

Homework 12

1. Consider a partial sticky price New Keynesian model. Suppose that the equations of the demand side are given as follows:

$$C_t = c_1(Y_t - G_t) + c_2(Y_{t+1} - G_{t+1}) - c_3r_t$$

$$I_t = -b_1r_t + b_2A_{t+1} - b_3K_t$$

$$M_t = P_t - m_1(r_t + \pi_{t+1}^e) + m_2Y_t$$

Here,  $c_1, c_2$  and  $c_3$  are positive parameters, as are  $b_1, b_2$  and  $b_3$  and  $m_1$  and  $m_2$ . Government spending  $G_t$  is exogenous.

- (a) Suppose the parameters are given as follows:  $c_1 = 0.6, c_2 = 0.5, c_3 = 10, b_1 = 20, b_2 = 1, b_3 = 0.1, m_1 = 15$  and  $m_2 = 1$ . Suppose that  $Y_{t+1} = 15, G_t = 10, G_{t+1} = 10, A_{t+1} = 5, K_t = 15, M_t = 25$  and  $\pi_{t+1}^e = 0$ . Using the parameter values, derive the IS curve. Using the IS curve and the LM curve, derive the AD curve.
- (b) Suppose that the AS curve is given as follows;

$$P_t = 0.3Y_t - 3$$

Calculate the equilibrium level of price and output using the AS and AD curve.

- (c) If the equilibrium you derived in part (b) equals medium run equilibrium, what are the values of  $\bar{P}_t, Y_t^f$  and the natural rate of interest?
2. Suppose the economy was initially at the medium run equilibrium you derived in Q1. Now people get more optimistic about the future and the value of  $A_{t+1}$  increases to 6.2. This is an example of positive IS shocks.
- (a) Using the parameter values and exogenous variables given in Q1 and the new  $A_{t+1}$ , derive the new IS curve.
- (b) From the IS curve you derived in part (a), provide  $Y_t^f$  and the natural rate of interest. What would be the medium run values of consumption and investment?
- (c) Suppose the central bank in the economy conducts monetary policy which aims to maintain the short run equilibrium output as the medium run level. Calculate the values of  $M_t$  and  $r_t$  which are consistent with this policy objective. (Hint: Derive the AD curve with unknown  $M_t$ . That AD curve should be the same as the one you derived in Q1 (a).)
- (d) If one relies on the fiscal policy instead of the monetary policy to achieve the same goal, how much the government spending  $G_t$  should change? What would be the value of  $r_t$  in this case? (Hint: Derive the IS curve with unknown  $G_t$ . That curve should be the same as the one you derived in Q1 (a).)
- (e) Compare the consumption, investment level and the real interest rate in part (c) and (d). Which policy (monetary or fiscal policy) attains the values derived in part (b)? Discuss why most economists may not favor using fiscal policy to stabilize the economy using the results.