Department of Economics
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Economics 182

Suggested Solutions to Problem Set V

1. We have that the money supply, M_0, is fixed because the central bank is pegging the exchange rate. Because the assets of the central bank equal its liabilities (neglecting net worth), we can say that

$M_0 = D + R = D_0(1 + \mu)^t + R$

This implies that $R = R(t) = M_0 - D_0(1 + \mu)^t$. Debt monetization means that the central bank is purchasing government debt with domestic currency. Since there is a currency peg, the central bank must keep the total money supply fixed. This means that debt monetization leads directly to *reserve depletion*, and hence, the currency peg comes under threat. When R = 0, we have

$M_0 = D_0(1 + \mu)^t \Rightarrow (1 + \mu)^t = M_0/D_0$

Taking logs, we get

$t \log (1 + \mu) = \log (M_0/D_0)$, or $t^* = \log (M_0/D_0)/ \log (1 + \mu)$.

So algebraically, reserves will be exhausted by debt monetization in t* periods of time. But from the appendix in Chapter 17, we know that rational participants in the financial markets will understand the consequences of the government's policy, and hence will stage a speculative attack on the central bank's reserves, not wanting to be left holding domestic currency when it must inevitably depreciate once reserves run out. So no, the government will not be able to monetize debt for t* periods. It will lose all its reserves before that time.

2. The Fisher equation tells us that $i = r + \pi$. In that case, after stabilization, with a fixed exchange rate, interest parity tells us that

$i = i^* = r^* + \pi^* = 2 + 1 = 3\%$.

So nominal interest rates fall to what they are in the US, that is, 3%. Since domestic inflation falls to 15% (which is given), the new real interest rate in the domestic economy is

$i - \pi = 3 - 15 = -12\%$.

So the stabilization results in inflation initially falling, which with interest parity implies a new real interest rate of -12%. This leads to an expansion in consumption and investment, because borrowing is so cheap in real terms.

But wait, we're not quite out of the woods. By definition, the real exchange rate $q = EP^*/P$. This implies that

$\%\Delta q = \%\Delta E + \%\Delta P^* - \%\Delta P = \%\Delta E + \pi^* - \pi$.

Because foreign inflation is 1%, domestic inflation is 15%, and the fixed exchange rate means that $\%\Delta E = 0$, we have

$\%\Delta q = \pi^* - \pi = 1 - 15 = -14\%$. That is, there is a real appreciation of 14%.

This leads to a current account deterioration, which over time slowly reduces aggregate demand, and hence, aggregate income (imagine a rightward shift in the DD curve). Therefore, the post-stabilization boom turns into a real-appreciation-driven bust. Investors see a contracting economy and current account deficits, and decide to sell their holdings of the country's assets. This happens because domestic inflation exceeds foreign inflation alongside the fixed exchange rate. This basic dynamic is behind why Argentina had its crisis in 2001, and why many other countries in the past that tried to control inflation by pegging the currency had currency crises as well. When domestic inflation continues to exceed foreign inflation, we'll see a current account depreciation because of the persistent real appreciation.

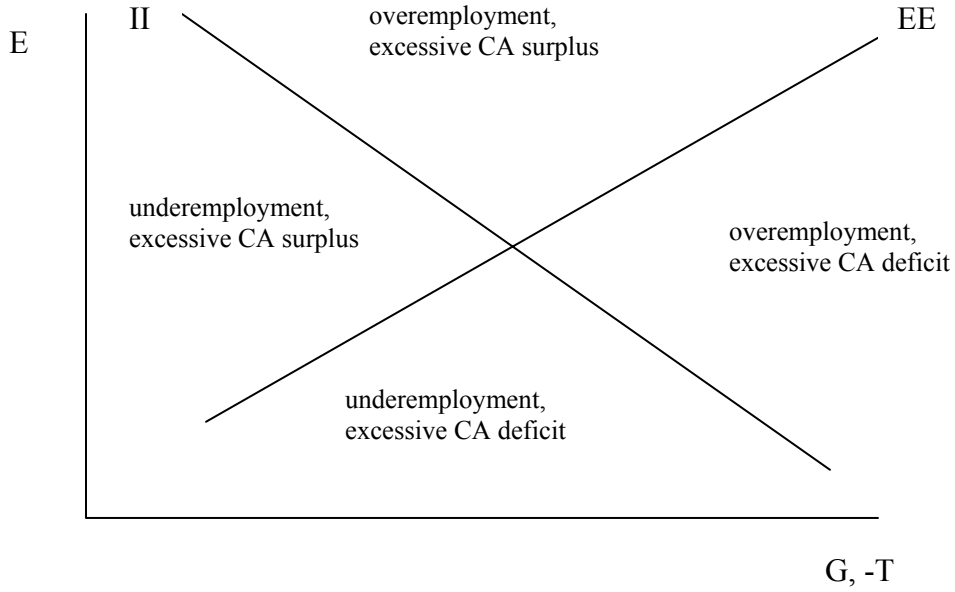
3. Many of you wrote that deficit countries are those running current account deficits, and that because countries running CA deficits are borrowing from foreigners, they are more constrained to have to pay back their debts than, say, a country that is a net foreign lender. A country with a CA surplus seeks repayment, which is not a constraint in the same sense. This is certainly correct, and that story is basically correct.

If countries have fixed exchange rates, then persistent CA deficits imply reserve losses for the central bank. Reserve losses inherently pose more of a danger to central banks than reserve accumulation. Why? There is theoretically no limit to how much foreign exchange reserves a central bank can acquire. It can acquire as many reserves as it wants, without threatening the viability of the peg. This is not the case with reserve losses. There is a limit to how much a central bank can sell its reserves – namely, the actual amount of its reserves. If reserves get exhausted, then the currency peg cannot be sustained. So that is why, in practice, we observe that surplus countries have less incentive to adjust than deficit countries. The only thing to add is that "deficit" need not mean only CA deficits, but balance-of-payments deficits in general.

4. Taking cue from question 3, the 1961 revaluation crisis in Germany is a good example of the dangers posed by excessive reserve accumulation. A revaluation crisis is just like a devaluation crisis, except in reverse. Instead of the central bank facing a massive selloff of the domestic currency that forces it to sell its reserves, the central bank faces massive purchases of the domestic currency. To maintain the German peg, the Bundesbank must sell domestic currency by purchasing foreign reserves. If this persists, this floods the marketplace with domestic currency that can lead to a surge in inflation.

Interest rates get pushed downward, and since the Bundesbank historically has a strong aversion to inflation, revaluing the currency in 1961 proves to be the only attractive option. When the Deutsch mark gets revalued, then the Bundesbank stops pegging the exchange rate at the higher level. Doing so allows the bank to stop accumulating reserves, stop increasing the money supply, and enables interest rates to rise. This describes what is going on in China these days. The Chinese central bank is purchasing massive amounts of dollars to keep the yuan fixed against the dollar. In doing so, the increase in the Chinese money supply is threatening to create a major increase in inflation.

5.



We can define the *internal balance* schedule, II, in the same way as done in Chapter 18. That is, it is the set of all points such that

$Y_f = C + I + G + CA(EP^*/P, Y_f - T)$

This has the familiar downward-sloping shape. Increases in G or decreases in T lead to higher aggregate demand. In order to maintain the equality, E needs to fall in order to worsen the current account and bring aggregate demand down.

Define the *external balance* schedule, EE, as the current account balance at some predetermined level X.

$CA(EP^*/P, Y_f - T) = X$

The difference with floating exchange rates is that increases in monetary ease, that is, increases in M, will depreciate the currency and lead to a rise in E. In order to maintain

the equality, a decrease in T is required, in other words, more fiscal ease. Therefore, EE is upward-sloping.

As we can see from the diagram, if an economy is suffering from underemployment and an excessive current account deficit, a dose of monetary ease will move the economy up towards EE. Assuming the economy is southwest to the equilibrium point, fiscal ease is also required. Assuming the economy is southeast to the equilibrium point, fiscal tightening is required to bring the economy closer to internal and external balance.

6. Macroeconomic data reveals that Europe had higher unemployment than the UK from 1998-2003, and lower interest rates, inflation, and growth. All data appear in percent.

Year	Eur: U	UK: U	Eur: i	UK: i	Eur: π	UK: π	Eur: Δy	UK: Δy
1998	9.8	6.1	4.0	7.2	1.1	3.4	2.9	3.1
1999	9.0	5.8	3.0	5.2	1.1	1.6	2.8	2.8
2000	8.1	5.1	4.4	5.8	2.3	2.9	3.5	3.8
2001	8.1	5.1	4.3	5.1	2.1	1.8	1.6	2.1
2002	8.7	4.9	3.3	3.9	2.3	1.6	.9	1.6
2003	8.9	4.8	2.3	3.6	2.1	2.9	.5	2.2

This suggests that if the ECB were setting the UK's nominal interest rates, the UK's inflation almost certainly would have been higher. However, it is possible that growth would have been higher and unemployment a little lower. If the UK were pegged to the euro, we can reasonably conjecture that this might have been the case.