

## HARROD

Model:

$$\begin{aligned}S &= sY \\K &= gY \\I &= \dot{K} \\S &= I \\gr &= s/g\end{aligned}$$

Unde:

- $Y(t)$  = PIB-ul (Produsul Intern Brut)
- $S(t)$  = economisirea
- $K(t)$  = capitalul
- $I(t)$  = investitia
- $s$  = rata economisirii
- $g = K/Y$  = capitalul necesar pentru a obtine o unitate de venit
- $gr$  = rata de crestere a PIB-ului =  $S/K$

Tip de problema 1: se dau 2 dintre parametrii  $s$ ,  $g$  si  $gr$  si se cere al treilea

Tip de problema 2: se dau  $s$ ,  $g$  si  $Y_0$  si se cer:  $gr$  si functiile  $S, K, I, Y$

Solutie:

$$\begin{aligned}Y &= Y_0 e^{\frac{s}{g}t} \\S &= sY_0 e^{\frac{s}{g}t} \\K &= gY_0 e^{\frac{s}{g}t} \\I &= sY_0 e^{\frac{s}{g}t} \\gr &= s/g\end{aligned}$$

## SOLOW – v1

Model:

$$\begin{aligned}\dot{L} &= n * L \\ \dot{K} &= s * Y \\ Y &= K^\alpha L^{1-\alpha}\end{aligned}$$

Solutie:

$$\begin{aligned}L &= L_0 e^{nt} \\ K &= \left(\frac{s}{n}\right)^{\frac{1}{1-\alpha}} * L \\ Y &= K^\alpha L^{1-\alpha}\end{aligned}$$

Tip de problema: se dau  $L_0, s, n$  si  $\alpha$  si se cer  $L, K$  si  $Y$

Obs: cand  $s=n$  rezulta  $L = K = Y = L_0 e^{nt}$

## SOLOW – v2

Model:

$$\dot{L} = n * L$$

$$\dot{K} = s * Y \quad \text{unde } A = e^{gt}$$

$$Y = AK^\alpha L^{1-\alpha}$$

Solutie:

$$L = L_0 e^{nt}$$

$$K = \left[ K_0^{1-\alpha} - \frac{s(1-\alpha)}{n(1-\alpha) + g} L_0^{1-\alpha} + \frac{s(1-\alpha)}{n(1-\alpha) + g} L_0^{1-\alpha} e^{(n(1-\alpha)+g)t} \right]^{\frac{1}{1-\alpha}}$$

$$Y = AK^\alpha L^{1-\alpha}$$

Tip de problema: se dau  $L_0, s, n$  si  $\alpha$  si se cer  $L, K$  si  $Y$

Obs: cand  $K_0 = L_0$  si  $s(1-\alpha) = n(1-\alpha) + g$  rezulta  $K = L_0 e^{st}$