

The Measurement and Structure of the National Economy (Ch 2)

1. **National Income Accounting: The Measurement of Production, Income, and Expenditure**
2. **Gross Domestic Product**
3. **Saving and Wealth**
4. **Real GDP, Price Indexes, and Inflation**
5. **Interest Rates**

1. National Income Accounting

National income accounts: an accounting framework used in measuring current economic activity

Three alternative approaches give the same measurements

- Product approach: the amount of output produced
- Income approach: the incomes generated by production
- Expenditure approach: the amount of spending by purchasers

Important concept in product approach:

value added = value of output minus value of inputs purchased from other producers

Why are the three approaches equivalent?

Any output produced (product approach) is purchased by someone (expenditure approach) and results in income to someone (income approach)

The fundamental identity of national income accounting:

total production = total income = total expenditure

(2.1)

2. Gross Domestic Product

The product approach to measuring GDP

GDP (gross domestic product) is the market value of final goods and services newly produced within a nation during a fixed period of time

Market value: allows adding together unlike items by valuing them at their market prices

Problem: misses nonmarket items such as homemaking, the value of environmental quality, and natural resource depletion

There is some adjustment to reflect the underground economy

Government services (that aren't sold in markets) are valued at their cost of production

Final goods and services

Final goods & services are those that are not intermediate

Don't count intermediate goods and services (those used up in the production of other goods and services in the same period that they themselves were produced)

Adding up value added works well, since it automatically excludes intermediate goods

Inventory investment (the amount that inventories of unsold finished goods, goods in process, and raw materials have changed during the period) is also treated as a final good

Capital goods (goods used to produce other goods) are final goods since they aren't used up in the same period that they are produced

Newly produced: counts only things produced in the given period; excludes things produced earlier

GNP vs. GDP

GNP (gross national product) = output produced by domestically owned (American) factors of production anywhere in the world

GDP = output produced within a nation (on the territory of the USA)

$$GDP = GNP - NFP \quad (2.2)$$

NFP = net factor payments from abroad =

= payments to domestically owned factors located abroad minus payments to foreign factors located domestically

- Example: Engineering revenues for a road built by a U.S. company in Saudi Arabia is part of U.S. GNP (built by a U.S. factor of production), not U.S. GDP, and is part of Saudi GDP (built in Saudi Arabia), not Saudi GNP
Difference between GNP and GDP is small for the United States, about 0.2%, but higher for countries that have many citizens working abroad

The expenditure approach to measuring GDP

Measures total spending on final goods and services produced within a nation during a specified period of time

Four main categories of spending: consumption (C), investment (I), government purchases of goods and services (G), and net exports (NX)

$$Y = C + I + G + NX \quad (2.3)$$

the income-expenditure identity

Consumption: spending by domestic households on final goods and services (including those produced abroad)

- About 2/3 of U.S. GDP
- Three categories
 - Consumer durables (examples: cars, TV sets, furniture, major appliances)
 - Nondurable goods (examples: food, clothing, fuel)
 - Services (examples: education, health care, financial services, transportation)

Investment: spending for new capital goods (fixed investment) plus inventory investment

- About 1/6 of U.S. GDP
- Business (or nonresidential) fixed investment: spending by businesses on structures and equipment and software
- Residential fixed investment: spending on the construction of houses and apartment buildings
- Inventory investment: increases in firms' inventory holdings

Government purchases of goods and services: spending by the government on goods or services

- About 1/5 of U.S. GDP
- Most by state and local governments, not federal government
- Not all government expenditures are purchases of goods and services
 - Some are payments that are *not* made in exchange for current goods and services
 - One type is transfers, including Social Security payments, welfare, and unemployment benefits

- Another type is interest payments on the government debt
- Some government spending is for capital goods that add to the nation's capital stock, such as highways, airports, bridges, and water and sewer systems

Net exports: exports minus imports

- Exports: goods produced in the country that are purchased by foreigners
- Imports: goods produced abroad that are purchased by residents in the country
- Imports are subtracted from GDP, as they represent goods produced abroad, and were included in consumption, investment, and government purchases

The income approach to measuring GDP

Adds up income generated by production (including profits and taxes paid to the government)

National income = compensation of employees (including benefits) + proprietors' income + rental income of persons + corporate profits + net interest + taxes on production and imports + business current transfer payments + current surplus of government enterprises

National income + statistical discrepancy = net national product

Net national product + depreciation (the value of capital that wears out in the period) = gross national product (GNP)

$GNP - \text{net factor payments (NFP)} = GDP$

Private sector and government sector income

Private disposable income = income of the private sector = private sector income earned at home (Y or GDP) and abroad (NFP) + payments from the government sector (transfers, TR , and interest on government debt, INT) – taxes paid to government (T)

$$\text{Private disposable income} = Y + NFP + TR + INT - T \quad (2.4)$$

$$\begin{aligned} \text{Government's net income} &= \text{taxes} - \text{transfers} - \text{interest payments} = \\ &= T - TR - INT \end{aligned} \quad (2.5)$$

$$\text{Private disposable income} + \text{government's net income} = GDP + NFP = GNP$$

3. Saving and Wealth

Wealth

Household wealth = a household's assets minus its liabilities

National wealth = sum of all households', firms', and governments' wealth within the nation

Saving by individuals, businesses, and government determine wealth

Wealth is accumulated saving

Measures of aggregate saving

Saving = current income – current spending

Saving rate = saving/current income

Private saving = private disposable income – consumption

$$S_{pvt} = (Y + NFP - T + TR + INT) - C \quad (2.6)$$

Government saving = net government income – government purchases of goods and services

$$S_{govt} = (T - TR - INT) - G \quad (2.7)$$

Government saving = government budget surplus =

= government receipts – government outlays

Government receipts = tax revenue (T)

Government outlays = government purchases of goods and services (G) + transfers (TR) + interest payments on government debt (INT)

Government budget deficit = $-S_{govt}$

Simplification: count government investment as government purchases, not investment

National saving

National saving = private saving + government saving

$$S = S_{pvt} + S_{govt} = \quad (2.8)$$

$$= [Y + NFP - T + TR + INT - C] + [T - TR - INT - G]$$

$$= Y + NFP - C - G =$$

$$= GNP - C - G$$

The uses of private saving

$$S = I + (NX + NFP) \quad (2.9)$$

$$S = I + CA \quad (2.10)$$

Derived from $S = Y + NFP - C - G$ and $Y = C + I + G + NX$

$CA = NX + NFP$ = current account balance

$$S_{pvt} = I + (-S_{govt}) + CA \quad (2.11)$$

(using $S = S_{pvt} + S_{govt}$)

Saving is used in three ways:

- investment (I)
- government budget deficit ($-S_{govt}$)
- current account balance (CA)

Relating saving and wealth

Stocks and flows

- Flow variables: measured per unit of time (GDP, income, saving, investment)
- Stock variables: measured at a point in time (quantity of money, value of houses, capital stock)
- Flow variables often equal rates of change of stock variables

Wealth and saving as stock and flow (wealth is a stock, saving is a flow)

National wealth: domestic physical assets + net foreign assets

- Country's domestic physical assets (capital goods and land)
- Country's net foreign assets = foreign assets (foreign stocks, bonds, and capital goods owned by domestic residents) minus foreign liabilities (domestic stocks, bonds, and capital goods owned by foreigners)

- Wealth matters because the economic well-being of a country depends on it
- Changes in national wealth
- Change in value of existing assets and liabilities (change in price of financial assets, or depreciation of capital goods)
 - National saving ($S = I + CA$) raises wealth

Comparison of U.S. saving and investment with other countries

- The United States is a low-saving country; Japan is a high-saving country
- U.S. investment exceeds U.S. saving, so we have a negative current-account balance

Application: Wealth Versus Saving

- The personal saving rate has declined dramatically in recent years (Fig. 2.1)
 - We might not need to worry about the decline in the personal saving rate because:
 - private saving is the relevant measure of saving
 - the personal saving rate may be revised upward in the future (Fig. 2.2)
 - We might not need to worry about the decline in the personal saving rate because:
 - the personal saving rate ignores capital gains; as people's wealth rises, their saving rate declines (Fig. 2.3)
- **Figure 2.3** Annual change in net worth divided by disposable personal income, 1953-2006

1. Real GDP, Price Indexes, and Inflation

Real GDP

Nominal variables are those in dollar terms

Problem: Do changes in nominal values reflect changes in prices or quantities?

Real variables: adjust for price changes; reflect only quantity changes

Nominal GDP is the dollar value of an economy's final output measured at current market prices

Real GDP is an estimate of the value of an economy's final output, adjusting for changes in the overall price level

Table 2.3 Production and Price Data

Table 2.4 Calculation of Real Output with Alternative Base Years

Price Indexes

A price index measures the average **level** of prices for some specified set of goods and services, relative to the prices in a specified base year

GDP deflator = $100 \times \text{nominal GDP} / \text{real GDP}$

Note that base year $P = 100$

Consumer Price Index (CPI)

Monthly index of consumer prices; index averages 100 in reference base period (1982 to 1984)

- Box 2.2 on the computer revolution and chain-weighted GDP
 - Choice of base period matters for GDP when prices and quantities of a good, such as computers, are changing rapidly
 - BEA compromised by developing chain-weighted GDP

Now, however, components of real GDP don't add up to real GDP, but discrepancy is usually small

Inflation

Calculate inflation rate:

$$p_{t+1} = (P_{t+1} - P_t) / P_t = \Delta P_{t+1} / P_t$$

Text Fig. 2.4 shows the U.S. inflation rate since 1960 for the GDP deflator

- Box 2.3: Does CPI inflation overstate increases in the cost of living?
The Boskin Commission reported that the CPI was biased upwards by as much as one to two percentage points per year
One problem is that adjusting the price measures for changes in the quality of goods is very difficult
- Box 2.3: Does CPI inflation overstate increases in the cost of living?
Price indexes with fixed sets of goods don't reflect substitution by consumers when one good becomes relatively cheaper than another
 - This problem is known as substitution bias
- Box 2.3: Does CPI inflation overstate increases in the cost of living?
 - If inflation is overstated, then real incomes are higher than we thought and we've overindexed payments like Social Security
 - Latest research (July 2006) suggests bias is still 1% per year or higher

Interest Rates

Real vs. nominal interest rates

Interest rate: a rate of return promised by a borrower to a lender

Real interest rate: rate at which the real value of an asset increases over time

Nominal interest rate: rate at which the nominal value of an asset increases over time

$$\text{Real interest rate} = i - p \quad (2.12)$$

Text Fig. 2.5 plots nominal and real interest rates for the United States since 1960

The expected real interest rate

$$r = i - p^e \quad (2.13)$$

- If $p = p^e$, real interest rate = expected real interest rate