the entire product is valued at its market price. The Birr value of output is determined by its Birr market price.

Ex-post and ex-ante

National accounts take stock of what has already happened: it is an **ex-post** system of bookkeeping. Macroeconomic analysis wishes to know what will happen: it is an **ex-ante** approach. National accounts deliver the most important data for macroeconomic analysis. Understanding the past is a step toward knowing the future

2.1.1 Approaches to Measure GDP

There are three different ways to calculate a nation's GDP:

- 📄 The Product/value added approach
- 📄 The Expenditure approach
- 📄 The Income approach

These different ways of measuring total output give us different insights into the structure of the economy.

1. The Product Approach

The first method for calculating GDP is to add up the value of all the final goods and services produced in the economy—a calculation that excludes the value of *intermediate* goods and services. This approach makes use of the *value-added* concept- adding up each firm's contribution to the final product at each stage of production. The value added of any producer is the value of its *output* minus the value of the *inputs* it purchases from other producers. Consider the following example: Suppose the farmers do not purchase any input. So when we compute GDP using the value added approach, the value to be added is the sum of value added by all firms at all stages in the production process. In the above example, GDP is calculated as the initial value (500) plus the value added by the miller (1100-500=600) plus the value added by the bakery (1250-1100 =150)



$500 + 600 + 150 = \$1250$ (which is equal to the final sales price of the bread)

2. The Expenditure Approach

This method calculates GDP by adding up aggregate spending by ultimate users (households, firms, government and the external sector), on domestically produced final goods and services. In the expenditure approach, we divide output into four categories according to which group in the economy purchases it as an ultimate user:

- Personal consumption expenditures (C);
- Gross private domestic investment (I);
- Government consumption expenditures & gross investment (G) &
- Net exports (NX)

$$\text{GDP} \equiv \text{C} + \text{I} + \text{G} + \text{NX} \dots \dots \dots (2.1)$$

Equation (2.1) is called the basic product- side *identity* of national income and product account, it always holds true or it is a definition.

A. Personal Consumption Expenditure (C)

Consumption is the part of GDP purchased by households as final users, which includes:

- Spending on durable goods (cars, appliances...),
- Spending on non durable goods (food) &
- Spending on services (education, healthcare, hair cut)

Durable goods are goods that are expected to last for more than three years, such as refrigerators, ovens, or cars. Nondurable goods are goods that are not expected to last for more than three years, such as food and services are intangible items such as hair cut, car repair, and entertainment. Household's purchases of *used goods*, *financial assets* (such as shares and bonds), *newly constructed homes* (b/c they are counted as private investment) are not included in consumption. Consumption expenditure is the largest spending component of GDP in Ethiopia (in 2008/9 it accounted for 85% of GDP, NBE)

B. Gross Private Investment (I) or Gross Capital Formation

Investment is spending by firms on goods that will be used in the future to produce more goods & services. Investment is divided into three subcategories:

- *Business fixed investment* (e.g. new plant and equipment)
- *Residential fixed investment* (new houses construction), and
- *Inventory investment* (goods that have been produced but not yet sold)
I.e. production - sales

Gross investment in a given year increases the *capital stock* of nation. That is:

$$\Delta K_t = I_t - \delta_t$$

C. Government Purchases (G)

Government purchase includes spending by federal, state, and local governments on goods and services. It is classified in to: *gross investment* such as spending on highways, bridges, schools, health centres... and *government consumption* which include wages and salaries of workers, office appliances e.t.c., and are generalized in to *government purchases*.

Government *transfer payments*, including *interest payments* on the government debt, which are payments to persons that are not made in return for goods and services currently supplied, are not included in government purchases. Social Security benefits and welfare payments are two examples of transfer payments; neither is a payment for current productive efforts.

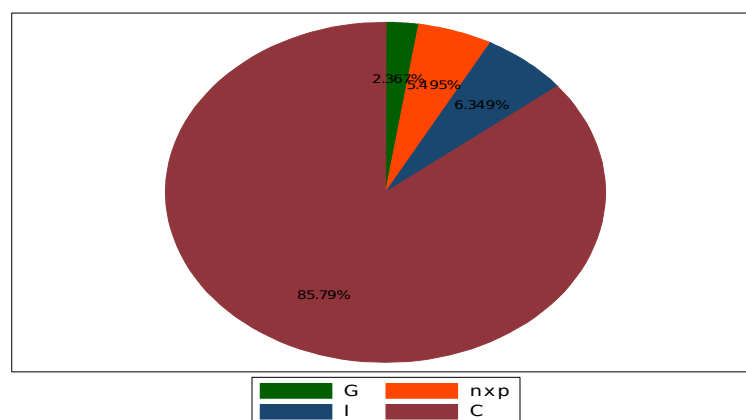
D. Net Exports (NX)

Also called trade balance and accounts for trade with other countries: output sold to, and output bought from foreigners.

$$NX = X - M \dots\dots\dots (2.2)$$

Net exports are the value of goods and services sold to other countries (exports) minus the value of goods and services that foreigners sell us (imports). Conceptually, net exports are included in GDP because the income is earned by residents of the exporting country, where as we deduct imports to avoid double counting because imported goods are *absorbed* either by consumers, investors or the government sector and they are not produced domestically.

Fig 2.1 Ethiopia's components of GDP, 2010; in current market prices (Millions birr)



Source: Data was taken from **UNCTAD stats** online

3. The Income /Factor Payments Approach

Measures payments made to the owners of resources that are used in production process. The national income accounts divide national income into *five* components, depending on who earns the income:

- ✓ *Compensation of employees* (wages, salaries)
- ✓ *Proprietors' income* (income of non corporate business)
- ✓ *Rental income* (which include imputed rent)
- ✓ *Corporate profits* (income of corporations before tax)
- ✓ *Net interest* (The interest domestic businesses pay minus the interest they receive, plus interest earned from foreigners)

Compensation of Employees

Compensation of employees consists of *wages* and *salaries* paid to employees plus employers' contributions to Social Security and employee benefit plans plus the monetary value of fringe benefits, tips, and paid vacations.

Proprietors' Income

Proprietors' income includes all forms of income earned by self-employed individuals and the owners of unincorporated businesses, including unincorporated farmers. Included in farm income is an estimate of the value of the food *grown* and *consumed* on farms.

Rental Income (Of Persons)

Rental income is the income received by individuals for the use of their nonmonetary assets (land, houses, and offices). It also includes returns to individuals who hold copyrights and patents. Finally, it includes an imputed value to owner-occupied houses. For example, someone may own the house she lives in, and therefore not pay any rent, but for purposes of national income accounting, a rental value is imputed. In short, home ownership is viewed as a business that produces a service that is sold to the owner of the business.

Corporate Profits

Corporate profits include all the income earned by the *stockholders* of corporations. Some of the profits are paid to stockholders in the form of *dividends*, some are kept within the firm to finance investments (undistributed profits or *retained earnings*), and some are used to pay

corporate profits taxes. The portion of corporate profits used to pay corporate profits taxes is counted as income “earned” by households even though households do not receive the income.

Net Interest

Net interest is the interest income received by Ethiopian households and government minus the interest they paid out. For instance, a Chinese company that invests in Ethiopia earns interest on its capital. This interest income is paid back to china.

$$NI = \text{compensation of employees} + \text{proprietors income} + \text{rental income} + \text{corporate profits} + \text{net interest} \dots\dots\dots (2.3)$$

From National Income to GDP: Making Some Adjustments

The income approach to computing GDP requires us to add certain things to national income and to subtract certain things from national income.

$$GDP = NI - \text{income earned from the rest of the world} + \text{income earned by the rest of the world} + \text{Indirect business taxes} + \text{Depreciation (Capital Consumption Allowance)} + \text{statistical discrepancy} \dots\dots\dots (2.4)$$

Income earned from ROW: Account for the income earned by citizens of the country who live and work abroad.

Income earned by ROW: Account for the income earned by producing and selling goods and service, by foreigner who live and work in Ethiopia.

Indirect Business Taxes (IBT): The main items that comprise indirect business taxes are *excise taxes*, *sales taxes*, and *property taxes*. These taxes are not part of national income because they are not considered a payment to any resource (land, labor, etc). You should think of them as “*monies collected by the government*” and not as payment to land, labor, capital, or entrepreneurship. Indirect business taxes are included in purchases of

goods and services (you pay a sales tax when you buy most goods) and so are included when the expenditure approach is used to compute GDP.

Capital Consumption Allowance (CCA) or Depreciation: Some capital goods are used up in the production process through natural *wear, obsolescence, or accidental destruction* (e.g., the machinery that breaks down and cannot be repaired). We add the CCA to national income because we want a measure of all the income earned in the economy.

Statistical Discrepancy: GDP and national income are computed using different sets of data. Hence, statistical discrepancies or pure computational errors often occur and must be accounted for in the national income accounts.

What GDP Omits

GDP does not account the following transactions

Certain Nonmarket Goods and Services

Family members in households perform such tasks as cooking, cleaning and child rearing but their services are not counted in GDP. However some nonmarket goods such as food produced and consumed by farm households is estimated, and its imputed value is part of GDP.

Underground Activities, both Legal and Illegal

The underground economy consists of unreported exchanges that take place outside the normal recorded market channels. Some underground activities involve illegal goods (e.g., smuggling, cocaine, some gambling), and others involve legal goods and tax evasion.

Sales of Used Goods

GDP measures *current* production (i.e., occurring during the current year). A used car sale, for example, does not enter into the current-year statistics because the car was counted when it was originally produced.

Financial Transactions

The trading of stocks and bonds is not counted in GDP because it does not represent the production of new assets. It is simply the trading of existing assets (the exchange of stocks or bonds for money)

Government Transfer Payments

A transfer payment is a payment to a person that is not made in return for goods and services currently supplied. Government transfer payments—such as Social Security benefits and veterans’ benefits—are not counted in GDP because they do not represent payments to individuals for current production.

Leisure

Leisure is a good in much the same way that cars, houses, and shoes are goods. New cars, houses, and shoes are counted in GDP, but leisure is not because it is too difficult to quantify.

2.1.2 Other National Income Accounting Measurements

Net Domestic Product (NDP)

$$NDP = GDP - depreciation \dots\dots\dots (2.6)$$

NDP measures the total value of new goods available in the economy in a given year after worn-out capital goods have been replaced. Some of the fixed investment by firms is used to replace worn-out or obsolete capital goods.

Personal Income

Not all income earned is received, and not all income received is earned. An example of “income earned but not received” is undistributed profits (retained earnings). An example of “income received but not earned” is Social Security benefits.

Personal income is the amount of income that individuals actually receive.

$$PI = \text{National income} - \text{Undistributed corporate profits} - \text{Social insurance taxes} - \text{Corporate profits taxes} + \text{Transfer payments} \dots\dots\dots 2.7)$$

Disposable Income

Disposable personal income or simply disposable income is the portion of personal income that can be used for consumption or saving.

$$\text{Disposable income} = \text{Personal income} - \text{Personal taxes (income taxes)} \dots\dots\dots (2.8)$$

Exercise 2.1

Using the following data, calculate (a) national income (NI) (b) gross domestic product (GDP) by using both the expenditure and income approaches, (c) net domestic product (NDP), (d) personal income (PI). All numbers are in millions of birr

Consumption	\$1,149.5
Inventory investment	39.6
Business fixed investment	360.7
Government purchases	425.3
Exports	160.1
Imports	71.0
Capital consumption allowance	303.8

Indirect business taxes	213.3
Statistical discrepancy	4.4
Social Security insurance taxes	216.5
Government transfer payments	405.6
Undistributed profits	91.0
Corporate profits taxes	77.7
Personal taxes	340.0
Dividends	0.0
Compensation of employees	800.0
Income earned from the rest of the world	50.0
Income earned by the rest of the world	56.0
Proprietors' income	400.0
Rental income	145.0
Net interest	23.0

GDP vs. Gross national product (GNP)

The difference between GNP and GDP lies in the treatment of output produced by capital and labor working outside its home (domestic) country. Specifically, GNP is the market value of final goods and services newly produced by *nationals* during the current period, whereas GDP is production taking place within a country

$$GDP = GNP - NFP \dots\dots\dots (2.9)$$

Where, NFP is net factor payments from abroad (earned from Rest of World - paid to Rest of World)

2.1.3 Real vs. Nominal GDP

Nominal GDP measures the value of output in a given period in the prices of that period, or, as it is sometimes put, in *current* Birr. Nominal GDP can be changed from year to year for two reasons: The *physical output* of goods & services changed or Market prices change or both.

Real GDP measures changes in *physical output* in the economy between different time periods by valuing them at the same price, or, *constant price* or *base year price*. Any change in GDP that arises due to changes in the price level is then deflated-inflation is taken out.

Consider the following two goods economy example

	2002		2003		2004	
	P	Q	P	Q	P	Q
Good A	\$30	900	\$31	1000	\$36	1050
Good B	\$100	192	\$102	200	\$100	205

Compute nominal GDP in each year? Compute rgdp in each year using 2002 as base year

Answers:

i. Computing nominal GDP

$$\begin{aligned} \text{GDP}_{2002} &= (\$30 \times 900) + (\$100 \times 192) \\ &= \underline{\underline{\$46200}} \end{aligned}$$

$$\begin{aligned} \text{GDP}_{2003} &= (\$31 \times 1000) + (\$102 \times 200) \\ &= \underline{\underline{\$51400}} \end{aligned}$$

$$\begin{aligned} \text{GDP}_{2004} &= (\$36 \times 1050) + \\ &\quad (100 \times 205) \\ &= \underline{\underline{\$58300}} \end{aligned}$$

ii. Real GDP

$$\begin{aligned} \text{rgdp}_{2002} &= (\$30 \times 900) + (\$100 \times 192) \\ &\quad (\$100 \times 200) \\ &= \underline{\underline{\$46200}} \end{aligned}$$

$$\begin{aligned} \text{rgdp}_{2003} &= (\$30 \times 1000) + \\ &\quad (\$100 \times 200) \\ &= \underline{\underline{\$50000}} \end{aligned}$$

$$\begin{aligned} \text{rgdp}_{2004} &= (\$30 \times 1050) + (\$100 \times 205) \\ &= \underline{\underline{\$52000}} \end{aligned}$$

Real GDP is computed as:

$$\text{rgdp} = \frac{\text{Nominal GDP}}{\text{Implicit GDP deflator}} \times 100$$

GDP deflator measures the current price of output *included* in GDP relative to its base year price by deflating (taking inflation out of) nominal GDP. It is the weighted average of prices that reflects what is happening to the *overall* level of prices in the economy. The weight on each price reflects that good's relative importance in GDP and the weights are subject to change over time. Note that the GDP deflator is an **index** number set = 1 in the base year and it has no any economic interpretation because the base year is chosen arbitrarily.

2.1.4 GDP and Welfare

Real GDP is a measure of the size of the economy, which provides us a scale against which to measure the economic performance of other years, or compare the economic performance of other countries. Moreover Standard of living of a given country's citizens is usually proxied by real GDP per capita income:

$$rGDPC = rGDP / \text{total population} \dots\dots\dots (2.5)$$

However, output per capita is an imperfect measure of living standards because:

- ✓ *First*, many things that contribute to our economic welfare are not captured by GDP at all: leisure time, an equitable distribution of income, a sense of community, and more.
- ✓ *Second*, GDP also ignores economic “bads”-crime, pollution, traffic congestion, and more-which make us worse off
- ✓ *Finally*, GDP does not distinguish between production that makes us better off and production that only prevents us from becoming worse off-traffic accidents, insurance, legal services