

Problem Set Chapter 6 – Selected Assigned Problems Answers
GOUCHER COLLEGE
EC 217 - Intermediate Macro Theory
Spring 2015

Numerical Problems – Questions 1 and 2.

Analytical Problems - Question 2.

Additional Problem – What do you believe is the number one impediment to economic growth ? Explain.

Answers to Problem Set 6

Numerical Problems

1. Hare: $\$5000 \times (1.03)^{70} = \$39,589$
 Tortoise: $\$5000 \times (1.01)^{70} = \$10,034$

2.

	20 Years Ago	Today	Percent Change
<i>Y</i>	1000	1300	30%
<i>K</i>	2500	3250	30%
<i>N</i>	500	575	15%

$$\begin{aligned} \text{(a) } \Delta A/A &= \Delta Y/Y - a_K \Delta K/K - a_N \Delta N/N \\ &= 30\% - (0.3 \times 30\%) - 0.7 \times 15\% \\ &= 30\% - 9\% - 10.5\% \\ &= 10.5\% \end{aligned}$$

Capital growth contributed 9% ($a_K \Delta K/K$), labor growth contributed 10.5% ($a_N \Delta N/N$), productivity growth was 10.5%.

$$\begin{aligned} \text{(b) } \Delta A/A &= 30\% - (0.5 \times 30\%) - (0.5 \times 15\%) \\ &= 30\% - 15\% - 7.5\% \\ &= 7.5\% \end{aligned}$$

Capital growth contributed 15% ($a_K \Delta K/K$), labor growth contributed 7.5% ($a_N \Delta N/N$), productivity growth was 7.5%.

Analytical Problems

2. (a) Solow model

The rise in capital depreciation shifts up the $(n + d)k$ line from $(n + d^1)k$ to $(n + d^2)k$, as shown in Figure 6.5. The equilibrium steady-state capital-labor ratio declines. With a lower capital-labor ratio, output per worker is lower, so consumption per worker is lower (using the assumption that the capital-labor ratio is not so high that an increase in k will reduce consumption per worker). There is no effect on the long-run growth rate of the total capital stock, because in the long run the capital stock must grow at the same rate (n) as the labor force grows, so that the capital-labor ratio is constant.

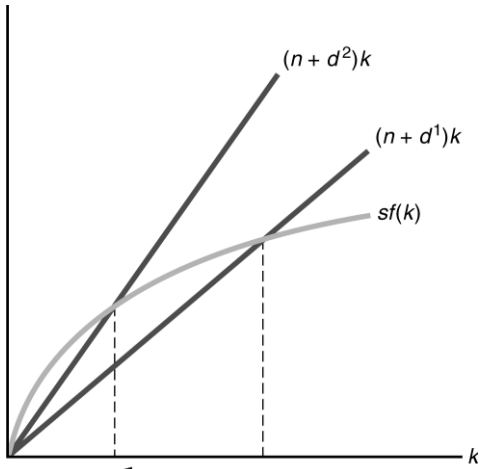


Figure 6.5

(b) Endogenous growth model

In an endogenous growth model, the growth rate of output is $\Delta Y/Y = sA - d$, so the rise in the depreciation rate reduces the economy's growth rate. Similarly, the growth rate of capital equals $\Delta K/K = sA - d$, which also declines when the depreciation rate rises. Since consumption is a constant fraction of output, its growth rate declines as well. So the increase in the depreciation rate reduces the long-run growth rate of the capital stock, as well as long-run capital, output, and consumption per worker.