14.02 Principles of Macroeconomics
Problem Set 4 Solutions
Spring 2003

Question 1

a) TRUE
The q theory of investment predicts a tight relationship between changes in investment and changes in the variable 'q' (measured as the ratio of the market value of the firm to the replacement value of the firm's capital). The market value of the firm depends on stock prices, so the theory a fall in stock prices will be reflected in a fall in investment.

b) UNCERTAIN
Remembering the formula for the expected net present value (NPV) of profits, NPV depends positively on future dividends, and negatively on future interest rates. A cut in government spending will result in lower interest rates, but may also reduce output in the short run, which will reduce profits and the expected value of future dividends. So the net effect on the NPV of profits is ambiguous.

c) FALSE
Investment is more volatile than consumption, but this is not because investment represents a larger proportion of output. In fact, investment is a much smaller proportion of output than consumption, but because individuals try and smooth out their consumption levels over time, current investment reacts much more dramatically to changes in economic conditions than current consumption does.

d) TRUE
Once we take expectations into account, the IS curve is much steeper than before. So a short lived change in monetary policy will have more of an effect on interest rates and less of an effect on output than in the basic IS-LM model. Note that since the change in the money supply remains only for a short time, any shift in the IS curve due to changing expectations about future interest rates will not be very large.

e) FALSE
Even though the IS curve is much steeper than before, a persistent change in interest rates may have a very large effect on output through its effect on expectations. This change in expectations will cause the IS curve to shift (eg see Figure 17-4) in the textbook), amplifying the effect on output of the shift in the LM curve.

f) TRUE
Remember that the real exchange rate is given by E P* / P. In the short run (over a few weeks or months) E will be much more volatile than P* or P (since inflation rates are not generally that volatile over short periods of time). Thus, the real exchange rate and the

nominal exchange rate (E) will generally move in the same direction over short periods of time.

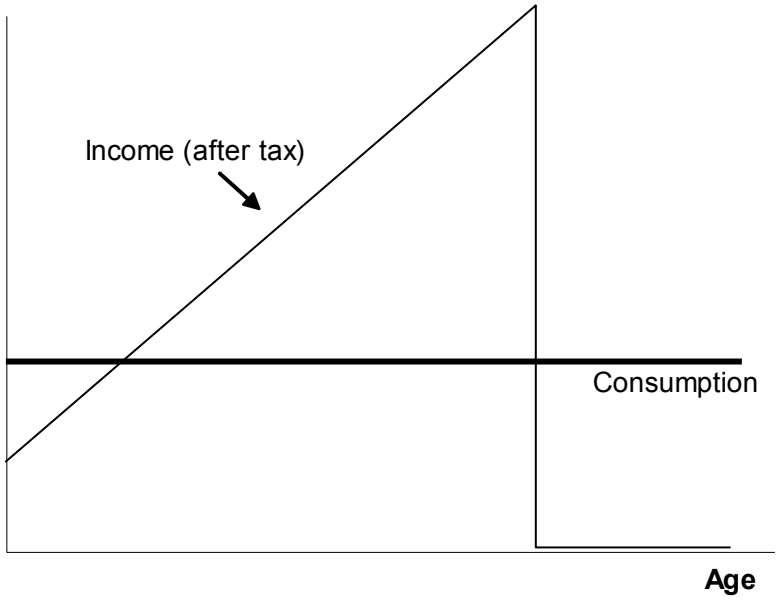
g) FALSE
It is true in theory that the current account balance and capital account balance should add up to zero. In practice, however, the data used to construct the two sides of the balance of payments come from different sources, and because of measurement error the two balances will rarely if ever add up to exactly zero. The difference is called (somewhat unoriginally) the 'statistical discrepancy' and is often quite large.

Question 2

(a) Sum of future earnings = 40 000 + 45 000 + ….. + 240 000
= (40 000 + 240 000)/2 * 40
= 5 600 000 (before tax)

(b) Taking tax into account, you plan to consume (5 600 000 * 0.7) / 60 = $65 333 per year from now until your expected demise in 60 years time.

(c)



As you can see from the diagram, you save in the middle of your life, and dissave during the early part of your working life and after you retire. During the early years, you will have negative net assets (ie. you will have to borrow to finance your high consumption).

(d) Your expected consumption is now (40 000 + 840 000)/2 * 40 * 0.7 * 1/60 = $205333 per year

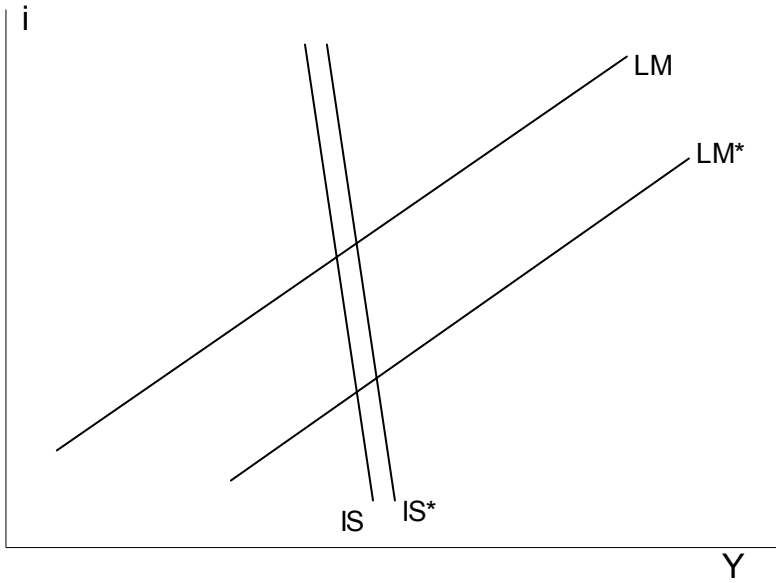
(e) So, comparing your answers in parts (d) and (b), you consume much more in the second case, and thus have to borrow much more in your first year after graduation (since your income is the same in both cases). The reason you borrow more in the second case is because your expected future income is higher (and thus you expect to be able to maintain a higher average level of consumption over your life).

(f) Possible reasons include the following:

- You are unable to borrow money early in your working life to finance your high level of consumption.
- You are worried that your plans for a high-income future might not be realized, and so decide to save early in life as a precaution.
- Your tastes change over your life – when you are young, most of your peers are poor, and so you do not need to spend as much to maintain a comparable lifestyle to your friends.

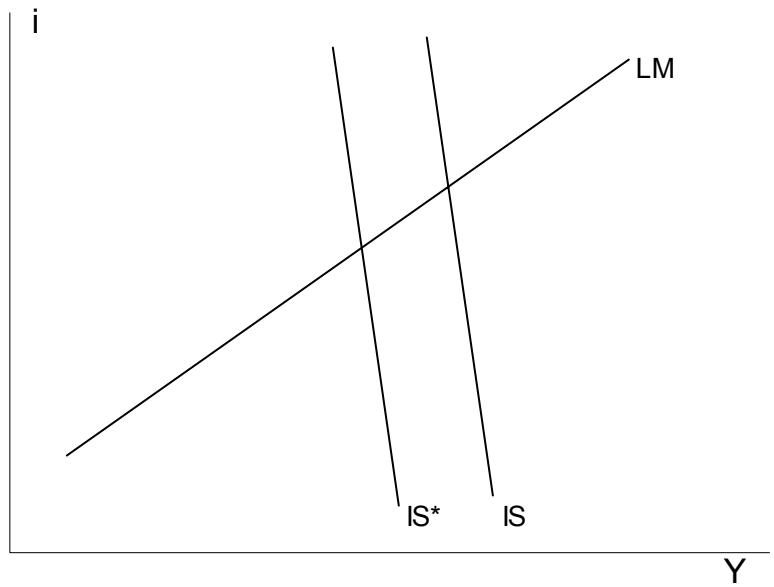
Question 3

(a)



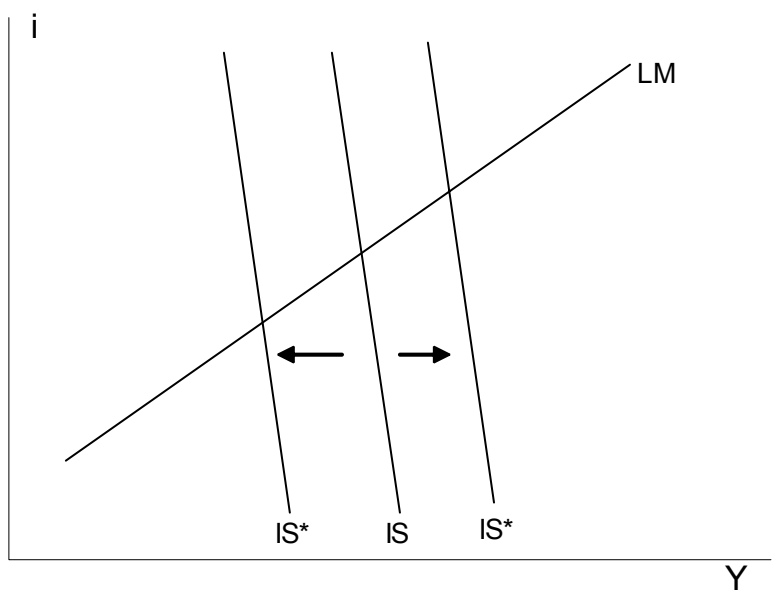
The LM curve shifts outwards as the money supply increases. This has little effect on output relative to interest rates, however, because the IS curve is so steep. Because future expected interest rates are expected to by lower for a short time in the future, the IS curve shifts out marginally, causing a further increase in output. The shift in the IS curve is small though, because the change in the money supply is expected to be sustained only for a short time.

(b)



The LM curve does not shift, because the change in monetary policy occurs only in the future, not in the present. However, the expectation of higher interest rates in the future will reduce the present value of profits, decreasing investment; similarly, the present value of future income will decrease, causing consumption to fall. This, the IS curve will shift inwards, and output today will fall.

(c)



It is not clear in which direction the IS curve will shift. The standard static model predicts that the IS curve will shift outwards, because the increase ing G will increase output in the short run. However, recall that in the medium run, an increase in G will not change Y but will reduce private investment. This in turn may lead to lower output because the capital stock of the economy will be lower. If people take these long run effects into account, current consumption might fall in expectation of lower income in the future, causing the IS curve to shift inwards rather than outwards.

Question 4

(a) E = 500 / 1000 = 0.5

(b) E = 99.8 / 200 = 0.499. Since E has **fallen**, this means the US dollar has **appreciated** during your holiday.

(c) If the trend continues, this means that E will be 0.5 – 0.001*50 = 0.45 in a year's time. The percentage change in E is (0.45 – 0.5) / 0.5 = -10 %.

(d) Recall that Є = E P* / P. With a bit of algebra, we can write

$$1 + \%Є = (1 + \%E)(1+\%P^*)/(1+\%P)$$

where %*x* means the percentage change in *x*. We can rewrite this as:

$$\%Є \approx \%E + \%P^* - \%P$$

as long as the percentage changes are not too large. So if %E = -0.10, %P* = 0.07 and %P = 0.02, then %Є = -0.05. ie the real exchange rate is expected to depreciate by 5 per cent over the coming year.

(e) Uncovered interest parity predicts: $i_t = i^*_t + \%E$. So if $i_t = 0.02$ and %E = -0.10 then $i^*_t = 0.12$, that is, the New Zealand interest rate should be 12 per cent.

(f) Your calculation in part (e) essentially says you will get the same expected return in either country if the NZ interest rate is 12%. So if the NZ interest rate is only 10%, you would be better off investing in the United States, once expected exchange rate changes are taken into account.

(g) To answer this question, remember that other things equal, smaller countries will tend to have higher exports and imports, because they produce a narrower range of goods and services.

Thus, Country B probably has less pro-trade policies than Country C (since they have the same proportion of exports + imports, but B has a smaller population). Also, Country A probably has more pro-trade policies than Country C, since they have similar populations, but A has much higher imports + exports.

Thus, the country with the most pro-trade policies is Country A. The country with the least pro-trade policies is Country B.

(h) (i) Smaller current account deficit (CAD), since imports fall.

(ii) Larger CAD, since net transfers to overseas increases.

(iii) Smaller CAD, since exports increase (domestic services consumed by foreigners, like education or tourism, are part of exports)

(iv) No effect. All that is happening is a reallocation between different parts of the capital account.

(v) Increase in the CAD, since net investment income falls.

(vi) Increase in the CAD, since imports (of tourism services) increase.