Exercise Sheet 5 (Elasticities Approach to Balance of Trade)

After a change in the exchange rate occurred, we distinguish three periods:

- Currency-contract period: The period right after the exchange rate change ($\approx$ a few months). Import- and export contracts have already been made and both prices and quantities of traded goods are fixed during this period.

- Medium term ($\approx$ 2-3 years after the exchange rate change). Prices of imported and exported goods can be adapted to the new exchange rate. How the trade balance reacts to the exchange rate change in this periods depends on whether the Marshall-Lerner condition is fulfilled or not.

- Medium/long-term: (more than $\approx$ 2-3 years after the exchange rate change). The change in the exchange rate affects the general price level in the country. Example: A depreciation of the exchange rate increases the price of imported goods (expressed in domestic currency) which will eventually increase the general price level in the country. This is referred to as the "pass-through effect" of exchange rate changes.

Exercise 1

Suppose that there is a sudden appreciation of the Swiss Franc vis-à-vis other currencies. Also suppose that Switzerland had a trade balance of zero before the appreciation. The trade balance is expressed in Swiss Francs.

a) How does the trade balance change during the currency-contract period if

- Export contracts are denoted in CHF and import contracts in foreign currency.

- Both export and import contracts are denoted in foreign currency.

b) Suppose that, instead of trade balance of zero, Switzerland had a positive trade balance before the appreciation. Both export and import contracts are denoted in foreign currency. Does the trade balance change during the currency contract period? How?

c) If the Marshall-Lerner condition is fullfilled for Switzerland, what happens to the Swiss trade balance after the currency-contract period? Suppose all firms (Swiss and foreign) want to keep their profit margins constant.

d) Does it matter for your answer in c) whether Swiss export firms bill their products in Swiss Francs or in foreign currency?

e) Suppose now that foreign firms exporting to Switzerland (but not Swiss firms exporting abroad) pursue a strategy of *pricing-to-market* and do not lower their Swiss-franc prices of the goods which they export to Switzerland after the appreciation of the Swiss Franc. (Meaning essentially that they charge a higher price for their goods in Switzerland than in other countries, that is they increase their profit margin in Switzerland). How does the trade balance of Switzerland react in this case, compared to your answer in c)?

e) Suppose again that all firms keep the profit margins constant (no pricing-to-market). Explain how the pass-through effect of the exchange rate change will affect the general price level in Switzerland in the medium/long term. What is the implication for the Swiss trade balance in the medium/long term?

f) Suppose that, during the currency-contract period, imports are paid in foreign currency and export receipts in domestic currency. Suppose the Marshall-Lerner condition is fulfilled for Switzerland. Draw a graph showing the evolution of the Swiss trade balance over time after the appreciation, taking into account the eventual pass-through effect of the appreciation on the domestic price level.

g) Wrong or right: The Marshall-Lerner condition always holds if price-elasticity of exports is larger than one.

JPY per USD

Trade Balance Japan
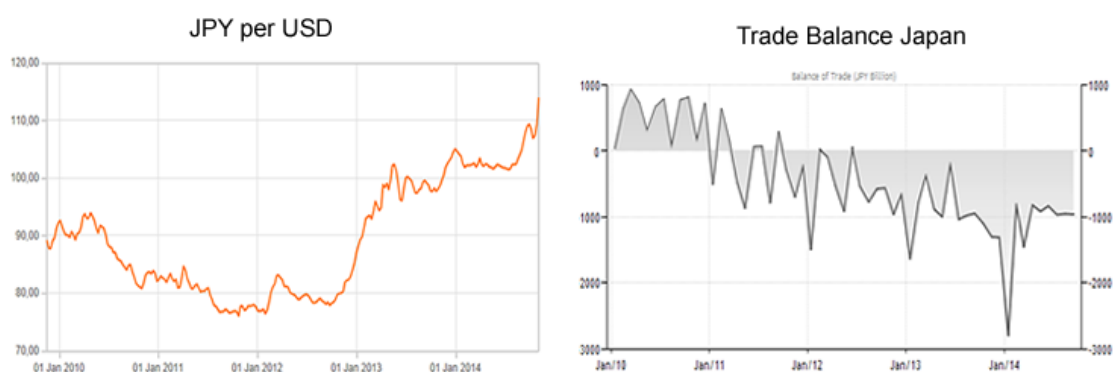
In early 2013, Japan started to pursue a very expansionary monetary policy ("Abe-nomics"). This led to a strong depreciation of the Japanese Yen. One objective was to boost exports. Below are the graphs of the exchange rate, given in JPY per USD, and a graph of the Japanese trade balance (monthly values). As you can see, the depreciation of the JPY did not improve the trade balance - if anything, the deficit got bigger after the depreciation.

a) Assuming that, in the graph, we are still in the "currency contract" period following the devaluation, what is the explanation for this behaviour of the trade balance?

b) The fact that, two years after starting the devaluation, the trade deficit was still more negative than before the devaluation, indicates that the Marshall-Lerner condition did _not_ hold in Japan during this period. It is unlikely that we are still in the currency-contract period after two years. Can you think of a particular reason why the Marshall-Lerner condition did not hold in Japan? (hint: think about an event that happened in Japan in 2011)

c) If the Marshall-Lerner condition does not hold, the trade balance increases after an exchange rate appreciation. Does this mean that Japan could permanently improve its trade balance by appreciating its currency? (difficult question)

c) At the moment, Japan has a trade deficit but still has large current account surpluses. Give a plausible explanation for this.

Exercise 3

In this exercise you need to derive the Marshall-Lerner condition. Domestic export firms set fix prices $\overline{P}$ in domestic currency. Foreign export firms set fix prices $\overline{P}^*$ in foreign currency. The exchange rate E is defined in terms of domestic currency per foreign currency. The cost of domestic export goods abroad (in foreign currency) is hence given by $P_X = \frac{\overline{P}}{E}$. The price of import goods (in domestic currency) is given by $P_M = E\overline{P}^*$. The demand function for imports is $M = M(P_M)$ and the demand function for exports is $X = X(P_X)$. The trade balance, expressed in domestic currency, is then given by:

$$TB = \overline{P}X\left(\frac{\overline{P}}{E}\right) - E\overline{P}^*M\left(E\overline{P}^*\right)$$

Make sure you fully understand this equation. Remember that the elasticity of any function $f(x)$ with respect to x is given by $\frac{x}{f(x)}f'(x)$. Hence the price-elasticities of exports and imports respectively are given by:

$$\epsilon_X = -\frac{P_X}{X(P_X)}X'(P_X)$$
$$\epsilon_M = -\frac{P_M}{M(P_M)}M'(P_M)$$

Derive the Marshall-Lerner condition, that is, show under which condition $\frac{\partial TB}{\partial E} > 0$. Show that the Marshall-Lerner condition that we have seen in the lecture notes only holds if the country has a trade balance of zero in the beginning (i.e. expenses on imports equal revenues from exports).

Hint : To make it more simple, you can normalize prices to $\overline{P} = \overline{P}^* = 1$