Econ 371: Answer Key to Problem Set 4
(Chapter 16-17)

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1. (2 points) Explain the effect of temporary monetary expansion on output under a flexible exchange rate, using the AA-DD framework. Compare that with the effect of the same policy under fixed exchange rate. Is the effect on output different across exchange rate systems? Why? How will your answer change when the monetary expansion is permanent?

ANSWER: Yes, the effect depends on flexibility of exchange rate. A monetary expansion increases output only when exchange rate is flexible, as depicted in Figure 1.A. Point 1 is the initial condition. Point 2 is the equilibrium under flexible exchange rate, and Point 3 is that under fixed exchange rate. A monetary expansion shifts AA curves upward and depreciates the domestic currency to Point 2, if the central bank does not intervene in the foreign exchange market to support the currency. The depreciation improves current account and raises output. Under fixed exchange rate system, the central bank has to intervene to prevent the depreciation by selling foreign assets. The intervention reduces reserves and money supply. As a result, it reverses the shift of the AA curve, and bring the economy back to Point 1.

Monetary policy is ineffective when exchange rate is fixed, because any attempt to raise money supply has to be followed by a foreign exchange rate market intervention that reverses the change in money supply. In this case, the effect of monetary policy on output is zero. For this reason, any monetary expansion is impossible given fixed exchange rate. Figure 1.B illustrates the effect of a permanent expansion of monetary policy. Notice that when exchange rate is flexible, the output expansion is larger with a permanent change, because a permanent expansion also raises expected inflation and further pushes the AA curve upward to Point 2. The simultaneous intervention in the foreign exchange market brings the economy back to Point 1.

2. (2 points) Explain the effect of temporary fiscal expansion on output under a flexible exchange rate, using the AA-DD framework. Compare that with the effect of the same policy under fixed exchange rate. Is the effect on output different across exchange rate systems? Why? How will your answer change when the fiscal expansion is permanent?
exchange rate systems? Why? How will your answer change when the fiscal expansion is permanent?

ANSWER: Yes, the effect depends on flexibility of exchange rate. Figures 2.A and 2.B illustrate the case of temporary, and permanent fiscal expansion, respectively. Point 1 is the initial condition, and Point 2 is equilibrium with flexible exchange rate. Point 3 is equilibrium with fixed exchange rate. With fixed exchange rate, a fiscal expansion requires the central bank to intervene in the foreign exchange market by buying foreign assets. That raises money supply and shift the AA curves to Point 3. This is true even when the expansion is permanent. In fact, a permanent fiscal expansion does not expand output unless exchange rate is fixed. This is because people know exchange rate will appreciate following the expansion, so the AA curve shifts downward and cancels out the effect of fiscal expansion.

3. (2 points) Describe the effects of an unexpected devaluation of a currency on the central bank’s balance sheet, output and the balance of payments account.

ANSWER: The immediate effect of an unexpected devaluation is that it raises foreign demand for the domestic goods, and reduces domestic demand for foreign goods. It then raises output and improves current account. The rise in output raises real money demand, which creates an upward pressure on interest rate or appreciation pressure on the currency. The central bank has to intervene by buying foreign assets and expanding money supply. That is why the AA curve shifts upward in Figure 3, and the economy moves from Points 1 to 2.

4. (2 points) What causes a balance of payments crisis? Are speculative attacks on a national currency or capital flights irrational? Write a time path of domestic bonds, foreign reserves, money supply and interest rate before and after a crisis.

ANSWER: A balance of payments crisis, or a currency crisis, can happen because of inconsistent policies of the government. One is to fix exchange rate, and the other is to definitely expand its fiscal spending. In this case, speculative attacks or capital flights are rational outcome. Speculators correctly predict that in the future money supply will increase as a result of continued fiscal expansion. So, it is rational for them to expect exchange rate to depreciate. They simply try to avoid capital loss they could incur if they do not sell the currency before the future depreciation.

Time paths of key variables are in Figure 4. Foreign reserves $B_{t,F}$ falls gradually until speculators attack the currency at time T. Then speculators will acquire the remaining foreign reserves. This is a completely rational action taken by speculators, given that everybody knows the central bank has to sterize the expansion in domestic bonds $B_{t,H}$. To be specific, with knowledge about the initial stock of reserves and the rate of domestic credit expansion $\mu = B_{t,H}/B_{t-1,H}$, everybody knows the precise timing of T by calculating the shadow floating exchange rate that will prevail after the attacks. After the attack, the currency is freely floated and the money supply
M_t is made up 100 percent by only domestic credit. The path of domestic credit is essentially also the path of money supply after the attack. Interest rate R after the attack will rise as much as the rate of inflation, which is the same as the rate of expansion of money and domestic credit \( \mu \). See also the Appendix of Chapter 17 in the textbook.

5. (2 points) In a three-country world, a central bank fixes one exchange rate but lets the other float. Can it use monetary policy to affect output? Can it fix both exchange rates?

ANSWER: When a central bank fixes its exchange rate, it cannot use monetary policy to affect output, regardless of what other countries in the rest of the world do. In a three-country world, there are two exchange rates. For example, consider China, the U.S. and the euro zone. When China fixes its exchange rate with the U.S. dollar \( E_{y/s} \), it effectively lets changes in its exchange rate with the euro \( E_{y/\epsilon} \) track changes in the dollar-euro exchange rate \( E_{s/\epsilon} \). In other words, \( E_{y/\epsilon} = E_{y/s} / E_{s/\epsilon} \). China therefore cannot fix both exchange rates. However, we can observe fixed Yuan-euro exchange rate, if the U.S. and the eurozone decide to fix the dollar-euro exchange rate.
Figure 1.A Effects of temporary monetary expansion

Figure 1.B Effects of permanent monetary expansion
Figure 2.A Effects of temporary fiscal expansion

Figure 2.B Effects of permanent fiscal expansion
Figure 3 Effects of unexpected devaluation

Figure 4 Time paths of key variables before and after a currency crisis