

Econ 102
The Open Economy

1. Be sure to read your copy of the Wall Street Journal every weekday, looking especially for items related to the material in this course. Find an article in this week's Wall Street Journal or other news source that is relevant to the topic of this homework assignment. Turn it in, or a copy of it, with your assignment, and write a brief summary of it (half a page to a page). Your summary should outline the main points of the article **and** explain why it is relevant to the homework topic, in this case "the open economy."
2. Consider the following data related to US GDP:

GDP: \$12 Trillion
Consumption: \$9.2 Trillion
Government Purchases: \$1.8 Trillion
US investment abroad: \$0.4 Trillion
Imports: \$1.5 Trillion
Domestic Investment: \$1.6 Trillion
Private Savings: \$2.2 Trillion

- (a) What is the value of US exports? Is the US running a trade deficit or surplus?

$NX = (Y - C - I - G) = (12 - 9.2 - 1.6 - 1.8) = -0.6$. *This is negative, so the US is running a trade deficit. $NX = EX - IM$, so $EX = NX + IM = -0.6 + 1.5 = 0.9$*

- (b) What is the amount of foreign investment in the US?

$NX = \text{net capital outflow (NCO)} = -\$0.6 \text{ Trillion (from part a)}$
 $NCO = \text{US investments abroad} - \text{Foreign investments in the US}$
So Foreign investments in the US = US investments abroad - NCO
 $= 0.4 - (-0.6) = \$1.0 \text{ Trillion}$

- (c) Is the US government running a deficit or surplus? What is the amount of its tax revenues?

National Savings are either domestically invested or invested abroad. That is,
 $\text{National Savings} = I + NCO = 1.6 - 0.6 = 1.0$

$\text{National Savings} = \text{Private Savings} + \text{Government Savings}$
 $\$1.0 \text{ Trillion} = \$2.2 \text{ Trillion} + \text{Government Savings}$
 $\rightarrow \text{Government Savings} = -\$1.2 \text{ Trillion} < 0$, *which means that the government is running a deficit.*

$\text{Government Savings} = T - G$
 $-\$1.2 \text{ Trillion} = T - \$1.8 \text{ Trillion} \rightarrow T = \0.2 Trillion

3. For each of the following, explain the effects on US Net Exports (NX) and/or Net Capital Outflow (NCO) of the US. For changes in NCO, indicate also whether the transaction affects Foreign Direct Investment (FDI) or foreign portfolio investment (FPI). Explain your reasoning for each.

- (a) A Canadian citizen buys a US-made Ford F150 truck from a US dealer. He pays for the truck with Canadian dollars. The dealer deposits all of this money in a bank account in Canada. (Note: putting money in a foreign bank account or holding a foreign currency is treated the same as holding foreign stocks or bonds.)

The sale of the car is an export of the US; therefore it will increase the NX of the US. The money used to buy the car is invested back in Canada, but since the account is owned by a US citizen, it will increase the US investments in Canada. This will increase the NCO of the US as well. Since a foreign bank account is treated the same as other foreign financial assets, this is a case of foreign portfolio investment.

- (b) GM sells a car to a Mexican citizen. The Mexican citizen pays for the car with pesos and GM sells the pesos to a grocery store in Detroit. The grocery store uses the pesos to pay for a delivery of salsa from Mexico.

Again NX increases here with the purchase of the car. But then NX also falls by the same amount when the grocery chain imports the Mexican salsa. There is no change in NCO here.

- (c) After a fall in stock prices on the NASDAQ, European investors buy US stocks from Americans using the European currency, euros. These euros are deposited in euro-denominated bank accounts in New York.

European investors acquire US stocks. This is a decrease in NCO (foreign portfolio investment into the U.S.). But now U.S. banks also hold European financial assets (the euros), so NCO (FPI) also increases. Overall, there is no change in NCO.

- (d) A Japanese company buys machinery in the US for use in its subsidiary in the US. It buys the machinery with US dollars that it purchased on the foreign exchange market by exchanging yen with a US citizen. The US citizen later (but in the same year) spends the yen on a vacation in Tokyo.

The purchase of machinery by a Japanese company causes NCO (FDI) to decrease, since the machinery is an addition to the capital stock owned by the Japanese company in the U.S. and thus is foreign direct investment by Japan in the U.S. The vacation in Tokyo by the US citizen then causes NX also to

decrease, by the same amount, since what is spent on the vacation is included in U.S. imports.

4. A Russian visiting student exchanges 120,000 rubles for \$6,000 for her living expenditures during her 1 semester stay in Ann Arbor.

(a) What is the nominal exchange rate?

20 rubles per dollar.

(b) Suppose that the average monthly student consumption basket costs \$900 in the U.S. and 3,600 rubles in Russia. What is the real exchange rate for this student and how do you interpret it?

Real Exchange Rate = 20 [rubles per \$] * 900 [\$] / 3,600 [rubles] = 5. For the same amount of money that the visiting student will have to spend in Ann Arbor, she could have consumed 5 times as much of everything back home. That's why it is often very hard for foreign students not to have permission to work in the U.S.!

5. Suppose that a friend of yours goes to Australia for spring break, and the day before coming back to the US, she calls you to check if you wanted a case of Australian Chardonnay. She tells you that the cost of this case of wine is 100 Australian dollars. Right after you hang up, your sister, who studies in England, calls. Knowing how much you like Chardonnay, she tells you about a deal that she came across: A case of the same quality Chardonnay for 60 British pounds. Both tell you that they will be able to ship you the case at no cost to you. Furthermore, a case of similar quality US-made Chardonnay is sold at the liquor store next door for \$70 (in US dollars).

(a) If one US dollar exchanges for 1.5 Australian dollars, how many US dollars will the Australian case of wine cost?

A case of Chardonnay costs 100 Australian dollars, an equivalent of $100/1.5=66.6$ US dollars.

(b) If one pound exchanges for US\$1.20, how many US dollars will the British case of wine cost?

This case costs 60 British pounds, and each pound is worth 1.2 US dollars. Therefore, its cost in US dollars is $60 \times 1.2 = \text{US\$}72$.

- (c) If you really believe that all three of the wines will taste the same, and if that and price are all that you care about, among all the options, which one will you choose?

A case of Australian wine costs US\$66.6, a case of British costs US\$72, and a case of US-made wine costs \$70. Therefore, you will choose the cheapest one, which is the Australian wine.

- (d) What are the real exchange rates between US-England and US-Australia? Assume for this that wine is the only good that matters.

The real exchange rate tells you how much foreign goods and services you can buy with one US-made good or service.

A case of US-made wine costs US\$70. To find the real exchange rate, we need to find how many cases of Australian (or British) wine we can buy with this US\$70.

Since a case of Australian wine costs US\$66.6, you can buy $70/66.6=1.05$ cases of Australian wine with one case of US-made. Therefore the real exchange rate between US-Australia is 1.05 Australian per one US-made.

Similarly, the real exchange rate between US-England is $70/72=0.972$ British cases per one US-made.

*Another method of finding the real exchange rate is applying the following formula: eP/P^**

where e is the nominal exchange rate (foreign currency per US dollar, or the amount of foreign currency that one US\$ buys), P is the domestic (US) price, and P^ is the foreign price.*

US-Australian real exchange rate = $1.5 \times 70 / 100 = 1.05$

Note that the exchange rate given between the British pound and the US\$ is the reciprocal of the exchange rate definition given above. If one British pound buys 1.2 US dollars, then one US dollar will buy $1/1.2=0.8333$ British pounds.

US-England real exchange rate = $0.8333 \times 70 / 60 = 0.972$

- (e) Define Purchasing Power Parity. If Purchasing Power Parity were to hold, what would be the nominal exchange rate for the U.S. dollar relative to the Australian dollar? How about for the U.S. dollar relative to the British pound? What would

be the nominal exchange rate between British pound and the Australian Dollar?

If the Purchasing Power Parity (PPP) holds, the prices of the products will be the same once we convert everything into the same currency. That is, we will have one price.

Likewise, if PPP holds, the real exchange rate will be one. That is:

$$eP/P^*=1 \text{ which implies that } e = P^*/P$$

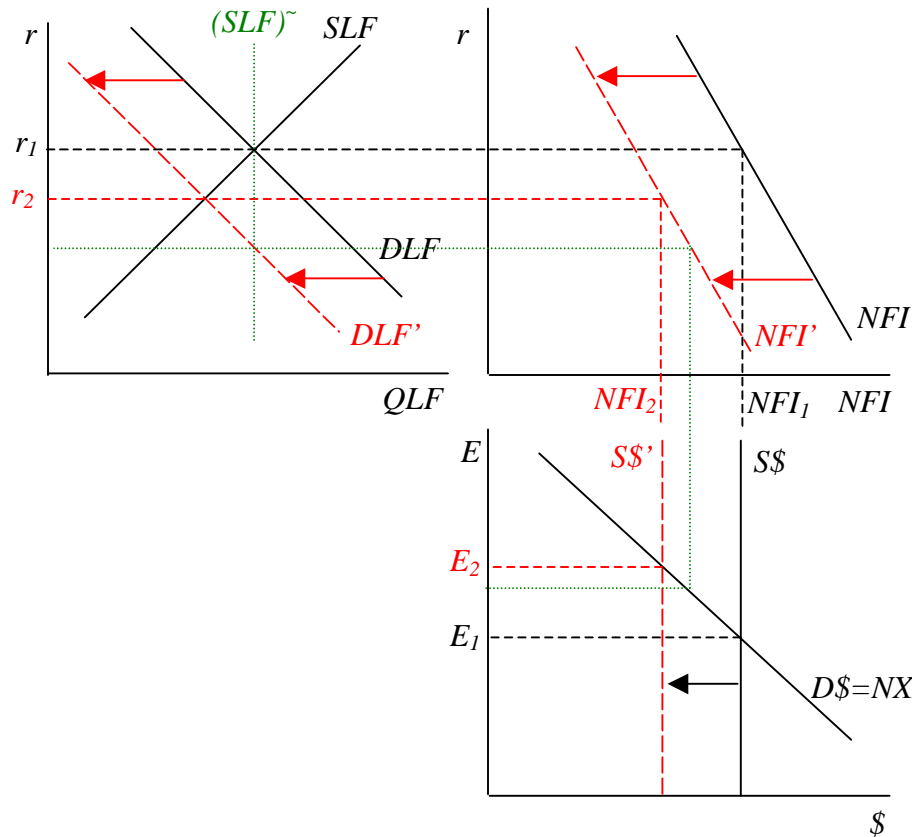
Then the exchange rate (i.e., the amount of foreign currency that one US\$ buys) is:

For the Australian dollar: $100/70 = 1.42$. That is, one US\$ will buy 1.42 Australian dollar.

For the British pound: $60/70 = .857$. That is, one US\$ will buy 0.857 British pound.

Since both 1.42 Australian dollars and 0.857 British pounds are worth one US\$, they are also equal to each other. Therefore the exchange rate between them is $1.42/0.857 = 1.657$ Australian dollars per British pound, or $0.857/1.42 = 0.604$ British pounds per Australian dollar.

6. Suppose that fear of war outside the United States causes people everywhere to view assets outside the US as more risky than before.
- (a) Using Mankiw's Open Economy Model, and starting from the initial position shown in the diagrams below, show which of the curves in the model will be shifted, and in which direction. Explain why these shifts occur.



The increased risk on non-US assets causes Americans to want to acquire and hold less of them, while foreigners will want to acquire and hold more US assets. Both of these changes cause a fall in net capital outflow, NCO, at the given interest rate, causing the NCO curve to shift to the left, as shown by the dashed red line above. Since the demand for loanable funds includes both domestic investment, I , and net foreign investment, NCO , the DLF curve also shifts to the left. Together these shifts lead to a new equilibrium level of NCO , and since this enters the bottom panel as the supply of dollars on the market for foreign currency exchange, $S\$,$ this curve also shifts to the left.

- (b) Is there anything that you know for sure about the sizes of these shifts?

The main thing that we know is that the DLF and NCO curves shift horizontally by the same amount, since the shifts represent the same change in behavior. Thus the horizontal arrows shown above are all of the same length. It follows also that, since the actual fall in NCO is smaller than the leftward shift (due to the fall in r), the S\$ curve shifts to the left by less than these arrows.

- (c) In what directions do the following variables change as a result of these shifts? State in a sentence or two the reasons for these changes.

- (i) The US real interest rate, r .

This falls, because more funds are available to lend on the domestic market.

- (ii) The US real exchange rate, E .

This rises – that is, the US dollar appreciates – because the resulting fall in NCO means that fewer dollars are being supplied by those wanting to invest abroad and more are being demanded by those wanting to invest in the US. (This increase in demand enters the figure as a reduction in supply.)

- (iii) The level of US (domestic) investment, I .

This increases, because the fall in the US real interest rate reduces the cost (or opportunity cost) of financing investment projects in the US.

- (d) Suppose that national saving were *not* affected by the interest rate, contrary to what is shown in the figure. How would the changes in part (c) compare to those you found?

Had savings not depended on the interest rate, the SLF curve would have been vertical, as shown by the green dotted line (SLF)[~] in the figure above. We show it passing through the same point on the DLF curve, so that we can start from the same equilibrium, for comparison. By following the green dotted lines around the figure, it is clear that the (same) shift of the DLF and NCO curves now causes a larger fall in the domestic real interest rate but therefore a smaller fall in NCO and a smaller appreciation of the dollar. The larger fall in real interest rate in turn means a larger stimulus to domestic investment.

7. Suppose the Bush administration is concerned about the magnitude of the U.S. trade deficit. Therefore, it promises U.S. car manufacturers restrictions on imports and subsidies for exports. According to the Open Economy Model, what will be the impact of this new trade policy on the trade deficit in the long run? Who do you think will benefit and who will be hurt by this policy in the U.S.?

This trade policy shifts the NX curve outwards (to the right), since at any given exchange rate more will be exported and less imported. However, in this long-run model, NX is pinned down by the amount of capital flows, which depends on interest rates, not the exchange rate or trade policy. Therefore, the real exchange rate will rise to make domestic goods more expensive relative to foreign goods until the initial increase in NX has been negated. American consumers will be hurt, because overall trade will decrease. American producers that are not among the privileged car makers will be hurt due to fewer export opportunities. U.S. car manufacturers will benefit from this trade policy. Foreign car manufacturers will suffer, but other foreign manufacturers will benefit, as they will export more at the expense of their car makers.