

Redundant Equation

$$D_t = \phi_t \cdot Y_t$$

same trend \longrightarrow

$$d_t \cdot X_t^Y = \phi_t \cdot Y_t \cdot X_t^Y$$

$$d_t = \phi_t Y_t$$

$$\text{Debt-obs} = \Delta \ln(\text{Debt}) = \Delta \ln \left(\frac{D_t}{X_t^D} \cdot X_t^D \right) = \Delta \ln (d_t \cdot X_t^D)$$

Here so assume data Debt matching $\frac{D_t}{X_t^D} \cdot X_t^D$

The problem is how to define model D_t with an economic intuition.

$$= \ln d_t - \ln d_{t-1} + \ln g_t^D$$

$$= \tilde{d}_t - \tilde{d}_{t-1} + \tilde{g}_t^D + \ln \bar{g}^D$$

\downarrow
percentage
deviation
from SS

\downarrow
AR(1) only showing in measurement equation.

So need to estimate ρ_{g^D} and ϵ_{g^D}