

Midterm Exam I: Answer Sheet

Read the entire exam over carefully before beginning. The value of each question is given. Allocate your time efficiently given the price schedule that is imposed. There are no trick questions.

1. (30%) Consider the two-country model of interest-rate determination with savings and investment. Suppose that at the initial world interest rate the home country has a current account surplus. Draw the savings-investment diagram and the equilibrium world interest rate for both countries.

See figure 1.

a) Suppose that preferences in the foreign country change so that savings is greater at every value of the interest rate. Show (using graphs wherever possible) what happens to the current account balance in the domestic and foreign country. What happens to the equilibrium world interest rate?

At the initial world interest rate the current account deficit in the foreign country has decreased. Since the current account has not changed in the home country, this means that the world current account is now in surplus. The price of current consumption must decrease, so the world interest must fall. This reduces the current account surplus in the home country. In equilibrium, the current account deficit in the foreign country is lower than before, and the current account surplus in the home country is also lower than initially, and the equilibrium world interest rate is lower.

b) Suppose instead that a war broke out involving the foreign country, but that the domestic economy was neutral. Show what happens to the current account balance in the domestic and foreign country. What happens to the equilibrium world interest rate?

Now savings in the foreign country is lower than before at every interest rate. The answer is similar to in part (a) but the countries are reversed.

c) Suppose that the foreign country was not allowed to trade with the rest of the world. Show that in this case the opportunity cost of going to war is greater for the foreign country. Explain.

In a closed economy savings and investment must be equal. The increased war expenditures must be financed out of lower consumption or lower investment, or some combination of the two. The interest rate in the closed economy must increase more than in the open economy. Hence, greater adjustment in the current period must take place. The price of future consumption falling, current consumption must go down.

2. (20%) Explain what is meant by the terms, covered interest parity and uncovered interest parity.

Covered interest parity implies that the expected return on domestic assets is equal to the expected return on foreign investments that are *covered* by forward purchases of domestic currency. Hence, in a covered investment currency risk has been hedged. Uncovered interest parity implies that the expected

return on domestic and foreign investments are also equal, but without any forward cover. The expected return to the foreign investment is calculated using the *expected* exchange rate for the period when the conversion back to domestic currency takes place.

Is it possible that the covered interest parity condition is satisfied but the uncovered interest parity condition is not? Explain.

Yes. Both conditions derive from the assumption that arbitrage equalizes expected returns. But risk-averse investors care about more than expected return; they also care about uncertainty. A risk-neutral investor will be indifferent between two investment that yield the same expected return. A risk-averse investor, on the other hand, trades off expected return to reduce risk. Hence, if investors are risk-averse they will not arbitrage away all differences in expected return if the respective investments bear different risks. Uncovered investments in foreign assets bear currency risks that are not present with domestic investments. Hence, arbitrage would not equalize returns if investors are risk averse. But for covered investments, currency risk has been hedged. Consequently, expected returns will be equalized via arbitrage.

Suppose that the forward premium (dollars for yen) on 6-month contracts is positive. What does this tell us about interest rates on comparable US and Japanese assets if the covered interest parity condition is satisfied? Explain.

CIPC implies that the interest differential (domestic minus foreign) is equal to the forward premium. A positive forward premium means that the forward exchange rate exceeds the spot rate. Hence, converting yen back to dollars occurs at a less favorable rate than today. This capital loss must be compensated by higher interest rates on domestic assets.

Suppose that uncovered interest parity also holds, what does the market expect to happen to the dollar over the next 6 months?

If UIPC also holds, then the expected exchange rate is equal to the forward rate. Because there is a positive forward premium, this means that the market expects the exchange rate to appreciate, or the dollar to decline in value relative to the yen. This is consistent with higher interest rates on dollar investments.

3. (15%) Use a supply and demand diagram for the market for foreign exchange (define the exchange rate to be the dollar price of foreign currency) to answer the following questions. [Assume that initially the fixed exchange rate is equal to the market clearing exchange rate.]

a) *What happens to the market-clearing exchange rate (\tilde{e}) if there is an increase in the demand for US exports? Under a regime of fixed exchange rates, what must be the effect of this change on the central bank's holdings of foreign exchange?*

An increase in the demand for US exports results in an increase in the supply of foreign exchange. Hence, the market clearing exchange rate falls. Consequently, . To keep the exchange rate from depreciating the CB must sell dollars and purchase foreign exchange; hence, its holdings of foreign exchange are increasing.

b) *Suppose that technological innovations overseas increases US direct foreign investment [assume*

that nothing else has changed]. What happens to the market-clearing exchange rate (\tilde{e})? Under a regime of fixed exchange rates, what must be the effect of this change on the central bank's holdings of foreign exchange?

Increased US DFI increased the demand for foreign exchange. The market-clearing exchange rate (\tilde{e}) increases. To prevent the exchange rate from appreciating the CB must sell foreign exchange, so its foreign reserves are decreasing.

c) Suppose that the fixed exchange rate exceeds \tilde{e} . Can this situation be sustained indefinitely? Explain. What of the opposite case, where the fixed exchange rate is below \tilde{e} ? Explain. What happens when the fixed rate is no longer sustainable.

The first case is like (a). With $\tilde{e} < \bar{e}$ the CB is accumulating foreign reserves and selling dollars. This can continue indefinitely because domestic currency can be created to meet any excess demand. The second case, on the other hand, is not sustainable, because now the CB is selling foreign exchange, of which it has a finite supply. It can support the domestic currency only as long as it has sufficient stocks of foreign reserves (or as long as the foreign central bank is willing to swap its currency for dollars at the fixed rate). When the exchange rate is no longer sustainable the excess demand for foreign exchange will cause the exchange rate to appreciate. Two possibilities are present: first, the CB could set a new exchange rate but continue to fix it. Alternatively, the CB can let the currency float and be determined by the market clearing condition. Notice that if the former alternative is chosen, the date of the policy change is likely to be earlier, because the CB will need reserves to sustain the new exchange rate. If floating is chosen, the required level of foreign reserves needed by the CB is reduced.

4. (20%) The current account balance can be expressed as the difference between savings and investment. Explain why this is so?

Savings is the difference between income and consumption. If investment exceeds savings, domestic production is insufficient to support both consumption and investment. The extra resources must come from external sources; hence, a current account deficit. Another way to think about this is that if you spend more than you earn you must borrow; hence, your net assets decline. For a country this means net foreign assets decline. But the current account is just the change in net foreign assets.

Suppose that we distinguish between public and private savings. Then we can define public savings as the difference between taxes and government spending. Provide an expression showing the current account balance in terms of private savings and investment and government spending and taxes.

$$\begin{aligned} CA &= S - I \\ S &\equiv S_{pr} + S_{pub} \equiv S_{pr} + T - G \\ \Rightarrow CA &= (S_{pr} - I) + (T - G) \end{aligned}$$

This is the expression that is sometimes used to discuss “twin deficits.” If private savings and investment are roughly in balance, then a government budget deficit and a current account deficit move together. You might also notice from this expression that if the budget deficit decreases, and if this leads to a decrease in private savings (because less savings is needed to offset future higher taxes -- why is that?) there may be no improvement in the current account. Moreover, if investment increases

with the decline in the deficit, the current account could actually worsen. Some argue that this is what has happened recently in the US.

5. (15%) *Between 1996 and 1998 Thailand has moved from a current account deficit of about 9% of GDP to a current account surplus of 8% of GDP. Why is this a crisis? Explain. Why is it painful for a country to make such a move in such a short period of time? Explain.*

When Thailand had current account deficits of 8% of GDP it meant that capital was flowing into the country. This capital inflow supported expenditures greater than current production. The reversal of the current account deficit is the result of the end of this inflow of capital. With foreigners unwilling to invest in Thailand the capital inflow stopped. But the accumulated debt must be serviced. So now Thailand must export capital; hence, the current account surplus. That is, Thailand must consume less than it produces so it can export capital to service its foreign debt. A sudden decrease in expenditure -- whether it be government spending, consumption, or investment -- of this magnitude -- some 17% of GDP -- is rather severe indeed. Had the withdrawal been less sudden more gradual adjustment could have occurred. For example, if the capital inflow had been used for investment, and had this led to higher future income, it would have been possible to service the debt out of the increased income. Presumably, it was the fear that the inflow was not being used effectively that led to the reversal in the capital account balance.

As an aside from the specifics of this question, we can note that it touches on an important classic controversy in international economics: the transfer problem. This debate first arose in the early 1920's concerning German reparations from WW1. Keynes argued that the burden to Germany of these reparations was greater than the amount that had to be transferred. Suppose, for example, that the French used the entire proceeds of the transfer to purchase German goods. Then the transfer is considered "fully effected." This means that the financial burden of the transfer is equal to the matching transfer of real goods. Keynes argued, however, that the transfer would be undereffected. Because the French would spend some of the transfer on their own goods, the positive effect on the trade balance would be less than the transfer. Hence, the current account worsens at the initial exchange rate, and the terms of trade must deteriorate to affect the transfer. Thus, the transfer would impose a burden greater than the amount of the transfer itself.

Ohlin, the Swedish economist who would later win the Nobel Prize, argued against Keynes. His point was that the recipients of the transfer would spend it on imports as well as on domestic goods, and that the transferor (Germany in this case) would cut its imports as well. Hence, the would increase the demand for Germany's exports, and it would reduce German imports. Ohlin showed that whether the burden of the transfer was greater than the amount of the transfer is ambiguous: it depends on the pattern of spending on domestic and foreign goods in the two countries.

At the time, many thought that Ohlin won the debate. Yet in practice it seems Keynes was probably right. Notice that the transfer from Germany to France raises French income and lowers German income. If the French propensity to buy German goods is less than the German propensity to buy German goods, the world demand for German goods goes down. Hence, the terms of trade go against Germany, and the burden of the transfer is greater than the amount of the transfer. To see this, let TB be the trade balance, and T the transfer. Assume that output is unchanged so that the only source of income changing is the transfer. Let m be the marginal propensity to import in the Germany, and m^* be the marginal propensity to import for France. Then, if the transfer is ΔT ,

$$\begin{aligned}
 \Delta TB &= \Delta X - \Delta M \\
 &= m^* \Delta T - m(-\Delta T) \\
 &= (m + m^*) \Delta T
 \end{aligned}$$

Now if the sum of the marginal propensities to import is less than 1, then the trade balance worsens. This means that the current account worsens, since $\Delta CA = \Delta TB - \Delta T < 0$. Note that this condition is equivalent to the foreign propensity to spend on domestic goods being less than the domestic propensity to spend on domestic goods.

Something like this may be relevant to the Thai case. Thailand must effect a transfer to the rest of the world to repay its debt. To do so it must increase its current account balance. But to effect this transfer it may be necessary for the currency to depreciate in real terms. This increases the cost to Thailand of the transfer.

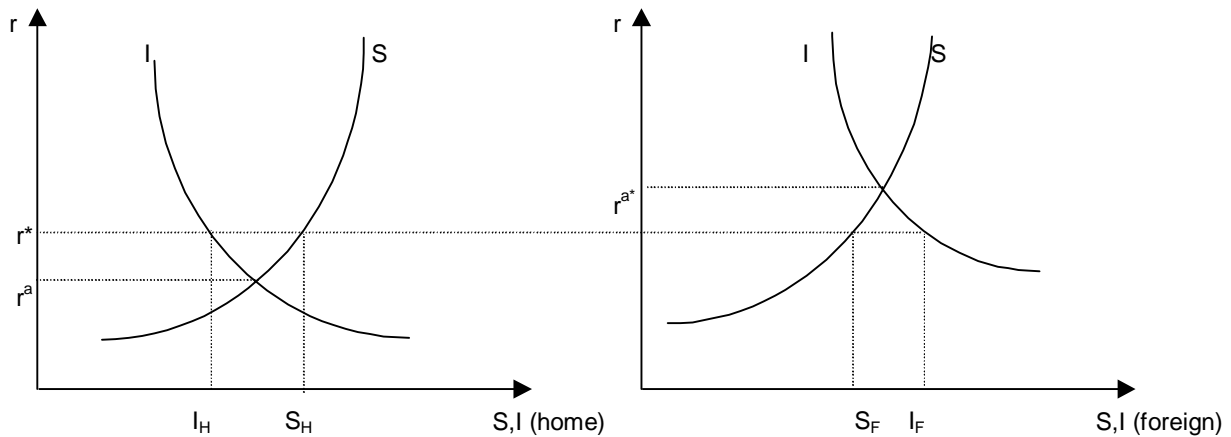


Figure 1