University of Toronto

Department of Economics

ECO 2061H

Economic Theory - Macroeconomics (MA)

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Practice Exercises - Set 1

1. Consider two closed economies i and j, described by the standard Solow model with a Cobb-Douglas technology given by,

$$Y(t) = K(t)^{\alpha}[A(t)L(t)]^{1-\alpha}$$

Assume that δ, n, g are the same in both countries, but $s_i > s_j$. Also suppose that $A_i(0) = A_j(0)$, $L_i(0) = 2L_j(0)$, $K_i(0) = 2K_j(0)$. Suppose these economies both start off below their steady state capital stock per unit of effective labor.

   (a) Explain whether these two economies will converge to the same steady state. What would you expect to happen if the two economies opened up their capital markets.

   (b) If $s_i = s_j$ which closed economy would converge faster to the steady state. Explain using a graph. What would you expect to be the short run and long run effect of opening up their capital markets.

2. Consider the standard Solow model. Suppose aggregate output is given by the following production function
$$Y(t) = K(t)^{\alpha} \left(A(t)L(t) \right)^{1-\alpha}$$

Find how rapidly *output* per unit of effective worker, y, converges to its balanced growth path value y^*, in the vicinity of the balanced growth path. In particular find the value of λ that satisfies,
$$y(t) - y^* = e^{-\lambda t} \left(y(0) - y^* \right)$$

(Hint: recall the steps we followed in class to solve for λ in the case of k, and note that since $y = f(k)$, we can re-write $k = g(y)$, where $g(.) = f^{-1}(.)$). Consider an economy in which, the population growth rate is 1%, the growth rate of efficiency 2%, and the depreciation rate 2%. From the NIEA you calculate that the share of labor earnings in total income is 2/3. Approximately how many years will it take to cover half the distance to the balanced growth path for this economy?

3. Romer, p.45, Ex. 1.3.

4. Romer, p.46, Ex. 1.4.

5. Romer, p.46, Ex. 1.5.

6. Romer, p.46, Ex. 1.6.

7. Romer, pp.46-47, Ex. 1.9.