Bachelor Business Administration and Economics 6th Semester

Macroeconomics and Behaviour

2014 Summer Term

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Problem Set 1

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Aghion, Howitt (1997): Endogenous Growth Theory

Question 1 (Neoclassical Growth Model)

a) Consider the rate of change of the capital stock:

$$\dot{K} = sF(K) - \delta K \tag{1}$$

Provide an interpretation using the following figure

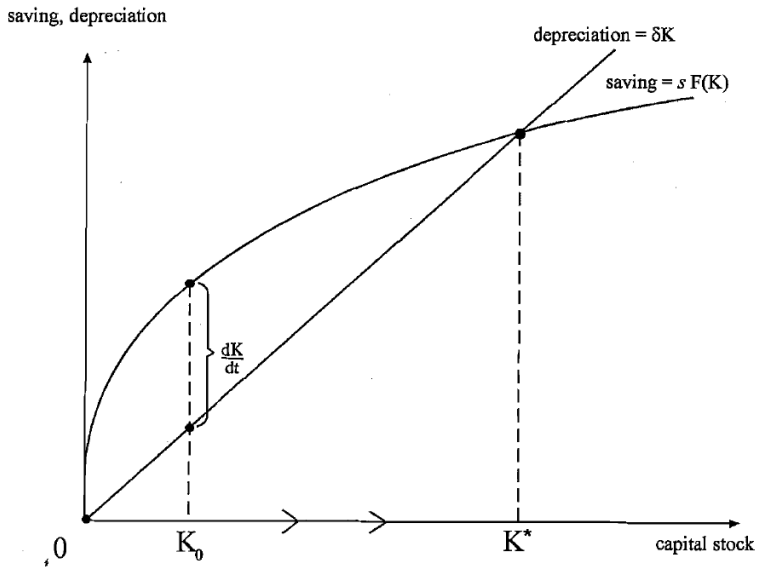

Figure 1: Aghion, Howitt (1997) – Endogenous Growth Theory (Fig 1.1)

where $K = K(t)$ is the aggregate capital stock, $F(K)$ – the aggregate production function, $Y = F(K)$ – the total output, s – the constant saving rate, and δ – the constant depreciation rate.

b) Analyze the dynamics of the capital K in the short-run and in the long-run.

c) Provide the economic logic of this dynamic behaviour.

Question 2 (Population Growth I)
Assuming a constant exponential rate of the population growth, n, provide an interpretation of the net rate of change in the capital stock per person:

$$\dot{k} = sf(s) - (n + \delta)k = sk^{\alpha} - (n + \delta)k, \tag{2}$$

where $k = K/L$, $L = L(t)$ is the population size, $y = Y/L$ – per capita output. Note that output is given by the Cobb-Douglas production function:

$$Y = F(K, L) = L^{1-\alpha}K^{\alpha}, \ 0 < \alpha < 1. \tag{3}$$

Question 3 (Population Growth II)
Given the production function (3), find the long-run growth rate of capital and output, $\dot{K}/K$ and $\dot{Y}/Y$.