

Answer Key to Problem set#4a

Econ 333

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1 Assumptions:

(A.1) Assume that labor is abundant and is not binding in the production of national output or income only capital is binding. The aggregate output Y_t produced at time t is a fixed proportion v of the total capital stock K_t , at time t , i.e.,

(1) $Y_t = v K_t$, for all $t = 0, 1, 2, \dots$ (notice that the output-capital ratio v does not change over time)

(A.2) Assume that the society or the whole economy's total savings S_t at time t is a fraction s of the total income K_t at time t , (this is also known as Keynesian savings function), i.e., in notation,

(2) $S_t = s Y_t$, for all $t = 0, 1, 2, \dots$ (notice that the savings rate s does not change over time)

(A.3) Assume that the economy under consideration is a closed economy, so that all the investment I_t during a period t comes out of total domestic savings, i.e., in notation

(3) $I_t = S_t$

Derivation: Note that

$$\begin{aligned} g_Y &= \text{discrete growth rate of total income between period } t \text{ and } t+1 \\ &= \frac{Y_{t+1} - Y_t}{Y_t} = \frac{vK_{t+1} - vK_t}{Y_t} \quad (\text{substituting Equation (1) for period } t \text{ and } t+1 \text{ in the} \\ &\quad \text{numerator}) \\ &= \frac{v[K_{t+1} - K_t]}{Y_t} = \frac{vI_t}{Y_t} \quad (\text{since } K_{t+1} = K_t + I_t, \text{ i.e., total capital in period } t+1 \text{ is the} \\ &\quad \text{capital stock} \\ &\quad \text{in period } t \text{ plus the investment during period } t) \\ &= v \frac{S_t}{Y_t} = v \cdot s \quad (\text{by the Keynesian savings behavior assumed in A.2}) \end{aligned}$$

The above is exactly what was to be shown.

Q2. $v = \frac{g_Y}{s} = 0.04 / 0.20 = 1/5$

if desired g_Y is 0.06, from $s = g_Y / v$, desired $s = 0.06 * 5 = 0.3$ (or 30%)

Ways to increase the saving rate include:

- 1) lowering income taxes, since $S = s(Y-T)$
- 2) increasing sales taxes (make consumption costly)
- 3) raise interest rates
- 4) capital gain tax breaks
- 5) improve tax collection, reduce government spending (increase govt. savings)

- Q3. Strengths: 1) highlights the importance of savings or investment and capital accumulation
2) easy to understand, and gives clear policy prescriptions
- Weaknesses: 1) lack of empirical support, high savings rate doesn't always lead to high growth
2) too narrow a view of growth: ignored labor, technology and substitution of inputs.
concerns only with capital
3) ignores diminishing returns to capital. Unrealistic production function.