14.02
Problem Set #5 Solutions

Part I. Multiple Choice

1.c
2.e
3.d
4.c
5.a
6.b
7.b
8.c
9.d
10.c
11.b; Note: the question should read: ..."if we observe the following **unexpected** policy"...
12.b

Part II. T/F/U

(1) TRUE, since an expansionary monetary policy and a contractionary fiscal policy and the combination of both, all lead to lower short term interest rates.

(2) FALSE. For example, think of the extreme case where investment does not respond to the interest rate (the widely popular 'Bledsoe trap' of the first quiz). Then the IS curve is vertical and monetary policy has no effect on output. Generally, the interest rate provides the link between the financial market and the goods market that the Fed can use to influence the economy.

(3) FALSE. [Using the nominal interest rate on the horizontal axis...] A decrease in expected inflation leads to an inward shift of the IS curve, and an increase in money demand (implied: for exogenous reasons, i.e., at any given level of income, money demand is higher) leads to an inward shift of the LM curve. The overall result is an unambiguous decrease in the level of output, but the effect on the interest rate is unclear.

(4) TRUE. The increase in the slope of the term structure of interest rates (also known as the yield curve) implies that people expect relatively higher short-term interest rates, which make the Present Discounted Value of future dividends lower.

Part III. The Yield Curve

A(a) The yield curve can be flatter in the recession years because people expect lower future short-term interest rates as a result of an imminent shift of the LM curve to the right (due to the Fed's efforts to help the economy), or an imminent shift of the IS curve to the left (due to say depressed consumer confidence) or both.

A(b) The yield curve was downward sloping in 1974 because people were presumably expecting the Fed to increase the money supply, shifting the LM curve to the right, and leading to lower short-term interest rates.

B(a) Using a PDV calculation:

$P_{1,t} = \frac{\$100}{1.1} = \$90.9$, $P_{2,t} = \frac{\$100}{1.1 \cdot 1.11} = \$81.9$, $P_{3,t} = \frac{\$100}{1.1 \cdot 1.11 \cdot 1.12} = \$73.13$

$P_{4,t} = \frac{\$100}{1.1 \cdot 1.11 \cdot 1.12 \cdot 1.13} = \$64.7$, $P_{5,t} = \frac{\$100}{1.1 \cdot 1.11 \cdot 1.12 \cdot 1.13 \cdot 1.14} = \$56.8$

B(b) If you used a three-year bond to save money for one year, then you would have to sell it next year as a two year bond. Thus your rate of return by doing this operation is

$\frac{P^e_{2,t+1} - P_{3,t}}{P_{3,t}}$

By arbitrage, this rate of return has to be equal to 10%, the rate of return on the one year bond. Before you can equate the two, however, you need to calculate $P^e_{2,t+1}$. Using the PDV approach,

$P^e_{2,t+1} = \frac{\$100}{1.11 \cdot 1.12} = \$80.44$. So,

$\frac{P^e_{2,t+1} - P_{3,t}}{P_{3,t}} = 10\% \Leftrightarrow P_{3,t} = \frac{P^e_{2,t+1}}{1.1} \Leftrightarrow 73.13$, as expected.

B(c). Using the approximation that yields are averages of expected short-term interest rates over the life-time of the bond,

$i_{1,t} = 10\%$, $i_{2,t} = 10.5\%$, $i_{3,t} = 11\%$, $i_{4,t} = 11.5\%$, $i_{5,t} = 12\%$

B(d). The yield curve is upward sloping because by assumption (in this problem) future expected short-term interest rates increase by 1% per year.