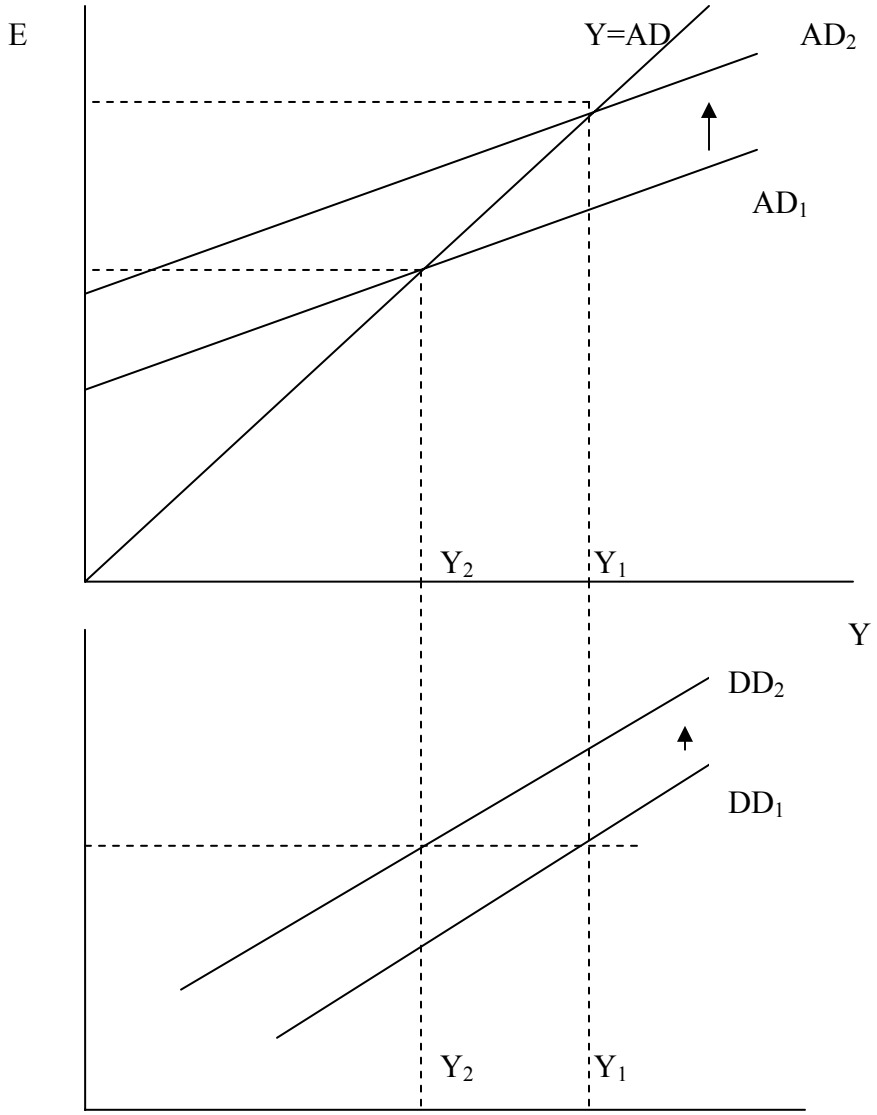
University of California Berkeley Spring 2006
Department of Economics Economics 182

Suggested Answers to Problem Set 3

Question 1 – Fiscal Policy under balanced budget in AA/DD framework

(a)
(i) To answer this question first we have to look at the aggregate demand function $D = C(Y - T) + I + G + NX(q, Y - T, Y^* - T^*)$. A decrease in T will cause an increase in consumption spending $C(Y - T)$ that is smaller than the increase in disposable income because part of the new income is saved. In addition, the increase in disposable income worsens the trade balance NX since imports increase. The increase in $C(Y - T)$ shifts the AD curve upward but the decrease in G and NX shifts the curve downward. The net effect of a decrease in G and T of equal amount is contractionary. Hence the AD curve shifts down from AD1 to AD2. This is depicted in Figure 1. The diagram on the bottom in Figure 1 shows how the DD curve would shift in response to the above-mentioned shift of the AD curve.

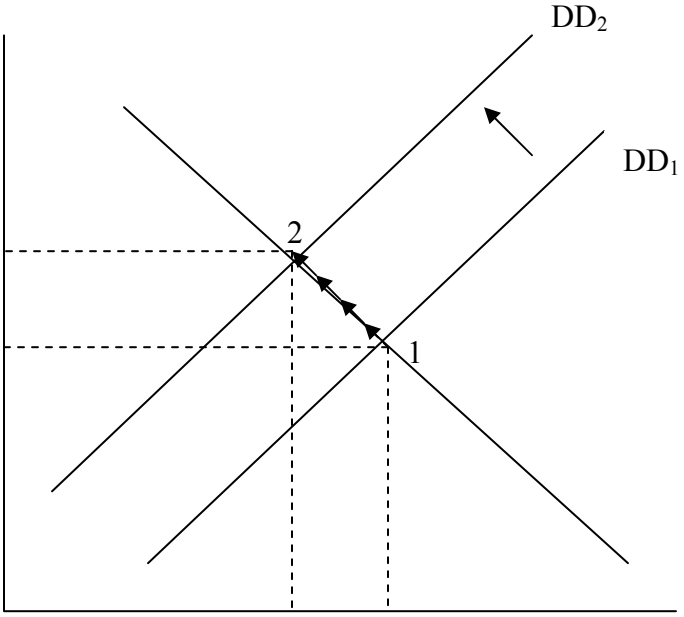
Figure 1



(ii) Now let's turn to the AA - DD diagram. The DD curve has to shift to the left. We see this in Figure 1, where the equilibrium moving from point 1 to point 2. Also note that neither of these shocks has an effect on the AA curve (Note however that if you considered the case where these policies were permanent, there would be a shift of the AA curve). Since point 1 is below the DD_2 schedule, there is an excess supply of domestic output. As firms decrease production to avoid accumulating inventory, the economy travels along the AA curve to point 2 where aggregate demand and supply are equal. The exchange rate rises as the economy approaches point 2 along AA because decreasing national output causes money demand to decrease, pushing the interest rate steadily downward. (The currency must depreciate steadily to raise the expected rate of future domestic currency depreciation and maintain interest parity.) Once the economy has reached point 2 on DD_2, aggregate demand equals output and producers no longer

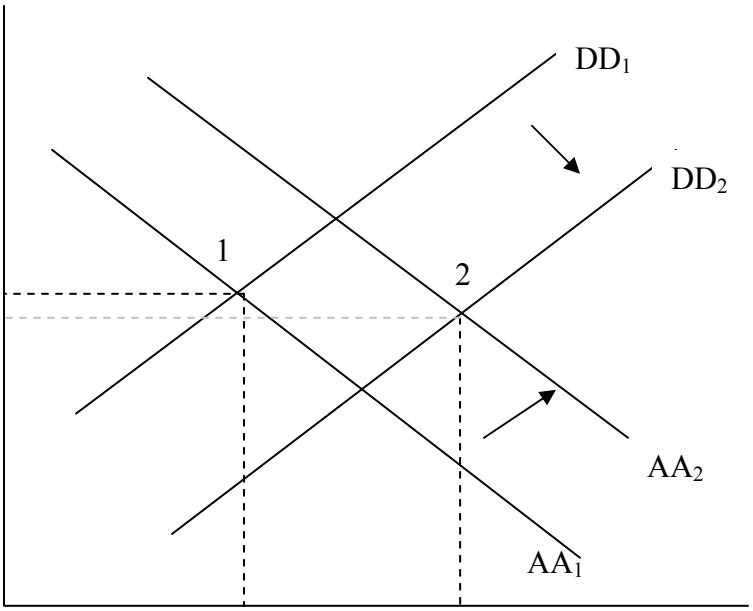
face the involuntary inventory accumulation. The economy therefore settles at point 2, the only point at which the output and asset markets clear.

Figure 2



(b) A temporary tax cut shifts the DD curve to the right. Since the tax cut is financed by an increase in the money supply, it generates an outward shift of the AA curve. As a consequence the equilibrium moves from point 1 to point 2. The net effect on the exchange rate is ambiguous, but output certainly increases more than in the case of pure fiscal stimulus. [Can you think of what unfavorable implications such policy mix might have?]

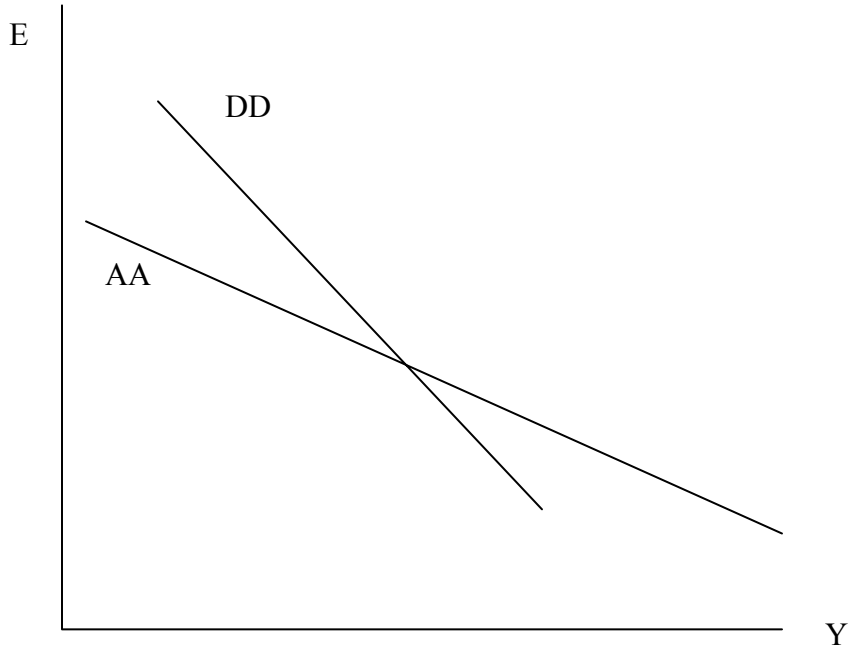
Figure 3



Question 2 – Modification of AA/DD diagram

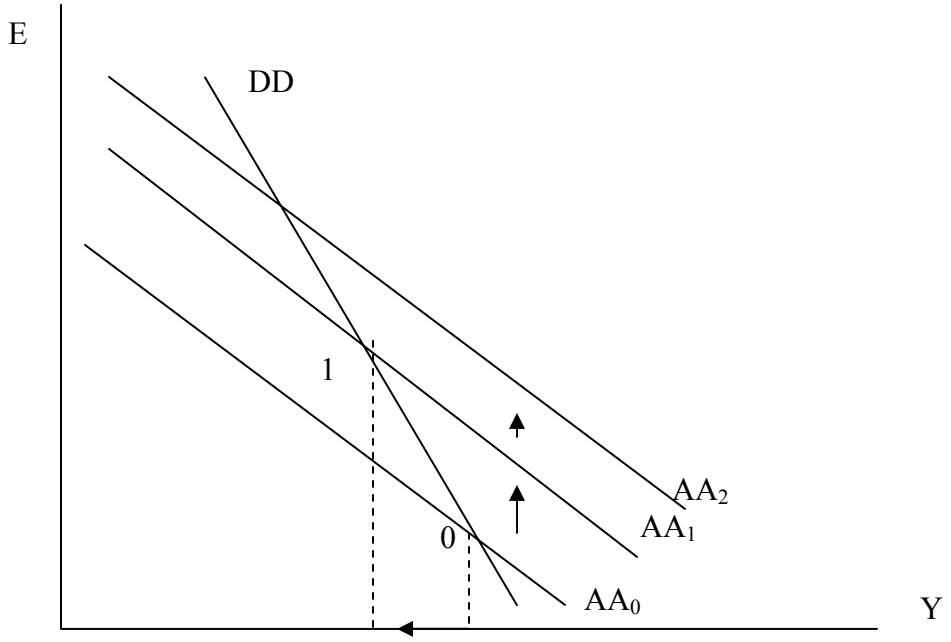
The DD curve might be negatively sloped (though probably DD will be steeper than AA) in the very short run if a depreciation of the currency follows a J-curve effect on the CA. This situation is depicted in Figure 4 below.

Figure 4



(i) A temporary monetary expansion, while depreciating the currency, would reduce output in the very short run. This is shown by a shift in the AA curve to AA_1 and a movement in the equilibrium point from 0 to 1. Only after some time would the expansionary effect of monetary policy take hold (assuming the domestic price level did not react too quickly), as the DD curve starts rotating to its "normal" slope. As a result of the reduction in output, the domestic interest rate will need to fall further than it normally would to clear the home money market. Correspondingly, the exchange rate will overshoot more sharply to create the larger expected domestic currency appreciation required for foreign exchange market equilibrium. Hence, J-curve effects amplify the volatility of exchange rates by introducing an additional source of overshooting. These effects are amplified when the monetary expansion is permanent as the AA curve would shift out more (to AA_2) due to an increase in E^e and the fall in output would be worse.

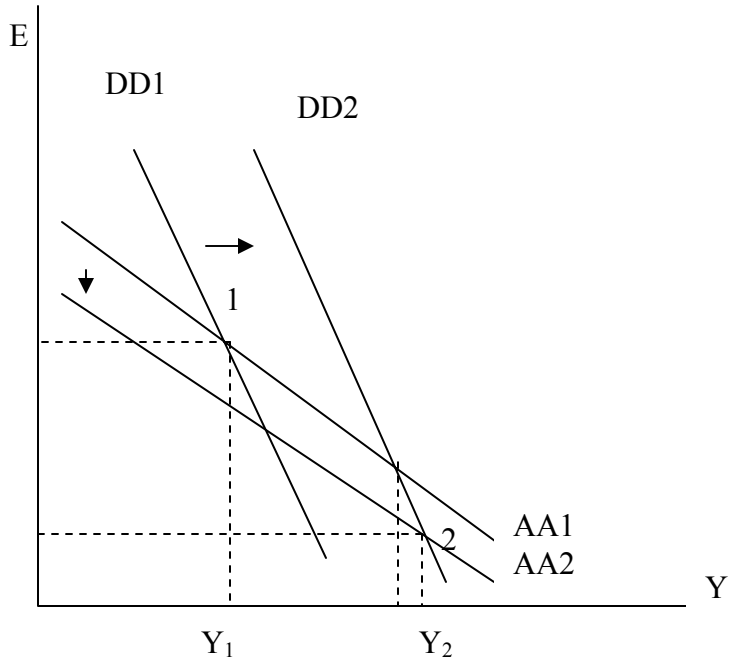
Figure 5



(ii) The effects of a temporary fiscal expansion, depicted as a shift in the output market curve to DD_2, would not be altered since it would still expand output and appreciate the currency in this case (the equilibrium point moves from 1 to 2). A permanent fiscal expansion will see a shift in the output market curve to DD_2 as well as a shift in the AA downwards to AA_2, amplifying the expansion in output and the appreciation of the home currency. The shift in the AA downwards to AA_2 reflects the fact that increased government expenditure will increase the relative demand for domestic goods, and this will lead to a real exchange rate appreciation in the long run. This long run appreciation in turn triggers a future nominal appreciation (because price levels remain unchanged if output and money supplies do not change in the long run). This expected appreciation shifts AA down which, in our model, stimulates output even more in the short run. Note the contrast between this model

and the "standard" AA/DD diagram (with upward-sloping DD curve): permanent fiscal policy was ineffective in the SR in the standard model, but it is very effective in the AA/DD model with J-curve effect in the SR.

Figure 6



Question 3 – Fixed Exchange Rates and Central Bank Intervention

a. An increase in the price of imports worsens the trade balance and the current account. Remember that countries that have current account deficits are borrowing from abroad. A reasonable assumption then is that whenever a country borrows from abroad it is expected to repay. Thus, we believe CA surpluses are necessary in the future. If the markets believe this story also and they either expect currency depreciation in the future in order to create the needed CA surpluses or they simply get worried about the country's ability to generate exports and thus CA surpluses, there will be a pressure on the currency to depreciate. The central bank has to sell foreign reserves (this increases demand for the domestic currency and lowers demand for foreign currency) in order to prevent the currency from depreciation. This action lowers the money supply.

b. The money supply falls, thus interest rates increase. In the AA/DD framework, we can see that output falls. Also, the exchange rate indeed appreciates as a result of this intervention. If the economy is in recession or below potential output the foreign exchange intervention would further deteriorate the situation in the economy. So, the central bank is faced with a choice between defending the peg and stabilizing the economy.

c. The central bank can sterilize the intervention by buying domestic bonds to offset the fall in the money supply. In this situation neither output nor interest would be affected.
d. If Asian central banks sell their foreign reserves (or stop buying them), difficulties would arise in financing of the US CA deficit. This should imply a correction of the CA deficit, higher interest rates in US (to attract foreign central banks and other foreign investors into buying US assets) or depreciation of the dollar.

Question 4

(a) Since Italy effectively had to maintain a fixed exchange rate with the DM, its monetary policy had to be dedicated to this aim only and thus could not be used for output stabilization. Therefore, Italy had only the fiscal policy tool available for macroeconomic stabilization. On the other hand, Germany was not constrained in any way because other countries were pegging their currencies to the peg, while the DM was un-pegged (it was the reference currency). If you thought however that there was some coordination mechanism through which Germany was committed to alter its monetary stance to assist Italy in maintaining the peg, then Germany's monetary policy is also constrained.
(b) Even though Italy had a floating exchange rate with the dollar, the floating exchange rate framework is not appropriate in analyzing the Italian economy. Italy has to achieve one target – the fixed exchange rate with the DM – and for that it needs to devote one policy instrument – the money supply. Therefore, Italy's monetary policy is unavailable for internal macro stability purposes, but it always changes as required to maintain the peg.

Question 5 – Speculative Attack on the Forint

a. As we have seen in the Balassa-Samuleson effect, if we expect Hungary to have faster growth and productivity gains (relative to Western Europe), then we expect higher inflation rates in Hungary and a real appreciation of the forint.
b. Say there is a pressure on the currency to appreciate. The central bank, dedicated to maintain a currency band, has to intervene by lowering the interest rate (increasing the supply of forint to offset the appreciative pressure). However, lower interest rates would have an adverse effect on inflation – they would cause the central bank to overshoot its inflation target. An alternative way to think about this is that the Hungarian central bank cannot achieve two different targets with only one policy tool.
c. We know there are inflationary pressures in the economy and we also know the central bank is strongly committed to achieving its inflation target. Therefore, we expect Mr. Jarai to increase interest rates in order to tame inflation and compromise the exchange rate band. Indeed, speculators were betting that the Hungarian central bank will revalue the forint. If we believe this, than we should buy forints.
d. If I want to fight this speculative attack then I have to lower interest rates. Foreign investors are attracted by higher expected interest rates, so lowering the interest rate discourages them as well as shows them that the central bank does not allow

deviations from the exchange rate band. The risk in this case is that inflation might get out of control. A lower interest rate means higher money supply, which creates inflation.

e. Mr. Jarai established his reputation through this episode. He signaled to the markets his strong commitment to both targets.

Question 6 - True/False/Uncertain questions from old midterm exams

(a) An increase in domestic output is always associated with a nominal appreciation of the domestic currency;

False: unless we know what the underlying shock is, we cannot tell. In AA/DD, monetary expansion increases output and depreciates the currency. Temporary fiscal expansion increases output and appreciates the currency

(b) Countries like China have the best of both worlds: they simultaneously run large current account surpluses and attract foreign private capital;

Uncertain. The key here is the BoP identity: CA + NRFA = OSB so if CA>0 and NRFA>0 then it implies that the Bank of China is accumulating reserves (which it is doing). Piling up reserves in the central bank gives an insurance against balance of payments crisis, but may not be the most profitable investment for the central bank. If the value of the dollar suddenly falls, and the Central Bank of China holds a lot of dollar reserves, its net worth will subsequently fall. Also, CA>0 is not per se a good thing and maybe China could grow even faster if it consumed more and bought more capital goods from abroad.

(c) According to the theory of Purchasing Power Parity, countries with high domestic inflation rates should experience a high rate of real depreciation of their nominal exchange rate relative to the currency of countries with lower inflation rates.

False. Remember that under PPP the real exchange rate is constant (or equal to 1). Thus any differences in inflation rates would not affect real exchange rates, but would be exactly matched by changes in the nominal exchange rate. However, note that the statement is true if it refers to nominal exchange rates. Remember that PPP states: $E_{d/f}=P_f/P_d$. *In percentage growth rates:* $\%\Delta E = \pi_f - \pi_d$. *Therefore, higher inflation countries experience high rates of nominal appreciation (remember that a fall in E represents an appreciation). [For practice, think about the answer to this question according to Balassa-Samuelson theory instead of PPP.]*

(d) You read in the press: 'The strength of the dollar comes from the faster growth of the US economy.'

Ambiguous. The link between output growth and the exchange rate is ambiguous and depends upon the nature of the shock and which theory we are considering. In the monetary approach, an increase in domestic output would lead to an appreciation.

In the Balassa-Samuelson model, the appreciation comes from the faster productivity (and hence output) growth in tradables. In the AA/DD framework, an increase in output is associated with different exchange rate movements depending upon whether it results from a monetary expansion (depreciation) or a fiscal expansion (appreciation).

(e) Fiscal policy is less effective in more open economies with flexible exchange rates.

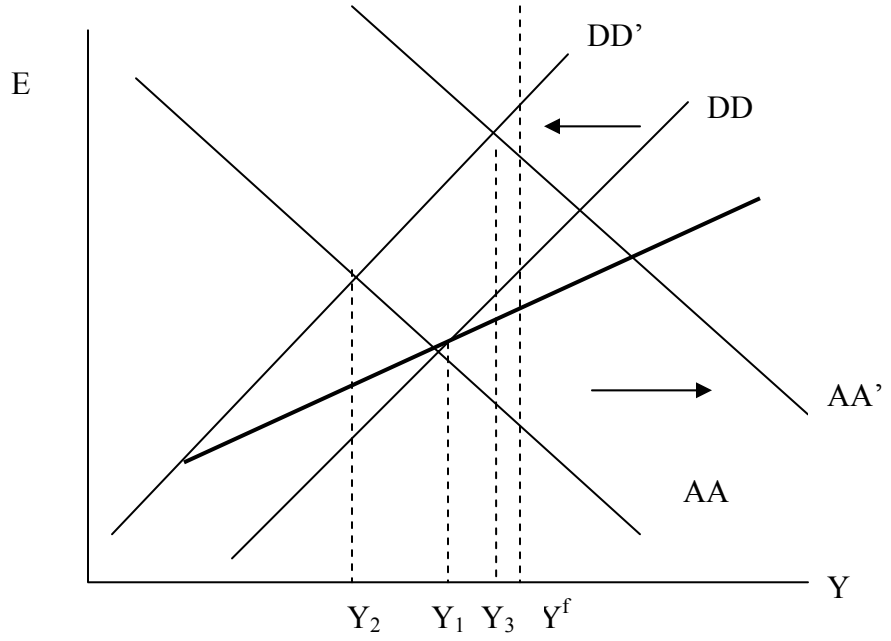
True. Fiscal policy is not effective with flexible exchange rates because it creates an appreciation of the real exchange rate, which in turn shifts the IS curve back in.

(f) Uncovered interest parity states that countries with high interest rates will see their currency appreciate over time, as they offer more attractive returns than foreign assets.

False. UIP says that a higher interest rate should be matched by an expected depreciation so that there are no possibilities for arbitrage. Remember $i=i^*+$ (expected rate of depreciation), so higher i means higher rate of depreciation over time.

Question 7 – The Greenspan 1992 package

(a) A contractionary fiscal policy leads to lower output (if we started from Y_1, we are now at Y_2) and a depreciated nominal exchange rate. As a result the CA is in surplus.
(b) If this policy had been implemented in the US after 1991, the recession would have worsened and the trade surplus would have increased.
(c) A monetary expansion would increase output towards its full-employment level. This would also lead to a high nominal exchange rate.



(d) The Federal Reserve might have been reluctant to increase the money supply due to money neutrality. That is, any increase in the money supply will ultimately lead to higher price levels. As a consequence, the initial attempt to increase output will be offset by the subsequent increase in prices. In addition, we can recall that the Fed's mandate is to maintain monetary stability and remain independent of decisions of the executive.
(e) The tax cuts would lower budget revenue and thus reduce the surplus, or create a fiscal deficit. Chairman Greenspan needs outstanding government bonds in order to perform open-market operations and alter the money supply. In order to increase the money supply, the Fed needs to buy government bills. But if there are no outstanding government bills, than the Fed can increase the money supply only by buying privately issued bonds. Mr. Greenspan was worried about having to do that and this explains why he favored the tax cuts at that time.