Midterm Exam: Answers & Comments

June 28, 2010

- Basic Statistics: Average 64, Standard Deviation 22, Best score 103(of 105).
- Your score is multiplied by 0.4. The midterm accounts for 40 percent of your final grade.
- Question 2 of Part 3 includes a typo, and requires more complex calculation than I intend it should. Therefore, I didn't grade the question and gave all the students 10 points. Those who did well on this question, I'll give some extra points when they are finally graded.

Part 1
1. small part
2. frequently
3. short
4. True
5. True

Part 2
1. "Coupon" of a bond is the amount of money paid by the issuer to the holder at a specified interval. The amount is also initially specified.

2. Firstly, money works as <u>a medium of exchange</u>, helping us to exchange goods and services and promoting economic efficiency. Secondly, it gives <u>a common unit of account</u>, saving us large cost of relative price calculation. Finally, money functions as <u>a means to store the value</u> that we've produced, enabling us to spend overtime.

3. M1 surveys a wider range of institutions than M2, but M2 surveys a wider range of financial products than M1. M1, for example, includes demand deposits at Japan Post Bank which M2 does not, while M2 includes time deposits which M1 does not. M3 surveys the same range of institutions as M1, and the same range of financial products as M2. Finally, L is the broadest definition and surveys the wider range of institutions and financial products than M3 does.

   Comment
   The relationship among the four definitions <u>with respect to the financial products and financial institutions surveyed</u> should be noted.

4. The amount of money you receive at the maturity is given by
$$100,000 \times (1+0.03)^3 = 100,000 \times 1.092727$$
$$= 109,272.7$$

5. Keynes classifies all kinds of financial assets into two categories: "money" and "bond." Money in his model includes the assets which have high liquidity but low profitability, where liquidity is the ease and certainty at which any particular asset can be converted into a means of payment. On the other hand, the assets with low liquidity but high profitability is together named bond.

6. $$\frac{7 \times 7 - 7}{2} = \frac{42}{2} = 21$$
   We need to calculate 21 relative prices in the world of 7 varieties of goods without a common unit of account.

Part 3

1. Without money as a medium of exchange, there must be double coincidence of wants in order for us to exchange goods and services, because we have to find a person who has what we want and at the same time wants what we have. Therefore, money saves us time and effort spent in exchanging goods and services, thus enabling us to spend more time and effort in production. Moreover, by reducing the costs of exchanging goods and services, money enables us to specialize in producing small varieties of goods and services that we are better at producing, thus expanding our production.

    Comment
    You should also mention the benefit of specialization. Many students wrote only about a more efficient resource allocation; more time and effort could be left for production.

2. Let i_d and i_c represent the interest rates for the discount bond and the coupon bond. Then, substitute, say $i_d = 0.05$, into the equation that gives the interest rate of this discount bond,

    $$100,000 = \frac{108,900}{(1+i_d)^2} \quad \text{or} \quad 100,000 \times (1+i_d)^2 = 108,900 \quad .$$

    The LHS is $100,000 \times (1+0.05)^2 = 110,2500$, which is larger than 108,900. This implies that the interest rate of this discount bond is <u>smaller than 0.05</u>. Then, let us substitute $i_c = 0.05$ into the equation for the coupon bond,

    $$90,000 = \frac{7,000}{1+i_c} + \frac{7,000}{(1+i_c)^2} + \frac{7,000+100,000}{(1+i_c)^3} \quad \text{or}$$

    $$90,000 \times (1+i_c)^3 - 7,000 \times (1+i_c)^2 - 7,000 \times (1+i_c) = 107,000$$

    The LHS is

    $$90,000 \times (1+0.05)^3 - 7,000 \times (1+0.05)^2 - 7,000 \times (1+0.05)$$
    $$= 90,000 \times 1.157625 - 7,000 \times 1.1025 - 7,000 \times 1.05$$
    $$= 104186.25 - 7717.5 - 7350$$
    $$= 89118.75$$

    The LHS is smaller than the RHS, which implies that the interest rate of this coupon bond is <u>greater than 0.05</u>. Therefore, the coupon bond is more profitable.

3. Because demand for money is negatively related with interest rates, at the interest rate lower than the equilibrium one, demand exceeds supply in money market. Then people try to sell their bonds and hold as much money as they desire, which leads to the excess supply of bonds. This causes the price of bond to fall and its interest rate to rise. As the interest rate, or the cost of holding money rises, people are demanding less money, until at last demand equals fixed supply at an interest rate of 7%. Now there is no motive for people to sell or buy bonds because they have exactly the amount of money they want.

    Comment
    You should specify the final outcome; there is no excess supply or demand for money and the market is in equilibrium. Some closes by saying "the interest rate rises and demand for money declines until the interest rate reaches 7 percent" and not explaining why it stops at 7 percent.