

### Review Questions - Chapter 4

1. Suppose we have an economy with a single, profit-maximizing firm, as in the production model. Assume that the production function is given by  $Y = F(K, L) = AK^\alpha L^{1-\alpha}$ , where  $A$  is a constant and  $\alpha$  is between 0 and 1.

- (a) Write down, but do not solve, the expression for the firm's profit maximization problem in terms of  $A$ ,  $K$ ,  $L$ ,  $\alpha$ ,  $r$ , and  $w$ , where  $r$  and  $w$  are the cost of capital and labor, respectively.
- (b) What is the firm's demand for capital? What is the firm's demand for labor? Write out these expressions in terms of  $A$ ,  $K$ ,  $L$ ,  $\alpha$ ,  $r$ , and  $w$ .
- (c) If the capital stock in the economy is 1000 machines, and there are 100 workers in the economy, write down the expression for the equilibrium cost of capital,  $r^*$ , and equilibrium wage,  $w^*$ , in terms of the model's parameters.
- (d) What is equilibrium GDP,  $Y^*$ , in this economy? What is equilibrium GDP per worker in this economy?
- (e) Calculate the share of capital income in the economy,  $r^*K^*/Y^*$  in terms of the model's parameters. Do the same for the share of labor income,  $w^*L^*/Y^*$ , in the economy. Show that these shares add up to exactly one.
- (f) Provide a brief interpretation of your answer to part (e).