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Notes on Answers for Carola Schenone

1. Suppose there are two types of goods, a traded good and a nontraded good, P_i^T and P_i^{NT}, respectively, for country i, $i = 1, 2$. Let the price index be denoted:

$$P_i = a_i P_i^T + b_i P_i^{NT}, \ i = 1, 2.$$

With free trade, we'd expect $P_1^T = P_2^T$. However, there is no reason to expect the same for the non-traded goods. To see the implications for the ratio of the two countries' prices:

$$\frac{P_1}{P_2} = \frac{a_1 P_1^T + b_1 P_1^{NT}}{a_2 P_2^T + b_2 P_2^{NT}} = \frac{a_1 + b_1 \left(P_1^{NT}/P_1^T \right)}{a_2 + b_2 \left(P_2^{NT}/P_2^T \right)}.$$

Suppose

$$\lambda_1^t = P_{1,t}^{NT}/P_{1,t}^T,$$

where $\lambda_1 - 1$ denotes the excess in the inflation in nontradables over that in tradeables. Similarly, define λ_2^t. The statement that inflation in one country (say country 1) is higher than it is in country 2 is equivalent to the statement that $P_{1,t}/P_{2,t}$ is growing over time. This can happen if $\lambda_1 > \lambda_2$ and $\lambda_1 > 1$. Suppose first that $\lambda_2 > 1$. Then rewriting the expression for the relative price:

$$\frac{P_{1,t}}{P_{2,t}} = \frac{a_1 + b_1 \lambda_1^t}{a_2 + b_2 \lambda_2^t} = \frac{a_1 \lambda_2^{-t} + b_1 \left(\frac{\lambda_1}{\lambda_2} \right)^t}{a_2 \lambda_2^{-t} + b_2}$$

$$\rightarrow \frac{b_1}{b_2} \left(\frac{\lambda_1}{\lambda_2} \right)^t \rightarrow \infty,$$

since $\lambda_2^{-t} \rightarrow 0$ and $\lambda_1/\lambda_2 > 1$. The above expression also shows that if $\lambda_2 < 1$, then $P_{1,t}/P_{2,t} \rightarrow (a_1 + b_1 \lambda_1^t)/a_2 \rightarrow \infty$ because $\lambda_2^t \rightarrow 0$ when $\lambda_2 < 1$.

Notice that in this example, there is completely free trade in the tradeables.

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2. According to the model,

$$V = \frac{Y}{M/P} = \frac{Y^{1-\gamma}}{f(R)}.$$

(a) The growth rate in velocity, $\%\Delta V$, is,

$$\%\Delta V = (1 - \gamma) \, \%\Delta Y,$$

since $\%\Delta f(R) = 0$ with R being constant. So,

$$\gamma = 1 - \frac{\%\Delta V}{\%\Delta Y}.$$

If the growth rate of velocity is greater than the growth rate of output, then $\gamma < 0$. If the growth rate of velocity is less than the growth rate of output, $\gamma > 0$.

(b) In the long run, we expect the interest rate to be a constant, so that the money demand equation implies:

$$\%\Delta M - \pi = \gamma \%\Delta Y,$$

or

$$\%\Delta M = \pi + \gamma \%\Delta Y.$$

So, money growth has to be higher than the targetted inflation rate by $\gamma \%\Delta Y$.

3. (a) The current account is increasing in q because q is the price of foreign goods divided by the price of domestic goods. When q is big, foreign goods are relatively expensive and everyone (domestic residents and foreigners) prefers to buy goods from the domestic economy, driving up net merchandise exports. It is decreasing in disposable income. The higher is the disposable income of domestic residents, the more they want to buy. Some of that increase in desired purchases falls on foreign goods, raising imports and, hence, reducing the net merchandise export component of the current account.

i. To answer this question requires drawing the AA and DD curves and also the various curves that underly them. The increase in I raises aggregate demand. Using the Keynesian cross diagram, we can see that if aggregate demand rises, for given values of the other variables, equilibrium output in the goods market rises. Thus, the increase in I shifts the DD curve to the right (the distance it moves to the right is the amount Y has to increase, holding E constant, to restore clearing in the goods market). The variable, I does not enter the money market or the UIP relation, and so it does not shift the AA curve.

ii. With the DD curve shifted right, the new equilibrium intersection of the AA and DD curves is down and to the right. Call the old intersection point 1 and the new intersection point 2. The economy starts at 1. At the moment that the shock occurs, the economy remains on the AA curve, but it is not on the DD curve. So, no disequilibrium pressures emerge from the financial markets. The goods market, on the other hand, is out of equilibrium. We are now above the DD curve, so there is excess demand in the goods market and output starts to shift to the right. Of course, as soon as the economy moves to the right, it finds itself above the AA curve, causing E to drop down to the AA curve. With output increasing slowly and E's move essentially instantaneous, the economy's motion describes a path down along the AA curve until it reaches point 2. As E falls, the current account deteriorates because the relative cost of domestic goods is rising. A second factor pushing the current account down is the rise in income, which raises imports.

iii. The intuition works like this. The shock appears in the goods market. There is an increase in demand for goods, and presents itself to firms as an unanticipated decline inventories. Businesses respond to the decline in inventories by hiring more workers and producing more output. The increase in output has effects in the financial markets, because it raises the demand for money which puts upward pressure on the interest

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rate. The rise in the interest rate triggers international capital flows into the country, which cause the currency to appreciate. This works against the positive impact on demand coming from the increase in I, by making domestic goods relatively more expensive than foreign goods. At this point, you should feel like you have too many variables dancing in your head, and you should be thankful for being able to lean on the graphs for help you think clearly about what's happening!

4. The temporary increase in R^f shifts the UIP relation up. That in turn causes a shift up in the AA curve. This should be explained carefully using graphs. With the AA curve shifted up, the new equilibrium is upward and to the right, in the $AA - DD$ curve space. With the higher value of E and Y, the impact of the shock on the current account is ambiguous. The higher E makes foreign goods relatively more expensive than domestic goods, driving the current account up. The higher Y, by driving up imports makes the current account go down. Which effect is stronger requires making stronger assumptions on the CA relation than we have made.

   In terms of how the economy goes from the old to the new equilibrium. The shock enters the economy through the financial markets. Point 1 is no longer a point on the AA curve. So, this creates pressure for E to rise. There is, initially, no pressure on Y, since there is no problem at first in the goods market. Our assumption about disequilibrium dynamics imply that E jumps immediately to the new, higher AA curve. At this point, the economy is above the DD curve, so there is excess demand for goods. Inventories start falling and firms respond by raising output. When output rises even a little, we're above the new AA curve, and E drops right away to that curve. In this way, the economy slides down the new, higher, AA curve down to the new intersection.

   Intuitively, here is what's going on. The rise in the foreign interest rate makes domestic assets seem much less attractive. Portfolio managers 'rush for the exits' as they try to sell the domestic currency for the foreign currency. This causes an abrupt depreciation of the currency, up to the point where managers are no longer anxious to exchange cur-

rencies. Because they understand the shock is temporary, they believe that the long run exchange rate has not changed. So, any current depreciation creates an anticipation of a later appreciation. This latter anticipation compensates them for the relatively low rate they receive in the domestic economy.

All these effects in the financial market spill over into the goods market. The depreciated currency makes foreign goods look unattractive, and people do more buying at home. Similarly, foreigners come into the domestic economy to buy goods. This stimulus to the demand for domestic goods leads to an increase in domestic output. This has a secondary impact on the financial markets because it has the effect of raising the domestic rate of interest.

5. The current account is the sum of net exports and income received from investment abroad minus income paid on investments by foreigners in the domestic economy. So, the current could be negative even though net exports are positive if foreigner own a lot of assets in the domestic economy, and income paid to foreigners on their investments is large.

6. The demand for real balances should be an increasing function of the excess of the *real* return on money (which is $-\pi$, the minus of the inflation rate) and the *real* return on other assets (which is $R - \pi$). Working out the difference, we get $-\pi - (R - \pi) = -R$. That is, the demand for real balances should be an increasing function of $-R$, or, a decreasing function of R.