New-Keynesian Model

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$$egin{aligned} Y_t &= \left(\int_0^1 Y_t(i)^{rac{ heta-1}{ heta}} di
ight)^{rac{ heta}{ heta-1}} \ Y_t(i) &= Y_t \left(rac{P_t(i)}{P_t}
ight)^{- heta} \end{aligned}$$

 $P_t = \left(\int_0^1 P_t(i)^{1-\theta} di\right)^{\frac{1}{1-\theta}}$

$$X = \frac{\theta}{\theta - 1} \frac{E_t \left(\sum_{k=0}^{\infty} (\alpha \beta)^k Y_{t+k} P_t + k^{\theta - 1} M C_{t+k} \right)}{E_t \left(\sum_{k=0}^{\infty} (\alpha \beta)^k Y_{t+k} P_t + k^{\theta - 1} \right)}$$

$$P_t^{1-\theta} = (1-\alpha)X_t^{1-\theta} + \alpha P_{t-1}^{1-\theta}$$

$$X = \frac{\theta}{\theta - 1} \frac{E_t \left(\sum_{k=0}^{\infty} (\alpha \beta)^k Y_{t+k} P_t + k^{\theta - 1} M C_{t+k}\right)}{E_t \left(\sum_{k=0}^{\infty} (\alpha \beta)^k Y_{t+k} P_t + k^{\theta - 1}\right)}$$

$$\sum_{k=0}^{\infty} \frac{E_t C_{t+k}}{\left(\prod_{m=1}^{k+t} R_{t+m}\right)} = A_t + \sum_{k=0}^{\infty} \frac{E_t Y_{t+k}}{\left(\prod_{m=1}^{k+t} R_{t+m}\right)}$$

$$L = \sum_{k=0}^{\infty} \left(\frac{1}{1+\beta}\right)^k U(C_{t+k}) + \left[\sum_{k=0}^{\infty} E_t Y_{t+k} \sum_{k=0}^{\infty} E_t C_{t+k}\right]$$

$$L = \sum_{k=0}^{\infty} \left(\frac{1+\beta}{1+\beta} \right) U(C_{t+k}) +$$

$$\lambda \left[A_t + \sum_{k=0}^{\infty} \frac{E_t Y_{t+k}}{\left(\prod_{m=1}^{k+1} \right)} - \sum_{k=0}^{\infty} \frac{E_t C_{t+k}}{\left(\prod_{m=1}^{k+1} R_{t+m} \right)} \right]$$

 $A = rac{1}{1 + \sigma \phi_{\mathsf{x}} + \kappa \sigma \phi_{\psi}} egin{pmatrix} 1 & \sigma (1 - eta \phi_{\psi}) \ \kappa & eta + \sigma \kappa + eta (1 + \sigma \phi_{\mathsf{x}}) \end{pmatrix}$

 $B = rac{1}{1 + \sigma \phi_{\mathrm{x}} + \kappa \sigma \phi_{\psi}} egin{pmatrix} 1 & -\sigma \phi_{\psi} \ \kappa & 1 + \sigma \phi_{\mathrm{x}} \end{pmatrix}$