

Notes on National Income and Balance of Payments Accounts

This handout briefly describes some features of the National Income and Product Accounts (NIPAs) and the Balance of Payments Accounts (BPAs) and shows how the two sets of accounts are related. A more detailed description of the NIPAs appears in the Mankiw text.

The Balance of Payments Accounts and the National Income and Product Accounts are separate sets of accounts that employ somewhat different accounting conventions. As the names suggest, the BPAs are primarily concerned with foreign transactions while the NIPAs are a more comprehensive set of accounts dealing with both domestic and foreign transactions. Most of the foreign transactions recorded in the BPAs also appear in the NIPAs. Some items are given different names in the two accounts so as to make it clear which set of accounts (and thus which set of accounting conventions) the item is a part of. The differences in accounting conventions are minor, so that the numbers reported in the BPAs are close to the corresponding entries in the NIPAs. In the examples below, we will use the NIPAs as the source of data for both domestic and foreign transactions, but we will refer to some foreign transactions by their BPA names because these names are more commonly used than those in the NIPAs.

Balance of Payments Accounts

In the BPAs, transactions that lead to payments to foreign countries are debits and transactions that lead to receipts from foreign countries are credits. Debits are recorded with a minus sign, and credits with a plus sign. The major debit categories are: merchandise imports, service imports, payments (profits, interest, rents) on foreign investments in the U.S., gifts to foreigners, purchase of assets abroad by U.S. residents, and increases in the U.S. government's international assets. The opposite transactions give rise to credits. (Gifts constitute an exception. Gifts received from foreigners are subtracted from gifts to foreigners, and net gifts to foreigners are recorded as a debit entry. There is no corresponding credit.)

Table 1 shows a hypothetical set of BPAs. (The table indicates that there is no official intervention. Official intervention will be defined later.) Rows 1 through 4 are the *current account*. Entries in these rows are payments for currently produced goods and services and, as a consequence, also appear in the NIPAs. Rows 6 and 7 are the *capital account*. Entries in these rows are payments for exchanges of assets and, because they are not payments for currently produced goods and services, they do not appear directly in the NIPAs.

The first row of the table deals with merchandise imports and exports, and the sum of the debit and credit entries in this row is called the *merchandise trade balance*. If this sum is positive, exports exceed imports and the merchandise trade balance shows a surplus. Similar balances can be defined for the other rows of both the current and capital accounts, with the convention that a positive balance corresponds to a surplus and indicates that receipts from foreigners exceed payments to foreigners. The balances on

Table 1

Hypothetical Balance of Payments Accounts
(No Official Intervention)

	Debits		Credits		Col. 1 + Col. 2		Running Total of Col. 3	
	(1)		(2)		(3)		(4)	
Current Account								
1.	Merchandise imports	−300	Merchandise exports	200	Merchandise trade balance	−100	Merchandise trade balance	−100
2.	Service imports	−60	Service exports	50	Balance on services	−10	Balance on goods and services (trade balance)	−110
3.	Payments on foreign investment in U.S.	−70	Receipts on U.S. investment abroad	90	Balance on investment income (≈net factor income from abroad)	20	Balance on goods, services, and income	−90
4.	Unilateral transfers	−15				−15	Current account	−105
5.								
Capital Account								
6.	Change in private U.S. assets abroad	−20	Change in private foreign assets in U.S.	125	Private capital account (net capital inflow)	105	(Official settlements BOP)	0
7.	Change in U.S. official assets	0	Change in foreign official assets in U.S.	0	Official capital account balance	0	Balance of Payments	0

individual lines can be combined to give successively more inclusive totals. For example, the sum of all debit and credit entries on lines 1 through 4 is called the current account balance.

By the principles of double-entry bookkeeping, each debit entry must be matched by a credit. Thus, the sum of all debit and credit entries in all rows of the table (called the balance of payments) must be zero. A zero balance of payments requires that the current account balance and the capital account balance must be equal in size but opposite in sign. For example, a current account deficit of \$100 billion implies a capital account surplus of \$100 billion. A current account deficit means that the United States imports more currently produced goods and services than it exports. A capital account surplus means that the United States sells more assets (located either here or abroad) to foreigners than it buys from foreigners. If the United States is a net importer of currently produced goods and services, it can pay for those goods and services only by being a net seller of assets. A capital account surplus is sometimes called a *net capital inflow*. A net inflow of currently produced goods and services requires a net inflow of capital to pay for those goods and services. The capital account deficit is also sometimes called *net foreign investment*. A capital account deficit means that the United States is a net purchaser of assets from foreigners, so that the United States is increasing its net foreign asset position. Because the balance of payments must equal zero, net foreign investment must equal the current account. In fact, the term "current account" appears only in the BPAs, whereas the NIPAs use the term "net foreign investment." Apart from minor differences in accounting conventions, these two items are the same.

BPAs, Exchange Rates, and Official Intervention

Suppose that residents of a given country always demand payment in their own currency and do not hold foreign currencies. For example, when a U.S. merchant imports German appliances, she must pay the German exporter with Deutsche marks purchased on the foreign exchange market. Likewise, a German importer must purchase dollars to pay for goods exported from the United States to Germany. If the United States runs a trade balance deficit with Germany, the demand for Deutsche marks (supply of dollars) by Americans exceeds the supply of Deutsche marks (demand for dollars) by Germans. The excess demand for marks (or excess supply of dollars) tends to drive up the value of the mark relative to the dollar.

Rather than let the value of the dollar decline, the U.S. government can intervene in the foreign exchange market to support the dollar. If the U.S. government holds a supply of Deutsche marks, it can sell these marks in exchange for dollars, thus equating the demand for and supply of marks on the foreign exchange market and preventing the mark from appreciating against the dollar. Deutsche marks held by the U.S. government are a part of U.S. official assets, and sale of these marks would lead to a positive entry in Table 1, row 7, column 1. (The entry is positive because the sale of this asset leads to the receipt of dollars by the United States.) U.S. official reserve assets include not only foreign currencies, but also other highly liquid international monetary assets such as gold, reserves at the International Monetary Fund (IMF), and special drawing rights (SDRs), a type of international reserve "currency" issued by the IMF. These assets can be used to support the foreign exchange value of the dollar. For example, if the U.S. government holds no Deutsche marks, it can use SDRs to buy marks from the German government and then sell these marks to support the dollar on the foreign exchange market. This sequence of transactions also results in a net decline in U.S. official assets.

If the U.S. government does not intervene in the foreign exchange market, the German government can intervene to prevent the Deutsche mark from appreciating. It can do so by selling marks in exchange for dollars. This transaction increases German official assets in the U.S., resulting in a positive entry in Table 1, row 7, column 2. In practice, the German government would probably use these dollars to buy U.S. government debt, and foreign government holdings of such debt are a major component of foreign official assets in the United

States.

Notice that all entries in the last row of Table 1 are zero. This implies that neither the U.S. government nor foreign governments intervene in the foreign exchange market. If the U.S. and foreign governments stay completely out of the foreign exchange market, the exchange rate between the dollar and foreign currencies adjusts so that the quantity of each currency supplied equals the quantity demanded. Such an arrangement is called a system of *floating exchange rates*.

Table 2 shows a set of hypothetical balance of payments accounts similar to those in Table 1, except that there is now official intervention in the foreign exchange market. (Is the U.S. government trying to support or depress the value of the dollar? Are foreign governments trying to support or depress the value of the dollar?) Government intervention may keep the exchange rate constant over time. Such an arrangement is called a system of *fixed exchange rates*.

During the days of fixed exchange rates, the cumulative positive balance up through row 6 was called the *official settlements balance of payments*. Notice that in Table 2 the negative balance on the official capital account (row 7, column 3) exactly offsets the official settlements balance of payments surplus (row 6, column 4). This must be the case if the overall balance of payments is to equal zero. The official settlements balance of payments measured the degree of official intervention in foreign exchange markets. When this number was positive, a country was said to be running a balance of payments surplus. (Remember that the overall balance of payments must always equal zero by construction.) For a country running an official settlements balance of payments surplus, does official intervention in the exchange markets work to support or depress the value of the home currency?

With floating exchange rates, all entries in row 7 are zero (refer back to Table 1). This means that the official settlements balance of payments is identically zero. With the abandonment of fixed exchange rates in 1973, the government ceased reporting the official settlements balance of payments. Even though exchange rates are no longer fixed, governments still occasionally intervene to influence exchange rate movements. Thus, we do not have a system of purely floating rates. Even though the official settlements balance of payments is no longer reported, it can still be calculated from other numbers that are reported. Thus, we still hear references to (official settlements) balance of payments surpluses or deficits. As under a system of fixed rates, these surpluses and deficits indicate the extent and direction of government intervention in foreign exchange markets.

Table 3 shows the U.S. BPAs for 1997. Note the presence of an additional item called *errors and omissions*. This item reflects discrepancies between the capital account and the current account. The capital account is measured using data reported to the government concerning asset exchanges. The current account is measured using data reported to the government concerning exports, imports, etc. With complete and accurate reporting of all transactions, the current account would exactly offset the capital account. Because of errors and omissions in reporting, the measured capital account balance does not exactly match the measured current account. The errors and omissions entry is a residual quantity required to reconcile the two accounts. In some recent years, errors and omissions have been large relative to both the current account and the capital account.

Table 2

Hypothetical Balance of Payments Accounts
(Official Intervention)

	Debits		Credits		Col. 1 + Col. 2		Running Total of Col. 3	
	(1)		(2)		(3)		(4)	
Current Account								
1.	Merchandise imports	−300	Merchandise exports	200	Merchandise trade balance	−100	Merchandise trade balance	−100
2.	Service imports	−60	Service exports	50	Balance on services	−10	Balance on goods and services (trade balance)	−110
3.	Payments on foreign investment in U.S.	−70	Receipts on U.S. investment abroad	90	Balance on investment income (≈net factor income from abroad)	20	Balance on goods, services, and income	−90
4.	Unilateral transfers	−15				−15	Current account	−105
5.								
Capital Account								
6.	Change in private U.S. assets abroad	−20	Change in private foreign assets in U.S.	140	Private capital account (net capital inflow)	120	(Official settlements BOP)	15
7.	Change in U.S. official assets	−10	Change in foreign official assets in U.S.	−5	Official capital account balance	−15	Balance of Payments	0

Table 3

Balance of Payments Accounts, 1997
(billions of dollars)

	Debits		Credits		Col. 1 + Col. 2		Running Total of Col. 3	
	(1)		(2)		(3)		(4)	
Current Account								
1.	Merchandise imports	-877	Merchandise exports	679	Merchandise trade balance	-198	Merchandise trade balance	-198
2.	Service imports	-171	Service exports	258	Balance on services	87	Balance on goods and services (trade balance)	-110
3.	Payments on foreign investment in U.S.	-247	Receipts on U.S. investment abroad	242	Balance on investment income (=net factor income from abroad)	-5	Balance on goods, services, and income	-116
4.	Unilateral transfers	-40				-40	Current account	-155
5.	Errors and omissions	-100						-255
Capital Account								
6.	Change in private U.S. assets abroad	-478	Change in private foreign assets in U.S.	717	Private capital account (net capital inflow)	239	(Official settlements BOP)	15
7.	Change in U.S. official assets	-1	Change in foreign official assets in U.S.	16	Official capital account balance	15	Balance of Payments	0

National Income and Product Accounts

From the circular flow diagram, we know that the economy's output equals its income. Thus, we can measure total output either by measuring total production or by measuring the total income of all factors of production. Quantifying total production leads to a *national product* measure of output, whereas quantifying total factor income leads to a *national income* measure.

National product is frequently broken down into categories, and this classification can be performed in either of two ways. One classification shows product by industry, while the second and more common classification breaks national product down by the type of expenditure, i.e., by the use to which the product is put. In a closed economy, national product may be used for three purposes: consumption (C), investment (I), and government purchases of goods and services (G). This classification leads to the familiar national product identity

$$Y = C + I + G, \quad (1)$$

where Y is the commonly used shorthand for national product. This identity says that total domestic expenditure on consumption, investment goods, and government purchases must equal the economy's total output of goods and services.

Opening up the economy to the rest of the world necessitates modifying this identity and introducing some new concepts. In an open economy, part of domestic output may be sold abroad, so that exports must be added to the right-hand side of equation (1). Likewise, a portion of domestic consumption expenditure may fall on imported rather than domestic goods, and the same is true for domestic investment and government purchases. Thus, imports must be subtracted. The result is the national product identity for an open economy:

$$Y = C + I + G + NX, \quad (2)$$

where NX denotes net exports.

There are three major national product concepts: Gross Domestic Product, Gross National Product, and Net National Product. Each of these constitutes a different definition of Y . (In addition, there are real and nominal variants of each.)

Nominal Gross Domestic Product (GDP) is the current output of final goods and services produced during a given time period by domestically located factors of production and valued at current market prices.

Some domestically located factors of production are owned by residents of foreign countries, and the earnings of these factors constitute income of foreign residents. Examples include income of foreign-owned real estate and factories located in the United States and labor income of foreign residents working in the United States. In a similar manner, U.S. residents generate income abroad by supplying either labor services or services of capital. The foreign income of U.S. residents less the U.S. income of foreigners enters the U.S. accounts as **Net Factor Income from Abroad (NFIA)**. Most of this income is the return on capital, with very little accruing to labor. For simplicity, we will assume that all net factor income from abroad constitutes a return to capital.

Let A_{t-1}^f denote the foreign assets owned by U.S. residents at the end of period $t-1$ less the U.S. assets owned by foreigners, and let r_t denote the rate of return on those assets during period t . U.S. net factor income from abroad during period t is $NFIA_t = r_t A_{t-1}^f$. This item appears in row 3 of Table 1. The net foreign asset position A_{t-1}^f , and thus $NFIA_t$, can be either positive or negative.

Nominal Gross National Product (GNP) is the current output of final goods and services produced during a given time period by domestically owned factors of production and valued at current market prices. The relation between GNP and GDP is

$$GNP_t = GDP_t + NFIA_t. \quad (3)$$

Nominal Net National Product (NNP) equals gross national product less the depreciation of capital used in production during the period. If K_{t-1} denotes physical capital in place at the end of period $t-1$ and available for use in production during period t , and if a fraction δ of this capital is used up during period t , then depreciation during period t is $DEPR_t = \delta K_{t-1}$. The relation between NNP and GNP is

$$NNP_t = GNP_t - DEPR_t. \quad (4)$$

Relation Among Measures of National Product (optional)

If the national product identity (equation 2) is to hold for each of the three definitions of national product, then there must be alternative definitions for at least some of the variables on the right-hand side to correspond with the various definitions of national product. The definitions of consumption and government purchases are the same for all definitions of national product, while the definitions of investment and net exports vary.

Because the difference between GDP and GNP concerns the treatment of the foreign sector, it makes sense that the GDP concept of net exports should differ from the GNP concept. Net exports of goods and services produced by domestically located factors of production are sometimes referred to as the **Trade Balance (TB)**. The trade balance is the measure of net exports that corresponds to GDP. The GNP concept of net exports is a broader measure defined by adding net factor income from abroad to the trade balance: $NX_t = TB_t + NFIA_t$. U.S. assets located abroad are presumed to generate productive services in foreign countries, and net factor income from abroad is regarded as payment for the export of these productive services. (Refer back to Table 1 to see how the trade balance, net exports, and net factor income from abroad enter the BPAs.)

Because the difference between GNP and NNP concerns the depreciation of the capital stock, it makes sense that the GNP concept of investment should differ from the NNP concept. Let I_t^g denote gross investment, i.e., the total of new physical capital put in place during period t . Because an amount of existing capital equal to δK_{t-1} depreciates during period t , net investment (the net increase in the capital stock) is equal to $I_t^n = I_t^g - \delta K_{t-1}$.

Using these definitions, equation (2) holds for any of the three national product concepts. The explicit identities for the three definitions of national product are:

$$GDP_t = C_t + I_t^g + G_t + TB_t \quad (5)$$

$$GNP_t = C_t + I_t^g + G_t + NX_t \quad (6)$$

$$NNP_t = C_t + I_t^n + G_t + NX_t \quad (7)$$

Consider the GNP identity. If net exports are negative, then domestic expenditure on consumption, investment, and government purchases exceeds GNP. We have seen that (apart from unilateral transfers and errors and omissions), a country's net exports equal its net capital inflow. Thus, if a country spends more than it produces, the difference must be financed by a net capital inflow from abroad.

Some Useful Identities

We now introduce some additional variables and show how they are related to one another and to GNP and NNP.

Subtracting net taxes, i.e, tax revenues net of transfer payments, from both sides of the GDP identity (2) gives

$$(Y - T) = C + I + (G - T) + NX. \quad (8)$$

Now introduce the following definitions:

$$\text{Disposable income:} \quad Y - T$$

$$\text{Private saving:} \quad S_p = (Y - T) - C$$

$$\text{Government saving:} \quad S_g = T - G$$

$$\text{National saving:} \quad S_n = S_p + S_g$$

Subtracting consumption from both sides of equation (8) gives

$$(Y - T) - C = I + (G - T) + NX \quad (9)$$

or

$$S_p = I - S_g + NX. \quad (10)$$

Adding government saving to both sides of equation (10) gives

$$S_p + S_g = I + NX \quad (11)$$

and rearranging terms gives

$$I = S_p + S_g - NX. \quad (11)$$

This equation says that private domestic investment must be financed by private saving, government saving, or borrowing from abroad. The sum of personal, business, and government saving is national saving. Making this substitution and solving for net exports gives

$$NX = S_n - I. \quad (12)$$

This equation says that a country has positive net exports if its national saving exceeds its domestic investment. Noting that net exports equal net foreign investment, equation (12) can be arranged to give

$$S_n = I + NFI. \quad (13)$$

This equation says that a country's national saving can be devoted to either domestic investment or foreign investment. A country that saves more than it invests at home has positive net foreign investment. A country that saves less than its domestic investment must borrow from abroad to finance that investment. Finally, noting that the government budget deficit (denoted DEF) equals $-S_g$, equation (13) can be solved to give

$$DEF = S_p - I - NX. \quad (14)$$

This equation says that an increase in the government deficit (a reduction in government saving) must be matched by an increase in private saving, a reduction in domestic investment, a reduction in net exports (an increase in borrowing from abroad), or some combination of the three.

Equations (11) through (14) are accounting identities that must always hold. They show how certain variables are related to each other, but they do not indicate which variables cause others. We need some economic theory to answer questions about cause and effect. Nevertheless, these identities are useful checks on the consistency of one's reasoning. For instance, equation (14) says that an economic analyst forecasting an increase in the government budget deficit cannot simultaneously forecast a decrease in private saving, an increase in domestic investment, and an increase in net exports. Such a forecast would violate simple national income accounting identities and would not be believable. (Later in the course, we will see that there are different theories about the effects of government deficits, but our accounting identities place some definite restrictions on exactly what those effects can and cannot be.)