Midterm Part I Answer Key

November 2, 2017

1. In the Goldsmith story there is no legally binding limit, but there is a limit given by depositors confidence. The Goldsmith cannot flood the market with pieces of non counterfeitable paper because he is limited by the possibility of a "run on the bank". Because of this, he has to keep the paper:gold ratio not too far above 1.
   In modern times, the required reserve ratio limits the amount that commercial banks can lend.

2. The main reason why labor markets don't always seem to be in equilibrium is that (unlike most prices for goods) wages are 'sticky', specially downwards. Wages are sticky for many reasons: implicit and explicit contracts, minimum wage laws, efficiency wages, etc.

3. The price that someone would be willing to pay for the lottery depends on the value of the interest rate because the interest rate represents the opportunity cost of alternative investments (like putting the money in a savings account or buying a bond).
   The maximum price that someone would be willing to pay for this lottery is the present value of the promise: $X = \frac{10{,}000{,}000}{(1+r)^5}$. If the interest rate were zero, the price of this lottery would be exactly $\$10,000,000$.

4. The high inflation rates in the 1970's were caused by cost shocks (increases in the oil prices in particular). Inflation has been low so far in your lifetime because there were no significant cost shocks, and also because the Fed has built up credibility in the last couple of decades by intervening in the market when prices started to increase.

Answers to Part II

QUESTION 1

Consider the AS/AD model with investment equation dropped – *I* is exogenous. Say there is an increase in the price of imports, *PM*, which is the exogenous cost shock variable in the model. What effects will this have on the price level, *P*, the interest rate, *r*, consumption, *C*, and output, *Y*? In other words, will each of these variables increase or decrease and why?

Answer:

P and r increase. C and Y are unchanged.

Explanations:

If *I* is exogenous, *Y* is exogenous too (remember: Y=C(Y) + I + G, so nothing can change the value of Y). We are in the situation we had before working the AS/AD model (Keynesian cross). The increase in *PM* increases *P* through the AS equation which increases *r* through the Fed equation, but has no effect on Y. Since C(Y) is a function of Y only, C is also unchanged.

QUESTION 2

Consider the full AS/AD model but where in the Fed rule the coefficient on output, *Y*, is zero, but the coefficient on the price level, *P*, is not zero. In other words, the Fed does not change the interest rate when output changes, but it does change the interest rate when the price level changes. In this case, when government spending, *G*, increases, is the increase in *Y* larger or smaller than it would be in the case where the coefficient on output in the Fed rule is positive (the normal case). In other words, how is the government spending multiplier affected when the Fed does not respond to output changes in its setting of the interest rate? Explain.

Answer:

The government spending multiplier is larger. The Fed does not increase *r* when *Y* increases due to an increase in *G*. This absence of increase in *r* means that there is no crowding out of private investment. Graphically the AS curve is flatter (but not horizontal), such that *Y* might fluctuate a lot, but the price level *P* is stable.

QUESTION 3

It was announced last Friday that Social security benefits will increase by 2 percent next year. Using the full AS/AD model, what effect will this have on output, *Y*, consumption, *C*, the price level, *P*, and the interest rate *r*? Explain why each variable will increase or decrease.

Answer:

All increase.

Explanations:

An increase in Social security benefits is a decrease in taxes *T* because they are an increase in transfers *Tr* (not an increase in G). This change in *Tr* increases disposable income, so it increases consumption, which increases income *Y* (for a given *r*). Because Y increases, *r* increases (Fed rule). *P* increases as well through the AS equation. Graphically this corresponds to a shift up of the AD curve.

QUESTION 4

Given current data on the one year interest rate and the two year interest rate, what main assumption is necessary to allow one to back out the expected one year interest rate a year from now? Under this assumption, if the current two year rate is greater than the current on year rate, how will the expected on year rate a year from now compare to these two? (All interest rates are taken to be at annual rates)

Answer:

The assumption is the *No arbitrage condition*, which means that investors must be indifferent between buying a two-year bond or buying a one-year bond and planning to buy a one-year bond a year from now. This means that we have:

$$(1 + r_2)^2 = (1 + r_1)(1 + r_1^e)$$

where r_2 is the annual interest rate of the two-year bond, r_1 is the annual interest rate of the one-year bond and r_1^e is the expected annual interest rate of the on-year bond a year from now.

This means that r_2 is a geometric average of r_1 and r_1^e so $r_1 < r_2 < r_1^e$. The expected one-year rate a year from now is greater than both the two-year rate and the current one-year rate.

Note that: $r_2 \approx \left(\frac{1}{2}\right)(r_1 + r_1^e)$.

Part III

1 The Fed was trying to reduce the interest rates. The usual channel, reducing the Federal Funds rate by buying Treasury bills and bonds, had already been fully exploited (the federal Funds rate was at 0) but commercial rates were still too high. Hence the Fed decided to intervene directly in those markets by buying MBS, increasing their price and hence reducing their yield.

The asset side of the Fed's balance sheet increases by the amount (in $) of securities bought. These securities are paid for by increasing the reserve accounts of the selling banks. By construction, the Fed's balance sheet remains balanced.

In normal times, this should have increased the money supply, as increasing reserves leads to more loans, hence more deposits. But banks decided to sit on their reserves and did not increases lendings. Hence the money supply did not increase. Note that reserves are not part of M1.

2 The 90's boom was caused by the sustained increase of the stock market over nearly a decade. This lead to an increase in consumption through the wealth effect, i.e. an increase of the MPC due to the decreased need to save (as perceived by households at that moment).

The 2008 crash is more or less the same story in reverse. It was caused by the sudden crash of housing prices. This lead to an decrease in consumption through the wealth effect, i.e. an decrease of the MPC due to the increased need to save to make up for the wealth lost in the housing crash.

Note the feedback effects in both cases: increased C sustains higher stock market prices which fuels more C, and decreased C pushes housing prices down, which depresses C even more..

3 There are five behavioral equations.
C = a + b*Yd. Households consume out of disposable income with a constant MPC.
I = d - e*r. Firms invest less when interest rates are up, because lending is more expensive (alternatively: they have better options on the financial markets)
R = a*Y + b*P + c*Z. Fed rule: The fed "leans against the wind" and increases r if Y or P increase. Together with I, this leads to the AD curve.
P = d + e*Y + z*PM. Monopolisitic competition (and sticky wages) lead firms to exploit their (limited) monopoly power and increase both prices and quantities when demand increases. This leads to the AS curve.
TAX=tY, government raises money proportionally to output.