Assignment Task 8

(with R)

Deadline: 2018-05-30, 23:59

Do not forget to explain your answers!

Note: when generating data use `set.seed(student.code)` where `student.code` is your unique student code.

```
suppressPackageStartupMessages({
  library(plm)
})
data("Gasoline", package = "plm")
head(Gasoline)
```

The dataset contains 18 `country` observations from 1960 to 1978 on gasoline consumptions (for a total of 342 observations). In the dataset:

- `country` - a factor with 18 levels;
- `year` - the year;
- `lgaspcar` - logarithm of motor gasoline consumption per car;
- `lincomep` - logarithm of real per-capita income;
- `lrpmg` - logarithm of real price of motor gasoline;
- `lcarpcap` - logarithm of the stock of cars per capita.

Part 1: Data analysis

Visually inspect the `lgaspcar` data in each country. Is the (logarithm of) gas consumption per car similar throughout the countries or could there be some country-specific (fixed) effects, which could influence gas consumption? If so, what, in your opinion, could these (fixed) effects be?

Part 2: Predictor assumptions

Let's say that you are tasked to create a model for the (log of) gasoline consumption using the data available in this dataset. Which exogenous variables would you include in your model and what would you expect their signs to be?

Part 3: POLS

Create a pooled ols model for `lgaspcar` using relevant exogenous variables.

- Are the coefficients significant?
- Are the signs of the coefficients the same as the expected ones from `Part 2`?

Part 4: FE

Looking back at the results from `Part 3` and the overview of the data from `Part 1`:

- Create a Fixed Effects model and estimate it. Are the exogenous predictor coefficients different from those in `Part 3`?
- Test whether the country-specific fixed effects are statistically significant.

Part 5: RE

Let's say that we believe that the variation across entities is assumed to be random and uncorrelated with the predictor (or independent) variables included in the model. Estimate a Random Effects model and compare the predictor coefficients.

Part 6: FE vs. RE

We would prefer the RE estimator if we can be sure that the individual-specific effect really is an unrelated effect. Test whether the RE estimator is consistent compared to the FE estimator.

Part 7: Plot the fitted data

Plot the fitted data alongside your actual data for:

- The best model (according to the test results from `Part 4` and/or `Part 6`);
- One of the two remaining models of your choosing;