

EC2102 Macroeconomic Analysis I
Tutorial 4, Week 6 (February 22-26, 2010)

Suppose we have an infinitely-lived representative firm which has a production technology of $Y_t = z_t F(K_t, N_t) = z_t K_t^a N_t^{1-a}$, $a > 0$, $t = 1, 2, \dots$. This firm is owned by an infinitely lived representative consumer who receives dividends from this firm. The real rate of interest rate prevailing in the economy for the first period is r_1 .

(i) What are the marginal products of labour and capital in time period t , MPN_t , and MPK_t respectively?

(ii) Write down the firm's maximization problem in the first period, derive the first order conditions, and explain the economic meaning of the *F.O.C.s*.

Suppose we have an infinitely-lived representative consumer who values both leisure and consumption. Let his per period utility function be $u(C_t, l_t) = \ln(C_t) + \ln(l_t)$, $t = 1, 2, \dots$. Let his discount factor be β .

(iii) Write down his maximization problem in time period 1, and derive the *F.O.C.s*.

(iv) When is this economy with a representative consumer and a representative firm in a competitive equilibrium? Illustrate the goods and labour market equilibria in the first period using graphs.

Suppose we are in an equilibrium as described and illustrated in part (iv). In time period 1, labour market equilibrium is (w_1^*, N_1^*) , and the goods market equilibrium is (r_1^*, Y_1^*) .

Let us now introduce a government, who neither spends, nor taxes. However, it likes to enact laws. Let us suppose that the government decides to impose a minimum wage w_1^m at the start of time period 1.

(v) If the minimum wage $w_1^m < w_1^*$, derive the new output supply curve \hat{Y}_1^s by varying period 1's interest rate, as we did in the lecture. How would the equilibrium in the labour and goods markets change?

(vi) If the minimum wage $w_1^m > w_1^*$, derive the new output supply curve \hat{Y}_1^s by varying period 1's interest rate, as we did in the lecture. How would the equilibrium in the labour and goods markets change?