Calibration

Calibration strategy

General hints:

- don't just use values from other papers, lacks reasoning!

- construct and parameterize model such, that it corresponds to objects you want to study

- uses steady state characteristics in accordance with long-run averages of data (switch types!)

- micro-studies: be careful about the aggregation!

Productivity parameter α

Due to Cobb Douglas production function this should be equal to the proportion of capital income to total income of economy (avg. capital share):

Look into national accounts, set α to 1 minus share of labor income over total income

For most OECD countries this implies a range of 0.25 to 0.45

Depreciation rate δ

Quarterly data: literature uses values in the range of 0.02 to 0.03

Model-implicit way: use steady-state relationship

$$\delta = \frac{\bar{I}}{\bar{K}} = \frac{\bar{I}/\bar{Y}}{\bar{K}/\bar{Y}}$$

OECD data:

- average ratio of investment to output ($\bar{I}/\bar{Y}$) around 0.25

- average capital productivity ($\bar{K}/\bar{Y}$) roughly between 9 and 10

Discount factor β

Subjective intertemporal preference rate of households

Quarterly data: values slightly less than 1, agents discount the future

Model-implicit way: use steady-state relationship

$$\bar{R} = \alpha \frac{\bar{Y}}{\bar{K}} \text{ and hence } \beta = \frac{1}{\bar{R} + 1 - \delta}$$

TFP parameters ρ_A and σ_A

Productivity is based on "Solow Residual":

- $\log(A_t) = \log(Y_t) - \alpha \log(K_{t-1}) - (1-\alpha)\log(L_t)$

- Regressing $log(A_t) = \rho_A \log A_{t-1} + e_t$

ρ_a mostly highly-persistent 0.85-0.95

σ_A^2 from residual of sum of squares of regression, e.g. $\sigma_A = 0.01$

σ_A can also be calibrated by trying different values and trying to match shape of (S)VAR impulse response functions

Utility elasticities η_C and η_L

Elasticities depend on concrete utiltiy function (e.g. additive separable or non-separable, CES vs. log vs. linear)

Calibration of risk aversion η_c highly debated, range 0.5 - 10 (and above)

Calibration of Frisch elasticity of labor ($1/\eta_L$) highly debated, in RBC models we often find $\eta_L = 2$ or the log ($\eta_L = 1$) or linear case ($\eta_L = 0$)

Calibration of elasticities changes model dynamics (e.g. volatility)

Utility weights γ and ψ

Steady-state labor $\bar{L} = 8\text{hrs} \ / \ 24\text{hrs} = 1/3$

Model-implicit way: use steady-state relationship for labor:

$$\psi = \gamma \bar{W} \left(\frac{\bar{C}}{\bar{L}} \right)^{-\eta_C} (1 - \bar{L})^{\eta_L} \bar{L}^{-\eta_C}$$

$\bar{C}/\bar{L}$ and $\bar{W}$ are given in terms of other calibrated parameters

Normalize γ (or alternatively ψ) to 1

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