

## 14:02 Solutions to Problem Set # 6

### 1. Multiple Choice

1. D. If agents base their decisions on expectations then all three statements are correct. Transitory changes will not have a large effect on expected future values; if people correctly anticipate that the changes will not last, they will not be given much weight in current decisions. Credible policy announcements will affect expectations and thus decisions. If the announcements are not credible, expectations will not be affected and so there will be no impact on agents' behavior.
2. C. The formula for calculating the interest rate for longer maturity bonds based on the average of current and expected short term rates, eg.  $i_2 = (i_1 + i_{1t+1}^e)/2$ . Thus the rate on a two year bond is  $(3\% + 5\%)/2 = 4\%$ , and the rate on a three year bond is  $(3\% + 5\% + 1\%)/3 = 3\%$ .
3. C. If expected interest rates next period fall from 5% to 2%, the rates on both two and three year bonds will fall. The fall will not be one for one, as the rates represent an average of current and expected rates. Thus the rate on a two year bond would be 2.5% and the rate on the three bond is 2%.

### 2. Yield Curves

- a.) All three yield curves are upward sloping, implying that short term interest rates are expected to rise. This can be understood from the formula relating the interest rate on longer maturity bonds to the average of current and expected future short term rates. If the rate on longer term bonds is higher than the current short rate, it must be that expectations are that the short rate will increase. The yield curve for Dec. 93 is less steep, implying that expectations of increases fell over 1993. However, expectations have shifted back again, with the curve even steeper than before.
- b.) Comparing the 3 month rates and the one year rates in Nov. 1992, one infers that people expected short rates to increase. A year later, however, the rate on the 3 month bond was lower, counter to the expectations. Comparing the 3month and 1 year rates from Dec. 1993, one again sees the expectation that short rates would rise. This time the expectations were too low; the short term rates of Oct. 1994 are higher than had been predicted the year before (it was higher even than the previous 5 year rate).
- c.) The first yield curve corresponds to the election of Bill Clinton. Worries about increases in the deficit explain part of the upward sloping yield curve. The passing of the deficit reduction package assuaged these somewhat and the yield curve of Oct. 1993 (2 months after the bill was passed) reflect this greater optimism as the yield curve is flatter. However, since then the curve has become steeper. Rather than the increased taxes and reduced spending leading to a recession, economic growth fuelled inflationary fears. The Federal reserves response of tightening monetary policy over 1994 is thus reflected in the steeper yield curve.

## Long Question

a). If the monetary policy in the second period is unexpected, it will not affect behavior in the first period. In the second period the LM curve would shift out to the right, lowering second period interest rates and income. The second period IS curve would not shift, rather the economy would move down along it. As there is no further future period, there is no role for expectations to be altered and affect behavior, so the second period behaves in the usual way as if expectations did not matter.

b). If the monetary expansion was anticipated, decisions in the first period would be affected. The policy change implies that expected interest rates next period will be lower, raising current investment. Also expected output is higher leading to increased investment and consumption in the first period. Thus the first period IS curve shifts out to the right while the LM remains the same (expectations do not enter the money market equation). Thus this period's interest rate and income rise in expectation of future money growth. In the future when the policy is implemented, the LM will shift out. The IS curve will not shift again, but it is further out than it would otherwise have been. So are expectations are that Y will increase and r will be higher than if the policy was unanticipated.

c). IS:  $Y' = C' + I' + G'$

Plugging in:  $Y' = 1000 + 0.3(Y' - 500) + 300 + 0.2Y' - 0.4r' + 500$

$$Y'(1 - 0.3 - 0.2) = 1650 - 0.4r'$$

$$Y' = 2(1650 - 0.4r')$$

LM:  $M' = Y' - 3i'$ ; as expected inflation is 0, r can be used instead.

$$3200 = Y' - 3r'$$

There are two equations and two unknowns. Plugging in Y' into the LM',

$$3200 = 3300 - 0.8r' - 3r'$$

$$r' = 100/3.8 = 26.31$$

$$\text{And thus } Y' = 3300 - 0.8(26.31) = 3278.9$$

d). The first period variables depend on current income and interest rates as well as expected future income and interest rates. The expected values have been calculated in part c).

IS:  $Y = C + I + G$

$$Y = 500 + 0.3(Y - 500) + 100 + 0.1Y - 0.2(0.5(r + r^e)) + 500$$

$$Y(1 - 0.3 - 0.1) = 950 - 2.631 - 0.1r$$

$$Y = 947.37/0.6 - r/6$$

LM:  $M = Y - 3r$

$$1500 = Y - 3r; \text{ or } Y = 1500 + 3r$$

Setting them equal in equilibrium:

$$r = 78.95/3.16 = 24.9$$

$$Y = 1500 + 3 * 24.9 = 1574$$

Thus, in the second period, taking account of the effects of the expected policy change on behavior in the first period, Y increases dramatically and r is higher. This is different from the effect of a monetary expansion taken alone that would serve to lower interest rates. This is consistent with the answer in b) except that there it was indeterminate as to whether interest rates would rise or fall overall. There is no ambiguity regarding the increase in Y.