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FORECASTING AND COMPARISON OF THE WAGES MODELS

INTRODUCTION

- ✘ *The wages are very important indicator from the microeconomic and macroeconomic point of view.*
- ✘ The problematic of wages was and still it is a central point of interest of many economists.
- ✘ Original Phillips curve presents indirect interdependence between the rate of growth of the nominal wages and the rate of growth of unemployment.
- ✘ Generally, the main determinants of wages are inflation, unemployment and labor productivity.
- ✘ It is not possible to separate the terms like wages, employment, inflation and output since they form together the complex area of economics.

AIM OF THIS PAPER

- ✘ We use the econometric approach and to construct some variants of wages models.

(classical linear model, logarithmic model and Error correction model – ECM).

- ✘ Finally we compare the presented models and make evaluations of the results and in order to use the best model for the forecast.

DATA

- ✘ Our analysis is based on quarterly data reported by the Slovak Statistical Office over the period 2000 to 2011.
- ✘ The models were estimated only for the period 2000 – 2010 in order to use the data from 2011 for verification purposes.
- ✘ The econometrical program Eviews 5.1 was used for the analyses.

VARIABLES

Macroeconomic indicators:

W – average nominal wage (€ per person),

GDP – gross domestic products in current prices, (billion €),

CPI – costumer price index according to the classification of individual consumption by purpose (COICOP),

Dummy variables:

DK – dummy variable for correcting the decrease in wage growth in times of crisis,

S3 a S4 –seasonal dummy variables.

LINEAR AND LOGARITHMIC MODEL

Model M1

$$W_t = -39.84 + 27.57 \cdot \text{GDP}_t + 1.99 \cdot \text{CPI}_t + 57.72 \cdot \text{S4}_t - 22.11 \cdot \text{S3}_t + 47.47 \cdot \text{DK}_t$$

$$R^2 = 0,996$$

$$D-W = 2,17$$

$$BG(4) = 8,65$$

Model M2

$$\text{LOG}(W_t) = 2.93 + 0.65 \cdot \text{LOG}(\text{GDP}_t) + 0.36 \cdot \text{LOG}(\text{CPI}_t) + 0.09 \cdot \text{S4}_t - 0.04 \cdot \text{S3}_t + 0.07 \cdot \text{DK}_t$$

$$R^2 = 0,997$$

$$D-W = 1,39$$

$$BG(4) = 5,39$$

ECM MODEL OF WAGES

Model M3

$$D(W_t) = -9.57 - 1.15 * R_M1_{t-1} + 38.41 * D(GDP_t) - 6.92 * D(CPI_t) + 95.73 * S4_t - 5.15 * S3_t,$$

$$R2 = 0,926$$

$$D-W = 1,99$$

$$BG(4) = 4,62$$

✘ R_M1_{t-1} is residual from cointegration equation model M1.

VERIFICATION OF THE MODELS

The forecast of wage for the year 2011

	W real	W_M1	W_M2	W_M3
2011Q1	746,00	752,00	748,96	753,03
2011Q2	781,00	792,07	792,38	790,95
2011Q3	769,00	799,92	792,30	818,44
2011Q4	848,00	868,28	889,87	912,79

Percentage error and MAPE

	W_M1	W_M2	W_M3
2011Q1	0,80%	0,40%	0,94%
2011Q2	1,42%	1,46%	1,27%
2011Q3	4,02%	3,03%	6,43%
2011Q4	2,39%	4,94%	7,64%
MAPE	2,16%	2,46%	4,07%

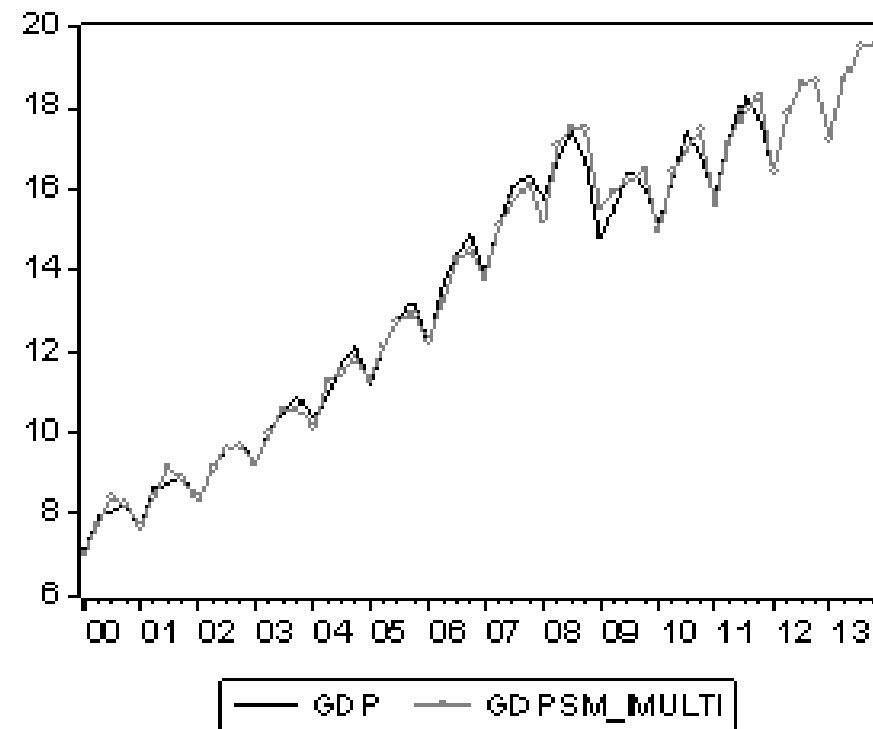
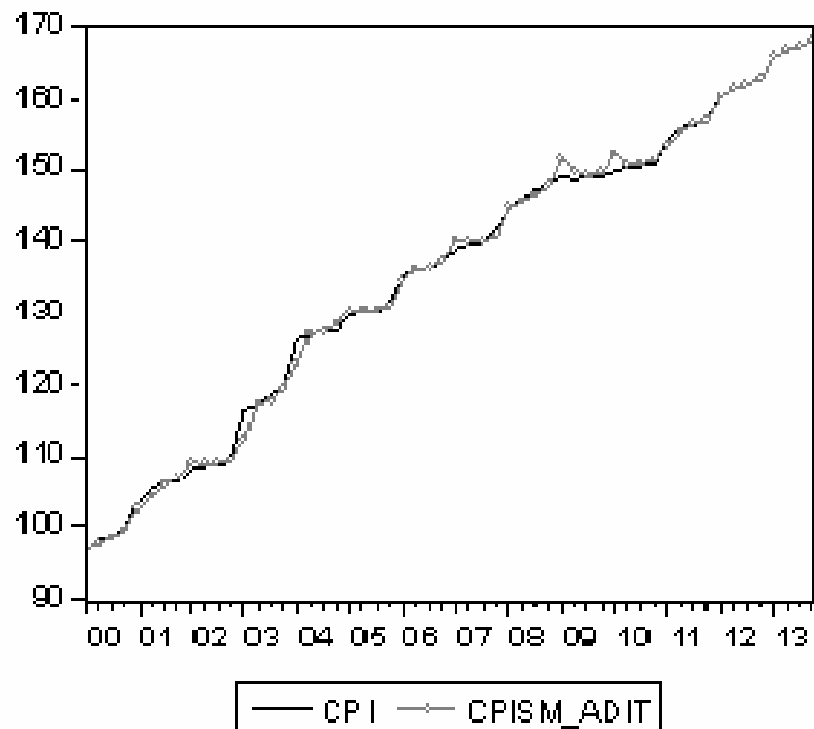
ESTIMATE MODEL M1 (WHOLE PERIOD)

$$W_t = -39.99 + 27.13 \cdot \text{GDP}_t + 2.03 \cdot \text{CPI}_t + 57.19 \cdot \text{S4}_t - 23.49 \cdot \text{S3}_t + 42.58 \cdot \text{DK}_t$$

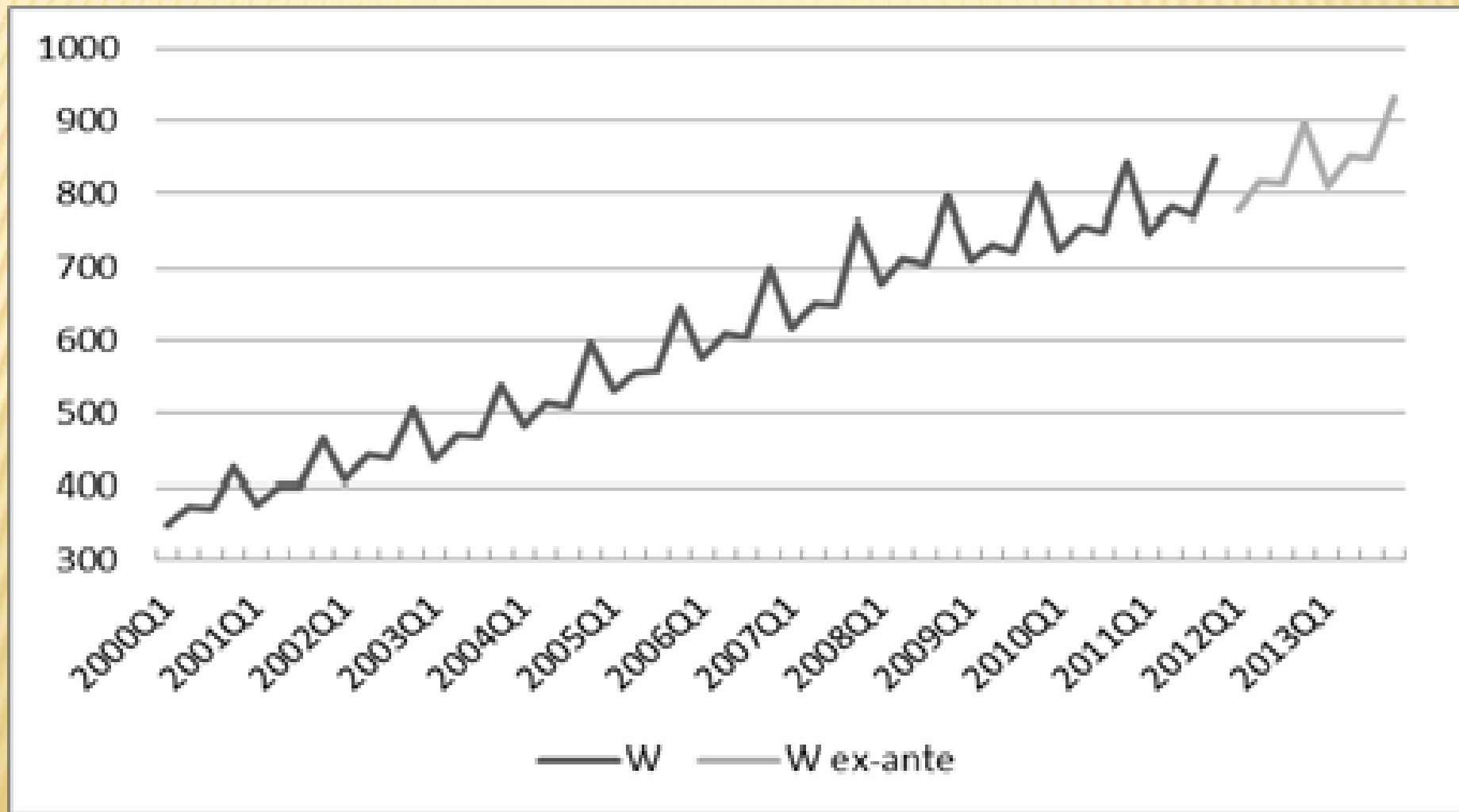
$$R^2 = 0,99 \quad D-W = 1,82 \quad \text{BG}(4) = 8,752$$

To obtain the value of wages for the years 2012 and 2013, we must know values of all explanatory variables. We use the methodology exponential smoothing – additive and multiplicative. More appropriate is model with smaller root mean squared error (RMSE).

REAL AND EXPONENTIAL SMOOTHING VALUES OF CPI AND GDP



REAL VALUES AND EX-ANTE FORECASTS OF AVERAGE NOMINAL WAGES OF SLOVAKIA



CONCLUDING REMARKS

- ✘ We presented three different econometric models of average nominal wages of Slovak republic.
- ✘ Two models (linear and logarithmic) were formulated regardless of stacionarity of variables and one model (ECM) took into account the stacionarity of dependent and independent variables.
- ✘ Models obtained were evaluated using the forecasts for year 2011. Finally on the basis of ex-post forecasts we compared models and their prognostic ability.
- ✘ Linear model shows to be the best model for forecast calculation for the next years.