INFLUENCE OF THE INTENSIVE AND EXTENSIVE DETERMINANTS ON THE LEVEL OF GROSS VALUE ADDES IN THE AGRICULTURAL SECTOR – AN ECONOMETRIC ANALYSIS

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Abstract*: The determinants of economic growth in a national economy or in an activity field were the subject of many disscusions between specialists, starting from identifying the indicators considered to be the engine of economic growth, but also to the correlations between them, and to the interpretation of the results. Regarding to the agricultural sector, were identified as indicators/factors with influence on the economic growth the following: final consumption, the value of exports, the value of production for market, variation of stocks, the value of taxes on products. In this approach, the analysis of factors/determinants is depened by an econometric model, of which correlations relations highlights the intensive determinants with effect on the final indicator of the economic growth – gross value added. For testing the influence of the factors mentioned above on the gross value added from the agricultural sector was used the E-views program, which allowed the moddeling the phenomenon and the influence of different effort factors on one or more effect factor.*

Key words*: determinants, efficiency, results, agricultural sector.*

INTRODUCTION

The determinants of economic growth in a national economy or in an activity field were the subject of many disscusions between specialists, starting from identifying of the indicators considered to be the engine of economic growth but also to the correlations between them, and to the interpretation of the results. The aim of the present approach is to identify of extensive and intensive indicators with direct influence on economic growth in the Romanian agricultural sector and the testing this influence on the effect indicators through an econometric model.

MATERIALS AND METHODS

The attempt to indentifying some intensive or extensive determinants of the economic growth in the Romanian agricultural sector has a starting point, except the theoretichal concepts, the available statistical data from the National Institute of Statistics (INS), through Tempo-Online database, as well as the information of National Commission for Prognosis, through their forecasts on the medium term. For analysis, were used statistical methods, like dinamics, structures, comparations, the results being presented also from tabular form of figures. In order to ensure the comparability of data, meaning the elimination of influence of inflation, the value of data were trasformed in comparable prices of the last available year (2011), using the GDP deflator. It worth mentioned that, for ensuring of completed series, the time period refered to the 2000-2011 period.

RESULTS AND DISCUTIONS

As an important part of national economy, the agricultural sector has distinctive characteristics which generated oscilanting evolutions of activities, with direct impact on the sector contribution of the gross value product and also on the level of satisfaction of the internal consumption requirements of population.

The high sesonality of production, linked to the high defragmentation of agricultural land, to which may be added also the conditions more or less subjective, influence the way down the intensive and extensive determinants, with efect on sustainable economic growth.

As an economic indicator, the economic grotwh in the agricultural sector may be apreciated from the perspective of rate of growth of gross value added obtained in the sector or of a value of agricultural production, to whose evolution is played by the following factors (determinants), respectively:

- The structure of agricultural land, from the arable and agricultural perspective;
- The structure of population from the perspective of population with age between 14-64 years, on total and also from the rural area;
- The average of life, on total and rural/urban areas;
- Education;
- The number of employees from the production process;
- Employment rate;
- The rate of activity;
- The rate of inflation;
- The level of investments;
- The level of production realized for market;
- The level of intermediate consumption;
- The level of taxes on products;
- The level of final consumption;
- The level of exports.

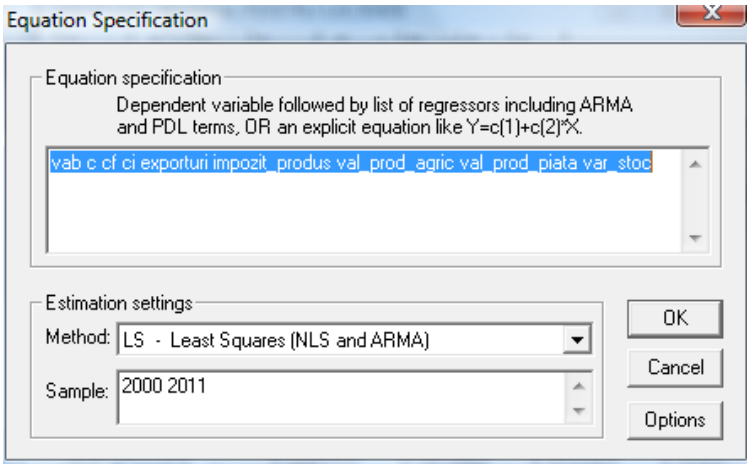
It is worth mentioned that the present approach has considered also the calculation of certain complex indicators of which analysis put in evidence significant changes, generates by the evolution of primary indicators, as base of complex indicators. The analysis of factors/determinants realised by now from the perspective of their evolutions and of the changes in the last 12 years is deeped through an econometric model, of which correlations relations put in evidence the intensive determinants, with direct effect on an resultative indicator of economic growth – gross value added. In this sense, on the basis of available information, as time series, we created a data series for the 2000-2011 period, in which the gross value added of agricultural sector is defined as a function of these indicators. To establish the correlation between the effort indicators and effect indicator we calculated the correlation coefficient, by descriptive statistics, the results indicate different intensity, also as value but as sign (+/-).

From the analysis results that a high correlation are between the gross value added and the following indicators:

- Final consumption (FC) – 95.6%;
- Intermediate consumption (IC) – 95.1%;
- Exports – 76.9%;
- Taxes on products – 91.1%;
- Value of agricultural production – 98%;
- Value of production for market – 95%;
- Variation of stocks – 40.1%.

For these seven effort indicators and for the effect indicator was realised, firstly, a descriptive analysis of data, following also the evolution in time but also the indicators of average, median, standard deviation, etc. For an econometric model, respectively of a equation, we consider the gross value added as a function related to the indicators compared has an significant correlation. In this sense, we used a multifactorial model (with many explanatory variables of back-looking type). The equation of model is presented in the following figure (**Figure 1**).

Figure no.1. The equation of model



By applying this equation, was obtained the following model (**Figure no.2**):

Figure no.2. The influence of indicators on the gross value added in the agricultural sector

EViews - [Equation: ECUTIE Workfile: PENTRU LUCRARE]

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Dependent Variable: VAB
Method: Least Squares
Date: 12/01/13 Time: 19:28
Sample: 2000 2011
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3146.451	796.0359	-3.952650	0.0168
CF	0.530770	0.070578	7.520365	0.0017
CI	0.388151	0.099822	3.888443	0.0177
EXPORTURI	0.038048	0.081663	0.465920	0.6655
IMPOZIT_PRODUS	-1.081011	0.370678	-2.916304	0.0434
VAL_PROD_AGRIC	0.402825	0.059619	6.756679	0.0025
VAL_PROD_PIATA	-0.346248	0.057085	-6.065456	0.0037
VAR_STOC	0.506021	0.057043	8.870802	0.0009

R-squared	0.999782	Mean dependent var	49260.83
Adjusted R-squared	0.999402	S.D. dependent var	13263.30
S.E. of regression	324.4553	Akaike info criterion	14.63689
Sum squared resid	421085.0	Schwarz criterion	14.96016
Log likelihood	-79.82136	F-statistic	2625.390
Durbin-Watson stat	1.988148	Prob(F-statistic)	0.000000

Source: Own calculations.

Analysing the estimated parameters, we observe that these are statisticaly significant on a thereshold of 5%. Because in the column Prob, the values registered for the probabilities associated to the T-statistic test are less than 0.05, we can conclude with a probability of 95% that estimated parameters are statisticaly significant. Also, on the value of data, we observe that 99.97% from the variation of resultative variable is explained by the variation of the explanatory variables included in the model. This high value of R^2 indicates the fact that the model considered explain by a very good manner the economic phenomenon.

For testing the model were followed the next steps:

a) **testing the existing of autocorrelation on the residual level**; for this test we realised the correlogram of residuals squared with 24 lags. Analysing this correlogram we observe that are not any autocorrelations (all probabilities associated to the Q statistic - Ljung-Box Test > 0.1) (**Figure no.3**);

Figure no.3. Correlogram of residuals

Equation: ECUTIE Workfile: PENTRU LUCRARE

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Correlogram of Residuals Squared

Date: 12/01/13 Time: 19:32
Sample: 2000 2011
Included observations: 12

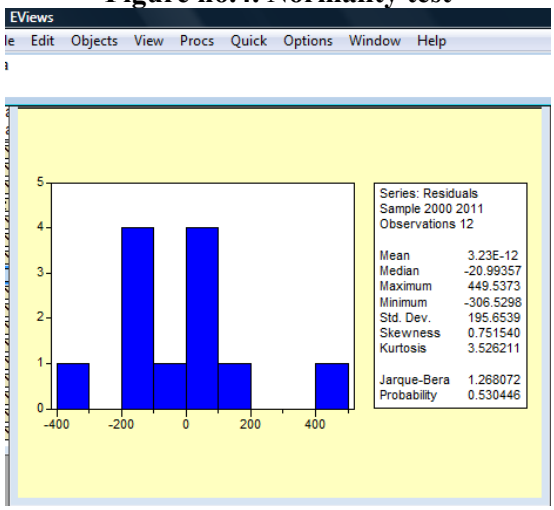
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.253	-0.253	0.9810	0.322
		2	-0.121	-0.198	1.2281	0.541
		3	0.343	0.284	3.4198	0.331
		4	-0.146	-0.004	3.8687	0.424
		5	-0.113	-0.094	4.1766	0.524
		6	-0.016	-0.216	4.1841	0.652
		7	-0.078	-0.130	4.3876	0.734
		8	-0.043	-0.052	4.4651	0.813
		9	-0.125	-0.138	5.3351	0.804
		10	0.038	-0.031	5.4554	0.859

Source: Own calculations.

b) **Calculation an normality test of residual**, in sense to verify if residuals following a normal distribution; the value of Jarque-Bera test = 1.268072, with an associated probability equal with 0.53. Therefore, we cannot reject the nule hypothese on an

significant thereshold of 5%, according to which the residual are a normal distribution (**Figure no.4**);

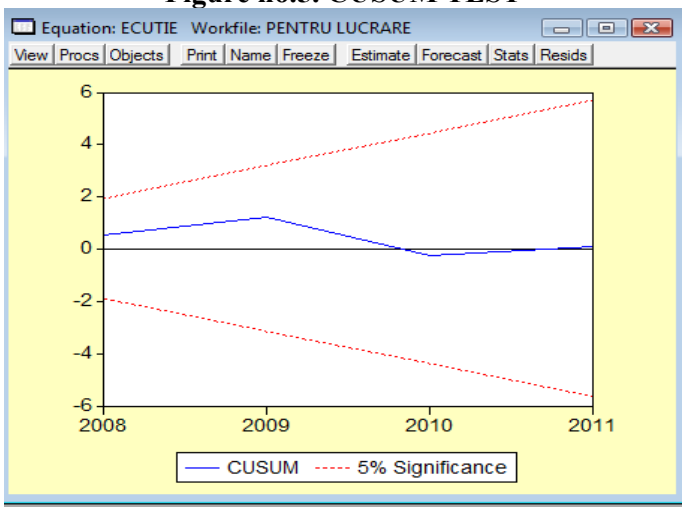
Figure no.4. Normality test



Source: Own calculations, on the INS data 2011.

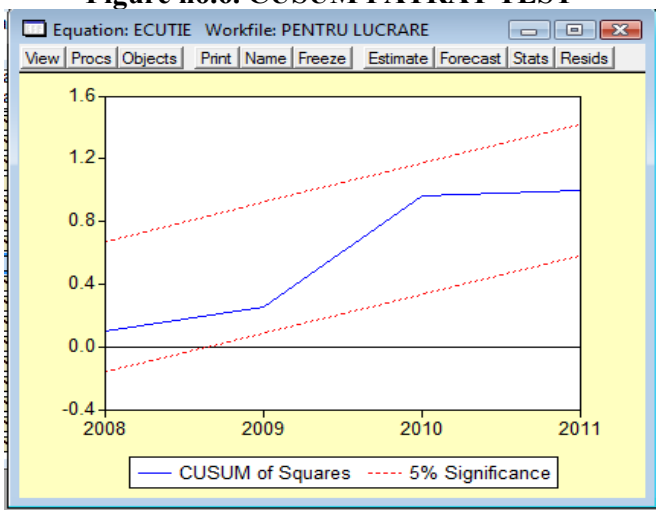
c) **Testing the stability of model**, by using Cusum test (**Figure no.5**) which is based of the cumulative sum of the recursive errors of the regression equation, Cusum Pătrat test (**Figure no.6**) (calculating and analysing in a similar manner with CUSUM test, with different that the recursive errors are replaced with double recursive errors), as well as the recursive coefficients test, respectively of the coefficients of the regrresion equation, calculating on a recursive basis (**Figure no.7**).

Figure no.5. CUSUM TEST



Source: Own calculations.

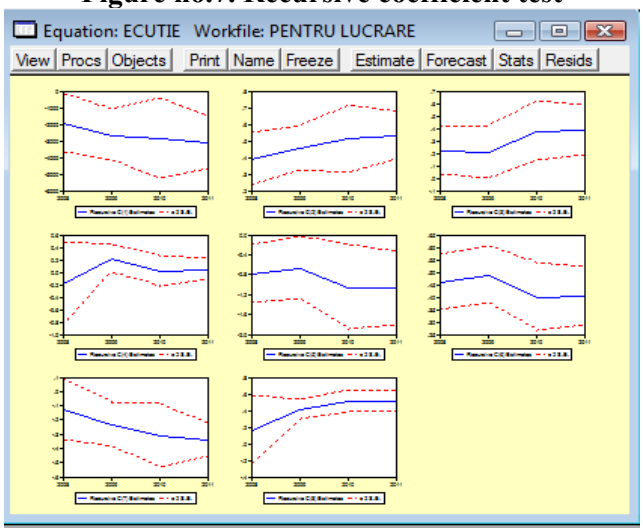
Figure no.6. CUSUM PĂTRAT TEST



Source: Own calculations.

From the analysis of CUSUM test we observe the existence of some shocks of explanatory variables with not a significant instability at the level of explanatory variable.

Figure no.7. Recursive coefficient test



Source: Own calculations.

The recursive coefficient test shows that the model is stable. In our researsch we try to introduce in model some other variables, obtain poor results, including the test pattern so as to maintain the proposed model and consider it to be relevant. In conclusion, it was proved **that the model is considered valid and captures very well the influence analysis of gross value added in the food industry**.

CONCLUSIONS

As a continuing topic of debates, generated by the need to identify new determinants and their impact on the formation of added value in the economy, the issue of economic growth in the agricultural sector and the intensive and extensive determinants still arouses heated discussions taking account the specific characteristics of this industry and its importance in ensuring the domestic demand for food for the population. Starting from general economic theory, this approach attempted to identify a number of determinants (factors) that influence the intensive and extensive growth of the Romanian agricultural sector.

In this regard, the particular features of agricultural economy, including agriculture and food, beverages and tobacco, the present approach revealed the existence of significant correlations between gross value added and a number of factors whose development puts full mark on sectoral growth.

From this perspective, it should be noted that among the determinants of the extensive nature may be included in intermediate consumption, final consumption and taxes on product, while in the category of intensive determinants we include the agricultural production value, value of production for the market, changes in stocks and exports.

Although in the literature there is a significantly higher number of determinants of economic growth, analysis and customization in the agricultural sector revealed a weak influence on the level of gross value added sector.

Series analysis of data revealed that the total agricultural production and the gross value added relative to 1 leu intermediate consumption registered during 2000-2011 a downward trend, particularly in the agriculture, reflecting the character extensive further value of the Romanian agricultural sector.

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