TRADE AND INVESTMENT IN THE NATIONAL ACCOUNTS

This text accompanies the material covered in class.

1 Definition of some core variables

Imports (flow): Q_t

Exports (flow): X_t

Net exports (*or* Trade balance) (flow): $NX_t = X_t - Q_t$

Net foreign asset holdings (*or* Net international investment position) (stock): B_t

Foreign debt accumulation (stock): $-B_t$

Investment income balance (debt service) (flow): rB_t

Current account balance (identity): $CA_t = B_{t+1} - B_t \equiv rB_t + NX_t$

Gross domestic product (GDP) (flow): Y_t

Gross national product (GNP) (flow): $Y_t^N = Y_t + rB_t$

2 Investment

Investment (I_t) increases the stock of capital according to the following relation:

$$K_{t+1} = K_t - \delta K_t + I_t. \tag{1}$$

Recall, from the assumptions of the Solow model, that higher capital stocks increase output, which is paid in the form of both higher wages and additional capital payments. (What happens to the marginal product of capital and the capital rental rate when K_t increases?) Recall that higher wages are due to the higher marginal productivity of workers who are equipped with more capital. In a competitive labor markets, higher marginal productivity translates into higher wages. (Why?)

3 The closed economy (autarky)

In the closed economy, whatever is invested must be saved, that is,

$$I_t = S_t, \ \text{where} \ S_t = Y_t - C_t. \tag{2}$$

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Hence, increasing investment must be matched by lower consumption. For poor countries, it may be difficult to increase the capital stock this way because people already have low consumption levels. As a consequence, they may remain poor longer or forever (recall the development trap argument).

4   The open economy

When the economy is open to trade, it becomes possible to use foreign goods in order to invest domestically. Domestic savings and investments are thus no longer necessarily connected *one-to-one*. The total amount of resources available is the sum of domestic output Y_t and imports Q_t. (Note that all the variables are expressed in *real* terms.) Those resources can be used for domestic investment, domestic consumption or exports. We thus have:

$$I_t + C_t + X_t = Y_t + Q_t. \tag{3}$$

Or, equivalently,

$$I_t = Y_t - C_t - X_t + Q_t, \tag{4}$$
$$I_t = Y_t - C_t - NX_t. \tag{5}$$

This implies that investment can be increased through two channels:

  i) With lower consumption;

 ii) With lower net exports.

Reducing net exports in order to increase investment means that more capital goods are being imported (and/or less are being exported) in order to increase the domestic stock of capital. For a very poor country that has very little capital and thus a very low consumption level, this can be a boon. Of course, this means that the country will increase its liabilities towards the rest of the world in the form of a larger foreign debt. But this may not be a bad idea if the extra investment is *well directed* in the sense that it increases the productivity of workers by a larger amount than future interest payments.

To make a simple analogy, imagine a young accountant who borrows from the bank in order to buy office equipment. She does so because she knows that her additional income will exceed the future capital and interest payments. If she did not have access to such credit, she would be poorer, perhaps much more.

There is therefore nothing fundamentally "immoral" about poorer countries being indebted towards private investors (savers) in richer countries. Unfortunately, the problem is that the elite of a poor country may often finance their personal consumption through foreign debt which is then passed on to the rest of the country, which is unable to pay because worker productivity has not increased. A challenge for foreign development aid agencies is to find mechanisms that insure that the money being lent is being directed towards productive investments while not meddling into the internal affairs of a sovereign country.

4.1 Perfect capital mobility in the Solow model

The Solow model's framework is useful to understand the role of capital mobility. We have seen earlier that in the context of a closed economy, the savings rate is an important determinant of long-run income levels. (See section 11.3 of the textbook for detailed explanations regarding the following set of equations.)

$$y = Ak^\alpha$$
$$MPK = \alpha Ak^{\alpha-1} = r: \text{ competitive rental market}$$
$$r = r_W: \text{ law of one price}$$
$$\Rightarrow r_W = \alpha Ak^{\alpha-1}$$
$$k = \left(\frac{\alpha A}{r_W}\right)^{\frac{1}{1-\alpha}}$$
$$y = Ak^\alpha = A^{\frac{1}{1-\alpha}}\left(\frac{\alpha}{r_W}\right)^{\frac{\alpha}{1-\alpha}}$$

With perfect capital mobility, output per worker is independent of the domestic savings rate. Note that this does not necessarily mean that people in low-savings economies do as well as those in high-savings economies. To gain insight on this, it is useful to look at how debt is being accumulated and repaid.

5 Debt accumulation and payments

Suppose, to simplify, that net foreign holdings take the form of bonds from governments only and that they pay a constant interest rate of r. B_t denotes

the *net* foreign bonds that Canadians hold; that is, they are equal to the total amount of Canadian claims on foreign bonds minus the foreign claims on Canadian bonds. More generally, it is referred to as the Canadian *net international investment position.* We want to understand how this position can vary over time through three possible scenarios.

Scenario 1 Assume that Canada is a net foreign debtors $(B_t < 0)$. If neither capital nor interest is being repaid, then the debt in period $t+1$ equals that of period t augmented by accumulated interests, that is, $B_{t+1} = B_t + rB_t$.

Scenario 2 Alternatively, assume now that B_t is positive and foreigners want to keep constant this debt towards Canadians. To this end, they must pay the interest service on the debt rB_t, called the *investment income balance.* How do foreigners achieve this? They have to send more goods and services to Canada than Canada sends to them. This means that Canadians import more goods than they export and so net exports are negative. With $-NX_t = rB_t$, we have $B_{t+1} = B_t$, leaving the net investment position of Canadians unchanged as well as the debt of foreigners towards Canadians.

Scenario 3 Finally, that B_t is positive but that foreigners want to reduce their debt towards Canadians, then the difference between imports and exports must exceed the interest payment, i.e., $-NX_t > rB_t$.

With the above three scenarios, it should now become clear why in general, we must have the following identity:

$$B_{t+1} = B_t + rB_t + NX_t \tag{6}$$

For a better grasp of equation (6)'s implications, let us now assume that Canadians are net debtors with respect to foreigners $(B_t < 0)$. Suppose Canadians want to reduce this foreign debt. To this end, Canadians must give foreigners more goods and services than they receive from them, that is, Canada's exports must exceed its imports by a larger amount than interest payments $(NX_t > -rB_t)$. (This is equivalent to saying that in order to reduce your credit card balance, you must cover more than just interest payments. One potentially significant difference is that with a credit card debt, we consider *nominal* values. Our national account variables are here all expressed in *real* terms.)

It is often useful to look at the change in a country's net position between two years:

$$B_{t+1} - B_t = rB_t + NX_t. \tag{7}$$

This is called the *current account balance.*

To apprehend its usefulness, suppose that Canada is a net creditor and that its net exports are positive: $B_t > 0$ and $NX_t > 0$. Then its current account balance is positive and so its foreign asset holdings are increasing. This may not be as desirable as it seems. Indeed, it means that the savings from Canadians are being invested elsewhere. If capital is already quite abundant in Canada, then it is probably a good thing as it allows Canadian savers to receive a better return elsewhere and diversify the risk. But for a country where capital is scarce, the productivity of their workers does not increase as much as it should.

Exercise: It is a good idea to consider all the following cases and their combinations:

- $B_t > 0$ or $B_t < 0$,

- $rB_t + NX_t > 0$ or $rB_t + NX_t < 0$.

Discuss under what conditions it may be a good or a bad situation.