Practice Question #3

Course 14.454 – Macro IV, Fall 2004

Monetary Policy via the Lending Channel & Credit Shocks

This question is based on the model developed by Bernanke and Blinder and will ask you to prove some of the results stated in their paper. Similar to their paper, begin with the following market clearing conditions:

$$L\underset{- \; + \; +}{\left(\rho, i, y\right)} = \lambda\underset{+ \; -}{\left(\rho, i\right)} D(1-\tau) \tag{1}$$

$$D\underset{- \; +}{\left(i, y\right)} = m\underset{+}{\left(i\right)} R \tag{2}$$

$$y = Y\underset{- \; -}{\left(i, \rho\right)} \tag{3}$$

Equation (1) gives us the market clearing condition in the loan market. $L(\,)$ is the demand for loans, and the RHS is the supply of loans. D is the deposits held by banks, τ is the fraction of deposits required to be held in reserves by banks to back up their deposits, $\lambda(\,)$ is the fraction of non-required reserves that are supplied as loans, i is the interest rate on bonds, and ρ is the interest rate on bank loans.. The plus and minus symbols below each variable indicate the sign of their partial derivative. Equation (2) is our money market clearance condition (LM curve), where $D(\,)$ is the demand for deposits (money), m is the money multiplier, and R is the reserves of the banking system. Finally, equation (3) is our goods market clearance condition where $Y(\,)$ represents planned expenditures.

(a) Please explain in words why the derivatives in equations (1) - (3) have the signs we've assumed. [This is to help refresh your memory of the IS-LM model].

(b) If we wanted to return to the standard IS-LM framework we are familiar with, how could we modify the above market clearing conditions? In other words, what have Bernanke and Blinder added to our standard IS-LM model?

(c) Use equations (1) and (2) to find an implicit function of ρ in terms of $i, y,$ and R. Define this function as $\rho = \phi(i, y, R)$. Use the implicit function theorem to prove $\partial\rho/\partial y > 0$ and $\partial\rho/\partial R < 0$. Explain in words the intuition of each of these results.

Note: for the remainder of this question, I assume $\partial\rho/\partial i > 0$, so we have $\rho = \phi\underset{+ \; + \; -}{\left(i, y, R\right)}$.

Substituting ρ out of equation (3), we now have our CC curve that describes the relationship between output and bond interest rates such that both the credit and commodity markets clear. The intersection of the LM and CC curves will determine the equilibrium of this economy by ensuring that all markets clear at the given interest rates and output level.

Now consider a country where it has just been announced that a very prominent and large firm in the country has just gone bankrupt. Stories of corruption arise, and banks now fear the corruption of managers in the economy may be widespread. Hence, they perceive the extension of loans in the economy to be much riskier now.

(d) How will this new perception of risk affect the credit supply of the economy? In particular, which function in our initial setup changes? How will this shift the LM and CC curves? How do output, money, credit and the interest rate change?

(e) What monetary policy would you recommend to return the economy to its original output level? How does this policy shift the LM and CC curves? *[Hint: we assume monetary policy is conducted by direct changes in the reserves,* R*, held by banks.]*

(f) Now suppose that banks realize that the failure of the firm was just a one time incident and that their loans are no more risky than before. However, they aren't so sure depositors know this, and the banks fear there may be a bank run. To bolster confidence in the banking system and to prevent a bank run, banks decide to lend a smaller fraction of their deposits. How does this response to a fear of a bank run affect output of the economy?