A second method to calculate GDP

INCOME APPROACH

Recall: **What is spent by one economic agent (expenditure) accrues as income to another.**

Examples:
1. The price paid for a good by a household accrues as income to a firm.
2. Wages paid by a firm accrues as income to households.
3. Taxes paid by households and firms accrue as income to the government.

So if GDP = Aggregate Expenditure by the agents in the domestic economy, then GDP = Aggregate Income of the domestic agents in the economy, as well.

- What does ‘income’ mean in this context?

Income is the amount of compensation earned for providing an input required for production.

Note: My approach in the following exposition is seemingly different from Parkin’s. In reality it is not. If we think of firms being owned by proprietors (owners) & capitalists (shareholders), who themselves belong to some household in the economy, then it is easy to switch between Parkin’s exposition & mine. In essence, Parkin thinks of all the factors of production being ultimately owned by households.

THE INCOME APPROACH

Households & firms provide the following inputs that are needed for domestic production in the economy:
1. Labor (provided by households)
2. Capital (provided by households, firms)
3. Land (provided by households, firms)
4. Entrepreneurship (provided by owners of firms)

What do the economic agents earn for providing these productive inputs?
1. Labor earns compensation, ex., wages.
2. Capital lent out earns either interest income (if deposited in a bank), or corporate profits (if it is invested in a company)
3. Land earns rent income.
4. Entrepreneurship earns proprietors’ (owners’) income.

Adding the incomes of these factors of production give us the Net domestic income at factor cost.

Final steps in arriving at the GDP at market prices by the Income method:

- To the income of the above factors, we must add the income earned in the goods & services market by the remaining domestic economic agent, the Government. This income is Indirect Taxes imposed (Taxes on goods & services) – Subsidies paid by the government to firms & consumers (food stamps, farm subsidies, etc.).
- Add depreciation level (value of capital consumption) for the economy (since corporate profits are calculated netting out depreciation).

Note: in case the government does not impose any indirect taxes or provide subsidies, market prices and factor cost would be equal.

GDP by income method:

\[ \text{GDP} = \text{Compensation of employees} + \text{Interest earned by capitalists on their Net Lending} + \text{Rental income} + \text{Proprietors’ income} + \text{Indirect taxes less Subsidies} + \text{Depreciation}. \]

- Question:

Does more GDP really mean that we have more goods & services available in the economy?

Consider:

Let an economy produce 5 bushels of wheat & 3 cars in year 1. Let the market price of a bushel of wheat be $2 and that of a car be $100. According to our definition of GDP, in year 1 GDP is \[ 5 \times 2 + 3 \times 100 = 310. \]

Let the economy still produce 5 bushels of wheat & 3 cars next year, year 2. Now, let the market price of a bushel of wheat be $5 and that of a car be $200. Now, GDP is \[ 5 \times 5 + 3 \times 200 = 625. \]

Clearly, we not have more goods & services available in the economy in year 2, compared to year 1.

How to avoid this?
• Nominal Vs. Real GDP

1. Calculation of Nominal GDP: The market values used for the calculation of Nominal GDP of a certain year (say 2000) are the prices of that year, i.e., 2000 itself. In other words, we use ‘current prices’ to calculate nominal GDP.

2. Calculation of Real GDP: The market values used for the calculation of Real GDP of a certain year (say 2000) are the prices of a certain ‘base’ year, say, 1999. In other words, we use ‘base prices’ to calculate nominal GDP.

If we now take 1999 prices and calculate the GDP for 2000, 2001, and 2002 lets say, then we will be able to compare these figures and say whether we really had more goods & services available in the economy in one of these years, compared to another.

Returning to our example, the Nominal GDP for years 1 & 2 in the economy were $310 & $ 625 respectively. If we now take year 1 as the base year, then the RGDP of year 1 is $ 310 (it remains the same, since the prices used to calculate it are for year 1 itself). However, the RGDP for year 2, now becomes $ 310 as well: now we can comparer these two figures to correctly state that the level of goods & services in the economy remained the same between years 1 & 2.

Another Example.

<table>
<thead>
<tr>
<th>GDP Data for 2002</th>
<th>GDP Data for 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>Price</td>
</tr>
<tr>
<td>Balls</td>
<td>100</td>
</tr>
<tr>
<td>Bats</td>
<td>20</td>
</tr>
</tbody>
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Nominal GDP in 2002: 100*1 + 20*5 = 100 + 100 = 200$
Nominal GDP for 2003: 160*0.50 + 22*20 = 80 + 440 = 520$

Let 2002 be the base year:
Real GDP in 2002: 100*1 + 20*5 = 100 + 100 = $200
Real GDP in 2003: 160*1+ 22*5= 160+ 110 = $ 270

The disparity in RGDP for the two years is not as large as that in NGDP, hence the RGDP is a truer measure of the increase in production of goods & services between the years.
Another big macroeconomic issue: What is the level of investment in the economy?

Why are we concerned about this issue?

It is investment in the economy that gives rise to production. Investment in machines, more factory space, etc, means that greater capacity is being created in the economy for greater production to occur. As a greater level of production means more goods & services available for consumption in the economy, greater investment is essential in creating a better living standard in the economy.

In order to understand how investment is financed we shall now create a simple macroeconomic model of financial flows in the economy.

The Model

To show using the model:

Investment is financed from 3 sources:

1. Private saving
2. Government budget surplus
3. Borrowing from the ROW

Let us start by denoting aggregate income of all the households as $Y$. We note that owners of firms and capitalists (shareholders in firms, who we assume to take home all the profits earned by firms) are part of some household in the economy.

What is the total income of the household sector? It is the take-home pay of workers (after taxes), the after-tax profit income of capitalists, the after-tax income of firms’ owners, plus the aggregate taxes they all pay.

$Y = \text{After-tax income of the household sector} + \text{income taxes} (T)$

How do households spend after-tax income?

It is spent by households to buy consumption items from the market. They might also save some of it. Let $C$ be the dollar value of aggregate consumption expenditure as before, and let $S$ denote aggregate savings of households.

$Y = C + S + T ----(1)$

We know from the equivalence of the income method & expenditure method of calculating the GDP:
\[ Y = C + I + G + X - M \quad ----(2) \]

Equating (1) and (2):

\[ C + S + T = Y = C + I + G + X - M \]

\[ \rightarrow C + S + T = C + I + G + X - M \]

\[ \rightarrow S + T = I + G + X - M \]

\[ \rightarrow S + (T-G) + (M - X) = I \]

Where,

T-G = Taxes – Government spending = Government’s earning – Its spending = Government budget surplus (if it is positive)/ Budget deficit (if negative),

And,

M - X = Import expenditure – Export earnings = Foreign borrowings (FB).

If it is positive, then we have a trade deficit, i.e., we are borrowing from the ROW. Otherwise, we have a trade surplus & are lending to the ROW).

So, we see that investment is funded through private savings, the government’s budget surplus (government savings), and foreign borrowings (foreign assets invested in our economy).

So, National savings (NS) = Private savings + Government savings.

Therefore, \( I = NS + FB \)

We have shown what we wanted to, using this model.