1st HellasGrid User Forum

10-11 January 2008
School of Physics, Amphitheatre Aristotle of the National and Kapodistrian University of Athens, Ilissia Campus, Athens, Greece

Book of Abstracts

Using grid technologies for the mapping out of taxation policy

Th. Glavelis, K. Margaritis , N. Ploskas, N. Samaras

Department of Applied Informatics, University of Macedonia,
156 Egnatia Str., Thessaloniki, Postal Code 540 06, Greece
Email: {mai086, kmarg, mai084, samaras}@uom.gr

Abstract

It is a fact that the impact of taxes in the economy is significant. Via the taxation, the government decides how will be acquired the essential resources that will serve public aims, since the taxation influences the economic effectiveness, that is to say the reaction of public in different levels of marginal taxes (additional tax for each Euro of additional income) and the reallocation of income. Consequently, it is very important for the Public Administration to have in its disposal reliable elements and alternative scripts that are related with the effective application of tax policy.
The infrastructure of Hellas Grid [1] and Eumed Grid [2] gives the possibility for processing big volume of data and having substantially simultaneous control of different approaches, models or scripts. Having a vast list of historical elements relative with interaction of various factors in the tax policy, we can seek models that can be used for formulation of forecasts with regard to the future development of important tax sizes. According to these models, we can advance in control of various affairs, altering either the prices of entries or the prices of parameters of models.
This paper presents an application which is a powerful tool for the tracing of taxation policy. The scope of this tool is to present the ongoing opportunities that grid technologies provide to many sectors, such as the sector of Public Administration. This software uses an economical model to estimate the taxation policy of Greek government. The regression with which we appreciated the tax policy of Greek government connects the taxes (T) with: (1) the Government budget deficit/surplus (S_{govt}), (2) the Transfer Payments (TR), (3) the Net Interest Payments (INT) and (4) the Government Purchases (G).
The regression that was estimated is the following [3]:

$$S_{govt} = a_0 + a_1 * T + a_2 * TR + a_3 * INT + a_4 * G$$

where a_i, i=1, …, 4 are the coefficients of the regression and a_0 is the constant term.
Due to the lack of real elements of many years, the application creates each time a lot of instances of data. Of course the range of prices of instances that were created we tried to be as much as possible more representatives. For this reason, it was taken a sample of elements for the past fifteen years from the databases of OASA, Eurostat and National Statistical Service of Greece. From them, we created daily data from 1988 until 2006.

More instructions for the way that collections of data could be generated can be found in the papers [4] , [5].
Afterwards the creation of instances, the regression is executed for each one of the different instances and becomes a comparison of these instances between them as for a line of econometric indicators [6]. In the last step, the application exports a report that includes all the statistic and econometric results of the model with the most adequate data.
Using such a kind of report the government could forecast its budget deficit or surplus setting up various scripts. This way, government can obtain a deeper analysis of all different approaches to succeed its goal. Obviously, this is only a tool for examining different solutions of the taxation policy and cannot substitute the theoretical approach of the problem.
The application was developed with the high-level open source language Gnu Octave (edition 2.9.12) and because of its demands for memory and computational resources, it is infeasible to be executed locally in a typical computer, so a grid should be used in order to accomplish this operation.

Keywords: Grid, Taxation Policy, Public Administration, Econometrics, Octave.

References

[1]. Hellas Grid – Task Force. (www.hellasgrid.gr).
[2]. Eumed Grid – Empowering eScience across the Mediterranean. (http://www.eumedgrid.org).
[3]. A. Andrew, B. Bernanke and Dean Croushore “Macroeconomics, European Edition”, Pearson Addison – Wesley, 1998.
[4]. R. L.Rardin and R. Uzsou “Experimental evaluation of heuristic optimization algorithms: A tutorial”, Journal of Heuristics, Vol. 7, pp. 261-304, 2001.
[5]. J. N. Hooker “Needed: an empirical science of algorithms”, Operations Research, Vol. 42(2), pp. 201-212, 1994.
[6]. A. Katos. “Econometrics, Theory and Applications”, Publications Zygos, Thessaloniki, 2004.