

EC210 Macroeconomic Principles MT

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Lecture Notes

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1 Measuring GDP

A few questions surrounding Gross Domestic Product (GDP):

- What is national income and what are its components?
- How is it measured?
- How should it be interpreted?

To answer these questions, we take the example island economy with a description of its various components outlined below:

- Markets and Goods: fish (\$2); restaurant meals (\$10); boats (\$1,000)
- Firms: produce goods by hiring labour (island limited to 20 workers), renting land (totalling 4 units), and using their capital (1 boat)
- Households: buy goods, work (wage per worker is \$100) and rent out land (\$50 per unit)
- Government: tax and provide public services
- There is also trade with the rest of the world

So from the list above, we can try to create a set of national accounts for the economy.

1.1 National Accounts

Listed below are the national accounts created from the island economy above.

1.1.1 Corporate Sector: Fish Producers

	Item	Value	units
1	Sales of Fish (Revenues)	\$1,800	900
2	Net addition to inventory	\$200	100
3	Production (1+2)	\$2,000	1,000
4	Wages paid to workers	\$1,000	10
5	Interest on debt	\$200	
6	Gross Operating Profits [= (3)-(4)-(5)]	\$800	
7	Net Borrowing	\$500	
8	Investment (New Boat)	\$1,000	1
9	Dividends [= (6)+(7)-(2)-(8)]	\$100	

1.1.2 Corporate Sector: Restaurants

	Item	Value	units
1	Sales of Meals (Revenues)	\$2,500	250
2	Purchase of intermediate goods (fish)	\$1,000	500
3	Wages paid to workers	\$500	5
4	Rent of land	\$200	4
5	Tax on sales	\$250	
6	Gross Operating Profits $[(1)-(2)-(3)-(4)-(5)]$	\$550	
7	Retained Earnings	\$100	
8	Dividends $[(6)-(7)]$	\$450	

1.1.3 Government Sector

	Item	Value	units
1	Income tax on wages (direct)	\$200	
2	Sales tax (indirect)	\$250	
3	Tax Revenue $(1+2)$	\$450	
4	Wages of government employees	\$500	5
5	Interest on debt	\$150	
6	Budget deficit $[(4)+(5)-(3)]$	\$200	

1.1.4 Household Sector: Income

1.1.5 Household Sector: Expenditure

1.1.6 International Trade and Income

1.2 GDP

Gross Domestic Product is the most common measure of the size of an economy. The definition is as follows: *the value of all goods and services produced in a country in a period of time*. A few things about the definition:

- It is a gross measure: that means it is the opposite of 'net' i.e. it does not account for depreciation
- It is domestic: that means it covers the geographical area of a country irrespective of ownership or nationality
- Product: it is based on the amounts of goods newly produced, not just sold

Having understood that, there are further points to note about GDP.

- GDP aims to include all output for sale in the market and also some non-market output
- Value means market value (where possible)

- Only final goods are counted which means we exclude intermediate goods
- GDP is a flow not a stock so it is measured in a period of time

There are three equivalent approaches to measure GDP:

1. Production approach
2. Expenditure approach
3. Income approach

1.2.1 Production Approach

This is when we sum all the *value added* over all industries producing goods and services. Here are some key things to remember:

- Value added equals value of output **minus** value of intermediate goods used in production. This is to avoid double counting.
- Use market value where possible which can be $\text{Price} \times \text{Quantity}$
- For government services where there is no market value, use cost of production as a proxy
- Impute values for some non-market outputs as well such as services from owner-occupied housing

1.2.2 Expenditure Approach

The expenditure approach sums all the expenditures within the economy. This means household consumption, investment, government consumption and net exports.

- Households consumption is equal to purchases of goods and services by households
- Investment is equal to purchases of new capital goods by firms plus purchases of new residential structures plus net change in inventories of goods
- Government consumption is equal to purchases of goods to provide public services including their own production
- Net exports is equal to the value of exports minus the value of imports

1.2.3 Income Approach

The income approach is the sum of all income derived from the production process. These include:

- Wages
- Rents
- Net interest paid by firms
- Profits
- Indirect taxes

Incomes are paid by firms (or the government) and is related to the value of production. Indirect taxes deducted from profits are added back for consistency in relation to the value of production.

1.3 Comparing GDP

We usually compare GDP through price indices and between nominal and real GDP values. We also compare GDP across time and countries. Here is a run down of what we mean by Nominal and Real:

- **Nominal** variables are expressed in units of money, with no change, just as it is recorded
- **Real** variables are adjusted for changes in the value of money so they aim to capture changes in quantities only and remove the effects of inflation

When calculating nominal growth, we just compare the figures from year to year. For example:

Year 1 GDP in US\$: 10,000

Year 2 GDP in US\$: 22,000

$$\frac{22,000 - 10,000}{10,000} = 1.2$$

That is a 120% growth in nominal GDP between Year 1 and Year 2.

We use a base year to calculate the changes in real

A National Income and Product Accounts

The NIPA is produced by the Bureau of Economic Analysis (BEA), providing information on the value and composition of output produced in the United States during a given period and on the types and uses of the income generated by that production. NIPA begins by considering the transactions that occur in a simple economy in order to introduce the economic concepts that underlie the NIPAs. We also describe the NIPA sectors for which economic activity is measured and the use of T-accounts to illustrate economic flows.

A.1 Conceptual Basis of the Accounts

This section covers concepts used within the NIPA framework.

A.1.1 The circular flow

The fundamental idea of a working economy can be illustrated between just two parties: individuals and businesses. Between these two parties, we can illustrate the flow of income such that:

- Individuals provide labour and in return businesses provide goods and services or,
- Individuals are given income from their labour and in return, they expend their income on the business.

This basic form of exchange is called the circular flow of income and is self-contained within this example.

A.1.2 Economic concepts in the NIPAs

The circular flow illustrates the interdependence of the flows or activities that occur in the economy, such as the production of goods and services and the income generated from that production. The circular flow also illustrates the equality between the income earned from production and the value of goods and services produced.

However, we did mention that the actual economy is much more complicated. What is not included is also the state, local governments and the rest of the world (trade). Other parts are also not discussed in this simply flow, such as investment in capital (PP&E), flows of financial capital (stocks, bonds, deposits) and the contribution of these flows to the accumulation of fixed assets.

A.1.3 Output

The featured measure of output in the NIPAs is GDP. GDP measures the market value of goods, services and structure produced by the nation's economy in a particular period. The following points are things to keep in mind when considering the output of the economy.

GDP includes market production and some nonmarket production

This means that GDP accounts for things sold in the market, your normal goods and services any consumer could purchase, and of things that are not sold in the market such as defence services provided by the government, education provided by the local government or the state and so on. Data aims to include this to gain a true measure

Whenever Possible, GDP is valued at Market Prices

The NIPAs value market goods and services using prices set by the market. This means that there is a common unit of measurement that facilitates the comparison of goods and services that make up economic activity. Using market values also facilitates the analysis of the impacts on the economy of events such as the implementation of government programs or the occurrence of natural disasters e.g. boost in education spending or destruction of infrastructure valued at x .

In some cases, market prices do not fully reflect the **value** of a good or service and may include some types of services where an actual exchange has not occurred. In these cases, the value is *imputed* from similar market transactions. Imputations measure the value of goods and services that are not fully reflected in market prices. Examples of imputed measure in the NIPAs include the value of compensation-in-kind (such as meals provided by employers).

GDP is a measure of current production, not sales

In the NIPAs, the measure of output refers to output produced within that period, regardless of when that output is sold. For example, if a car-maker produces a car in Period 1 but does not sell it, we record that as GDP. When it sells the car in Period 2, we subtract from inventory and also record it as an expense, these two cancel out so GDP is not affected.

GDP is equal to the value of goods and services for *final* users

This means that measurement of GDP captures the value of products that are consumed and not used in a later stage of production, those that are sold, given away, or otherwise transferred to foreign residents, those that are used to produce other goods and that last more than a year, and those that may be inventoried for future consumption. When considering the production process for the entire economy, the value of intermediate products - goods and services used in the production process (and will not contribute to future production) - is excluded, so that the measure of output is an un-duplicated total.

GDP can be measured in three different ways

Refer to notes above on more detail but a quick reminder:

1. Expenditures approach
2. Income approach
3. Value-added approach

GDP is a gross measure

This means that we do not account for depreciation of consumption of fixed capital. Setting aside this amount from GDP would give us the Net Domestic Product which is a measure of current production excluding these other costs. Net domestic product is a measure that indicates how much of the Nation's output is available for consumption or for adding to the Nation's wealth.

A.2 The T-account

A T-Account offers another way to illustrate the flows of the economy. More detailed than the circular flow diagram, it is a two-sided table that matches source of funds on the right (credit) with uses on the left (debit). The example below is a simple "Income and Outlay Account" for an individual.

Uses of income		Sources of income	
Consumption	50	Compensation	70
Tax payments	20	Interest received	20
Saving	30	Dividends received	10
Total Expenditures and Savings	100	Total Income	100

The right side of the account shows an individual's sources of income: compensation (wages and salaries) and the interest and dividends received from the ownership of assets (bonds and stocks). The sum of these sources is total income. The left side shows the individual's uses for this income: consumption (purchases of goods and services, tax payments and savings). The sum of these uses is total expenditures and savings.

The structure of the T-account provides two analytical benefits. First, because it is an identity, it enables one to identify and estimate a balancing item between the two sides of the account. For example, we can take away expenditure items with known values from total income to arrive at values of other expenditures. Second, when constructed for more than one economic sector, the T-accounts provide a double-entry system in which a source of income in an account for one sector also appears as a use of income in the account of another sector.

A.3 Seven NIPA accounts

Here are the seven accounts listed:

1. Domestic Income and Product Account
2. Private Enterprise Income Account
3. Personal Income and Outlay Account

4. Government Receipts and Expenditures Account
5. Foreign Transactions Current account
6. Domestic capital Account
7. Foreign Transactions Capital Account