Eco-Economic Model Regarding the Human Possibility Food Consumption in the Context of Realization the Ecosanogenesis

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Abstract: In our study we developed one model for descript the interrelation from consumption of human calories, the population growth and the possibility for pay the food in Romania. The economy is in conflict with the environment and realization the ecosanogenetic balance. Eco-economy development is influenced by essential factors with different contributions to decrease or increase the level of degradation of the environment, including biodiversity and ecosanogenetic balance. In this direction for realization the ecosanogenesis it must reconsider the relationship between biodiversity and economy as mankind consumes more food than it produces because the global grain stocks were reduced to less than half, leading to food shortages and start a food crisis imminent in the world. The econometric model developed can highlight the need for calories at the individual level is approximately constant, being influenced by specific biological factors, and population and GDP influences consumption of calories, which directly influences can have negative impacts on ecosanogenesis and agro ecosystems.

Keywords: eco-economic model; analysis; ecosanogenesis

JEL Classification: Q270

1. Introduction

The field of eco-economy developed basing any decisions aimed at ensuring productive and social capital in accordance with the characteristics of natural capital, including counting based on ecological, economic and social, both short term and long term. The idea dependence environmental quality (or the degree of deterioration) the level of economic development has occurred because research economist Simon Kuznets who theorized that there is an inverse relationship between environmental damage and economic development, which means that environmental degradation is amplifies the beginning of the development process and then to fall with a certain level of development. Concerns in the vast ecosanogenesis are primarily related to the implications of technology and various health products, because their effects are far more extensive and generalized. The objectives of concept aims ecosystem management and quality production correlated

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with environmental requirements. These objectives are linked to interest consumers and producers and the environment. Achieving equilibrium ecosanogenetic requires effective management of ecological systems can be achieved by applying the principles and methodologies ecosystem management.

Economic development is influenced indirectly by key factors: the level of economic activity or the size of the economy, the structure of the economy, the latest technology, the application of legislation on environmental policy and spending ambient. For conservation and environmental protection in the business or economy size we can say that the higher a country's economy is more developed, while the other factors remain constant, the more rapid depletion of natural resources and pollution level is higher. The type and level of resource depletion and pollution depends also of the regional structure of the economy. Thus, economies that depend heavily on agriculture and other primary sector industries tend to suffer from a rapid depletion of natural resources, deforestation and land erosion, but suffer less industrial pollution. Ecosanogenesis concept requires that an objective requirement, because man can only survive in a healthy environment. If health depends on the human - product - nature, and promote better health will depend on the relationship optimal functionality. This concept involves problematic man to major human actions and their results, nature and society, material and spiritual culture in a global relational context (Hoffman, et al., 1990) refers to both. The field of ecosanogenesis is the workplace health, the health of consumers, and the environment. The costs of biodiversity loss and degradation are very difficult to determine, but studies to date worldwide shows that they are substantial and growing. In a study on understanding the causes that led to the loss of biodiversity are referred to the economic valuation of ecosystems and biodiversity at international level and it is estimated that the annual loss of ecosystem services is equivalent to EUR 50 billion and that, by 2050, cumulative losses in terms of welfare will rise to 7% of world GDP. We can say that a certain economic phenomenon is influenced positively or negatively by the time variable if the latter does not suffer significant changes that disturb phenomenon (economic and financial crises occurring in the period under review, and not before it, the fundamental legislative measures can change inside phenomenon, the fiscal policies determined by the dramatic events etc.) or changes that occur are normal grade of economic developments so far. Half a century ago, Barten (1964) and Theil (1965) formulated the theory, which today is known as the Rotterdam model. This system of equations has allowed the first effective test of the theory in relation to consumer utility maximization. Few works in the economy have a long period of use and citation even after almost half a century. The basis of this theory was the two works, which were published in Econometrical in 1964 and 1965. These documents were integrated and became known as the “Rotterdam model”. For the first time, this model has become an important tool for econometric analysis of consumer demand model and test-maximized utility theory. The Rotterdam led to an extensive literature and occupies a status similar consumer demand linear expenditure system (LES,

Stone, 1954), TRANSLOG (Christensen et al., 1975) and Deaton and Muellbauer application system, 1980. The Rotterdam-income social describes the minimum required coverage of consumption which is a linear function of real income variation for varying prices. The model is an equation for each variable, but includes a system of n equations that relate the changes for each of the successive periods T. The answer to the question, if the person's income amounts dollar, as this is spent in really? The determined values of certain variables, called endogenous combined dependent variables in the model are simultaneously determined by relations model. In this case minimal consumption and income are endogenous variables, which can be explained or predicted. The model also contains other variables, called exogenous, which are determined outside the system, but which influence the damage values endogenous variables. The model also contains certain parameters which are generally estimated using econometric techniques and relevant data. The econometric model can be defined as a special type of algebraic model, because it includes one or more random variables (random variables). Econometric model can be linear, in which case it is called linear parameters. The assumption of linearity is important because, on the one hand, it allows theorem proving mathematical statistics such models and, on the other hand, provides easy calculation of values taken by variables. The model is linear in the parameters, when income and prices are taken as exogenous variables and can be estimated as a system of seemingly unrelated regression equations. The Rotterdam follows a different path that involves a three-step process: start with a general system of differential equations specific application. Then you have performed a constraint of these equations so that they meet the characteristics of homogeneity and symmetry. These constraints may result from the solution to the maximization of the utility budget, but specific functional form is unspecified. At this stage, "coefficients" are not constant demand equation approach is general and in accordance with any algebraic form of the utility function or cost. In the last stage, infinitesimal changes are replaced by finite changes and the model is parameterized to become constant coefficients defining Slutsky. Therefore, the coefficients of the equations are coefficients Rotterdam utility function as algebraic form. The Rotterdam is the simplest example of the general system of differential demand. According to this model, the coefficients of equations de- shares represented marginal revenue flexibility, Slushy coefficients and coefficients of price - are all constant. However constancy of marginal actions can be problematic, especially for food when there are large variations in income.

2. Material and Methods

For implement the systematic study of the methods used to cross-seeking aspects of phenomena and processes at a time and longitudinal methods, which aim processes, while issues. Were used statistical methods and casuistic methods. Data collection method will be particularly quantitative because it is an objective method, deductive and generalized. These quantitative approaches will be made in the methods concerned. It will use both sequential methods, each method (quantitative or qualitative) research will be addressed at the same time, as well as theoretical and methodological triangulation method for determining the indices. Numerous bibliographical sources were analyzed by experts in the field, FAO expert reports, scientific papers and documents of the Official Monitor.

3. Rezults and Discussion

Linear regression can describe the time evolution of calories, where the independent variable x would represent time and the dependent variable y calorie consumption. In most economic research, regression models containing both types of variables: quantitative and qualitative. Often requires the introduction of qualitative variables in the regression. One of the types most commonly used qualitative variables are dummy variables in regression. These take the value 1 if a certain condition is true and 0 otherwise. These models are called models of analysis of covariance (ACOVI). If a qualitative variable has m variants are introduced m-1 dummy variables. Dummy variables are used to correct abnormal values (outliers) for consideration of qualitative variables and analysis of seasonality. Dummy variable= dependent variable influenced by: quantifiable variables (income, production, prices, costs, etc.) qualitative variables, eg - gender, race, religion, nationality, - the occurrence of catastrophic events caused by man or nature, such as wars, earthquakes, seasonality caused by the seasons special events such as strikes, restructuring, or the life of the nation. The following example will be estimated and a regression equation to illustrate a model calorie consumption, GDP and population in Romania, using annual date for the period: 1990-2012. Series used: first quality-calorie pop.-population, GDP growth rates. For a description of the analyzed phenomenon we built a model of the form:

D(CALORII) = C(1)*D(POP/1000) + C(2)*PIB + C(3) + C(4)*T + C(5)*T^2 + C(6)*@ISPERIOD(“1993”) + C(7)*@ISPERIOD(“2007”)

When playing multiple linear regression model was used data on calories/day/person, population, GDP, since 1990 with the data source: www.insse.ro-Tempo-online database. After estimating the parameters in EViews, we obtained the equation: Estimation Command:

==========
LS D(CALORII) D(POP/1000) PIB C T T^2 @ISPERIOD("1993") @ISPERIOD("2007")
Estimation Equation:
==========
D(CALORII) = C(1)*D(POP/1000) + C(2)*PIB + C(3) + C(4)*T + C(5)*T^2 + C(6)*@ISPERIOD("1993") + C(7)*@ISPERIOD("2007")
Substituted Coefficients:
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D(CALORII) = -0.0914584788317*D(POP/1000) + 4.33863*PIB - 211.669 + 39.005*T - 1.44211917141*T^2 + 270.1314*@ISPERIOD("1993") - 180.7934*@ISPERIOD("2007")

Dependent Variable: D(CALORII)
Method: Least Squares
Date: 06/09/14 Time: 00:28
Sample (adjusted): 1991 2012
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POP/1000)	-0.091458	0.046731	-1.957131	0.0692
PIB	4.338632	1.441005	3.010837	0.0088
C	-211.6698	33.39412	-6.338535	0.0000
T	39.00533	5.930936	6.576590	0.0000
T^2	-1.442119	0.218631	-6.596132	0.0000
@ISPERIOD(1993)	270.1315	33.73819	8.006697	0.0000
@ISPERIOD(2007)	-180.7934	31.02446	-5.827447	0.0000

R-squared	0.927192	Mean dependent var	10.45455
Adjusted R-squared	0.898069	S.D. dependent var	92.36456
S.E. of regression	29.48897	Akaike info criterion	9.859281
Sum squared resid	13043.99	Schwarz criterion	10.20643
Log likelihood	-101.4521	Hannan-Quinn criter.	9.941059
F-statistic	31.83679	Durbin-Watson stat	2.652824
Prob(F-statistic)	0.000000		

For each independent variable and constant EViews program reported standard error of the coefficient t-statistic test and the associated probability. Assuming that it works at 5% level of relevance, as in the example above statistical t-test probabilities are attached below this level variables D (POP/1000), C, T ^ 2 and ISPERIOD

("2007") coefficients are considered statistically significant. It is also reported F-statistic and its associated probability. Since this probability is less than the level of relevance in this assay that at least one coefficient of the regression line is statistically significant. Were tested by the equation errors View/Residual tests/Correlogram - Q Correlogram of Residuals

Date: 06/09/14 Time: 09:33
Sample: 1991 2012
Included observations: 22

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
***| . |	***| . |	1	-0.382	-0.382	3.6727	0.055
. | . |	.**| . |	2	-0.061	-0.243	3.7711	0.152
. |**. |	. |* . |	3	0.265	0.179	5.7257	0.126
.**| . |	. *| . |	4	-0.301	-0.164	8.3789	0.079
. | . |	. *| . |	5	0.046	-0.109	8.4453	0.133
. | . |	. *| . |	6	-0.037	-0.196	8.4906	0.204
. *| . |	. *| . |	7	-0.100	-0.135	8.8416	0.264
. *| . |	.**| . |	8	-0.067	-0.288	9.0128	0.341
. |* . |	. | . |	9	0.141	-0.018	9.8147	0.366
. *| . |	.**| . |	10	-0.169	-0.261	11.073	0.352
. |* . |	. | . |	11	0.124	-0.054	11.813	0.378
. | . |	. *| . |	12	0.046	-0.180	11.924	0.452

According to this test, for all lags of errors no serial correlation of errors (autocorrelation coefficient does not exceed the rated range in the chart). The existence of autocorrelation test is invalidated and the Q-statistic and the associated probability. Hetroscedasticity test was applied and revealed that there is a direct relationship between calories and GDP. GDP coefficient of the regression model is = 4.338, standard error = 1.44 m and statistic = 3.01, shows that GDP is an important factor influencing the consumption of calories. Population coefficient is -0.0914, standard error 0.04, and statistical = -1.95. The sign parameter does not influence the result of comparison between t and t calc tabled for consideration because it utilizes the estimated value of probability is here absolute- 0.07. The value of t calc (1.95) is less than the value of t table (2.365) so the population is not an important factor of influence of calorie consumption. Theoretically with GDP growth should increase the number of calories, but up to a certain level.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.729850	Prob. F(6,15)	0.1820
Obs*R-squared	8.997176	Prob. Chi-Square(6)	0.1737
Scaled explained SS	2.670012	Prob. Chi-Square(6)	0.8490

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/09/14 Time: 09:37
Sample: 1991 2012
Included observations: 22

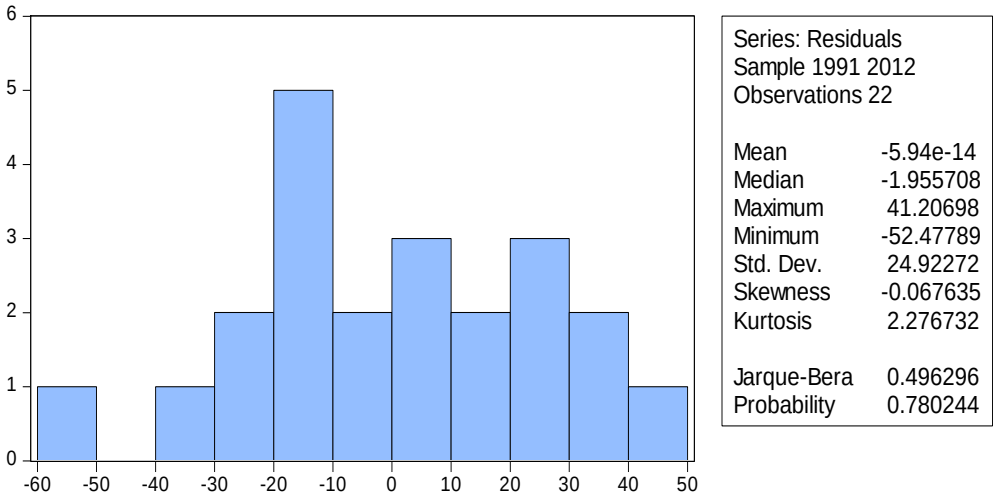
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2479.783	706.3523	3.510689	0.0032
D(POP/1000)	-0.399426	0.988452	-0.404093	0.6918
PIB	71.01215	30.48013	2.329785	0.0342
T	-343.1370	125.4511	-2.735225	0.0153
T^2	12.03292	4.624482	2.602005	0.0200
@ISPERIOD(“1993”)	-1419.744	713.6299	-1.989469	0.0652
@ISPERIOD(“2007”)	-668.0547	656.2291	-1.018020	0.3248

R-squared	0.408963	Mean dependent var	592.9085
Adjusted R-squared	0.172548	S.D. dependent var	685.7081
S.E. of regression	623.7504	Akaike info criterion	15.96275
Sum squared resid	5835968.	Schwarz criterion	16.30990
Log likelihood	-168.5902	Hannan-Quinn criter.	16.04453
F-statistic	1.729850	Durbin-Watson stat	2.062305
Prob(F-statistic)	0.182038		

D(CALORII) = -0.0914*D(POP/1000) + 4.3386*PIB - 211.66 + 39.005*T - 1.442*T^2 + 270.131*@ISPERIOD(1993”) -180.79*@ISPERIOD(“2007”)

In the model developed there is a direct relationship between calories and GDP, and a statistically insignificant relationship with the population. In a growing population calorie consumption will decrease by 0.09%, so the calories/individual is not significantly influenced by population growth.

F-test comparing the F probe (31.83) with the F tab (3.47) we see that the calculated value is higher, so the null hypothesis refused, the no significantly, which confirms the model as valid in the sense that general parameter estimates are statistically significantly. The Durbin Watson test serial correlation of errors. In this case, DW = 2.652824, is close to a value of 2 and therefore no autocorrelation of errors, so it is not affected quality estimators.



*Histogram – Normality test anal*yzes (similar distribution analysis of a series) distribution of errors from regression. It is noted that skewness = -0.067 and kurtosis = 2.276, likelihood test is = 0.78, so we can say that we accept the null hypothesis that the regression ie it follows a normal distribution.

Homoskedasticity relates to the assumption of regression model that states that errors should have the same variance model: for any t = 1, ..., n. The presence or not of heteroskedasticity can identify both graphically and by means of statistical tests. From the chart we can safely not waste any homoskedasticity existence nor the random heteroskedasticity. Variable (residual) ε is zero mean and its variance is constant and independent of X - homoskedasticity hypothesis, on which it can be accepted that the link between Y and X is relatively stable. Check homoskedasticity hypothesis error for this model will be Breusch-Godfrey test using Serial Correlation LM Test. Applying the test involves the following steps: initial model parameter estimation and calculation of estimated residual variable, u; construction of an auxiliary regressions based on assumption of a relationship of dependency between square error values, exogenous variable included in the initial model and the square of its values: and calculating the coefficient of determination, R2, corresponding to the auxiliary regressions; check the significance of the model parameters newly built and one of them is insignificant, then the error heteroskedasticity assumption is supported. Variants of the test strip: use LM test, calculated as the product of the corresponding model number of observations, n, and the coefficient of determination, R2, corresponding to the auxiliary regressions. In general, the LM test is asymptotically distributed as a χ for which the degrees of freedom is given by: where k = number of exogenous variables, namely: LM = nR2 ~ χ If LM> χ, errors are heteroskedastic, otherwise, are homoskedastic or assumption invalid parameters is known accepted. The White's test is the test that tests the following hypotheses:

Null hypothesis: for all i = 1, ..., n. Alternative hypothesis: for at least one index i. New errors are normally distributed and independent vi of εi. In these circumstances you have the null hypothesis: the alternative: not all parameters α are zero. If we accept the null hypothesis when we accept the hypothesis of homoskedasticity, and if there are different parameters 0 heteroskedasticity accept. For this table Output obtained by regression model apply new meaning t test for each coefficient separately. The F test probability is quite high and again within the range of uncertainty, p = 0.59. Considering the value of p we can say that we reject the null hypothesis (presence of heteroskedasticity) with an error of 40%, therefore, we can accept the null hypothesis (presence of the homoskedasticity) with an error of 60%.

4. Conclusions

The economic value of biodiversity is evident by direct use of its components: non-renewable natural resources - fossil fuels, minerals etc. and renewable natural resources - plant and animal species used as food or energy production. Achieving the ecosanogenetic equilibrium requires effective management of ecological systems can be achieved by applying management principles and methodologies involving dependence of the ecosystems. The ecosanogenesis health report "man - product - nature", a phrase that leads to the promotion and strengthening of human health status, but and animals, plants and nature as a whole. In our research conducted to estimate a regression equation to illustrate a model calorie consumption, GDP and population in Romania. The series used were: first quality-calorie pop.-population, GDP growth rates. Theoretically with GDP growth should increase the number of calories, but up to a certain level. The econometric model to reveal the calorie needs at the individual level is approximately constant, being influenced by specific biological factors and influences population and GDP calorie consumption, which directly can have negative impacts on biodiversity agro ecosystems.

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