

1. Consider the *Solow* model with:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha},$$

$$\dot{K}_t = sY_t - \delta K_t,$$

$$\frac{\dot{L}_t}{L_t} = n,$$

where $\dot{K}_t = \frac{dK_t}{dt}$, $\dot{L}_t = \frac{dL_t}{dt}$.

A) Rewrite the production function and the capital accumulation equation using normalized variables $k = \frac{K}{L}$, $y = \frac{Y}{L}$. (5%)

B) What are the values of k and y along a balanced growth path? (10%)

C) This shows you how to calculate the rate of convergence exactly:

- Starting from the equation describing \dot{k} , obtain a differential equation in the variable $x = k^{1-\alpha}$. Solve this differential equation using the initial condition $x(0) = x_0$.

(Hint: Note that $\dot{x} = (1-\alpha)k^{-\alpha}\dot{k}$!) (10%)

- Calculate $x^* = \lim_{t \rightarrow \infty} x(t)$. (10%)

- At which rate does the distance between x_0 and x^* vanish? Call it β . (5%)

2. Suppose you are advising a small country (e.g. Zimbabwe) on whether to print its own money or to use the money of its larger neighbor (e.g. South Africa). In a few sentences, what do you think are likely to be the costs and benefits of a national money, reasoning from the theory in money and inflation? (Hint: be sure to consider the role of *seigniorage*.) Does the relative political stability of the two countries have a role in this decision? (15%)

3. Suppose that we have a consumption function of the form

$$C = 150 + 0.85Y_p,$$

where Y_p is permanent disposable income. Suppose that consumers estimate their permanent disposable income by a simple average of disposable income in the present and previous years

$$Y_p = 0.5(Y_d + Y_{d-1})$$

where Y_d is actual disposable income.

A) Suppose that disposable income Y_d is equal to \$3,000 in Year 1 and is also equal to \$3,000 in Year 2. What is consumption in Year 2? (5%)

B) What is the short-run marginal propensity to consume? (5%)

C) What is the long-run marginal propensity to consume? (5%)

4. Consider the following *Keynesian* economy:

Desired consumption $C^d = 200 + 0.6(Y - T) - 200r.$

Desired investment $I^d = 300 - 300r.$

Taxes $T = 20 + 0.2Y.$

Government purchases $G = 152.$

Net exports $NX = 150 - 0.08Y - 500r.$

Money demand $L = 0.5Y - 200r.$

Money supply $M = 924.$

Full-employment output $\bar{Y} = 1000.$

A) What are the general equilibrium (that is, long-run) values of output, the real interest rate, consumption, investment, net exports, and the price level? (10%)

B) Starting from full employment, government purchases are increased by 62, to 214. What are the effects of this change on output, the real interest rate, consumption, investment, net exports, and the price level in the short run? In the long run? (10%)

C) With government purchases at their initial value of 152, net exports increase by 62 at any income and real interest rate so that $NX = 212 - 0.08Y - 500r.$ What are the effects of this change on output, the real interest rate, consumption, investment, net exports, and the price level in the short run? In the long run? Compare your answer to that for part (B). (10%)