14.02 Fall 2001
Problem Set 6
Posted October 24, 2001
Due October 31, 2001

I. True/False (explain) (30 points, 5 each)

1. Your wealthy grandmother has all her wealth invested in US government bonds. On a recent trip to the Carnival in Rio de Janeiro, your grandmother returns and enthusiastically describes to you how the interest rate on Brasilian bonds is so much more desirable in comparison to the low interest she gets on her US bonds, and that as a result she will invest her wealth in Brasilian bonds instead. Is your grandmother's reasoning true or false? and what do you tell her? (Assume you care for your grandmother whether out of altruism or because you stand to inherit her fortune.)

2. The finance minister in Trustlesstan is fed up with the high interest payments his government has to pay on its debt. He cleverly decides to issue government debt denominated in US dollars instead. To his great surprise, the interest rate on this new debt still exceeds the interest rate on similar maturity US government debt. True or false: He should ask for his money back from Olivier Blanchard, the author of his 14.02 book.

3. In a last ditch attempt to keep his job, our friend the finance minister of Trustlesstan, is persuaded by Blanchard not to prosecute and even to order a newer snazzier edition of his textbook. Blanchard then advises him to devalue the currency in order to increase demand for domestic goods and improve the trade balance as a result. Our hapless finance minister is fired from his job a week after devaluing the currency because net exports fall as a result. He is replaced by another finance minister who is credited for increasing net exports in later months because of his patriotic speeches. True or false: the new minister is certainly effective.

4. There are two countries: Harvard and MIT and the unit of exchange in each country is the GPA of the respective country. Suppose initially that the two countries initially fix their exchange rate at one-to-one. Your current GPA is very low. A friend recommends you take 14.02 to boost your GPA for sure. But you have the choice between taking 14.02 at MIT or a similar course at Harvard. (charisma of TA does not enter your decision). If you invest one hour a week in 14.02 at MIT (a realistic assumption) the return is a GPA increase of 1 point, while at Harvard you would get 3 points. True or false: if the registrars maintain the fixed exchange rate at one-to-one, the MIT class will

be deserted. How can the situation be improved? (Assume your TA actually enjoys teaching.)

5. You are deciding whether to move to Ukraine or to stay in the US. You decide to calculate the relative price of goods between the 2 countries (only the real exchange rate enters your consideration of which country to live in). You look up the exchange rate and find that it is 0.2 US$ per one Hryvnia. You then look up the GDP deflators of the two countries and find that the GDP deflator in Ukraine was 50 while for the US it was 100. True or false: you conclude that it is 10 times more expensive in the US than in Ukraine, so you move there.

6. Suppose $M^d/P = YL(i)$, but prices are fixed in the short run. Suppose there is an expansionary monetary policy today. Also assume to be true that money is 'neutral' in the long run (that is $\Delta M/M = \Delta P/P = \Delta E/E$ in the long run). In the short run, the increase in money supply leads the exchange rate to depreciate but less than the long run value.

II. Small versus Large Economy (30 points)

Suppose there are two types of countries in the world, small and large. The behavioral equations for the small country are:

$C = \alpha Y$

$I = \beta Y - \gamma i$

G given (exogenous)

$NX = \delta Y^* - \lambda Y - \mu^s \frac{1}{E}$, where the superscript "s" denotes small, and have assumed that prices are fixed so e = E.

There are similar behavioral equations for the large country: $\mu^s > \mu^l$.

1. (5 points) What does our theory tell us about the relation between E (defined as in class and book) and net exports?

2. Now suppose $E^e_{t+1} = \bar{E} = 1$. Also suppose that the world interest rate is described by: $i^* = (1 - a^s)\,\bar{i}^* + a^s i$, where $\bar{i}^*$ is dependent on economic conditions in rest of world and a^s is the weight of the domestic interest rate for the small country.

(i) (6 pts) Use the arbitrage condition from trading domestic versus foreign assets and derive E(i). Plot with E on the y-axis.

(ii) (4 pts) Plot on the same graph the relation for a large country, that is $a^l > a^s$. Interpret the different slopes. Where do the two curves intersect?

3. (5 pts) Now solve for the goods market equilibrium in each country. What is the slope of the IS with i on the y-axis. Plot the two curves for a small and large country respectively (μ^l versus μ^s). How do they compare?

4. (5 pts) Now include a standard LM curve in the (i,Y) space. Analyze the effect of a monetary expansion in the two countries. In which country is monetary expansion more effective with respect to altering Y?

5. (5 pts) Now analyze the effects of a fiscal expansion in either country. Where is fiscal policy more effective?

III. Non-standard IS (20 points)

Recall that the standard IS relation is (holding prices fixed):

$$Y = C(Y - T) + I(Y, i) + G + NX(Y, Y^*, E)$$

Now assume that $T = 0$ (for simplicity) and that there are two types of consumers: workers and profit earners (employers). Workers' consumption function is $C_1(\frac{WY}{E})$. That is, consumption is still a function of "real" income, but it is more complicated than just Y. Workers in this economy earn a wage W for the value of their real output, Y (their nominal income is WY). They then consume goods whose price is E (or some $P = \alpha E$). To get a kick out of this model, we need to assume that profit earners (employers) have a different consumption behavior. For example their consumption $C_2(Y - \frac{WY}{E})$ falls entirely on imports. Continue to assume that NX respond positively to exchange rate depreciations (for example the exports of this country are not consumed at home and so a nominal depreciation affects the relative price of this country's exports).

1. (5 pts) Why might we want to model consumption as a function of WY/E rather than just Y?

2. (5 pts) Graph the standard IS curve and the new IS curve in the (i,Y) space. Assume that the other components of demand are unchanged. How do the two curves compare? Continue to assume that the IS is downward sloping.

3. (5 pts) Is monetary policy more or less effective than in the standard case? Why?

4. (5 pts) Now suppose workers gain bargaining power through newly established strong labor unions after a period of large devaluations drove people to the street in riots. These labor unions decide to index the wage to the exchange rate. So before it was just a given value, W. While after it is some W = E (or some $W = \beta E$). Why might they want to do this? What is the effect on the IS curve?

IV. Balance of Payments Crisis with a Fixed Exchange Rate (20 points)

Recall that we had previously studied the balance sheet of the Central Bank:

Assets	Liabilities
government bonds (B)	High-powered money (H)

Things are not so easy anymore in an open economy. Now the balance sheet of the Central Bank is:

Assets	Liabilities
domestic assets (B)	High-powered money (H)
foreign assets (F)	

Continue to assume that the domestic assets held by the central bank are government

bonds, B. However it also holds foreign assets (known as foreign reserves.)

1. (5 pts) Initially, the exchange rate is fixed and is believed to remain so in the future. What does this imply about the domestic interest rate, i in relation to i*? If the Central Bank engages in a purchase of foreign reserves, what does this imply about its holdings of government bonds and its liabilities?

2. (5 pts) Now suppose that domestic residents believe that the exchange rate is not sustainable (perhaps because the interest rate compatible with fixed exchange rates is hurting domestic investment). Therefore they assign some probability, π, that the fixed rate will be abandoned in the future and will depreciate by 100%. What happens to i today?

3. (8 pts) Now suppose that the government is actually following a policy that is inconsistent with a fixed exchange rate. That is, the government deficit is being financed by central bank purchases of government bonds. Given a fixed exchange rate, what does a rate of increase of B(assumed to be a constant, μ) imply? (i.e. in continuous time, $\frac{dB/dt}{B} = \mu$) What happens to foreign reserves eventually? What must then happen to the exchange rate and H?

4. (2 pts) Now suppose that the country imposes capital controls (controls on the capital

account), that is it restricts domestic residents from purchasing foreign assets and it restricts foreigners from purchasing domestic assets. Does the interest parity condition still have to hold? Can the Central Bank choose the level of the interest rate independent of the level of the fixed exchange rate?