UNDERSTANDING THE DECLINE OF GREECE

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Abstract: The research conducted in the present paper is mainly aimed at analyzing the causal relationships between the budget deficit and following macroeconomic variables: the gross domestic product, the *harmonised index of consumer prices*, the public debt and the real effective exchange rate, for Greece, during the period 2001-2014. The empirical study, conducted using the Vector Autoregressive Model (VAR) indicates that the analyzed variables are cointegrated, existing a reverse proportionate relationship between the budget deficit and the gross domestic product, and a directly proportional relationship between the budget deficit and the public debt. Therefore, the comparative approach of the effects determined by an unexpected rise in the budget deficit indicates a high speed and amplitude, with great persistence of the effect generated by the increase in the deficit on the real economy. Regarding the impact on public debt, it appears to be faster and with an increased amplitude and persistence. The study results do not illustrate any direct connection between the budget deficit and the other two macroeconomic variables - inflation and real effective exchange rate in the case of Greece. Hence, the exchange rate and the inflation variable react with a lower speed, less powerful and for a shorter period of time to the unanticipated increase in the budget deficit. The results reinforce the problem the arises increasingly more often, that is, if the Greek exit from the eurozone will come true or not. In terms of the accumulated debt default, the exit from the euro zone's most indebted member state of the Union seems inevitable, and the so-called Grexit could have serious consequences on both the Greek State and the stability of the whole European economy.

Keywords: Greece; Economic Decline; Macroeconomic Variables; Vector Autoregressive Model

JEL classification: F45; H62; H63

1. Introduction

With the transition to the euro, the fiscal and budgetary situation have known a constant deterioration in Greece. Since 2001, the government pushed the population on a spiral of lending, spending far more than their income. The pursuit of some short-term political advantages brought great harm to the long-term economic development, fostering the corruption spreading, the excessive bureaucracy and, finally, political collapse when the level of the public debt surfaced. Since 2009, we speak increasingly often about the so-called Grexit scenario, given that Greece is dominated by political instability and blockage of reforms.

The objective of this paper is to provide a quantitative analysis of the Greek economy since the adoption of the single European currency by 2015, using the VAR method. In this regard, attention was focused on the impact of an unanticipated increase in the budget deficit on the following macroeconomic variables: gross domestic product, *harmonised index of consumer prices*, public debt and real effective exchange rate.
The study is divided into five parts. The first part contains a brief description of the specialized literature, the second part focuses on model specification, the third section describes the data and methodology, and the penultimate section presents the empirical results. The study ends with a set of conclusions that complete scientific content by pointing out the most representative aspects captured by the VAR analysis for Greece.

2. Literature Review

The sequence of events in Greece in the recent years has attracted much debate among economists, analysts and institutions regarding the consequences of a voluntary or forced exit from the eurozone and the consequences of such a scenario both for the Greek State and also for the entire monetary union (Koutsoukis and Roukanas, 2014).
The Greek governments bought social peace and votes through large public spending and government loans. Entering the euro area, the loan wave could continue at low interest rates. Thus, the budget deficits and Greece's debt did not appear overnight but were gradually accumulated over recent decades. Also, the irresponsible policies were tolerated for too long (Jovanovic, 2012).
In the specialized literature on budget deficits there is no clearly defined theoretical foundation concerning the relationship between budget deficit and other macroeconomic variables. However, there are some studies that have granted a special interest relationship.
Evans (1985) and Barro (1987) found no causal link between budget deficit and interest rate. On the other hand, Hoelscher (1986) and Cebula and Koch (1989) proved that budget deficits have contributed to high levels of interest rates and Bernheim (1989) argues that budget deficits do not affect interest rates and consumption.
In another work, Evans (1987) argues that budget deficits are a signal of weakness in an economy and a possible future inflation sign. The author argues that the budget deficit affects the aggregate demand and may increase price levels, which would lead to a depreciation of the national currency.
Agreeing with Evans, McMillin (1986) argues that budget deficits cause inflation. Contrary to them, Karras (1994) and King and Plosser (1985) shows that budget deficits do not contribute significantly to higher inflation.
A recent study by economists Georgantopoulos and Tsamis (2011) argues that there is a unidirectional causality relationship between the nominal effective exchange rate and the budget deficit, and between the budget deficit and the GDP. The study results also illustrate the fact that there is a significant link between the budget deficit and inflation in Greece.

3. Model Specificity

Given the following system:

$$AY_t = C(L)Y_{t-1} + D(L)X_t + B\varepsilon_t (1)$$

where: *matrix A* includes all coefficients that describe simultaneous relationships between variables, *matrix C (L)* includes all coefficients that describe relations with lags between variables, *matrix D (L)* includes all coefficients that describe the relationships between endogenous and exogenous variables, *matrix B* is a diagonal matrix and *vector ε* includes residual terms. By multiplying the VAR system with the reverse of matrix A, we obtain the following relation:

$$Y_t = A^{(-1)}C(L)Y_{t-1} + A^{(-1)}D(L)X_t + A^{(-1)}B\varepsilon_t \ (2)$$

which can be rewritten as equation:

$$Y_t = aY_{t-1} + bX_t + \mu_t \ (3)$$

where: $a = A^{(-1)}C(L)$, $b = A^{(-1)}C(L)$, $\mu = A^{(-1)}B\varepsilon$

Equation (1) describes the *structural model* and equation (3) represents the *reduced form of the model*, the latter may be observed empirically.

Therefore, the considered VAR model has the following representation in the *reduced form*:

$$Y_t = aY_{t-1} + bX_t + \mu_t$$

where: Y_t is the endogenous variables vector, X_t is the vector of exogenous variables, μ_t is the vector of residuals (white noises), *a* is a matrix comprising all coefficients that describe the relationships between endogenous variables and *b* is a matrix that includes coefficients that describe the relationships between variables of endogenous and exogenous.

Thus, the considered VAR model will have be represented as shown in equation (4). In our case, *the vector of exogenous variables* contains the following variables: gross domestic product in the euro area (gdp_ea) and *harmonised index of consumer prices* in the euro area (hicp_ea). *The vector of endogenous variables* contains the following variables: gross domestic product in Greece (gdp), *harmonised index of consumer prices* in Greece (hicp), the budget deficit in Greece (bd), the public debt in Greece (pd) and the real effective exchange rate in Greece (reer).

$$\begin{bmatrix} gdp \\ hicp \\ bd \\ pd \\ reer \end{bmatrix} = a \begin{bmatrix} gdp_{t-1} \\ hicp_{t-1} \\ bd_{t-1} \\ pd_{t-1} \\ reer_{t-1} \end{bmatrix} + b \begin{bmatrix} gdp\_ea \\ hicp\_ea \end{bmatrix} + \mu_t (4)$$

The exogenous variables are included to help solve the so called *puzzle between the variables* designating the counterintuitive empirical results currently identified in the VAR literature. Treating these variables as exogenous implicitly presumes that there is no impact from endogenous variables to the exogenous ones. At the same time, a contemporary impact of exogenous variables on endogenous variables is allowed.

4. Data and Methodology

The used sample has quarterly data starting with 2001, when Greece joined the euro area and ends in 2014. The variables included in the analysis are: Greece's GDP - as chain linked volumes (index 2010 = 100), euro area's GDP - as chain linked volumes (index 2010 = 100), Greece's *harmonised index of consumer prices* - as index (2005 = 100), euro area's *harmonised index of consumer prices* - as index (2005 = 100), Greece's budget deficit - expressed in millions euro, Greece's public debt - in million euro and Greece's real effective exchange rate - as index (2005 = 100) considering 42 trading partners. The source is Eurostat, the data being processed using the statistical EViews8 program.

All series except the real effective exchange rate were adjusted to eliminate the seasonal factors with the help of *the X12 procedure used by the US Census Bureau*. Also, all series were *logarithmic.*

For the considered variables the stationarity testing was done with the *Augmented Dickey - Fuller Test*, its results indicating that the variables are not stationary. Most variables are *integrated of order 1 (I (1))* and some of *order 2 (I (2)).*

Table 1: Augmented Dickey - Fuller Test (ADF)

ADF	Log_gdp_sa	Log_hicp_sa	Log_bd_sa	Log_pd_sa	Log_reer	Log_gdp_ea_sa
Level	(-2.2935) [0.1778]	(-2.6096)** [0.0969]	(-3.5310)** [0.0104]	(-1.4016) [0.5755]	(-1.7209) [0.4157]	(-1.8105) [0.3719]
1st difference	-2.4414 [0.1354]	-	-	(-8.9635)*** [0.0000]	(-8.0810)*** [0.000]	(-4.5609) [0.0005]
2nd difference	-6.7922*** [0.0000]	-	-	-	-	(-9.5509)*** [0.0000]

Notes:

t - statistics in parentheses; p - value in square brackets;

, **, * signifies the rejection of the null hypothesis (the presence of unit root or absence of stationarity) at a significance level of 1%, 5%, 10%.*

Source: author's calculations

The variables used in the VAR analysis don't need be stationary. Sims (1980), among others, argues against the differentiation, even if the series contain a unit root, the differentiation causing the loss of information. Important for the strength of the VAR results is the overall system stationarity. Moreover, the use of variables in levels provides the ability to maintain long-term relationships (if present) and does not affect the statistical inference.

The cointegration testing, using the methodology developed by Johansen, highlights the existence of a number of cointegrating vectors, *r*, such that *0 <r <number of endogenous variables* (in our case 5), at a significance level of 0.05 (result based both on the *Trace Test* and the *Maximum Eigenvalue Test*). Such a result together with those obtained from the stationarity tests highlight *the possibility of estimating the model with variables expressed in levels.*

Table 2: Johansen Tests to determine the number of cointegrating equations

Lag	H_0	λ_{trace}	p-value	CE_{trace}	λ_{max}	p-value	CE_{max}
1	n = 0	85.95843***	0.0015	2	35.54184**	0.0314	1
	n ≤ 1	50.41658**	0.0282		24.96257	0.1045	
	n ≤ 2	25.45401	0.1459		12.22175	0.5259	
	n ≤ 3	13.23226	0.1066		9.173966	0.2720	
	n ≤ 4	4.058294**	0.0439		4.058294**	0.0439	

Notes:
Lag *refers to the number of lags in first difference;*
H_0 *is the null hypothesis test statistics and* λ_{trace} *and* λ_{max} *where "n" is the number of cointegration vectors;*
CE_{trace} *and* CE_{max} *indicate the number of cointegration equations indicated by statistics* λ_{trace} *and* λ_{max} *at a significance level of 5%;*
, **, * denote rejection of the null hypothesis at a significance level of 10%, 5%, 1%.*
Source: author's calculations

The choice on the number of lags was done based on the *evaluation criteria of informational content (Likelihood ratio test*, *Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion),* these signaling in all cases the selection of a single lag. The verification of the result was achieved by applying the *Lag Exclusion Wald test* to exclude insignificant lags that confirmed the continuation of the number of lags specified by the prior informational criteria.
The identification of the shocks that involve imposing a zero-restriction for the coefficients of the A and B matrices in the relationship $\mu = A^{(-1)}B\varepsilon$ is achieved through a Cholesky decomposition. Identification scheme of the shocks in the case of the considered VAR model is reflected in the equation (5).

$$\begin{bmatrix} \varepsilon_t^{gdp} \\ \varepsilon_t^{hicp} \\ \varepsilon_t^{bd} \\ \varepsilon_t^{pd} \\ \varepsilon_t^{reer} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{20} & 1 & 0 & 0 & 0 \\ a_{30} & a_{31} & 1 & 0 & 0 \\ a_{40} & a_{41} & a_{42} & 1 & 0 \\ a_{50} & a_{51} & a_{52} & a_{53} & 1 \end{bmatrix} \begin{bmatrix} \mu_t^{gdp} \\ \mu_t^{hicp} \\ \mu_t^{bd} \\ \mu_t^{pd} \\ \mu_t^{reer} \end{bmatrix} \quad (5)$$

The considered VAR model is confirmed if it is *stable*, and the residual terms are *white noise*. Otherwise, the confidence intervals for the impulse-response functions cannot be built. The stability of the model was verified by applying the AR *roots* tests as a graphic and a table. The obtained results illustrate the stability of the models considered for all cases, the opposite roots being subunitary, not exceeding the circle of unit radius, as can be observed in Figure 1.

Roots of Characteristic Polynomial
Endogenous variables: LOG_GDP_SA LOG_HICP_SA LOG_BD_SA LOG_PD_SA LOG_REER
Exogenous variables: LOG_GDP_EA_SA LOG_HICP_EA_SA
Lag specification: 1 1

Root	Modulus
0.995054 - 0.092085i	0.999306
0.995054 + 0.092085i	0.999306
0.852464	0.852464
0.761900	0.761900
0.294130	0.294130

No root lies outside the unit circle.
VAR satisfies the stability condition.

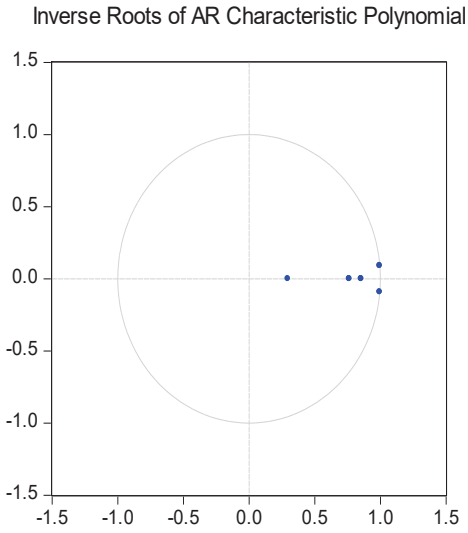


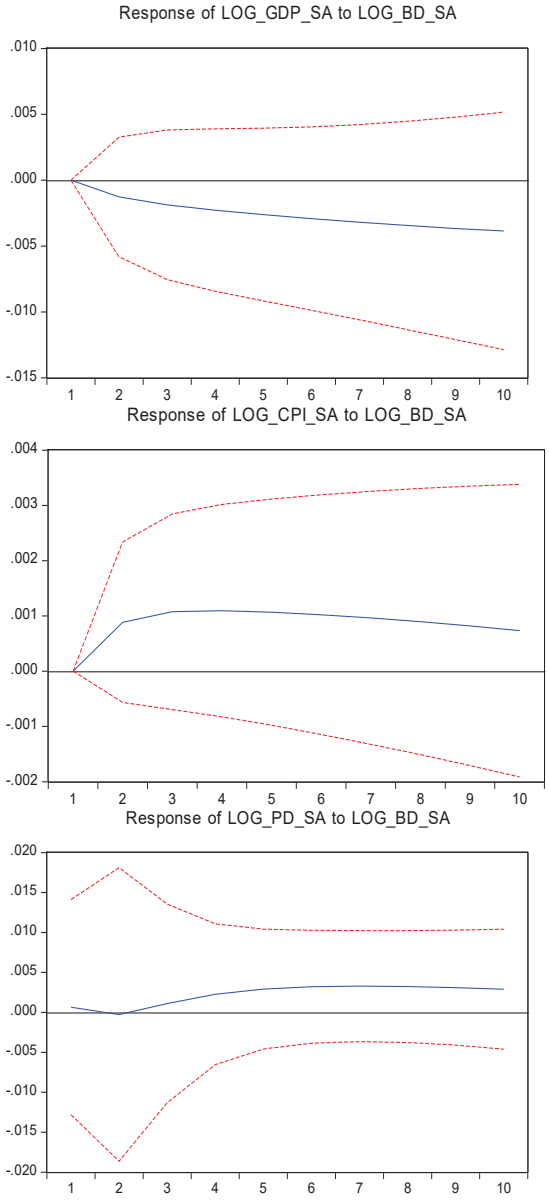
Figure 1: The verification of the VAR model stability
Source: author's calculations

Testing the hypothesis of serial residue non-correlation test was performed with the *Portmanteau test*. It checks the partial correlation to a certain specified lag, usually with a higher order towards the VAR model (in the present case the first 2 lags have been checked). The null hypothesis is the lack of autocorrelation.
The testing for normal distribution of errors was performed by the *Jarque-Bera test,* comparing the asymmetry and vaulting coefficients to those of a normal distribution. The assumption of normality was accepted as a consequence of a p-value that is greater than the significance threshold (5%).
The homoscedasticity of the residual terms was tested by the White test. The null hypothesis is that the errors are homoscedastic (their variation is constant.). The value of p-value was greater than 5%, which allowed us to accept the null hypothesis and state that the residual materials do not violate the homoscedasticity hypothesis.
The stability testing results and residuals indicate the fact that the considered model has the ability to provide a satisfactory picture of the dynamics of interactions between analyzed variables.

5. The Estimation Results

The analyses based on autoregressive vectors offer two main results: *the function of response to shock (impulse-response) and the variance (dispersion) decomposition.*
The functions of response to shock present the results obtained on the effects of a monetary policy shock on economic variables of interest for the monetary authority, providing information on both the *sign of response* (positive or negative) and on the

amplitude, *speed* and *persistence* of the effects of various shocks.
In the following figure, the confidence interval is of 95%, the shock is standard deviation, and time on the horizontal axis is expressed in quarters.



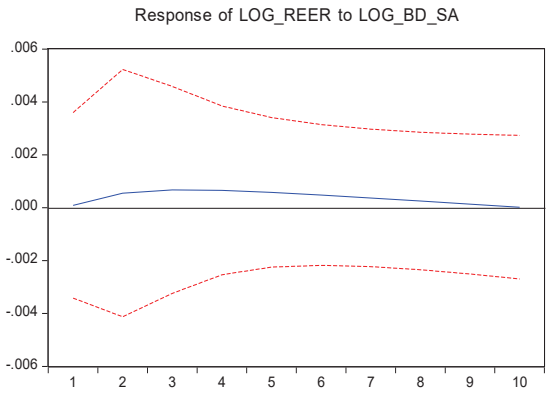


Figure 2: The variables response included in the model to an unanticipated increase in the budget deficit
Source: author's calculations

For the 2001q1: 2014q4 horizon, Figure no. 2 highlights:

- at an unanticipated increase in the budget deficit, the GDP decreases from quarter 1 and reaches the maximum size in quarter 10; the reduction persists uninterrupted over the 10 quarters, highlighting a persistent negative response to the gross domestic product, according to the analysis by the autoregressive vector;
- at an increase in the budget deficit, the inflation increases in turn, reaching the maximum value after about four quarters from an unanticipated growth of the budget deficit in the VAR approach;
- an unanticipated increase of the budget deficit indicates a persistent positive response to the public debt; the increase of the public debt reaches a maximum level at an interval of 7 quarters of the manifestation of unanticipated shock caused by an unanticipated increase in the budget deficit, according to the VAR analysis;
- an unanticipated increase in the budget deficit leads initially to an increase in the real effective exchange rate, over the 4 quarters in the analyzed period, which means an appreciation of the national currency and a loss of the Greek economy competitiveness. Subsequently, the answer of the real effective exchange rate shows a slight decrease, reflecting the depreciation of the national currency at an unanticipated budget deficit.

The effects due to an unanticipated increase of the budget deficit on the considered macroeconomic variables are quantified in terms of three fundamental characteristics: *speed* (V), *amplitude* (A) and *persistence* (P) thereof. The *speed* refers to the period of time expressed in quarters from the moment of the shock manifestation and until the moment in which the effect size becomes maximum, the *amplitude* represents the maximum of the effect caused by the contractionary shock upon the variable of interest and is quantified as a percentage in a standard deviation (the shock being represented by a standard deviation) and the *persistence* represents the number of quarters in which the shock effect is maintained over the considered variable.

Table 3: Synthesis of the results based on the impulse-response analysis

2001q1:2014q4	gdp			hicp			pd			reer		
	V	A	P	V	A	P	V	A	P	V	A	P
VAR	2	-0.0038	10+	2	0.0010	3	3	0.0032	5	1	0.00067	3

Note: V - speed with which the maximum effect of shock is reached (quarters); A - amplitude of the effect caused by shock (percentage of a standard deviation); P - persistence maintaining the effect generated by shock (quarters)
Source: author's calculations

The comparative approach of the effects induced by an unexpected rise in the budget deficit indicates a higher speed and amplitude, together with a high persistence of the effect genrated by the increase of the budget deficit on real activity. Also, an unexpected increase in the deficit is likely to cause a similar effect, but with a lower persistence on the inflation expressed by harmonized index of consumer prices. Regarding the impact on the public debt, it appears as faster and with a amplitude and increased persistence. The exchange rate reacts with a lower speed, less powerful and for a shorter interval to unexpected increase the budget deficit.
The variance decomposition allows determination, at different time horizons, of the proportions from the variance of endogenous variables that are due to their own shocks and shocks occurring at the level of the other variables considered in the system. So by the variance decomposition we obtain information on the importance of shocks manifested at the level of an endogenous variables on all other endogenous variables included in the VAR models.

Table 4: The variance decomposition of the gross domestic product variable (GDP)

Period	S.E.	LOG_GDP_SA	LOG_HICP_SA	LOG_BD_SA	LOG_PD_SA	LOG_REER
1	0.014991	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.021366	97.43733	1.239182	0.355413	0.000343	0.967737
3	0.026593	93.62232	3.455585	0.725304	0.076043	2.120745
4	0.031307	89.26367	6.235012	1.052122	0.361221	3.087972
5	0.035736	84.54448	9.371207	1.341985	0.924024	3.818300
6	0.039995	79.54209	12.74042	1.602647	1.775317	4.339519
7	0.044147	74.33107	16.24842	1.838032	2.892722	4.689760
8	0.048229	68.99871	19.81251	2.049477	4.237292	4.902006
9	0.052263	63.64023	23.35702	2.237057	5.763103	5.002595
10	0.056257	58.35157	26.81290	2.400381	7.422522	5.012620

Source: author's calculations

According to Table no. 4 at a time horizon of four quarters, the GDP variation is explained in proportion of 89.26% of personal innovations, 6.23% of shocks in the *harmonised index of consumer prices*, 3.08% shock of the real effective exchange rate, 1.05% shock of the budget deficit. Also, the change in GDP is not significantly

influenced by debt. On a longer time horizon (eight quarters), the variation in GDP is explained in the proportion of 68.99% of personal innovations, 19.81% of shocks in the *harmonised index of consumer prices*, 4.90% shock of the real effective exchange rate, 4.23% shocks of the public debt and 2.04% shock of the budget deficit.

Table 5: The variance decomposition of the *harmonised index of consumer prices* variable

Period	S.E.	LOG_GDP_SA	LOG_HICP_SA	LOG_BD_SA	LOG_PD_SA	LOG_REER
1	0.004755	0.075825	99.92418	0.000000	0.000000	0.000000
2	0.006647	0.066241	96.59768	1.770596	1.419244	0.146236
3	0.008215	0.163172	93.05263	2.873984	3.734333	0.175877
4	0.009639	0.449448	89.66622	3.378018	6.346750	0.159560
5	0.010975	1.000127	86.37145	3.551275	8.939910	0.137242
6	0.012244	1.873010	83.11428	3.549281	11.34344	0.119988
7	0.013456	3.110691	79.85900	3.452476	13.46730	0.110539
8	0.014616	4.742214	76.57696	3.303210	15.26661	0.111013
9	0.015727	6.783564	73.24464	3.124914	16.72220	0.124688
10	0.016792	9.237263	69.84539	2.931429	17.83002	0.155898

Source: author's calculations

In the case of the variable variance decomposition, the *harmonised index of consumer prices*, at the level of four quarters, this is explained in the proportion of 89.66% of personal innovations, 6.34% shocks of the public debt and 3.37% of the budget deficit. In terms of gross domestic product and the real effective exchange rate, they do not significantly influence the variation of the *harmonised index of consumer prices* variable. On a longer time horizon (eight quarters), *harmonised index of consumer prices* variation can be attributed to their innovations in a proportion of 76.57% and shocks the public debt at a rate of 15.26%.

Table 6: The variance decomposition of the budget deficit variable

Period	S.E.	LOG_GDP_SA	LOG_HICP_SA	LOG_BD_SA	LOG_PD_SA	LOG_REER
1	0.472705	0.044555	1.378672	98.57677	0.000000	0.000000
2	0.490810	0.767708	1.444340	97.09043	0.077755	0.619763
3	0.495763	1.715368	1.630108	95.48559	0.295679	0.873259
4	0.499456	2.761126	1.689650	94.08900	0.551320	0.908907
5	0.502990	3.894867	1.678753	92.77301	0.756659	0.896711
6	0.506620	5.109281	1.656490	91.45772	0.882373	0.894140
7	0.510460	6.381742	1.664410	90.10374	0.935991	0.914112
8	0.514588	7.677357	1.735712	88.68907	0.940876	0.956988
9	0.519063	8.954540	1.899653	87.20069	0.925216	1.019900
10	0.523928	10.16985	2.182020	85.63202	0.917113	1.098996

Source: author's calculations

Table no. 6 points out that, at a time horizon of four quarters, the budget deficit variation is explained variation in proportion of 94.08% of their innovations and 2.76% of the shocks of the gross domestic product. On a longer time horizon, the budget deficit variation is explained at a rate of 7.67% of shocks occurring at the level of the gross domestic product. Regarding the relationship between the budget deficit and the index of consumer prices, the public debt and the real effective exchange rate, could not establish any significant variance.

Table 7: The variance decomposition of the public debt variable

Period	S.E.	LOG_GDP_SA	LOG_HICP_SA	LOG_BD_SA	LOG_PD_SA	LOG_REER
1	0.034122	4.029917	0.123219	0.049177	95.79769	0.000000
2	0.043345	2.689743	1.207679	0.037178	95.15067	0.914725
3	0.048831	2.230658	2.275603	0.030486	93.73004	1.733209
4	0.052596	2.614491	3.058914	0.027176	92.12357	2.175848
5	0.055397	3.785746	3.522025	0.026705	90.34874	2.316787
6	0.057626	5.677959	3.706055	0.030408	88.30480	2.280779
7	0.059523	8.199521	3.680607	0.040843	85.91042	2.168610
8	0.061245	11.22592	3.529890	0.061195	83.13457	2.048423
9	0.062898	14.60127	3.346731	0.094759	79.99584	1.961405
10	0.064559	18.14708	3.226801	0.144460	76.55303	1.928634

Source: author's calculations

Regarding the variance decomposition of the public debt at a time horizon of four quarters, its variation is explained in a very small proportion compared to the shocks occurring at the level of the gross domestic product, *harmonised index of consumer prices*, the budget deficit and the real effective exchange rate. At a time horizon longer than eight quarters, the public debt variance is influenced on a rate of 83.13% of innovations and 11.22% of gross domestic product shocks.

Table 9: The variance decomposition of the REER variable

Period	S.E.	LOG_GDP_SA	LOG_HICP_SA	LOG_BD_SA	LOG_PD_SA	LOG_REER
1	0.013961	5.074794	1.876620	0.003848	0.106275	92.93846
2	0.016625	9.634983	1.551321	0.112436	0.665034	88.03623
3	0.018137	14.03554	2.382868	0.232059	1.337836	82.01170
4	0.019251	17.96883	3.465980	0.321727	1.714624	76.52884
5	0.020157	21.48094	4.401900	0.375894	1.832662	71.90860
6	0.020936	24.68242	5.070316	0.400652	1.810377	68.03623
7	0.021631	27.66350	5.464575	0.404215	1.733446	64.73426

8	0.022270	30.48210	5.620699	0.394251	1.645428	61.85752
9	0.022870	33.16777	5.590842	0.377369	1.562469	59.30155
10	0.023444	35.72725	5.433464	0.359159	1.487785	56.99234

Source: author's calculations

Regarding the decomposition of the public debt variance decomposition at a longer time horizon (eight quarters), exchange rate variation is explained 61.85% of the personal innovations and 30.48% of the occurred shocks at the level of the GDP. The analysis conducted reveals no significant relationship between the real effective exchange channel and the rate inflation, budget deficit and public debt.

6. Conclusions

This paper was focused on a quantitative analysis of the Greek economy since the adoption of the single European currency until 2014, using the VAR method. In this regard, the attention was focused on the impact of an unanticipated increase in the budget deficit on the following macroeconomic variables: gross domestic product, *harmonised index of consumer prices*, government debt and real effective exchange rate.

According to the impulse response analysis to an unanticipated increase in the budget deficit, the paper highlighted: a negative response from the gross domestic product, which is a decrease persistent throughout the analyzed period, a positive response from the other three macroeconomic variables: harmonized index of consumer prices, public debt and real effective exchange rate.

The comparative approach of the effects determined by an unexpected rise in the budget deficit indicates a high speed and amplitude, with great persistence of the effect generated by the increase in the deficit on the real economy. Also, an unanticipated increase in the deficit causes a similar effect, but with a lower persistence of the number of quarters in which the shock effect is maintained on the inflation variable, expressed in price index. Regarding the impact on public debt, it appears to be faster and with an increased amplitude and persistence. The exchange rate reacts with a lower speed, less powerful and for a shorter period of time to the unanticipated increase in the budget deficit.

The results of the present study reinforce the problem the arises increasingly more often, that is, if the Greek exit from the eurozone will come true or not. In terms of the accumulated debt default, the exit from the euro zone's most indebted member state of the Union seems inevitable, and the so-called Grexit could have serious consequences on both the Greek State and the stability of the whole European economy.

References

Barro, R.J. (1987), "Government Spending, Interest Rates, Prices and Budget Deficits in the United Kingdom, 1701-1918", *Journal of Monetary Economics,* Volume 20, pp. 221- 234.

Bernheim, B.D. (1989), "A Neoclassical Perspective on Budget Deficits", *The Journal of Economic Perspectives,* Volume 3, pp. 55-72.
Cebula, R., Koch, J. (1989), "An Empirical Note on Deficits, Interest Rates, and International Capital Flows", *The Quarterly Review of Economics and Business,* Volume 29, pp. 119-126.
Evans, P. (1985), "Do large deficits produce high interest rates?", *American Economic Review,* Volume 75, pp. 68-87.
Evans, P. (1987), "Do budget deficits raise nominal interest rates? Evidence from six countries", *Journal of Monetary Economics,* Volume 20, pp. 281-300.
Eurostat Database, http://ec.europa.eu/eurostat
Georgantopoulos, A., Tsamis, A. (2011), "The Macroeconomic Effects of Budget Deficits in Greece: A VAR-VECM Approach", *International Research Journal of Finance and Economics*, Volume 79 (2), pp. 100-112.
Hoelscher, G. (1986), "New evidence on deficits and interest rates", *Journal of Money, Credit and Banking,* Volume 18(1), pp. 1-17.
Jovanovic, M. N. (2012), "Towards the 20th anniversary party of the Eurozone: will it be somptuous or meagre? ", in Prausselo F. (Ed.), *The Eurozone experience: monetary integration in the absence of a european guvernment*, Milano, Franco Angelini, pp. 36-67.
King, R., Plosser, C. (1985), "Money, Deficits and Inflation", *Carnegie-Rochester Conference Series on Public Policy,* Volume 22, pp. 47-96.
Koutsoukis, N. S., Roukanas, S. A. (2014), "The GrExit Paradox", *Procedia Economics and Finance,* Volume 9, pp. 24-31.
McMillin, W. (1986), "Federal Deficits and Short-Term Interest Rates", *Journal of Macroeconomics,* Volume 8, pp. 403-422.
Sims, C.A. (1980), Macroeconomics and Reality, *Econometrica*, Volume 48 (1), pp. 1-48.