

Set 2

The classical model of an open economy

If we add the possibility of international trade to the classical, then we need to write the amount of spending in the economy as:

$$Y = C + I + G + NX \quad \text{where} \quad NX = X - Im = \text{trade balance}$$

We already know that the sum of trade balance (in goods and services), income and current transfers constitutes the current account balance. For the sake of simplicity we assume that there is no exchange of income and current transfers. As a result:

$$\text{Current account balance (CA)} = NX$$

It is important to underline that introduction of international trade has to influence the amount of investment in home country. In a closed economy we have:

$$(Y - C - T) + (T - G) = I \quad \text{where} \quad Y - C - T = S_{pr} \quad \text{and} \quad T - G = S_{pu}$$

$$S_{pr} + S_{pu} = S = Y - C - G = I$$

After including net exports we have:

$$S = I + NX \quad \Rightarrow \quad S - I = NX \quad \Rightarrow \quad (I - S) + NX = 0$$

It is easy to spot that the introduction of international trade allows the investment to exceed national savings. In this case the difference is financed by lending received from abroad. The $(I - S)$ term is called capital account. In accordance with the equilibrium condition current account and capital account have to balance.

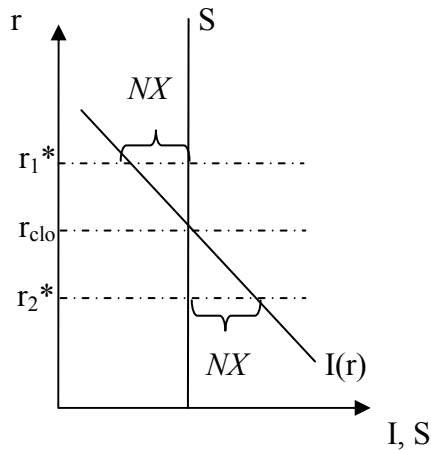
A small open economy model

The main assumptions of the model are exactly the same as in classical model of closed economy. The only difference is that real interest rate do not necessary balance national savings and investment – since our country has an access to international capital markets and we are small economy (that means that we cannot influence interest rate of other countries) our real interest rate equals world's interest rate.

$$r = r^*$$

$$NX = S - I(r^*)$$

The above equations clearly shows that the amount of national investment depends on the level of world's interest rate.



The above diagram shows the relations between real interest rate, investment, savings and current account balance. In a closed economy the level of interest rate would be determined by the intersection of investment curve and savings curve (r_{clo}). In case of small open economy, when world's interest rate is higher than for closed economy (r_1^*) we will face a current account surplus. On the other hand, lower interest rate (r_2^*) means the existence of current account deficit.

The impact of national fiscal policy on balance of payments

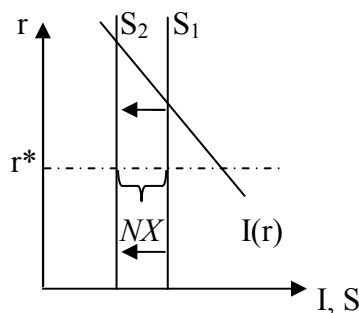
The amount of national savings depends on national fiscal policy. Since there is:

$$S = Y - C - G$$

it is clear that an increase in G leads to a decrease in S . The same impact will have a decrease in taxes that causes an increase of consumption (consumption depends on disposable income). If interest rate remains unchanged than the investment remains unchanged. As a result a decrease in savings has to lead to a decrease in net export, since:

$$S - I = NX$$

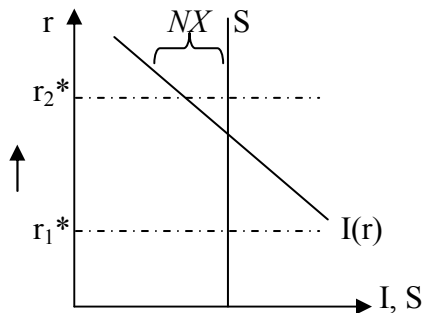
In case when we start with balance trade ($NX = 0$), expansive fiscal policy (that leads to an increase in government spending or in consumption) will cause the emergence of current account deficit and capital account surplus.



It appears that the theoretical previsions are valid in the real economy. Hence, budget deficit is usually accompanied by current account deficit.

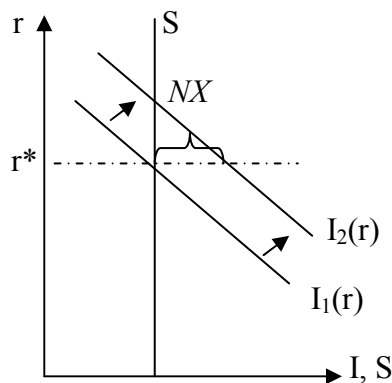
The impact of foreign fiscal policy on national balance of payments

In case of a big country we suppose that its policy may influence world's interest rate. Hence, an expansionary fiscal policy will cause a decrease in world's savings and an increase in world's interest rate. As a result, small open economy will face capital account deficit and current account surplus.



The impact of change in investment demand on balance of payments

Once national investment demand increases (e.g. due to some government incentives) there has to appear a current account deficit. Investment will be partly financed by foreign lending – capital account has to increase.



Nominal and real exchange rate

The nominal exchange rate is a relative price of two different currencies. Therefore, the exchange rate that we find in an exchange office is a nominal exchange rate. It can be defined as:

$$e = P_{cur}/P_{cur}^* \quad \text{where } e \text{ is a nominal exchange rate, } P_{cur} \text{ i } P_{cur}^* \text{ are currency prices}$$

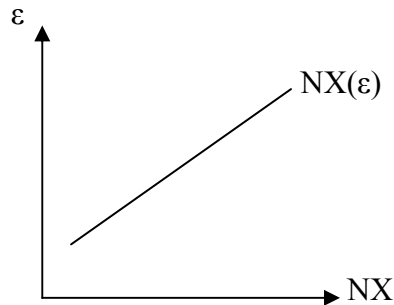
The above implies that the nominal exchange rate is defined as a price of foreign currency in national currency (e.g. 1.3 \$ for 1 euro).

The balance of payments depends though on real and not nominal exchange rate. The former can be defined as a relative price of goods in different countries:

$$e_r(\varepsilon) = eP^*/P \quad (1) \quad \text{where } P \text{ and } P^* \text{ are prices of goods home and abroad}$$

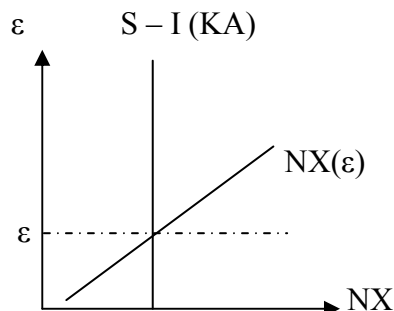
The impact of real exchange rate on net exports

The real exchange rate influence the competitiveness of goods produced home and abroad. The definition of real exchange rate shows that its decrease will hamper the competitiveness of national products (because their prices are rising or foreign goods prices are falling). On the other hand once real exchange rate increases our competitiveness increases as well. The relationship between net exports and real exchange rate is shown below:



The determinants of real exchange rate

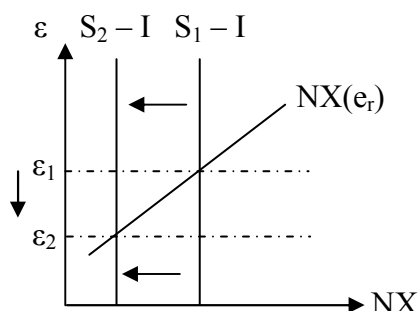
Since real exchange rate depends on the prices of goods produced home and abroad it is related to the current account level. In equilibrium current account and capital account must be balanced so real exchange rate will be determined by the two accounts.



As can be seen above, real exchange rate is determined by intersection of current account curve (NX) and capital account curve (S-I).

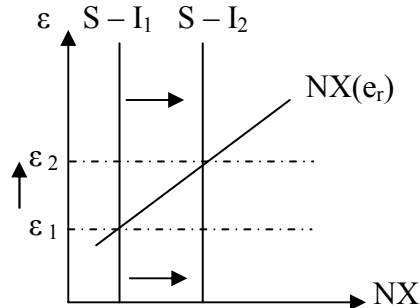
The impact of national fiscal policy on real exchange rate

Expansionary fiscal policy leads to a decrease of national savings. As a result $S - I$ curve shifts to the left. This causes a fall of real exchange rate and a decrease in competitiveness of national products. So exports fall and we face current account deficit.



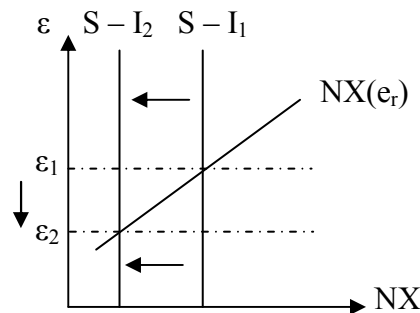
The impact of foreign fiscal policy on real exchange rate

Expansionary fiscal policy run by big open economy will cause an increase in world's interest rate. Hence, national investment will fall and the curve $S - I$ will shift to the right. As a result both real exchange rate and net exports will increase.



The impact of change in investment demand on real exchange rate

The impact of increase in investment demand is exactly the same as an impact of decrease in national savings (e.g. as a result of expansionary fiscal policy). So we have a fall of both real exchange rate and net exports.



Question 1. Show graphically the model of small open economy using both the graph with interest rate and the level of savings and investment and the graph with real exchange rate and NX . For what level of interest rate there will be a current account deficit? For what level of interest rate there will be a current account surplus?

Question 2. People sometimes talk about “twin deficits” where the twins are the current account and the government budget deficit. Explain how these two deficits are related economically so that changes in one are reflected in changes in the other.

Question 3. Consider a big open economy where the government decides to increase its spending. How would it affect the national savings, investment, trade balance and the real interest rate in the small open economy? Assume that initially the trade account of small economy is balanced and the big economy may influence world interest rate. Please, answer the question using algebra and drawing the necessary diagrams.

Question 4. Lets suppose that the government of small open economy has decided to decrease its spending. At the same time they decided to lower lump taxes the way that the budget deficit would remain constant. How would it affect the trade balance, investment and the real interest rate?

Question 5. The US recession has forced Barrack Obama administration to apply fiscal expansion on an unprecedented scale. At the same the capital is outflowing from the East Europe region, including Poland, due to fears concerning the possibility of public finance insolvency. Using the classical model of an open economy, please show how this happenings will influence the structure of aggregate demand in Poland (e.g. C, I, G, NX) and the real exchange rate. Let's suppose that the consumption is not related to the interest rate and that there is a current account deficit. Is there any policy that can be applied by polish government in order to keep current account balance unchanged?

Question 6. Production function of a small open economy takes a form of:

$$Y = AK^{1/3}L^{2/3} \quad \text{where} \quad A=1,25 \quad K=L=8000 \quad C=100+0,8(Y-T) \quad T=1500 \\ I=5000-100r \quad G=1100 \quad NX=500-50\varepsilon$$

Real interest rate equals the world level and reaches $r^*=10$.

Please, calculate:

- the level of C, I, NX, ε in equilibrium;
- the change of C, I, NX, ε after a decrease of c by 0,2;
- the change of C, I, NX, ε after an increase of G by 500;
- the change of C, I, NX, ε after a decrease of r^* by 3 percentage points;
- the change of C, I, NX, ε after an increase of output by 20% (caused by technological progress);
- the change of C, I, NX, ε after a decrease of autonomous investment by 1000.