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Company Case Study Form (WP3, Deliverable 3.1)

Explanation:

According to the Letters of Intent by the Associated Industry Partners, each university will be provided with **one practical company case study** for the courses which will start in the academic year 2019/2020.

Next steps:

- 1) Each university should **choose one course** for which it develops a case study together with a company representative (e.g. a practical problem/issue which companies in this area are facing and on which the students will work – supervised by their lecturer).
- 2) Please fill in the form below

Please note: In case a company case study is developed for a course, only one additional assignment is required (see course package form, section 8).

General information:

Title of the course (as specified in the reformed curriculum)	Econometrics (Advanced Course for Finance)
Name of the teacher	Lida A. Mnatsakanyan
Title of the case study	Public Debt and Economic Growth
Company with which the case study was developed	Ministry of Finance of Armenia

Practical case study:

Explanation: Please outline the practical case study that the students are going to work on.

1. Introduction of the case / problem:

The research *C. M. Reinhart & K. S. Rogoff "Growth in a time of debt" (2010)*¹ is well known among macroeconomists, where a "debt threshold" of 90% of GDP was found based on the correlation between GDP growth rates and the debt level, and when this threshold is exceeded, the GDP growth rate begins to fall significantly. It is noteworthy that the authors themselves made a reservation that the obtained result is approximate and varies for different groups of countries. Despite this, the value of 90% of GDP has become widespread. Many empirical studies test and confirm the non-linear dependence of GDP growth rates on debt. However, in 2013, *Herndon, Ash, and Pollin "Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff"*² found an error in the authors' calculations and refuted the main result of their research. Based on the same data, it was concluded that the impact of public debt on the growth rate of real GDP is negative and the same for all debt values.

Thus, one of the arguments in favor of the need to reduce consumer spending, which is supported by the study of the authors, was called into question. But this article does not deny the results of numerous studies that have found a nonlinear relationship for different groups of countries.

It is proposed to check whether the GDP growth rate depends on the level of public debt for 15 post-Soviet countries (Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Latvian, Lithuania, Moldavia, Russia, Tajikistan, Turkmenia, Uzbekistan, Ukraine, Estonia) in 2009-2019.

For this purpose, it is necessary to create an appropriate database that includes the following variables:

- *Country* – country
- *Year* – the year
- *Real GDP* – real GDP per capita, in constant prices, USD
- *Growth* – growth rate of real GDP per capita, %

¹ Carmen M. Reinhart Kenneth S. Rogoff (2010) «Growth in a time of debt» // National Bureau of Economic Research 1050 Massachusetts Avenue Cambridge, MA 02138 January 2010 // <https://www.nber.org/papers/w15639.pdf>

² Herndon, Ash, and Pollin (2013) «Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff» // https://www.peri.umass.edu/fileadmin/pdf/working_papers/working_papers_301-350/WP322.pdf

- *Pop* – population, thousand people.
- *Ngs* – gross national savings, % of GDP
- *Edu* – share of people with higher education, % of GDP
- *Openness* – the degree of economy openness (export + import to GDP), % of GDP
- *Infl* – inflation rate (CPI), %
- *Total_dep* – demographic burden of children and the elderly, %
- *Bankcrisis* – a binary variable that is equal to one if a banking crisis occurred in this country in this year, and is equal to zero otherwise
- *Govdebt* – gross national debt, % of GDP

2. Assignment / task for the students:

All students from continuous assessment will be participated in the study. They will be divided into groups (each group will consist of 3-4 students). Students have to share the work of writing maximum 8 page report. Presentation must be made by the whole group while informing the audience about the role each group member has performed. There are no limitation of average length of the case studies presentation slides. Each group must nominate a team leader who will be the main channel of communication with teacher when seeking clarifications, and who will allocate work among the team members. When the group makes the final version of case study the team leader will present the group’s work to teacher in pdf form. All group members will make the presentation of their analysis to the remainder of the class.

All members of the team should take an active interest in the assignment. They have to think of the assignment as a learning experience rather than as a task that must be completed for passing the course.

The task consisted of these phases:

1. Before starting the activity, students were asked to work on a case study prepared and facilitated by lecturer. At this stage the lecturer will explain the nature and characteristics of a case study, which was used as a model. Moreover, lecturer will give some suggestions allocation of tasks within the team.
2. After explaining the different theoretical contents, students were asked to develop a case study using their knowledge and abilities. The content had to be reflected in a different form (each group will choose how to create their own content).
3. The last step was to exchange cases among students or the whole class. So students could compare their findings with the analysis proposed by the other authors of the

case study (the case study presentation will be during 10-15 minutes).

Main tasks:

1. Evaluate the regression of the growth variable on Ngs, the logarithm of real GDP per capita, the rate of population growth, Openness, Edu, Total_dep, Infl, Bankcrisis, Debtgov, and the square of debt using three approaches:

- 1) pooled OLS,
- 2) model with fixed effects,
- 3) model with random effects.

This analysis must be done using R (R studio) software. With this purpose it is necessary to use the *plm* package. At the same time, to avoid a potential endogeneity problem, instead of the regressors themselves, take their first lags (of the T-1 period). They must present the results in a single table. They need to specify the coefficients and their standard errors. Important variables should be marked with asterisks.

2. Choose the best model among the evaluated models. Give the results of all the tests you used to do this. Explain how the selection is made based on the test results obtained.
3. Based on the estimates obtained from the selected model, calculate the "threshold value" of the level of public debt (as the top of the parabola), if the corresponding variables were significant. Use the linear constraints test at the 5% significance level to test the hypothesis that the "threshold" is 0.9 (90% of GDP).
4. For the selected model, give a meaningful interpretation of the coefficient for the Bank crisis variable (do not forget that it is included in the model with a lag).
5. It is necessary to calculate the threshold value of the state debt for Armenia (Russia) and make appropriate recommendations.