Econ 3143, Fall 2020, AS4 (Chapter 19 and 20)

Solution

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1. Label each of the following statement true, false, or uncertain. Explain briefly.

a) With a fixed exchange rate regime, the monetary authority will lose independence in domestic monetary policy.

False. According to the trilemma of international monetary policy, a country cannot achieve Fixed ER, Independent M policy and perfect capital mobility simultaneously. However, it is possible to achieve two objectives simultaneously. For example, China adopts a fixed exchange rate regime (almost), but it can have independent monetary policy since the capital inflow and outflow are limited between China and the ROW. If there is perfect capital mobility, UIRP condition implies that, $i_t = i^*_t - (E^e_{t+1} - E_t)/E_t$. Then the central bank basically gives up M policy as a policy instrument.

b) Higher labor mobility within Europe makes the euro area a good candidate for a common currency.

True. With common currency, the economies lose monetary policy independence and cannot use monetary policy to stabilize the economy if it is hit by shocks. So the criterion for common currency area is these areas should be subject to symmetric shocks. But if shocks are asymmetric, then the factor mobility will help to shift the labor and capital to the area with higher demand for labor and factor in case of asymmetric shocks.

c) When domestic inflation equals foreign inflation, the real exchange rate is fixed.

Uncertain. In the $\varepsilon=EP/P^*$, when domestic inflation equals foreign inflation, implying the percentage change of P and P* is the same. If initially P=P*, real exchange rate equals nominal exchange rate. Only when the countries are having the fixed exchange rate system, when nominal exchange rate is fixed, real exchange rate is fixed.

d) If financial investors expect the dollar to depreciate against the yen over the coming year, one-year interest rate will be higher in the US than in Japan.

True. Expected depreciation means $E_{t+1}^e < E_t$. According to UIRP, $i_t > i_t^*$, i.e. one-year interest rate will be higher in the US than in Japan.

e) A sudden fear that a country is going to devalue may force an exchange rate crisis, even if the fear initially had no basis.

True. Even if the fear has no basis, the fear of devaluation will lead to selling of domestic currency immediately by local people and exchange rate crisis will result.

f) Because economies tend to return to their natural level of output in the medium run, it makes no difference whether a country chooses a fixed or flexible price equilibrium.

False. Even under a fixed exchange rate regime, countries can adjust their real exchange rate in the medium run. They can do so by relying on adjustments in the price level. Nevertheless, the adjustment can be long and painful.

g) Changes in the expected level of exchange rate far in the future has little effect on the current level of exchange rate.

False. According to the relations: $E_t = \frac{(1+i_t)(1+i_{t+1})\ldots(1+i_{t+n})}{(1+i_t^*)(1+i_{t+1}^*)\ldots(1+i_{t+n}^*)} E_{t+n+1}^e$, the level of today's exchange rate will move one for one with the expected exchange rate (E^e_{t+n+1}) . Since today's exchange rate moves with any change in expectations, the exchange rate will be volatile, that is, move frequently and perhaps by large amount.

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2. Question 5 of Chapter 19 in the textbook. (7th edition, Flexible exchange rate and the response to changes in foreign macroeconomic policy).

Flexible exchange rates and the responses to changes in foreign macroeconomic policy

Suppose there is an expansionary fiscal policy in the foreign country that increases Y* and i* at the same time.

a. In an IS-LM–UIP diagram, show the effect of the increase in foreign output, Y*, and the increase in the foreign interest rate, i*, on domestic output (Y) and the exchange rate (E), when the domestic central bank leaves the policy interest rate unchanged. Explain in words.

b. In an IS-LM–UIP diagram, show the effect of the increase in foreign output, Y*, and the increase in the foreign interest rate, i*, on domestic output (Y) and the exchange rate (E), when the domestic central bank matches the increase in the foreign interest rate with an equal increase in the domestic interest rate. Explain in words.

c. In an IS-LM–UIP diagram, show the required domestic monetary policy following the increase in foreign output, Y*, and the increase in the foreign interest rate, i*, if the goal of domestic monetary policy is to leave domestic output (Y) unchanged. Explain in words. When might such a policy be necessary?

Answer:

a. The increase in both Y* and i* shifts the IS curve to the right. At the same domestic interest rate, the domestic currency depreciates and net exports rise. The increase in Y* directly increases net exports. Output will rise for both reasons. The UIP curve will

shift left – at the same domestic interest rate and a higher foreign interest rate, the currency will depreciate.

b. If the domestic central bank matches the increase in foreign interest rates then although the UIP curve shifts left, the central bank increases the domestic interest rate so that the exchange rate remains unchanged. However, the effect of Y* on exports, net exports remains in play. So the IS curve will shift to the right. It is not clear whether domestic output will rise or fall. It will tend to rise as the IS shifts right. Domestic output will tend to fall as you move up the new IS curve with a higher interest rate.

c. Based on the analysis in part (a), central bank should decrease M so as to keep Y unchanged. LM curve shifts up which will increase the domestic interest rate. Change in M will not affect UIP curve.

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3. Question 8 of Chapter 19 in the textbook. (7th edition, Demand for UK assets, the pounds, and the trade deficit).

Demand for U.K. assets, the pound, and the trade deficit
This question explores how an increase in global demand for U.K. assets is likely to slow down the depreciation of the British pound. Here we modify the IS-LM-UIP framework (where UIP stands for uncovered interest rate parity) to analyze the effects of an increase in the demand for U.K. assets. Write the uncovered interest rate parity condition as:
$(1 + i_t) = (1 + i^*_t)(E_t/E^e_{t+1}) - x$
Where x represents factors affecting the relative demand for domestic assets. An increase in x means that investors are willing to hold domestic assets at a lower interest rate (given the foreign interest rate and the current and expected exchange rates).

a. Solve the UIP condition for the current exchange rate, Et.
b. Substitute the result from part a in the IS curve and construct the UIP diagram. As in the text you may assume that P and P* are constant and equal to one.
c. The British pound has a higher interest rate in comparison to the euro. According to the UIP condition, explain whether the expected rate of the pound (E^e_{t+1}) is supposed to appreciate or depreciate in the future. What are the effects on output and net exports? How is this reflected in the IS-LM-UIP diagram?
d. Suppose that there are expectations that the expansionary monetary policy by the Bank of England will result in a permanent future increase in the money supply. If the prices of goods and services are fully flexible, do you expect the spot exchange rate to respond immediately?
e. What is the effect of an increase in the demand for domestic assets x? Do you expect that this increase will prevent the depreciation of the pound?

Answer:

a. $E_t = E^e_{t+1}(1 + i_t + x)/(1 + i^*_{t+1})$

b. The *IS* curve slopes down as before, but with the result in part a. substituted for the nominal exchange rate in the *NX* function. The UIP curve slopes up as before.

c. There will be expected depreciation. IS shifts right and UIP shifts left. Output and net exports increases.

d. Yes. This is because an increase in money supply leads to a depreciation of the pound. This depreciation is due to anticipated full adjustment of prices on the date at which money supply will increase. This expected depreciation of the pound must be matched by an immediate increase in the pound interest rate above the euro interest rate, otherwise no agent would hold the domestic currency denominated assets. As the period in which the change in the money supply actually takes place approaches, the interest rate differential starts to shrink.

e. An increase in *x* tends to increase the value of the domestic currency and therefore shifts the *IS* curve to the left. Yes, this increase is likely to prevent the depreciation of the pound.

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4. Question 3 of Chapter 20 in the textbook. (7th edition, Policy Choices when the real exchange rate is "too high")

Policy choices when the real exchange rate is "too high" and the nominal exchange rate is fixed

An overvalued real exchange rate is a rate such that domestic goods are too expensive relative to foreign goods, net exports are too small, and by implication the demand for domestic goods is too low. This leads to difficult policy choices for the government and central bank. The equations that describe the economy are:

The IS curve:

$$Y = Y\left(\frac{\bar{E}P}{P^*}, G, T, i^* - \pi^e, Y^*\right)$$
$$(-, +, -, -, +)$$

The Phillips curves for the domestic and the foreign economy:

$$\textit{Domestic Phillips curve} \qquad \pi - \bar{\pi} = (\alpha/L)(Y - Y_n)$$
$$\textit{Foreign Phillips curve} \qquad \pi^* - \bar{\pi}^* = (\alpha^*/L^*)(Y^* - Y_n^*)$$

In the text and in this question, we are going to make two critical assumptions. These are explored in parts (a) and (b). Then we move to the analysis of the policy options when a country is experiencing an overvalued exchange rate.

a. We are going to assume that the foreign economy is always in medium-run equilibrium. What are the implications of that assumption for foreign output and foreign inflation?

b. We are going to assume that the domestic and foreign economies share the same anchored value for the level of expected inflation denoted $\overline{\pi}$ and $\overline{\pi}^*$. What is the implication of that assumption once both the domestic and foreign economies are both in medium-run equilibrium?

c. Draw the IS-LM-UIP diagram for the case where the domestic country has an overvalued nominal exchange rate. What is the key feature of that diagram? Under fixed exchange rates without a devaluation, how does the economy return to its medium-run equilibrium?

d. Draw the IS-LM-UIP diagram for the case where the domestic country has an overvalued nominal exchange rate. Show how the economy can return to its to medium-run equilibrium when a devaluation is a policy choice.

e. Recall that the assumption has been made that interest rate parity holds so i = i* at all times. Compare the returns on the domestic bond and the returns on the foreign bond in the period of the devaluation. Will bond holders continue to believe there is a completely fixed nominal exchange rate? If bond holders believe another devaluation is possible, what are the consequences for domestic interest rates?

Answer:

a. If the foreign economy is always in medium run equilibrium, then foreign income is at the natural level and foreign inflation is constant.

b. When both economies are in medium run equilibrium, they will share the same value of inflation at the anchored level $\bar{\pi} = \bar{\pi}^*$.

c. The key feature of the diagram will be that the domestic country will be in a short run equilibrium where the actual level of output Y will be less that the natural rate of output Y_n. To return to a medium run equilibrium, inflation in the domestic country will be less than $\bar{\pi}$ for a prolonged period. As this occurs, the real exchange rate will gradually depreciate and the IS curve will shift right.

d. Start with the same diagram as in part c. Immediately devalue so the real exchange rate falls and the IS curve shift right. The economy returns to full employment immediately.

e. The devaluation means that the return on the domestic bonds over the devaluation was much lower than the return on the foreign bonds over the devaluation. It is hard to know if the bondholders will believe the devaluation is one-time only. If they believe another devaluation is imminent, domestic interest rates will be higher than foreign interest rates.

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5. Question 7 of Chapter 20 in the textbook. (7th edition, Real and nominal exchange rates for Russia and China).

Real and nominal exchange rates for Russia and China
Russia and China are two of the largest trading partners and exporters to the European Union. The database of the European Central Bank provides direct quotations of foreign currencies against the euro, which they refer to as the “Euro foreign exchange reference rates”.
Download the exchange rates for each of the Russian ruble (RUB) per euro and the Chinese yuans per euro for the last 10 years.

a. The exchange rate is defined as the number of Russian rubles per one euro and the number of Chinese yuans per one euro. Redefine the exchange rates as the number of euro cents per rubles and the number of euro cents per yuan. Who does this direct quote of exchange rates benefit?

b. Download and prepare charts depicting exchange rates of the euro against each of the ruble and yuan. Compare and contrast the behavior of each of the ruble and the yuan against the euro. Do you see a period when either of the ruble or lira is pegged? Do you observe a general trend of appreciation or depreciation of the euro against the two currencies? Which country/countries benefit from the changes in the exchange rate?

c. Why do countries resort to devaluing their domestic currencies? When does a depreciated currency lead to inflation? How do inflation measures help to differentiate between nominal exchange rates and real exchange rates? Check the inflation rate of Russia and the EU for last year. Do you expect the real exchange rate between the ruble and the euro to be higher or lower than the nominal exchange rate? Explain your answer.

a. A direct quote is the convention of expressing currency exchange in terms of units of domestic currency per unit of foreign currency. The main benefit is to enable residents to know the price of the foreign currency directly and easily. To convert a direct quote (i.e., foreign currency per one euro) into and indirect quote (i.e. euro cents per one unit of foreign currency) use the following equation: Direct Quote = 1/indirect quote.

b. The Russian ruble was pegged till 2014, when the Bank of Russia decided to gradually float its currency. In comparison, the Turkish lira was relatively more flexible with less intervention from the Central Bank of the Republic of Turkey, which floated the lira in as early as 2001. Both currencies depreciated against the euro. The depreciation of the lira and the ruble benefit export-oriented domestic companies, and thus, Turkey and Russia will be able to maintain trade balance stability. For Russia, another positive result is the benefit gained by Russian exporters, mainly the oil companies, which were compensated for the losses they suffered due to the drop in world energy prices.

c. While devaluation makes residents of the country relatively poorer, it makes domestic products cheaper to foreigners. A depreciated currency leads to inflation if the nation is dependent on imports (imported inflation). If Russian inflation is higher than EU inflation, the real exchange rate of EU will be lower than the nominal exchange rate.

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6. For your practice only. You do not need to hand it in. The following question is from final exam of 2009. Use that as an example for the essay question in the final exam. Read the article and answer the following question.

Burger-thy-neighbour policies

Feb 5th 2009
From The Economist print edition

Attacks on China's cheap currency are overdone
CHINA has been accused of "manipulating" its currency by Tim Geithner, America's new treasury secretary, and this week Dominique Strauss-Kahn, the managing director of the IMF, said that it was "common knowledge" that the yuan was undervalued. You would assume that such strong claims were backed by solid proof, but the evidence is, in fact, mixed.

Of course China manipulates its exchange rate—in the sense that the level of the yuan is not set by the market, but influenced by foreign-exchange intervention. The real issue is whether Beijing is deliberately keeping the yuan cheap to give exporters an unfair advantage. From July 2005, when it abandoned its fixed peg to the dollar, Beijing allowed the yuan to rise steadily, but since last July it has again been virtually pegged to the greenback. But American politicians are wrong to focus only on the yuan's dollar exchange rate. Since July the yuan has gained 10% in trade-weighted terms. It is up 23% against the euro, and 30% or more against the currencies of many other emerging economies.

Those who argue that the yuan is still too cheap point to three factors: China's foreign-exchange reserves have surged; it has a huge current-account surplus; and prices are much cheaper in China than in America. Start with official reserves. If China had not bought lots of dollars over the past few years, the yuan's exchange rate would have risen by more. So does the yuan's fixed level against the dollar in recent months mean that intervention has risen? On the contrary, in the fourth quarter of 2008, China's reserves barely rose, despite a record current-account surplus. This suggests that private capital is now flowing out of China.

Charles Dumas, an economist at Lombard Street Research, argues that outflows of hot money could become a flood if China did not have capital controls. China also has strict capital controls which, although leaky, keep private savings at home. If Beijing scrapped those controls, firms and households would want to invest abroad to diversify their assets. In other words, if the value of the yuan was not "manipulated" and instead was set entirely by the free market, it might fall, not rise.

Some argue that China's large current-account surplus is incontrovertible proof that the yuan is too cheap. Morris Goldstein and Nicholas Lardy estimate that the yuan's real trade-weighted value needs to rise by another 10-20% to eliminate the surplus. But other economists say it is wrong to define the yuan's fair value by the revaluation required to eliminate the current-account surplus. Trade does not have to be perfectly balanced to be fair. And China's surplus partly reflects its high saving rate. To reduce China's external gap, policies to boost domestic spending will be more important than its exchange rate.
……..

a) For an economy with fixed exchange rate regime, write down the good market clearing condition, the money market clearing condition and the UIRP condition. Assume that that $\pi^e = 0$, use IS-LM diagram in the open economy to show the effects of an increase in domestic spending on output, consumption, investment, exchange rate, and net export. Explain the intuition. (6 marks)

b) Many people think that China's large current-account surplus is incontrovertible proof that the yuan is too cheap. However, the author argues that boosting China's domestic spending is also important. Use your answer in a) to explain why this is the case. Then explain why an appreciation (revaluation of the RMB) might not help to eliminate the imbalance of trade between the US the China. Finally, the author mentioned that China's big trade surplus partly reflects its high saving rate, explain why this is the case. (7 marks)

c) We know from the article that China follows a fixed exchange rate regime and rigorous capital control. Can the Chinese government have monetary policy autonomy? Explain your answer. Then analyze why the value of Yuan might fall instead of rise if China does not impose rigorous capital control. (5 marks)

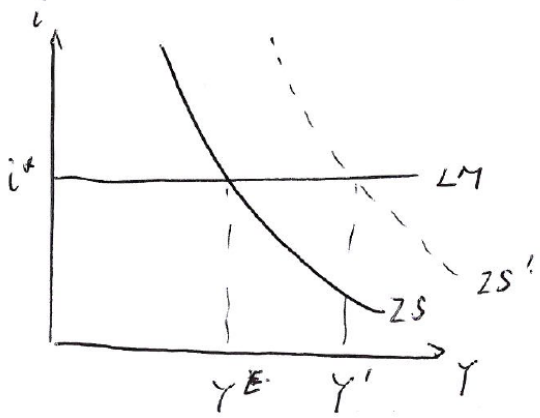
(2(a))

IS: $Y_t = C(Y_t - T_t) + I(Y_t, i^* - \pi^e_{t+1}) + G_t + NX(Y_t, Y_t^*, \varepsilon_t)$

where $\varepsilon_t = \frac{\bar{E}P}{P^*}$ $\bar{E}$ is the fixed ER

From UIRP, if $E_t = E^e_{t+1} = \bar{E}$, we must have $i = i^*$, so we simply write $L(Y_t, i_t - \pi^e)$ as $L(Y_t, i^* - \pi^e_{t+1})$

LM curve is simply given by $i_t = i^*$



If domestic spending increase, then we should have the IS curve shift right

But since UIRP implies that i_t should always equals to i^*, LM curve will not shift

In the new $\bar{E}_t^{nw}$, we have $Y' > Y^E$ increase.

$L(Y, i^* - \pi^e)$ will increase since $Y \uparrow$ & $i^* - \pi^e$ doesn't change.

$E = \bar{E}$ no change since $i = i^*$ all the time

$C(Y - T)$ will also increase.

$NX(Y, Y^*, \frac{\bar{E}P}{P^*})$ in the SR, since P & P^* is fixed, ε is also fixed.

so we must have that $NX \downarrow$

Part b. i) According to a), ↑ in domestic spending will lead to decreases in NX (net export). So this will help to reduce the trade imbalance.

ii) According to b), we know that although revaluation will lead to lead to ↓ of NX in the SR, in the MR, the adjustment of price level will lead the Real ER back to the level before the adjustment.

$$Y_n = C(Y_n - T) + G + I(Y_n, i^* - \pi^e) + NX(Y_n, Y^*, \varepsilon_n)$$

Before adjustment, $\varepsilon_n = \frac{\bar{E}_0 P_0}{P^*}$, in short run. ↓

E_0 ↑ to E_1, ε ↑; In the medium run, ε will go back to $\varepsilon_n = \frac{\bar{E}_1 P_1}{P^*}$, since other real variables remain unchanged. (real appreciation)

Also, even in the SR, ↑ of E will not lead to ↑ of net export immediately, just like what we describe in the J curve. $NX = X(Y^*, \varepsilon) - \frac{IM(Y, \varepsilon)}{\varepsilon}$, if the export and import do not change immediately to changes in ε, then NX will fall first, then increase.

So an appreciation might not help to eliminate the imbalance of trade between US and China

iii) $NX = Y - C - G - I$ $\quad S = Y - C - T$

$$\Rightarrow S = C + I + G - C - T + NX$$

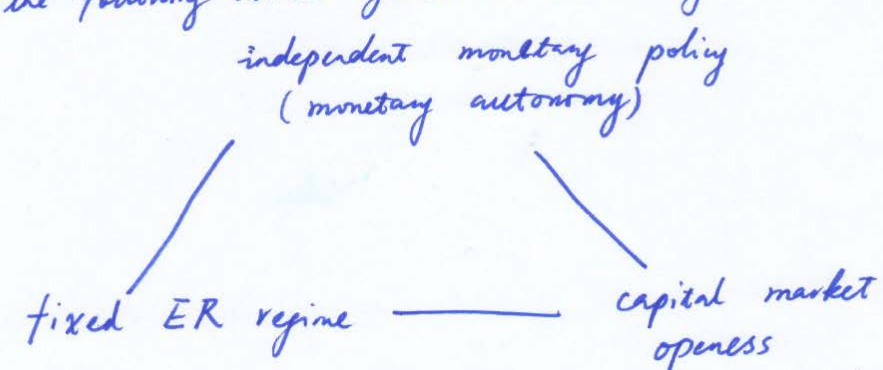
$$= I + G - T + NX$$

$$\Rightarrow NX = \underbrace{S + (T - G)}_{\text{private saving + public saving}} - I \rightarrow \text{investment}$$

Trade surplus - an excess of domestic saving over investment.

So ....

Part c. According to the policy trilemma, a country cannot achieve the following three goals simultaneously.



For China, since it adopts fixed ER regime, also has rigorous capital control, it can have independent monetary policy. This is because even if $i \neq i^*$, but E is fixed, rigorous capital control prevent huge inflow or outflow of funds. But if there is no capital control, like in the case of HK, i has to equal to i^* to keep fixed exchange rate. (full capital market openness)

→ This is an open question, possible answer are:

In China, ~~it~~ many people may want to diversify their portfolio by holding foreign currency denominated assets, so it is possible that there is a lot of demand for foreign currency (like US$) and supply of Yuan, which implies the RMB may devaluate if there is no rigorous capital control

Another possible reason is the inflow and outflow of hot money. Many investors may expect that the revaluation of RMB implies that in the future no more room for further revaluation (at least in SR), so they will sell RMB ~~and~~ assets. This may lead to huge capital outflow and devaluation of RMB, w/o rigorous capital control.

Open Q, so see if their answer makes sense.