

Homework 13

1. Suppose that you have a partial sticky price New Keynesian model in which the ZLB is binding. Consider an exogenous increase in  $A_{t+1}$ . Show how this affects the equilibrium values of the endogenous variables of the model, including labor market variables. Comment on how these effects compare relative to the case in which the ZLB does not bind.
2. Consider a *partial* sticky price New Keynesian model with exogenous credit spread  $f_t$ . Suppose there is an increase in  $f_t$ .
  - (a) Graphically depict this change in  $f_t$ .
  - (b) What is the optimal monetary policy in this case? Show this graphically. How do all the endogenous variables change relative to Part 2(a)?
  - (c) Suppose there is no change in monetary policy. How can the government change  $G_t$  to achieve the same level of output as in Part 2(b)? Graphically depict this. How do all of the other endogenous variables change?
3. Consider a *simple* sticky price New Keynesian model ( $P_t = \bar{P}_t$ ) with a credit spread  $f_t$ . Suppose that the equations of the demand side are given as follows:

$$C_t = c_1(Y_t - G_t) + c_2(Y_{t+1} - G_{t+1}) - c_3r_t$$
$$I_t = -b_1(r_t + f_t) + b_2A_{t+1} - b_3K_t$$
$$M_t = P_t - m_1(r_t + \pi_{t+1}^e) + m_2Y_t$$

Here,  $c_1, c_2$  and  $c_3$  are positive parameters, as are  $b_1, b_2$  and  $b_3$  and  $m_1$  and  $m_2$ .

Assume the credit spread  $f_t$  is purely exogenous.

- (a) Derive an algebraic expression for the AD curve.
- (b) Find an expression for how  $Y_t$  will react to an increase in  $G_{t+1}$ .

Now, suppose that the credit spread  $f_t$  has both an endogenous and an exogenous components as follows:

$$f_t = \bar{f}_t - aY_t$$

where  $\bar{f}_t$  is the exogenous component of the credit spread variable and  $a$  is a positive parameter.

- (c) Derive an algebraic expression for the AD curve.
- (d) Find an expression for how  $Y_t$  will react to an increase in  $G_{t+1}$ . How does the result change relative to Part 3(b)?