Macroeconomics - Problem Set #1

1. Econometric part:

The datasets for this assignment will be available on Moodle.

a) Economic growth and convergence - descriptive statistics.

DatasetA contains levels of GDP per capita for many countries of the world for the years 1970, 1985 and 2007.

1. Plot histograms of GDP for all the three years and describe how the distribution of income evolves.
   (Note: Choose appropriate number of bars (there shouldn't be gaps in histogram and also it should be relatively smooth). If there are any outliers, omit them. Don't forget to write, if you have some economic intuition for evaluating these countries as outliers.)

2. Split the data into two groups. The split should be done according to the median income in 1975. Then show boxplots of incomes for both groups in each year. What happened? Is there any evidence for convergence?
   (Hint.: Use logs instead of levels. Start with splitting the sample and creating six variables: poor in 1975, 1985 and 2007, then same for the rich. Plot boxplots for each variable).

3. If you consider current economic crisis, do you expect that relative position of your countries will change? And why? What kind of criteria might help you to give some kind of "expert evaluation"?

b) The Solow model:

We've estimated parameters of the Solow model based on cross-country regression. Attached you will find DatasetB. Some countries are different, also the time range is a bit smaller. Try to replicate the estimation from the class:

$$\log y_i = \beta_1 + \beta_2 \log s_i + \beta_3 \log(n_i + g + \delta) + u_i$$

However, if the specification is correct then $\beta_1 = -\beta_2$ must hold. Test this hypothesis and reestimate the original model with this restriction.(Hint: Use Wald test.) What can you conclude?

2. Mathematical part - Solow model:

Romer, problem 1.3 - playing with Solow diagram
Romer, problem 1.6 - fall in population growth
Romer, problem 1.9 - wage and rental rate of capital in Solow model

Please, note that the problems are taken from the Romer: Advanced macroeconomics, Third Edition. The numbering of problems in earlier versions might be different.

3. Reading + essay:
Jones, C.I. (1997). On the Evolution of the World Income Distribution. *Journal of Economic Perspectives* 11(3), pp: 19-36

In your essay, please focus on answering following questions:

1. What is the question of interest? What methods are used by the authors?

2. Sum up how the distribution evolved in the past and what are the outcomes.

3. What are the projections for future according to authors?

4. Do you have any objections against the paper, is there something that can be criticized (assumptions behind methodology, conclusions, generalizations, logical fallacies, etc.)? Hint: You might want to think about following points:

   - why is assumption of similar growth rates in long term crucial for the results?
   - what is Markov transition matrix and why , in this context, we cannot apply it to individual countries
   - how would the exogenous shocks affect the world? as a whole? individually? how is this connected to the idea of growth disasters/miracles versus the idea of similar growth?

Notes on problem sets.

Should be delivered via moodle only, by **October, 25th, 23:55**. You have to be enrolled in Moodle, too, not only in SIS, to be able to post problem set there.

Please follow these additional rules - it helps us to do our jobs better (if we correct your problem sets faster, we have more time to prepare lectures and seminars):

1. ONE file only. Do everything you can in order to put everything into one file. No "zips" or "rars" please. All text editors can import images, tables and even videos and append it to the main text.

2. Don't forget to assign a name to your file that will be displayed in moodle.

3. Name of your file: NameProblemSetX.*; example: BaxaProblemSet1.pdf.

4. The file type: If you can, submit pdf version. Prefer older MS Office file types over docx.

5. You are encouraged to work in teams. The names of your colleagues should be written in the header of your problem set. However, essay should be written by your own.

6. In the essay part, we want to see whether you are able to make critical summary of the article - i.e. understand and explain IN YOUR OWN WORDS what are the main ideas, results and comment on they validity. We are not expecting any form of journalism, or free essay on the topic, we want you to learn how to read articles. Therefore, please, avoid things like:

   - "borrowing" expressions or full sentences from the article - it is called plagiarizm

- using pronoun "we" in summary part - you are speaking about author's ideas and results
- using pronous "we" in discussion part - it is your opinion about the article + it should be individual, do not be ashamed of your opinions