

## 2.2: National Income or Product Identity

### Learning Objectives

1. Identify the components of GDP defined in the national income identity.
2. Understand why imports are subtracted in the national income identity.

The national income or product identity describes the way in which the gross domestic product (GDP) is measured, as the sum of expenditures in various broad spending categories. The identity, shown below, says that GDP is the sum of personal consumption expenditures ( $C$ ), private investment expenditures ( $I$ ), government consumption expenditures ( $G$ ), and expenditures on exports ( $EX$ ) minus expenditures on imports ( $IM$ ):

$$GDP = C + I + G + EX - IM$$

Personal consumption expenditures ( $C$ ), or “consumption” for short, include goods and services purchased by domestic residents. These are further subdivided into durable goods, commodities that can be stored and that have an average life of at least three years; nondurable goods, all other commodities that can be stored; and services, commodities that cannot be stored and are consumed at the place and time of purchase. Consumption also includes foreign goods and services purchased by domestic households.

Private domestic investment ( $I$ ), or “investment” for short, includes expenditures by businesses on fixed investment and any changes in business inventories. Fixed investment, both residential and nonresidential, consists of expenditures on commodities that will be used in a production process for more than one year. It covers all investment by private businesses and by nonprofit institutions, regardless of whether the investment is owned by domestic residents or not. Nonresidential investment includes new construction, business purchases of new machinery, equipment, furniture, and vehicles from other domestic firms and from the rest of the world. Residential investment consists of private structures, improvements to existing units, and mobile homes. Note that this term does not include financial investments made by individuals or businesses. For example, one purchase of stock as an “investment” is not counted here.

Government expenditures include purchases of goods, services, and structures from domestic firms and from the rest of the world by federal, state, and local government. This category includes compensation paid to government employees, tuition payments for higher education, and charges for medical care. Transfer payments, such as social insurance payments, government medical insurance payments, subsidies, and government aid are *not* included as a part of government expenditures.

Exports consist of goods and services that are sold to nonresidents.

Imports include goods and services purchased from the rest of the world.

The difference between exports and imports ( $EX - IM$ ) is often referred to as net exports. Receipts and payments of factor income and transfer payments to the rest of the world (net) are excluded from net exports. Including these terms changes the trade balance definition and reclassifies national output as growth national product (GNP).

### The Role of Imports in the National Income Identity

It is important to emphasize why imports are subtracted in the national income identity because it can lead to serious misinterpretations. First, one might infer (incorrectly) from the identity that imports are subtracted because they represent a cost to the economy. This argument often arises because of the typical political emphasis on jobs or employment. Thus higher imports imply that goods that might have been produced at home are now being produced abroad. This could represent an opportunity cost to the economy and justify subtracting imports in the identity. However, this argument is wrong.

The second misinterpretation that sometimes arises is to use the identity to suggest a relationship between imports and GDP growth. Thus it is common for economists to report that GDP grew at a slower than expected rate last quarter because imports rose faster than expected. The identity suggests this relationship because, obviously, if imports rise, GDP falls. However, this interpretation is also wrong.

The actual reason why imports are subtracted in the national income identity is because imports appear in the identity as hidden elements in consumption, investment, government, and exports. Thus imports must be subtracted to assure that only domestically produced goods are being counted. Consider the following details.

When consumption expenditures, investment expenditures, government expenditures, and exports are measured, they are measured without accounting for where the purchased goods were actually made. Thus consumption expenditures ( $C$ ) measures domestic expenditures on both domestically produced and foreign-produced goods. For example, if a U.S. resident buys a television imported from Korea, that purchase would be included in domestic consumption expenditures. Likewise, if a business purchases a microscope made in Germany, that purchase would be included in domestic investment. When the government buys foreign goods abroad to provide supplies for its foreign embassies, those purchases are included in government expenditures. Finally, if an intermediate product is imported, used to produce another good, and then exported, the value of the original imports will be included in the value of domestic exports.

This suggests that we could rewrite the national income identity in the following way:

$$GDP = (C_D + C_F) + (I_D + I_F) + (G_D + G_F) + (EX_D + EX_F) - M$$

where  $C_D$  represents consumption expenditures on domestically produced goods,  $C_F$  represents consumption expenditures on foreign-produced goods,  $I_D$  represents investment expenditures on domestically produced goods,  $I_F$  represents investment expenditures on foreign-produced goods,  $G_D$  represents government expenditures on domestically produced goods,  $G_F$  represents government expenditures on foreign-produced goods,  $EX_D$  represents export expenditures on domestically produced goods, and  $EX_F$  represents export expenditures on previously imported intermediate goods. Finally, we note that all imported goods are used in consumption, investment, or government or are ultimately exported, thus

$$IM = C_F + I_F + G_F + EX_F$$

Plugging this expression into the identity above yields

$$GDP = C_D + I_D + G_D + EX_D$$

and indicates that GDP does not depend on imports at all.

The reason imports are subtracted in the standard national income identity is because they have already been included as part of consumption, investment, government spending, and exports. If imports were not subtracted, GDP would be overstated. Because of the way the variables are measured, the national income identity is written such that imports are added and then subtracted again.

This exercise should also clarify why the previously described misinterpretations were indeed wrong. Since imports do not affect the value of GDP in the first place, they cannot represent an opportunity cost, nor do they directly or necessarily influence the size of GDP growth.

#### Key takeaways

- GDP can be decomposed into consumption expenditures, investment expenditures, government expenditures, and exports of goods and services minus imports of goods and services.
- Investment in GDP identity measures physical investment, not financial investment.
- Government includes all levels of government and only expenditures on goods and services. Transfer payments are not included in the government term in the national income identity.
- Imports are subtracted in the national income identity because imported items are already measured as a part of consumption, investment and government expenditures, and as a component of exports. This means that imports have no direct impact on the level of GDP. The national income identity does not imply that rising imports cause falling GDP.

#### Exercises

1. **Jeopardy Questions.** As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is “a tax on imports,” then the correct question is “What is a tariff?”
  - A measure of the value of all capital equipment and services purchased during a year.
  - The term for the goods and services sold to residents of foreign countries.
  - The component of GDP that includes household purchases of durable goods, nondurable goods, and services.
  - The component of GDP that includes purchases by businesses for physical capital equipment used in the production process.
  - The government spending in the GDP identity does not count these types of government expenditures.
  - Of *true* or *false*, imported goods and services are counted once in the  $C$ ,  $I$ ,  $G$ , or  $EX$  terms of the GDP identity.

2. The national income identity says that gross domestic product is given by consumption expenditures, plus investment expenditures, plus government expenditures, plus exports, minus imports. In short, this is written as  $GDP = C + I + G + EX - IM$ .

Consider each of the following expenditures below. Indicate in which category or categories ( $C$ ,  $I$ ,  $G$ ,  $EX$ , or  $IM$ ) the item would be accounted for in the United States.

Product	Category
a. German resident purchase of a U.S.-made tennis racket	
b. U.S. firm purchase of a U.S.-made office copy machine	
c. Salaries to U.S. troops in Iraq	
d. School spending by county government	
e. U.S. household purchase of imported clothing	

3. What is the gross domestic product in a country whose goods and services balance is a \$300 billion deficit, consumption is \$900 billion, investment is \$300 billion, and government spending is \$500 billion?

4. Below are the economic data for the fictional country of Sandia. Write out the national income identity. Verify whether Sandia's data satisfy the identity.

Gross Domestic Product	400
Imports of Goods and Services	140
Investment Spending	20
Private Saving	30
Exports of Goods and Services	100
Government Transfers	40
Government Tax Revenues	140
Government Spending	140
Consumption Spending	280

Figure 2.2.1: TABLE 2.1 SANDIA'S ECONOMIC DATA (BILLIONS OF DOLLARS)

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