

## Midterm Exam II: Answer Sheet

1. (40%) Consider a small economy so the country is a price taker in traded goods. Then we can treat foreign and domestic traded goods as a composite good,  $T$ . The country can transform capital and labor into traded and non-traded goods according to some production possibility frontier (PPF) given by its technology. Given preferences, consumption takes place at point  $C_0$ . Draw the PPF for this economy and label point  $C_0$ .

- (a) Suppose that the country receives a transfer from abroad. How would you represent this graphically?

**brief answer** The PPF shifts upward by the transfer. We are now at point  $P_0$ . This follows because the transfer must be of traded goods.

- (b) What happens to production and consumption in this economy? What happens to the relative price of traded goods? Explain. What does this imply about the real exchange rate? Explain. Show the new equilibrium in your diagram.

**brief answer** We move to  $P_0$  but this cannot be an equilibrium because at unchanged relative prices people would prefer to consume at  $P_1$ . But  $P_1$  is outside the PPF so the relative price of non-traded goods must rise. Thus production and consumption moves along the new PPF towards the southeast. Somewhere between  $P_0$  and where the 45-degree line intersects the PPF. The key point is that with the transfer the relative shares of traded goods to non-traded goods has increased. So the price of traded goods must fall otherwise people would prefer to trade them for non-traded goods.

- (c) Suppose that preferences are such that agents really dislike having to substitute traded for non-traded goods (and vice versa). How does this alter your picture? What does it mean economically? Will this cause the relative price of traded goods to change more or less in part (b)?

**brief answer** Consider the opposite case. Suppose people were indifferent between traded and non-traded goods. Then the indifference curves would be linear. There would be no reason for the relative price to change. We would end up at point  $P_0$ . Now if people hate to substitute traded for non-traded goods their indifference curves are very bowed. So we would need a larger change in relative prices to get them to shift their consumption bundle. For example, if they really preferred to consume along the 45-degree line the disequilibrium caused by the transfer would induce a big relative price change.

- (d) Why do we care about the relative price of traded goods? What is the relevance of this question to the issue of the current account?

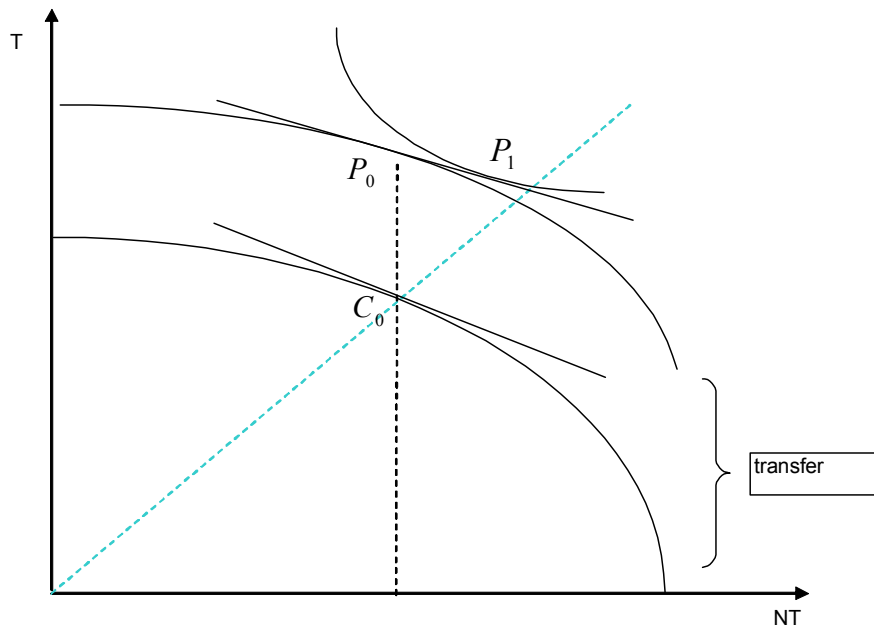


Figure 1:

**brief answer** We care because shifts in the relative price of traded goods effects the real exchange rate. Since traded goods prices are equal across countries, if non-traded goods prices rise domestically our price level rises relative to foreign countries – in other words, the real exchange rate decreases. This is important to understand how a change in the current account balance can be effected.

2. (35%) *What is the difference between the covered (CIPC) and uncovered interest parity condition (UIPC)? Explain.*

**brief answer** CIPC relates interest differentials to the forward premium. Specifically,  $i - i^* = \frac{F_t - e_t}{e_t} \equiv f_t$ . UIPC relates differentials to the expected depreciation of the currency, specifically  $i - i^* = \frac{\hat{e}_{t+1} - e_t}{e_t} \equiv \delta_t$ . The key difference is that with the latter currency risk is present, while with a covered transaction there is no currency risk.

- (a) *If UIPC holds, what relationship would you expect, if any, between the expected future spot rate and the forward exchange rate? Explain. Are there any key assumptions required for this condition to hold? Explain.*

**brief answer** If UIPC holds then we expect the forward rate and the expected future rate to be equal,  $F_t = \hat{e}_{t+1}$ . We can use the CIPC to substitute for the interest differential in the UIPC and we get  $\frac{F_t - e_t}{e_t} = \frac{\hat{e}_{t+1} - e_t}{e_t}$ . [Extra: note that the future spot rate should differ from the forward rate only by the expectation error. For this to hold we also would require agents to have rational expectations].

- (b) *Suppose that agents are risk averse. How would this effect the relationship between the forward price and the expected future value of the spot exchange rate? Explain.*

**brief answer** With risk averse agents people would pay a premium to eliminate the risk. So the forward rate would differ from the expected future rate by the risk premium.

- (c) *What implications would this have for the UIPC? How might you re-write the UIPC in this case? Explain?*

**brief answer** The UIPC would now be  $i - i^* = \delta_t + \rho$ .

- (d) *Suppose that the Central Bank periodically intervenes in the foreign exchange market. Is this likely to eliminate the risk premium? Explain.*

**brief answer** Unlikely. If the central bank intervenes frequently in the market then actual future spot rates may differ from what people expected, if they cannot anticipate central bank behavior. That is why longer-term tests of UIPC tend to produce bigger estimates of  $\beta$ . But if the central bank really stabilizes currencies then there may be less currency risk. In that case the risk premium would be smaller. That may explain why  $\beta$  tends to be larger for fixed exchange rate regimes (except when there are peso problems).

- (e) *Is risk aversion the only reason why the UIPC may not hold? Explain.*

**brief answer** No. Peso problems may be another reason. Or agents may not have rational expectations. If forecasts are not unbiased then UIPC may not hold in the data.

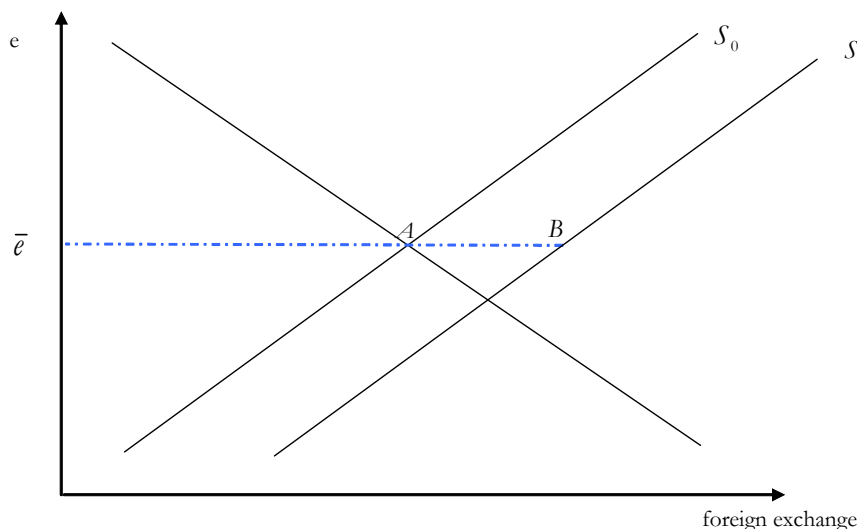


Figure 2:

3. (25%) Suppose an economy has a fixed exchange rate. Suppose that something happens to make the economy more competitive internationally (how is unimportant for this question), and that this effect is expected to persist. What effect would you expect this to have on the supply and demand for foreign exchange? Explain.

**brief answer** The demand for domestic currency will rise relative to the supply. This could occur because foreigners want to invest more, or because we export more. So if we draw a diagram of the foreign exchange market we see that the supply of foreign exchange will increase relative to the demand. Increased demand for dollars means more supply of foreign currency. For simplicity, assume that initially the fixed exchange rate  $\bar{e} = \tilde{e}$  the market-clearing rate. There is now an excess supply of foreign exchange equal to  $AB$  in figure 2 .

- (a) How is the fixed exchange rate maintained given the increase in competitiveness? Explain.

**brief answer** The central bank must buy up the extra foreign exchange to prevent its price from falling. They will sell dollars and accumulate foreign exchange. The foreign central bank is also selling dollars, but this causes its reserves to fall.

- (b) Given the fixed exchange rate, if the central bank does not engage in sterilization what will happen to the stock of money in the economy? Explain.

**brief answer** Foreign reserves are increasing, so the the monetary base rises. This means the money stock must rise. The central bank is selling dollars and purchasing foreign currency, so clearly the supply of dollars must be increasing. More formally, we know that the money stock is a multiple of the monetary base:  $M = \mu MB = \mu(IR + DS)$ , where  $\mu$  is the money multiplier. So if  $\Delta IR > 0$  then  $\Delta M > 0$ .

- (c) *If the central bank engaged in sterilization what would they do? Why might they want to sterilize?*

**brief answer** They would sell domestic securities to soak up the increase in liquidity. Obviously if they set  $\Delta DS = -\Delta IR$  then the monetary base is unchanged. They may wish to sterilize to avoid the inflation that a monetary expansion might imply. This could hurt competitiveness, for example, since the exchange rate is fixed. With higher prices and a fixed exchange rate the real exchange rate would depreciate, reducing our competitiveness. That could be a reason.