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**Special Topics in Applied Econometrics: Cross-Country Studies
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Hands-On Assignment 2:
Estimating a Growth Regression with Random Effects

Please take out the following hands-on assignment in Matlab

See **HandsOn2.m** for the program to solve the hands-on assignment.

1. Go to the website of Penn World Tables and download data in .csv format on real GDP per capita (rgdp) for all countries for the time period 1970-2009. Import these data into an Excel spreadsheet which can subsequently be loaded into Matlab
2. Run the program „DataProg.m“ to process the data into a balanced data set of quinquennial data, containing the growth rate of real GDP per capita between t and $t-1$ as well as the log of real GDP per capita
3. Using the data, estimate Equation (1.10) via RE [Equation (1.11)] with y_{it} the growth rate of real GDP per capita between $t-1$ and t and x_{it} the period initial value of the log per capita real GDP, that is, $(rgdpl_{t-1})$
The coefficient estimates for the constant and $rgdpl$ are -0.0075 and 0.0137, respectively.
4. Estimate the asymptotic variance of the regression parameters [Equation (1.12)]
The t-statistics for the constant and $rgdpl$ are -0.1613 and 2.6381, respectively.
5. Test for an unobserved effect in Equation (1.11)
TS equals 2.6366.
6. Interpret results

Since TS is standard normally distributed, the Z-value can be immediately obtained from it under the null that $\text{sig}_c=0$. If $\text{TS}>1.96$ sig_c is significantly different from 0 at a 5% significance level. The null of no unobserved heterogeneity is thus rejected.

From an economic perspective, the coefficient on $rgdpl$, however, signifies that each year there is divergence (as opposed to convergence) of 1.37 percentage points, that is, countries which are above their steady state level of income keep on growing and countries which are below their steady state level have negative growth. This outcome is likely driven by two effects: 1. The assumptions of RE are not fulfilled. 2. The countries are too heterogenous to fulfill the assumption of „unconditional“ (that is, without controlling for further time varying variable) convergence. See Acemoglu (2007)