

ECON-A4000 - Economics of Global Challenges

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Return method: through mycourses by the deadline

Problem Set 3: Question 1

In the lecture material (and in the book) on The Golden Age there are many instances where the discussion is centered around average growth rates. The purpose of this exercise is see what this means precisely. Suppose output y was \$2000 in year 1950 and \$25000 in year 2000. The average growth rate is obtained by calculating a constant growth rate that leads to this output increase over the given 50-year period. Denote this growth rate by g . We can obtain this g in two ways:

- When growth is a continuous process, we have $y_t = y_0 e^{gt} \Rightarrow g = (\ln y_t - \ln y_0)/t$ where $y_t = 25000, y_0 = 5000, t = 2000 - 1950$. This gives $g = .0321$, that is, 3.21% annual growth.
- When growth is a discrete process, we have $y_t = y_0(1 + g)^t \Rightarrow g = \left(\frac{y_t}{y_0}\right)^{1/t} - 1$ where $y_t = 25000, y_0 = 5000, t = 1990 - 1950$. This gives $g = .0327$, that is, 3.27% annual growth.

You can use either one of the two approaches.

From this (*source*) you can find Penn World Table version 9.1. From this data, you can find data on the variables that we discussed in the lecture: Y (label "cgdp0"), K (label "rn"), TFP (label "ctfp"). Please calculate the average growth rates for these variables in the The Golden Age (say, 1950-1973) for five European countries. You can choose the countries of interest to you, and provide a summarily analysis of the differences between the countries. Note that variables Y and K in the data are not given in per capital terms, so please divide them by the respective population numbers that you can find in the data as well for the countries.