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Tax Revenues and Economic Growth: An Empirical Investigation for Greece Using Causality Analysis

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Abstract: This study examines the relationship between tax revenues and the rate of economic growth for Greece. The viewpoint that the low ratio of direct to indirect taxation promotes high economic growth has been a main subject for discussion. However, not many papers have attempted to test the above hypothesis. One of the main problems that researchers are facing is the lack of time series data over a sufficiently long period. This brings out particular problems when testing for unit roots and cointegration between time series of the variables used. In this study, we try to analyse the relationship between total tax revenues, income tax and tax on capital gains, gross domestic saving and the rate of economic growth. In order to find this relationship, annual data from 1965 until 2002 and causality analysis are used. The findings have shown that there exists causal relationship between tax revenues and economic growth in Greece.

Key words: Tax Revenues, Economic Growth, Granger Causality

INTRODUCTION

Tax policy can be regarded as the necessary component of economic policies for every country in order to sustain and strengthen their global competitiveness and growth internationally. Nowadays, with the highly moving capital and specialized work, the tax structure should be competitive in order to attract capital, specialized work and technology which are essential elements for maximizing economic growth.

The first who examined how taxation affects growth was Solow[1]. The neoclassical growth model of Solow implies that steady state growth is not affected by tax policy. In other words, tax policy, however distortionary, has no impact on long-term economic growth rates, even if it does reduce the level of economic output in the long-term. Unlike, the 'new' endogenous growth theory pioneered by Romer[2], produced growth models in which government spending and tax policies can have long-term or permanent growth effects.

Countries have very different philosophies about taxation and very different methods of collecting their revenue. Castles and Dowrick[3], Atkinson[4], Agell, Lindh and Ohlsson[5] all argue that the different uses of total government expenditure affect growth differently and a similar argument applies to the way tax revenue is raised. During the past decades, some countries have increased taxation quite dramatically, while in other countries tax rates have remained roughly the same. Some countries incorporated value-added taxation in the 1960's (France, Britain) while others shifted away from corporate taxation (USA).

Due[6] supports that countries which are based on indirect taxation have grown more rapidly than those based on direct taxation. For example, the economic growth of Singapore can be attributed to low rates of corporate taxation and personal income taxation.

From 1980 and then, developed countries felt disappointed with taxes levied on income and gains and under pressure from taxpayers and in response to the structural pressures related to the increasing globalization of capital, they started to reduce the percentages from taxes of personal and corporate income and moved towards greater reliance on broad-based indirect taxes.

Burgess and Stern[7] argue that the structure of taxation in developing countries differs from that of developed. For developing countries, we have roughly two-thirds of tax revenue coming from indirect taxes, while for developed countries two-thirds comes from direct taxes. They suggest that tax structure can change over time to maximize the economic growth rate. Another important finding is that within developing countries there was a weak but significant relationship between the tax ratio and GNP per capita but no significant relationship for industrial countries.

Lehmussaari[8], Marsden[9], Trella and Whalley[10] have proven that taxation mix or the level of taxation have had an important influence on economic growth in developing countries. Economic growth relies on the

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increase of the savings rate and level of investment. If there exists a discernible influence of taxation policy on savings, capital allocation and economic growth, then, there are many lessons to be learned from developing countries about taxation levy and taxation policies which are adopted from mature developed economies and those developing economies which are growing fast.

Devereux and Love[11] explored the quantitative and qualitative effects of tax changes on growth and welfare in an endogenous growth model and showed that capital income taxes, wage taxes and consumption taxes reduce growth rates.

Zee[12] reviewed and extended previously findings discussed by Tanzi[13-15] about the various aspects of the tax revenue ratios. Covering a sample of 24 OECD and 56 non-OECD countries, he compared the tax revenue data of developing countries with those of developed. Developed countries tended to rely more on the income tax and much less on the trade tax than developing countries and that for developing countries, revenues from the income and consumption taxes comprised the bulk of their total tax revenue. Finally, the statistical relationship between economic growth and the level, structure and instability of taxation were found to be weak for all country groups except for the newly industrialized economies and Africa.

Kneller *et al.*[16] studied the effect of the structure of taxation and public expenditure to the steady-state growth rate. Taking account of the financing assumptions associated with the government budget constraint, their results are consistent with the Barro[17] model. Specifically they find that non-distortionary taxation and productive expenditure enhances growth.

Widmalm[18] using cross sectional data for 23 OECD countries for the period 1965-1990, find evidence that the tax structure affects economic growth. Specifically, the tax revenue raised by taxing personal income has a negative correlation with economic growth.

This study aims to investigate the relationship between taxation mix and the rate of economic growth in Greece looking in particular if there is any evidence that taxation variables have a causal role in the process of economic growth.

In the empirical analysis of this study we use annual data for the period 1965 until 2002 for the examined variables. The remainder of the study is as follows: the next section presents the data of the study together with the multivariate VAR model. The third section deals with Dickey-Fuller tests and examines stationarity of the data used. Cointegration analysis among variables is provided in section four. In section five the valuations of the error correction model are given while section six gives details on the Granger causality tests. The seventh section concludes.

Model specification and data: The method of autoregressive VAR model is being used so that we can valuate the influences of economic growth upon savings, total tax revenue and taxes on income, gains and gains on sales fixed capital. The method used allows us to identify cumulative influences taking into consideration the dynamic reaction (response) between economic growth and other variables[19] For the analysis of time series, suitable diversification is important because the algorithms' valuation fail when time series are non stationary. In small samples, estimators' distribution can be improved from the estimation of autoregressive vector in their first differences[20]. Moreover, using first differences in econometric papers, the results are explained more easily since logarithms' first differences of the initial variables represents growth's rate of these variables[21].

For the analysis of causal relationship between economic growth, savings, total tax revenues and taxes on income, gains and gains from sales fixed capital we use the following multivariate VAR model:

$$\Delta \ln(GDP95)_t = \alpha_0 + \sum_{i=1}^{k} \alpha_1 \ln\left(\frac{GDS}{GDP}\right)_{t-i} + \sum_{i=1}^{k} \beta_i \left\{\frac{\Delta \ln(TAX2)}{\Delta \ln(GDP)}\right\}_{t-i} + \sum_{i=1}^{k} \delta_i \Delta \left\{\frac{\ln(TAX2)}{\ln(TAX1)}\right\}_{t-i} + \sum_{i=1}^{k} \lambda_i \Delta \ln(GDP95)_{t-i} + v_t \quad (1)$$

where:

$\Delta\ln(GDP95)_t$ = Rate of economic growth modeled as the first difference of logarithm of constant prices Gross Domestic Product for the year 1995.

$\ln \frac{GDS}{GDP}$ = The logarithm of the ratio of Gross Savings to Gross Domestic Product in spot prices.

$\frac{\Delta \ln(TAX2)}{\Delta \ln(GDP)}$ = The marginal direct tax rate based on the quotient of the first difference of logarithm of (personal income tax + gains + gains from sales fixed capital) (TAX2) to the first difference of the logarithm of gross domestic product (GDP) in spot prices.

$\Delta \left\{\frac{\ln(TAX2)}{\ln(TAX1)}\right\}$ = The first difference of tax revenue, set up by the quotient of logarithm of (personal income tax + gains + gains from sales fixed capital) (TAX2) to the logarithm of total tax revenue (TAX1).

The data used for the analysis of this investigation are annual, covering the period from 1965 until 2002 and are obtained from International Monetary Fund's Government Financial Statistics (IMF), Revenue Statistics of OECD Member Countries, Bank of Greece and Main Economic Indicators European Economy.

All data are expressed in logarithms in order to include the proliferative effect of time series and are symbolized with the letter L preceding each variable name.

If these variables share a common stochastic trend and their first differences are stationary, then they can be cointegrated. Economic theory scarcely provides some guidance, for which variables appear to have a stochastic trend and when these trends are common among the examined variables as well. For the analysis of the multivariate time series that include stochastic trends, the Augmented Dickey-Fuller[22] (ADF) unit root test is used for the estimation of individual time series with intention to provide evidence as to when the variables are integrated. This is followed by multivariate cointegration analysis.

Unit root test: The cointegration test among the variables that are used in the above model requires previously the test for the existence of unit root for each variable and especially for economic growth, savings, total tax revenues and taxes on income, gains and gains from sales fixed capital using the Augmented Dickey – Fuller[22] (ADF) test on the following regression:

$$\Delta X_t = \delta_0 + \delta_1 t + \delta_2 X_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta X_{t-i} + u_t \qquad (2)$$

The ADF regression tests for the existence of unit root of X_t, namely in the logarithm of all model variables at time t. The variable ΔX_{t-I} expresses the first differences with k lags and final u_t is the variable that adjusts the errors of autocorrelation. The coefficients δ_0, δ_1, δ_2 and α_i are being estimated. The null and the alternative hypothesis for the existence of unit root in variable X_t is

$H_o : \delta_2 = 0 \qquad H_\varepsilon : \delta_2 < 0$

The results of these tests appear in Table 1. The minimum values of the Akaike (AIC)[23] and Schwarz (SC)[24] statistics have provided the better structure of the ADF equations as well as the relative numbers of time lags, under the indication “Lag”. As far as the autocorrelation disturbance term test is concerned, the Lagrange Multiplier LM (1) test has been used. The MFIT 4.0[25] econometric package that was used for the estimation of ADF test, provides us with the simulated critical values.

The results of Table 1 suggest that the null hypothesis of a unit root in the time series cannot be rejected at a 5% level of significance in variable levels. Therefore, no time series appear to be stationary in variable levels. However, when the logarithms of the time series are transformed into their first differences, they become stationary and consequently the related variables can be characterized integrated order one, I (1). Moreover, for all variables the LM (1) test first differences shows that there is no correlation in the disturbance terms.

Cointegration and Johansen test: If the time series (variables) are non-stationary in their levels, they can be integrated with integration order 1, when their first differences are stationary. These variables can be cointegrated as well, if there are one or more linear combinations among the variables that are stationary. If these variables are being cointegrated, then there is a constant long-run linear relationship among them.

Since it has been determined that the variables under examination are integrated of order 1 then the cointegration test is performed. The testing hypothesis is the null of non-cointegration against the alternative of the existence of cointegration, using the Johansen’s[26-28] maximum likelihood procedure. An autoregressive coefficient is used for the modelling of each variable (that is regarded as endogenous) as a function of all lagged endogenous variables of the model.

Given the fact that in order to apply the Johansen technique a sufficient number of time lags is required, we have followed the relative procedure, which is based on the calculation of LR (Likelihood Ratio) test statistic[29]. The results showed that the value ρ=3 is the appropriate specification for the above relationship. Further on, we determine the cointegration vectors of the model, under the condition that Table 2 has order r<n (n=3). The procedure of calculating order r is related to the estimation of the characteristic roots (eigenvalues), which are the following:

$$\hat{\lambda}_1 = 0.88685 \qquad \hat{\lambda}_2 = 0.44191 \qquad \hat{\lambda}_3 = 0.19929$$
$$\hat{\lambda}_4 = 0.089708$$

The results that appear in Table 2 suggest that the number of statistically significant cointegration vectors is equal to 1 and is the following:

$$\text{LGDP95} = 1.3566\text{L}\left[\frac{GDS}{GDP}\right] - 7.0988\text{L}\left[\frac{TAX2}{GDP}\right] - 2.4462\text{L}\left[\frac{TAX2}{TAX1}\right]$$

The valuations of the coefficients in equilibrium relationships, which are in fact the long-run estimated elasticities relatively to the rate of economic growth show that the ratio of gross savings to gross domestic product in spot prices, the marginal direct tax rate and tax revenues are elastic to the rate of economic growth. According to the signs of the vector cointegration components and based on the fundamentals of economic theory the above relationships can be used as an error correction mechanism in a VAR model.

Table 1: DF/ADF unit root tests

Variables (X_t) ***	In levels			1st differences		
	Lag	Test statistic (DF/ADF)*	LM(1)**	Lag	Test statistic (DF/ADF)*	LM(1)**
LGDP95	0	-0.1003	0.2204[0.639]	0	-5.4314	0.0107[0.917]
LGDS	0	-0.6604	0.8646[0.352]	0	-6.8759	2.2914[0.130]
LGDP	1	-0.3378	6.6386[0.010]	1	-3.9712	3.9016[0.049]
LTAX1	1	-0.1727	3.3049[0.069]	1	-4.1384	2.5815[0.108]
LTAX2	1	-0.0701	0.0599[0.807]	1	-4.9758	0.0815[0.775]

* Critical value: - 3.5348
** The numbers in brackets show the levels of significance
*** In Table 1 all unit root tests were carried out using regressions including constant and trend

Table 2: Johansen and Juselious Test for Multiple Cointegrating Vectors in (LGDP95, L[GDS/GDP], L[TAX2/GDP], L[TAX2/TAX1]) Maximum Lag in VAR = 3

Eigenvalues			Critical	Values
Null	Alternative	Eigenvalue	95%	90%
r = 0	r = 1	82.8047	23.9200	21.5800
r = 1	r = 2	13.4907	17.6800	15.5700
Trace Statistic			Critical	Values
Null	Alternative	Eigenvalue	95%	90%
r = 0	r > 0	116.9846	39.8100	36.6900
r ≤ 1	r > 1	17.9610	24.0500	21.4600

VAR model with an error correction mechanism: After determining that the logarithms of the model variables are cointegrated, we must then estimate a VAR model in which we shall include a mechanism of error correction model (ECM). The error-correction model has arisen from the long-run cointegration relationship and has the following form:

$$\Delta LGDP95_t = \text{lagged}(\Delta LGDP95_t, \Delta L\left[\frac{GDS}{GDP}\right]_t, \Delta L\left[\frac{TAX2}{GDP}\right]_t, \Delta L\left[\frac{TAX2}{TAX1}\right]_t) + \lambda u_{t-1} + V_t \qquad (3)$$

where:
Δ is reported to all variables first differences
u_{t-1} are the estimated residuals from the cointegrated regression (long-run relationship)
$-1<\lambda<0$ short-run parameter
V_t white noise disturbance term

One difficulty confronting a researcher in estimating a VAR model is the appropriate specification of the model. In particular, the researcher has to decide what deterministic components should be included as well as the number of time lags that should be used. Since arbitrarily chosen specifications of a VAR model are likely to produce unreliable results, we use a data based model selection criterion to specify the VAR model for Greece's economy. Among various model selection criteria the one proposed by Schwartz[24], known as Schwartz Bayesian information criterion (SBC), is shown to outperform other alternatives[30]. Therefore, our specification of the VAR model is based on Schwartz Bayesian information criterion. Schwartz's criterion selected a first order VAR specification with constant and time trend as well.

The final form of the Error-Correction Model was selected according to the approach suggested by Hendry[31]. The initial order of time lag for the model is 2 years, because it is large enough to enclose the system's short-run dynamic. We also apply a number of diagnostic tests on the residuals of the model. We apply the Lagrange test (LM) for the possible existence of autocorrelation and heteroscedasticity, the Bera-Jarque (C) normality test and the Ramsey's Reset test for the functional form of the model. The Error Correction Model appears in Table 3.

We do not reject the estimations, which are based on the results of Table 3 according to the statistical and diagnostic tests in 10% level of significance. The percentage of the total variation of the dependent variable that is described in our model is high enough (53%). The Error Correction Term is not statistically significant although it has a negative sign, which confirms that there is a problem in the long-run equilibrium relation between the independent and dependent variables in 5% level of significance, but its relative value of 0.027466 shows a satisfactory rate of convergence to the equilibrium state per period.

From the results of Table 3 we can see that a short-run increase of the ratio of gross savings to GDP per 1% induces an increase to the rate of economic growth per 0.11%, an increase of the marginal tax rate per 1% induces an increase to the rate of economic growth per 0.29%, while an increase of tax revenues per 1% induces an increase to the rate of economic growth per 0.30% approximately.

Granger causality test[32]: The model that was estimated in the previous section was used in order to examine the Granger causal relationships between the variables under examination. As a testing criterion the F statistic was used. With the F statistic the hypothesis of statistical significance of specific groups of explanatory variables was tested for each separate function. The results related to the existence of Granger causal relationships between the rate of economic growth, gross savings, direct tax rate and tax revenues appear in Table 4.

From the results of Table 4 we can infer that, there is no causal relationship between the rate of economic

Table 3: Error correction model

$$\Delta LGDP95_t = \underset{\substack{(1.3365)\\ [0.192]}}{0.00891} + \underset{\substack{(3.7769)\\ [0.001]}}{0.75148}\Delta LGDP95_{t-1} + \underset{\substack{(1.7021)\\ [0.098]}}{0.19510}\Delta LGDP95_{t-2} +$$

$$\underset{\substack{(1.7856)\\ [0.085]}}{0.11813}\Delta L\left[\frac{GDS}{GDP}\right]_{t-1} - \underset{\substack{(-2.2091)\\ [0.035]}}{0.29886}\Delta L\left[\frac{TAX2}{GDP}\right]_{t-1} - \underset{\substack{(-1.9548)\\ [0.060]}}{0.29858}\Delta L\left[\frac{TAX2}{TAX1}\right]_{t-1}$$

$$- \underset{\substack{(-1.1745)\\ [0.278]}}{0.027466}\, u_{t-1}$$

$\overline{R}^2 = 0.5308$ F(6,29) = 7.6003 [0.000] DW = 2.2940

A: $X^2[1] = 4.0390$ [0.054] B: $X^2[1] = 0.0051$ [0.943]

C: $X^2[2] = 0.4131$ [0.813] D: $X^2[1] = 0.6670$ [0.414]

Notes:

Δ: Denotes the first differences of the variables

$\overline{R}^2$ = Coefficient of multiple determination adjusted for the degrees of freedom (d.f)

DW= Durbin-Watson statistic

F(n, m)= F-statistic with n,m d.f respectively

A: $X^2(n)$ Lagrange multiplier test of residual serial correlation, following x^2 distribution with n d.f

B: $X^2(n)$ Ramsey's Reset test for the functional form of the model, following x^2 distribution with n d.f

C: $X^2(n)$: Normality test based on a test of skewness and kurtosis of residuals, following x^2 distribution with n d.f

D: $X^2(n)$: Heteroscedasticity test, following x^2 distribution

( )= We denote the t-ratio for the corresponding estimated regression coefficient

[ ]= We denote prob. levels

Table 4: Granger causality tests

Dependent variable	Hypothesis tested	F1	F2
LGDP95	$L\left[\frac{GDS}{GDP}\right]$ there is not Granger causality relationship ($LGDP95 \neq L\left[\frac{GDS}{GDP}\right]$)	0.323	2.480
	$L\left[\frac{TAX2}{GDP}\right]$ there is a unidirectional relationship ($LGDP95 \Leftarrow L\left[\frac{TAX2}{GDP}\right]$)	4.894	0.457
	$L\left[\frac{TAX2}{TAX1}\right]$ there is a unidirectional relationship ($LGDP95 \Leftarrow L\left[\frac{TAX2}{TAX1}\right]$)	6.171	0.740
$L\left[\frac{GDS}{GDP}\right]$	$L\left[\frac{TAX2}{GDP}\right]$ there is a unidirectional relationship ($L\left[\frac{GDS}{GDP}\right] \Rightarrow L\left[\frac{TAX2}{GDP}\right]$)	1.468	6.970
	$L\left[\frac{TAX2}{TAX1}\right]$ there is a unidirectional relationship ($L\left[\frac{GDS}{GDP}\right] \Rightarrow L\left[\frac{TAX2}{TAX1}\right]$)	1.986	3.652
$L\left[\frac{TAX2}{GDP}\right]$	$L\left[\frac{TAX2}{TAX1}\right]$ there is a bilateral relationship ($L\left[\frac{TAX2}{GDP}\right] \Leftrightarrow L\left[\frac{TAX2}{TAX1}\right]$)	4.067	5.148

Critical value: 3.41

growth and the ratio of gross savings to GDP. There is a unidirectional (one-way) causal relationship between the marginal direct tax rate and the rate of economic growth with direction from the marginal direct tax rate to the rate of economic growth as well as between tax revenues and the rate of economic growth in the same direction. Moreover, there is a one-way causal relationship between the ratio of gross savings to GDP and the marginal direct tax rate, as well as to the tax revenue, with direction from gross savings to the above variables. Finally, there is a bilateral causal relationship between the marginal direct tax rate and tax revenues.

CONCLUSION

This paper examined the relationship of the rate of economic growth to the ratio of gross savings to GDP, to the marginal direct tax rate and tax revenues using annual data for the period 1965-2002. The empirical analysis showed that the variables used in this study present a unit root. On the basis of this finding, the cointegration analysis has been used suggested by Johansen and a long-run equilibrium has arisen between the variables used. Furthermore, the methodology of error correction model was applied in order to estimate the long and short run relationships. The chosen vectors gave error correction terms, which have proven to be not statistically significant in 10% level of significance when entering the short-run dymanic equations.

Finally, with Granger causality we noted that there is a one-way causal relationship between the marginal direct tax rate and the rate of economic growth with direction from the marginal direct tax rate to the rate of economic growth, as well as between tax revenues and the rate of economic growth going in the same direction as before. Moreover, there is a one-way causal relationship between the ratio of gross savings to GDP and the marginal direct tax rate as well as to the tax revenues, with direction from gross savings to the above variables, while there is no causal relationship between the rate of economic growth and the ratio of gross savings to GDP. On the contrary, there is a bilateral causal relationship between the marginal direct tax rate and tax revenues.

REFERENCES

1. Solow, R., 1956. A contribution to the theory of economic growth. Quart. J. Econ., 70: 65-94.
2. Romer, P., 1986. Increasing returns and long-run growth. J. Polit. Econ., 94: 1002-1037.
3. Castles, F.G. and S. Dowrick, 1990. The impact of government spending levels on medium-term economic growth in OECD, 1960-85. J. Theor. Polit., 2: 173-203.
4. Atkinson, A.B., 1995. The welfare state and economic performance. Natl. Tax J0, 48: 171-198.
5. Agell, J., T. Lindh and H. Ohlsson, 1997. Growth and the public sector: A critical review essay. Eur. J. Polit. Econ., 13: 33-52.
6. Due, J.F., 1964. Introduction: The Issues. In A Conference Report of the National Bureau of Economic Research and the Brookings Institution, The Role of Direct and Indirect Taxes in the Federal Revenue System, Princeton University Press, Princeton.
7. Burgess, R. and N. Stern, 1993. Taxation and Development. J. Econ. Lit., 31: 762-830.
8. Lehmussaari, 1990. Deregulation and consumption-saving dynamics in the nordic countries. IMF Staff Papers, 37: 71-93.
9. Marsden, K., 1990. Taxes and Growth. In Richard M. Bird and Oliver Oldman (Eds.). Taxation in Developing Countries, The John Hopkins University Press, USA.
10. Trela, I. and J. Whalley, 1992. The Role of Tax Policy in Korea's Economic Growth. In Ito, Takatoshi and Krueger, Anne O. (Eds.). The Political Economy of Tax Reform, The University of Chicago Press.
11. Devereux, M. and D. Love, 1995. The effects of factor taxation in a two-sector model of endogenous growth. Can. J. Econ., 27: 509-536.
12. Zee, H., 1996. Empirics of cross-country tax revenue comparisons. World Development, 24: 1659-1671.
13. Tanzi, V., 1987. Quantitative Characteristics of the Tax Systems of Developing Countries. In David Newbery and Nicholas Stern (Eds.). The Theory of Taxation for Developing Countries, Oxford University Press, New York, pp: 205-241.
14. Tanzi, V., 1992. Structural Factors and Tax Revenue in Developing Countries: A Decade of Evidence. in Ian Goldin and L. Alan Winters (Eds.). Open Economies: Structural Adjustment and Agriculture, Cambridge University Press, New York, pp: 267-289.
15. Tanzi, V., 1994b. Taxation in Developing Countries. In Luigi Bernandi and Jeffrey Owens (Eds.). Tax Systems in North Africa and European Countries. Kluwer Law and Taxation Publishers, The Netherlands, pp: 1-22.
16. Kneller, R., M. Bleaney and N. Gemmel, 1998. Fiscal policy and growth: Evidence from OECD countries. J. Public Econ., 74: 171-190.
17. Barro, R.J., 1990. Government spending in a simple model of endogenous growth. J. Polit. Econ., 98: S103-25.
18. Widmalm, F., 2001. Tax structure and growth: Are some taxes better than others? Public Choice, 107: 199-219.
19. Pereira A. and Z. Xu, 2000. Export growth and domestic performance. Rev. Intl. Econ., 8: 60-73.
20. Hamilton, J.D., 1994. Time Series Analysis. New Jersey, Princeton University Press.
21. Dritsakis, N., 2003. Hungarian macroeconomic variables–reflection on causal relationships. Acta Oeconomica, 53: 61-73.
22. Dickey, D.A. and W.A. Fuller, 1979. Distributions of the estimators for autoregressive time series with a unit root. J. Am. Stat. Assoc., 74: 427-431.
23. Akaike, H., 1973. Information Theory and an Extension of the Maximum Likelihood Principle. In: Petrov, B. and Csaki, F. (Eds.). 2nd Intl. Symp. Information Theory, Akademiai Kiado, Budapest.
24. Schwarz, R., 1978. Estimating the dimension of a model. Ann. Stat., 6: 461-464.
25. MFIT 4.0, 1997. Quantitative Micro Software. Interactive Econometric Analysis. Oxford University Press.
26. Johansen, S., 1988. Statistical analysis of cointegration vectors. J. Econ. Dynamics and Control, 12: 231-254.
27. Johansen, S. and K. Juselious, 1990. Maximum likelihood estimation and inference on cointegration with applications to the demand for the money. Oxford Bull. Econ. Stat., 52: 169-210.
28. Johansen, S. and K. Juselius, 1992. Testing strustural hypotheses in a multivariate cointegration analysis at the purchasing power parity and the uncovered interest parity for the UK. J. Econometrics, 53: 211-244.
29. Sims, C.A., 1980. Macroeconomics and reality. Econometrica, 48: 1-48.
30. Mills, J. and K. Prasad, 1992. A comparison of model selection criteria. Econometric Rev., 11: 201-233.
31. Maddala, G.S., 1992. Introduction to Econometrics. 2nd Edn., Prentice Hall, New Jersey.
32. Granger, C.W., 1988. Some recent developments in a concept of causality. J. Econometrics, 39:199-211.