

### Homework 3

1. Download annual data on real GDP per capita (constant 2010 US dollars) a) in 1970 and b) in 2018 and Gross Fixed Capital formation (Investment) per GDP in 1970 for the following 20 countries:

Canada, Germany, Japan, Singapore, United Kingdom, Switzerland, China, Dominican Republic, Mexico, South Africa, South Korea, Thailand, Uruguay, India, Indonesia, Kenya, Mali, Senegal, Sri Lanka, Ghana.

All of this data can be downloaded from World Development Indicators by World Bank : <https://databank.worldbank.org/source/world-development-indicators>

- a. Take the natural logarithm of real GDP per capita in 1970. And calculate the cumulative gross growth rate of GDP per capita between 1970 and 2018 for each country  $i$  (using the raw series, not the logged value) as follows

$$g_i = \frac{GDP_{2018,i}}{GDP_{1970,i}}.$$

Once these are constructed, create a scatter plot of the initial log GDP on the horizontal axis and the GDP per capita growth rate on the vertical axis with a trendline. Report the correlation between these variables.

- b. Run a cross-section regression of the growth rate of real GDP per capita on the initial log real GDP per capita. Report the coefficient estimate and t-statistic for the initial log GDP.
- c. Create a scatter plot of the investment to GDP ratio in 1970 on the horizontal axis and the GDP per capita growth on the vertical axis with a trendline. Report the correlation between these variables.
- d. Run a cross-section regression of the growth rate of real GDP per capita on the initial investment to GDP ratio. Report the coefficient estimate and t-statistic for the investment ratio.
- e. Run a cross-section regression of the growth rate of real GDP per capita on the initial GDP per capita and investment to GDP ratio in 1970. Report the coefficient estimates and t-statistics for the initial log GDP and investment ratio.