

14.02. – Fall 2001 – QUIZ 1 Answers

QUESTION 1:

1. FALSE. The car should not be counted (it was already counted when Bond first bought the car). The only services produced were the tuning and repairing. Therefore GDP increases by £1000.

2. FALSE. People keep less cash. This implies that the money multiplier increases. Therefore the Central Bank needs to exchange fewer bonds in order to have the same effect in the Money supply.

3. TRUE. Both increase money supply. One directly increasing High-powered money and the other increasing the multiplier.

4. TRUE. Money supply increases therefore interest rates decrease. As interest rates decrease, investment increases, counteracting the effects of the decrease in investors' confidence.

QUESTION 2:

1. The demand for consumption depends positively on disposable income, that is, income after taxes, since this is the pool of resources from which consumers decide how much to consume or save. Only a fraction of additional spending is actually consumed so $c_1 < 1$. There is also an autonomous component of demand for consumption that could reflect necessities that consumers will always want to satisfy or the level of consumers' confidence (this is, how much they believe in the availability of future resources).

The demand for investment also has an autonomous component that will depend on investors' confidence. Then, as production increases, there are more investment opportunities, while high interest rates make it more costly to borrow in order to undergo an investment project (or, if you prefer this explanation, it is preferable to save in bonds than to carry out the project).

2. The result is:

$$Y = \frac{1}{1 - c_1 - d_1} (c_0 - c_1T + d_0 - d_1i + G)$$

3. The multiplier is $\frac{1}{1 - c_1 - d_1}$ and autonomous spending is $c_0 + d_0 - c_1T + G - d_1i$. Yes, we have to assume $c_1 + d_1 < 1$, so that this goods market has an equilibrium at a positive level of output and demand and supply do not diverge. Otherwise, an extra dollar of output would generate an increase in aggregate demand of more than one dollar (in other words, the geometric series of the multiplicative effects would be exploding).

4. The money demand depends positively on nominal income and negatively on the interest rate. Nominal income is used as a proxy for the level of transactions in the economy – the higher nominal income is, the more transactions take place, so the more money is needed. The interest rate is the opportunity cost

of holding money as opposed to bonds –the higher the interest rate, the larger the foregone earnings.

5. It is:

$$i = \frac{e\$Y - H}{f}$$

6. This is the usual IS-LM graph.

7. A government expands demand by demanding more goods. Hence, it increases G . In the IS-LM graph, the IS moves outwards, the interest rate increases and so does output. As the demand impulses output to a new equilibrium, money demand increases, driving up the interest rate. Higher interest rates, on the other hand contract the demand for investment, hence partially offsetting the initial impulse of fiscal policy.

8. The central bank expands money by open market operations, that is, by buying bonds in the market. As the supply of bonds contracts, their price increases and hence their return falls. Equivalently, as money expands it becomes cheaper and interest rates fall. In the IS-LM graph, the LM moves outwards, interest rates fall. Lower interest rate expand the demand for investment, hence expanding output. Higher output expands money demand, helping to close the money market.

QUESTION 3:

1. If nothing changes in this economy, that is, if the economy is at a steady state from period to period, GDP will be the same in two consecutive periods, and it will be:

$$Y_t = \frac{40 - 80 \cdot 0.5 + 60 + 100}{1 - 0.5} = 320$$

2. At $t=1$, autonomous spending, and therefore aggregate demand, increases by $-c_1 \cdot (-1) = c_1 = .5$. Supply cannot react yet so there is an excess demand of c_1 . At $t=2$, supply reacts to accomodate previous demand and then increases in c_1 , but demand reacts immediately increasing by $c_1^2 = .25$. At $t=3$, supply reacts and increases now by c_1^2 ...etc. Once an infinite number of periods have passed, the total increase in output will be:

$$\sum_{j=1}^{\infty} c_1^j = \sum_{j=0}^{\infty} c_1^j - 1 \underset{j \rightarrow \infty}{\rightsquigarrow} \frac{1}{1 - c_1} - 1 = \frac{c_1}{1 - c_1} = \frac{1}{1 - c_1} \cdot c_1 = 2 \cdot .5 = 1$$

So that the total effect is c_1 times the multiplier. The intuition is straightforward. The multiplier continues to be the same, but the initial autonomous demand impulse was only c_1 .

3. If investment depends positively on output, then there will be a second positive effect on output in each period. Starting from period $t=2$, investment will also increase as a result of the increase in output, adding a second positive term, say $d_1 c_1$ to the rise in aggregate demand. This effect reinforces that of

consumption, so as a result we should see output expand by more than in the previous case where investment did not respond to changes in output.

QUESTION 4:

1. If consumers confidence goes up, autonomous spending expands, so nominal output will increase. Increased output leads to a higher demand for money, this is, to an outward shift of the M^d curve, which pushes interest rates up. (The increase in interest rates will contract investment and partially offset the expansion in output, in a standard IS-LM framework. But we're not considering the goods market here, only the financial market). Figures are standard.

2. To restore the interest rate to its previous level, the Central Bank must expand money supply, thus shifting M^s to the right and counteracting the effect of the increased Money Demand on the interest rate. In other words, if there is an excess demand for money as a result of increased nominal income, then it is necessary to increase supply if we want to maintain the same equilibrium interest rate.

In order to do so, the Central Bank will have to buy bonds in the market (Open Market Operation). In doing so, the Central Bank will be increasing the demand for bonds, hence increasing the price of bonds –which is equivalent to reducing the interest rate on bonds.

3. First assume that all money is paid this interest rate, this is, both checking deposits and pocket cash (currency). Then, the opportunity cost of holding money is not i but $i - i_m$. If i_m goes up, money demand will increase for any given interest rate on bonds, i , so the M^d curve will shift to the right. In the new equilibrium, and if money supply remains unchanged, the interest rate on bonds i will have to be higher.