

# First Team Econometric Competition

April 5, 2008

The group of experts builds a macroeconometric model of Lithuania. They will use this model for forecasting as well as to evaluate the aftermath of economic and social politics decisions. One of the experts builds a private consumption equation. He has collected data from 1995 first quarter to 2006 fourth quarter for the following variables (all data are in file a *data.xls*):

## Endogenous:

- $C^R$  - household consumption at constant prices (mil. Lt)

## Potential factors:

- $B^L$  - Bank-issued loans for the private entities (mil. Lt)
- $i^l$  - Mid-long term interest rate (nominal)
- $P^C$  - Household consumption deflator
- $P1$  - Money M1 (mil. Lt)
- $QM$  - Quasi-money (mil. Lt)
- $Y^{DU}$  - Income from labor relations (mil. Lt)
- $Y^{MISR}$  - Mixed Income at constant prices (mil. Lt)

Help the expert!

1. Discuss the chosen factors. Are there lack or excess factors? What other factors could be included? What should be done if there is no indicator you need in the data base (give an example)?
2. The expert depicted the data set in the graphs (see graphs in file *expert.xls*). What can you say about the data analyzing graphical information? How this influence the modelling?
3. The expert has the following household consumption at constant prices model, which is estimated by ordinary least squares (OLS) method.

$$\begin{aligned}
\log(C_t^R) &= 1.031 + 0.23 \cdot \log(C_{t-1}^R) + 0.433 \cdot \log(Y_t^{DU}/P_t^C) + \\
&\quad [0.816] \quad [0.103] \quad \quad \quad [0.071] \\
&+ 0.21 \log(Y_t^{MISR}/P_t^C) + 0.058 \cdot \log(Y_{t-1}^{MISR}/P_{t-1}^C) + \quad (1) \\
&\quad [0.037] \quad \quad \quad [0.045] \\
&+ 0.006 \cdot \log(B_t^L) - 0.0001 \cdot i_t^l + \hat{\varepsilon}_t; \\
&\quad [0.032] \quad \quad \quad [0.0015]
\end{aligned}$$

here  $\hat{\varepsilon}_t$  denotes model residual at time moment  $t$ , and the standard errors are in brackets. What effect on real household consumption has increase of 1 percent of the following factors:

- (a) Income from labor relations
  - i. in short term
  - ii. in long term
- (b) mixed income
  - i. in short term
  - ii. in long term

when other conditions are *ceteris paribus*. Check if short term household consumption elasticity is significantly different from 0.6 (at 5% significance level).

4. In a file *expert.xls* there are actual, fitted and residual values of the estimated equation (1) as well as additional graphical information. Standard model adequacy statistics are also included. What can be said about the properties of coefficients (unbiasedness, consistency, efficiency) and residuals? Have the expert chosen the appropriate estimation method? Why? Give your critique and proposals to this model.
5. It is time to help the expert. Build your best model and compare it with (1). Why and how it is better than (1)? Write down the main modelling steps and explain them briefly. Is your model based on some economic theory? If yes, which one? Have you used some specific econometric theory? What methods did you use for parameter estimation? Is your model specification correct? How did you test it? Do residuals of your model have "good" properties, which and why?
6. Give economic interpretation to your model. Are results acceptable in economic view? What is short and long term elasticity of mixed income and income from labor relations in your model?