Topics in Macroeconomic Theory and Policy
Home Assignment
Deadline: July 14, 2024 at 23:39 via CANVAS

Instructions

- Please solve all three exercises
- This is a group exercise.
- Make sure you distribute the workload equally/fair within your group.
- Journal articles and datasets are linked (in blue). Articles are accessible via VPN or WU-Wifi.
- The solution has to be uploaded on CANVAS.
  Please combine all regression outputs and written sections/argumentations to one pdf.
  For the empirical exercise, please also provide your (commented) R/Stata/etc file that you used to create your results. You can use *outreg* (Stata), *stargazer* (R) or similar to generate regression tables.
- **Deadline for submission is: July 14, 2024 before midnight (23:59)**

1. Human Capital (Empirical Exercise)

In a very influential paper published in the Journal of Monetary Economics, Benhabib and Spiegel (1994) assess the importance of human capital for economic growth via growth accounting.
Contrary to Benhabib and Spiegel (1994), please use the Penn World Table dataset as your data source for the empirical exercise.

a) Replicate Table 1, Model Columns 1 - 4 for 1965-1985 using the Penn World Table dataset. Which variables do you use for the analysis? How do your results compare to the original results obtained by Benhabib and Spiegel (1994)? *Explain!*

b) Now replicate Table 1, Model Columns 1 - 4 for the most recent 20 years available using the Penn World Table dataset. How do these results compare to the results obtained before and why? *Explain!*

c) Supplement the Penn World Table dataset using Data on Educational Attainment from the Barro Lee Dataset and re-estimate your results from bullet point 2. Which educational attainment definition do you use and why? How does the Barro education data affect your results? *Explain!*

d) Expand the analysis done before according to your own preferences. Here you can be creative! (e.g., you can add additional control variables that entail valuable insight that are already in the dataset or add further data sources.) What additional results to you obtain? Why do you think this is interesting? How does that provide additional insight? *Explain!*

2. Overlapping Generations (Theoretical Exercise)

Consider an economy where agents live for three periods: As a child (period 1), a young adult (period 2), and as an old adult (period 3). We assume that children and old adults depend on the material support of young parents; each young adult has exactly one child and one old adult (his parent) to take care of. Output is produced by raw labor and human capital only, there is no capital, which implies that saving is impossible.
However, parents can invest in the human capital of their children by spending time with them. The technology of imparting human capital to children is given by

$$H_{t+1} = A(H_t + \bar{H})h_t$$

H_t is the level of human capital of the young adult parent which children automatically inherit, $\bar{h}$ is a fixed stock of "raw labor" that each child is endowed with (independent of his parent), and A is a technology parameter. h_t is the time investment of the young adult in his child. Each young adult is endowed with one unit of time, such that young adults work for $1 - h_t$ hours and receive a wage which is equal to the sum of their personal human capital and "raw labor" capacity, $\omega_t = H_t + \bar{H}$. The actual consumption flow of the representative young adult at time t would then be

$$c_1(t) = (H_t + \bar{H})(1 - h_t) - xH(t),$$

where $xH(t)$ is the transfer payment of the young adult to his parent in the generation of old adults. Consequently, the actual consumption flow of the representative old parent at time $t + 1$ is

$$c_2(t) = xH_{t+1}.$$

The utility function for each individual is as follows:

$$u_t = c_0(t - 1) + ln(c_1(t)) + ln(c_2(t + 1)).$$

We assume that $c_0(t - 1) = 1$, i.e. each child experiences a utility of one, independent of how much time his/her parent spends with him/her.

a) Solve the optimization problem of the young adult by use of a Lagrangian. Determine the Euler equation for consumption, and the optimal time investment of young adults into their child h_t^* as a function of H_t.

b) Human capital evolves according to $H_{t+1} = aH_t + b$. Determine a and b!

c) Derive a sufficient condition for positive growth in this economy!

d) Is the allocation Pareto efficient? Why (not)? *Explain!*

3. Endogenous Growth (Theoretical Exercise)

In an Econometrica paper, Aghion and Howitt (1992) develop a model of endogenous ("Schumpetarian") growth with creative destruction. Read the paper and "work" through the model.

a) Write a short summary of the paper (no more than 4 pages, max 3-4 equations/figures) that explains the main channels and the general idea of the model. *Make sure to explain the intuition of the model and the economic reasoning behind, rather than the steps of the derivation!*

b) Write a short (no more than 5 pages) "referee report" on the paper! Criticize the paper in a constructive[1] way. *Possible directions could be: How much do the results obtained depend on the assumptions that are made? How reasonable do you find these assumptions? How realistic do you think the model is? Do you agree with the authors synopsis?*

[1] In the real (academic) world, however, referee reports can be quite far away from being constructive!