Problem 1

Suppose the United States in 2019 has the following annual data in billions of USD:

GNE	EX	IM	$NFIA$	NUT
22,150	2,500	3,125	300	-250

(a) Compute GDP, GNI, and GNDI.

(b) Was GDP higher or lower than GNE? Interpret.

(c) Was GNI higher or lower than GDP? Interpret.

(d) Was the US a net giver or receiver of unilateral transfers?

(e) Find the current account, CA.

Solution 1

GNE is *gross national expenditure*, which captures total national resources devoted to expenditure, $GNE \equiv C + I + G$. As you might remember from previous courses, *gross domestic product* is given by $GDP \equiv C + I + G + EX - IM$, where $TB \equiv EX - IM$ is the *trade balance*. Therefore we can write $GDP = GNE + TB$. Thus the trade balance is

$$TB = 2,500 - 3,125 = -625,$$

implying that the US spends more on foreign goods and services than the rest of the world spends on US goods and services. Therefore GDP is

$$GDP = 22,150 - 625 = 21,525.$$

GNI is *gross national income*, which takes GDP and 1) adds factor income earned by US citizens in other countries; 2) subtracts factor income earned by non-US citizens within the US; which together are called net factor income earned from abroad, NFIA. Here NFIA is positive, which means US citizens abroad earn more factor income than foreign citizens in the US. Anyway, the numbers are

$$GNI \equiv GDP + NFIA = 21,525 + 300 = 21,825.$$

GNDI is *gross national disposable income*, which takes GNI and 1) adds transfers from other countries (e.g. foreign aid received); 2) subtracts transfers given to other countries (e.g. foreign aid given); which together are called *net unilateral transfers*, NUT. GNDI therefore reflects all available *income resources* generated for that country. US has negative NUT, which means the US gives more transfers than it receives. GNDI is therefore

$$GNDI \equiv GNI + NUT = 21,825 - 250 = 21,575.$$

Finally, the *current account*, CA, is all of the stuff in GNDI other than GNE, that is,

$$CA \equiv TB + NFIA + NUT = -625 + 300 - 250 = -575.$$

The current account captures cross-country flows of goods and services. It is one-half of the *balance of payments* (BOP) accounts, which deals with external transactions in goods, services, factor services, and unilateral transfers. The other half of the BOP accounts is the sum of the *financial account* (FA) and *capital account* (KA), which deal with external transactions in assets and gifts of assets, respectively. Aside from some statistical discrepancy, the two balance each other so that $CA + (FA + KA) = 0$.

The fact that CA is negative here means there is a *current account deficit*, and therefore a *financial account surplus*. The US is therefore a *net borrower*: overall it is selling a surplus of assets like US Treasury bonds to foreigners (the FA surplus) in order to finance expenditure on goods and services beyond its current income resources (the CA deficit).

Problem 2

(a) How should the sale by the U.S. central bank of $500 million of its holdings of U.S. Treasury bonds to a British financial firm be entered into the U.S. balance of payments, regardless of how the central bank pays for the bonds?

(b) How should a California computer manufacturer's purchase of a $50 hard disk from a Malaysian company affect the U.S. balance of payments, regardless of how the manufacturer pays for the hard disk? Give two possible ways that manufacturer could pay for the hard disk.

(c) What is the effect on the U.S. balance of payments of the central bank of China purchasing $1 million dollars of export earnings from a firm that has sold $1 million of toys to the United States, and the Chinese central bank holds these dollars as reserves.

Solution 2

Part a. We're talking about market transaction of assets, so we're thinking about the financial account. The US is exporting assets, so it's a financial account credit worth $500.

Rule of thumb: if foreign countries own more home assets, then home FA goes up; if home owns more foreign assets, then home FA goes down.

Part b. It's an import of a foreign good, therefore it's a $50 debit in CA through TB.

Note that because $CA + (FA + KA) = 0$, we must have

$$\Delta CA + (\Delta FA + \Delta KA) = 0.$$

Thus a change in CA must be matched with some other offsetting change — this is called the *double-entry principle of bookkeeping*.

There's a CA debit, so we have $\Delta CA = -\$50$. This must be matched by either an offsetting credit in the current account (we gave them a US-made beer for the hard drive), or an offsetting credit in the financial account (we wrote them a check in exchange for the hard drive, so now they own more of our assets). Also note that it can't be an offsetting KA entry because the KA category is for gifts whereas the problem explicitly says that the hard disk was purchased.

Part c. The US is importing $1 million worth of toys, so that is a CA deficit. China is acquiring $1 million dollars, i.e. China now owns more US assets, so there is a FA credit. Ergo we have

$$\Delta CA + \Delta FA = -\$1 \text{ million} + \$1 \text{ million} = 0$$

and all is in balance.

Problem 3

Consider the following things about the country of Nilfgaard, whose currency is the *floren*:

- Domestic investment I is 400 floren

- Domestic investment earned 15 floren in capital gains

- Purchased 160 floren worth of foreign assets

- Sold 120 floren worth of domestic assets to foreigners

- Valuation effects total 5 floren in capital gains

- The capital account is zero

Answer the following things.

(a) What is the change in external wealth?

(b) What is the current account?

(c) What is the total change in wealth?

(d) What is the amount of domestic savings?

(e) Suppose all foreign assets and liabilities are denominated in foreign currency. Would an appreciation in the floren increase or decrease the value of their foreign assets? What about their liabilities?

Solution 3

Part a.   There is an increase in external wealth of 160 floren from having acquired foreign assets — Nilfgaard now owns more, say, stock in foreign businesses. There is a decrease in external wealth of 120 floren from having sold some domestic assets — Nilfgaard now owns less stock in its own businesses. The 5 floren in valuation effects means that the foreign assets owned by Nilfgaard have gained value faster than the Nilfgaardian assets owned by foreigners. So the total change in external wealth is

$$\Delta W = (160 - 120) + 5 = 45 \text{ floren.}$$

Part b.   Because 120 floren worth of assets have been exported; and 160 floren worth of assets have been imported; we conclude that $FA = 120 - 160 = -40$. This means that Nilfgaard is a *net lender*: it has acquired more foreign assets (e.g. lending money to another country by purchasing their bonds) than it has exported domestic assets.

Therefore $CA = 40$ floren. This is a current account surplus: expenditure on goods and services is less than what their income resources could allow. Note that we can write

$$\Delta W = CA + KA + VE,$$

where VE represents valuation effects.

Part c.   Total wealth is domestic wealth plus external wealth, big surprise. Domestic wealth increases by 400 floren from investing in new capital; and by the 15 floren in capital gains. So the total change in wealth is $45 + (400 + 15) = 460$ floren.

Part d.   In an open economy, $S - I = CA$. We can interpret this as saying that the CA represents *unspent income*: if CA is positive, then $S > I$, so more is being saved. Anyway,

$$S = CA + I = 40 + 400 = 440 \text{ floren.}$$

Part e.   Suppose Nilfgaard owns one share of Temerian stock. Temeria's currency is the oren, and the share is worth 10 oren. The exchange rate is 2 floren per 1 oren. Therefore the value of Nilfgaard's ownership of Temerian stock, expressed in floren, is

$$10 \text{ oren} \times \frac{2 \text{ floren}}{1 \text{ oren}} = 20 \text{ floren.}$$

Now suppose the floren appreciates such that the new exchange rate is 0.5 floren per 1 oren. Then the value of the Temerian stock decreases in value to

$$10 \text{ oren} \times \frac{0.5 \text{ floren}}{1 \text{ oren}} = 5 \text{ floren.}$$