Homework 3

1 Exercises on growth theory

Ex. 1) In the Solow model it is assumed that prices for consumption and investment goods are the same. In this exercise we will relax that assumption. Assume the production function of the economy has the following form: $Y = AK^{\alpha}L^{1-\alpha}$. Population in the economy grows at the constant rate of n. Now suppose that the price of an investment good is given by p_I , the price of a consumption good is normalized to 1. Output is spent either on consumption or investment. This is to say that the following holds: $Y = C + p_I I$, where the latter part denotes savings of the economy. As usual in the Solow model, assume that a constant fraction $(1 - \gamma)$ of total income is consumed ($C = (1 - \gamma)Y$), and the remainder is saved (and invested).

1. Define the model in per capita terms, that is write all the relevant equations as functions of capital per capita, output per capita respectively. Denote per capita variables with lower case letters, i.e. $k = K/L$ and $y = Y/L$

2. Write down the capital accumulation equation with δ denoting the depreciation rate of capital.

3. Find the steady state values of capital per capita (k^*) and output per capita (y^*).

4. Suppose the price for investment goods p_I falls. Display graphically what happens. Comment on your graph (how are the steady state values affected?, what will happen in the short run?, etc.). Describe intuitively which effects are at work.

2 Micro-development economics - applied.

The purpose of this homework is that of replicating the analysis of Osili and Long (2008) about the effect of the UPE on fertility by using more recent Nigerian Data. In so doing, we can estimate the effect of education on total fertility, rather than on early fertility as in Osili and Long (2008).

1. You have been given the NDHS 2008 data. Briefly describe the sampling method and the contents of the survey (useful documentation is available at the following link `http://www.measuredhs.com/what-we-do/survey/survey-display-302.cfm`).
   A general description of the DHS surveys can be found at this other link
   `http://www.measuredhs.com/What-We-Do/Survey-Types/DHS.cfm`

2. Recall that the focus of all DHS surveys are women. Data come from interviews to a sample of women and on the males living in the same dwelling with the sampled women. DHS organizes information in different files, recoding data by individuals (women), households, household members, male, birth, children under 5 and couples. Depending on the analysis to be carried out, one recode is more ready-to-use than others. Use the individual recode file to estimate the reduced form effect of the UPE on the number of children each women had, by adopting a difference-in-differences technique. Define treated and untreated cohorts as in Osili and Long (2008). Note that you have to supplement to your DHS data information about high-intensity and low intensity states which can be recovered from the paper.

3. Estimate also an IV model where years of education are instrumented by federal funds per capita disbursed within the UPE program (as in Osili and Long). Use the functional transformation of funds per-capita suggested by Osili and Long. Execute this point by using first the IVREG2 command in STATA and next by "manually" performing the 2SLS procedure (standard errors will turn out to be different and would need to be corrected, but let's skip this problem for now).

4. We want to make a step ahead compared to Osili and Long, namely we want to check whether additional women education affects children health. By using the children recode file, which collects detailed information on all children under 5, estimate the effect of UPE on children size at birth, children current BMI and children vaccination history (i.e. total number of vaccines received).

5. Recall that the UPE has been closed after 1981 and federal expenditure on education reduced while school fees were re-introduced. Suppose that high intensity state suffered more than low-intensity states of this counter-reform. Exploiting this variation, estimate a DiD model where you compare the UPE cohorts with a suitably defined younger cohort (labeled as post-UPE cohort). As outcome variables consider both years of education and number of children.

6. Related to point 3) check whether the UPE had any permanent effect by estimating a DiD model where you compare the pre-UPE cohort with the post-UPE cohort. Perform also some robustness checks by varying the definition of the post-UPE cohort.

For each of the previous point (bar n.1), check the quality of the data at use, by means of summary statistics. Pay attention to the codes associated to "missing" and "don't know" answers. The latter need to be recoded as missing ("." in STATA).