

## **Satisfaction with government and good governance in the crisis era: the opposite pathways of Greece and Cyprus in retrospect**

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### **ABSTRACT**

The study analyzes satisfaction with government in two crisis-hit countries, namely Greece and Cyprus. We argue that differences in governance formed the ground for the opposite crisis experiences evidenced by the two countries. Using ESS (2002-2012) and Eurobarometer (2018) data we identify the level and determinants of citizens' satisfaction with government as grounded in the spheres of public governance (performance in economy, education, and health) and civic culture (political participation and trust). After controlling for the socio-demographic and economic profile of individuals, two different tails are observed. Cyprus is shown to experience a 'recovery phase', restoring citizens' satisfaction with government and providing support to the regime that has successfully dealt with the crisis. In contrast, Greece, after a longer period of dealing with the crisis, experiences a deep distrust phase, and lack of support towards the regime that handled the 'second crisis' and the last two, out of a total number of four, financial adjustment programs.

## 1. INTRODUCTION

We pursue a twofold research aim, which is to analyze citizen's satisfaction with government during the crisis period in Greece and Cyprus and link good governance indicators with the success or failure in dealing with the crisis. For this purpose, we focus on soft public administration performance indicators to discern their effect on perceived satisfaction with government in two crisis-hit countries namely Cyprus and Greece. In this sense, satisfaction with public administration performance in economy, education and health provision services are linked with key performance targets and outcomes. Political participation, both formal and latent, are taken into account, and social and institutional trust is linked to analysis accounts for indicators of civic culture as a key mediator between the wider socio-economic context and people's assessments of governance within it. Finally, we also control for the socio-demographic and economic profile of individuals.

The choice of the two countries is also of particular interest. The two countries have followed rather 'opposite' ways in dealing with the financial crisis, the study of which reveals the fundamental significance of political consensus. We consider political consensus as a feature of mature capitalist democracies that may handle the capitalist institutions of growth in a responsible, and thus economically sustainable, way.

## 2. THE CONTEXT: GOOD GOVERNANCE AND CRISIS IN GREECE AND CYPRUS

### 2.1. Good governance

Governance is about the process through which societies make their important decisions, determine whom they involve in the process and how they render account (Graham *et al.* 2003). A commonly accepted principle of good governance is consensus orientation suggesting that a governance system '*mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures*' (Graham *et al.* 2003: 3; UNDP 1997). Since a governance process is hard to observe, analysis focuses on the '*governance system or framework upon which the process rests - that is, the agreements, procedures, conventions or policies that define who gets power, how decisions are taken and how accountability is rendered*' (Graham *et al.* 2003: 1).

Perceived quality of governance is inexorably linked to individuals' satisfaction with personal socio-economic conditions, such as their income and job, but also, with people's assessment of the quality of public services they receive (Wang 2010). Within-country variations are also significant. Since good governance is related to the quality of life, increasing emphasis is placed not only upon 'hard' indicators of public administration performance, e.g., impacts and outcomes but also upon 'soft' indicators, namely citizen and user satisfaction targets (Bouckaert and Van de Walle 2003). Moreover, trust in, and satisfaction with the government is said to denote individual levels of perceived quality of governance. Thus, increasing trust in government is amongst the factors considered necessary for good governance (Bouckaert and Van de Walle 2003).

Social trust and institutional trust are the two most important types of trust in a society (Wagner *et al.* 2009) indicating an 'intelligent' society that cooperates for the pursuit of common goals (Fukuyama 1995; Uslander 2002; Yamagishi and Yamagishi 1994; Yamagishi 2001). In addition, institutional trust relates to regime support and confidence in government and other social structures such as political parties, the parliament, etc. (Newton 1999). Trust is functional and leads to individuals that are able and willing to

cooperate in order to solve social dilemmas (Gambetta 2000). In that sense, individuals can discern amongst institutions that implement public policies (and are, thus, critical for their personal welfare) from those that might represent their ideology or interests (Norris 1999; Rothstein and Stolle 2008).

## ***2.2. Crisis in Greece and Cyprus***

We identify good governance determinants in two mature democracies that present special cases of addressing the 2008 financial crisis: Cyprus with initial delay and subsequent success, and Greece with initial ‘success’ and a subsequent second crisis (Hardouvelis and Gkionis 2016; Michaelides 2014; Orphanides 2014). Both countries have been affected gravely by the international economic crisis. Accordingly, the two nations were cut off from the worldwide monetary markets and depended on rescue packages financed by the IMF, the European Commission and the ECB (known as troika). Because of the austerity programs, the two nations have entered a time of profound subsidence. Nevertheless, the length of the adjustment time frame does not depend just on the severity of the adaptation measures. An equally important parameter relates to the nature of institutions and administration instruments developed and employed by the two nations. On the basis of well-accepted indicators for the quality of institutions and public governance, Rapanos and Kaplanoglou (2014) argue that the shorter period of recession in Cyprus is due not only to the less harsh policies imposed by the troika but also to the higher quality of its institutions and governance mechanisms.

A brief outlook of the crisis in the two EU member countries is useful here. Cyprus is a Presidential Republic, an EU Member since 2004, and a Euro Area Member since 2008 and typically adopted a bail-in program in 2013. Although by 2009 the crisis had reached Cyprus as well, its form, magnitude, and threat were not realized until 2011, and its consequences turned dramatic only in 2012–2013. In 2013 Cyprus became the fourth Eurozone country (after Greece, Ireland, and Portugal) to resort to IMF, EC, and ECB (the so-called Troika) funding as a result of the financial crisis (Ioannou 2014). Now it can be said to be past the crisis.

Greece is a Parliamentary republic, an EU Member since 1981 and a Euro Area Member since 2001. The country adopted four bail in programs as follows:

- The first was a joint Euro area, and IMF financial support program pledged on 2 May 2010, referred to as the Greek Loan Facility (GLF - €80 bil.), scheduled for three years (May 2010 – June 2013), and involving a stand-by arrangement (SBA - €30 bil.) by IMF.
- On 14 March 2012, the second economic adjustment program was approved. This program involved the unreleased amounts of the first GLF plus an additional €130 billion for the years 2012-14. The total financial assistance involved €164.5 billion until 30 June 2015 (€144.7 billion via the EFSF, and €19.8 billion by the IMF).
- After Greece's second program expired on 30 June 2015, the Greek government made a formal request for stability support from the ESM on 8 July 2015. Greece signed a memorandum of understanding (MoU) with the European Commission, acting on behalf of the ESM, on 19 August 2015. This new stability support program involved financial assistance of up to €86 billion over three years (2015-18).
- On 19 May 2018, the European institutions and the Greek authorities reached staff-level agreement on the policy package to be implemented for the completion of the fourth and final review of the ESM program. The Supplemental Memorandum of Understanding (SMoU) lays down the agreement on policy conditionality.

### 3. EMPIRICAL MODEL

Here we estimate citizens' satisfaction with the national government as a function of perceived governance at the national space via the following identification:

$$\text{SwG} = \alpha_0 + \beta_1 \text{PNG} + \gamma_j \text{X} + \varepsilon$$

Where,

- SwG = individual's satisfaction with national government
- PNG = a vector including variables that may approximate individual perceptions of governance at the national space
- X = a vector of control variables including socio-demographic and economic characteristics of individuals and time dummies
- $\varepsilon$  = error term
- $\alpha$ ,  $\beta$ 's,  $\gamma$ 's = the coefficients to be estimated

### 4. DATA AND VARIABLES

We use ESS data for Greece and Cyprus as follows: For Greece we selected data from ESS Rounds 1 (2002), 2 (2004), 4 (2008), 5 (2010), reaching a total sample of 9,740 observations. For Cyprus we selected data from ESS Rounds 3 (2006), 4 (2008), 5 (2010), 6 (2012), reaching a total sample of 4,409 observations. We also use 2018 political data from Eurobarometer, for both countries.

We cover three periods of analysis as follows: The Pre-crisis period, using ESS data for both countries, the Crisis period which is subdivided to crisis onset with ESS data covering both countries and the deep crisis period with ESS data covering only Cyprus. Finally, the Post-crisis period covering both Greece and Cyprus with Eurobarometer data.

The data are divided to four sets of independent variables, covering main governance domains (economy, education, and health), political culture and ideology (formal and latent political participation), civic culture (generalized and institutional trust) and finally controls (socio-economic and demographic profile, time).

### 5. RESULTS

Results of the pooled regression showed a break, so different regressions were estimated referring to the pre-crisis period, the onset of the crisis, and, for the case of Cyprus, the deep crisis period (Tables 1 and 2). Results of these estimations show that individuals' satisfaction in the main governance domains of economy, education and health provision services, affect the level of satisfaction with government positively. This is evidenced for both Greece and Cyprus, and it is anticipated based on previous evidence in the field (Wang 2010).

The effect of formal political participation is shown to be different in the two countries. In Cyprus, we observe the statistically significant and adverse effect of contacts with political persons at the onset of the crisis period, and the positive effect of those who voted in the last national elections at the deep crisis period. It is relevant here to remind that the 2012 Round of ESS data in Cyprus covers the early 2013 elections were a change in the Presidential Office occurred (Table 1). For Greece, the only statistically significant variable is being member of political party which positively affects satisfaction with government at the onset of the financial crisis (Table2).

As regards the effect of the latent political participation variables, again differences are observed between the two countries. For Cyprus placement from left to right scale negatively affects satisfaction with government throughout the whole period of analysis, while a positive effect is observed for those feeling closer to a political party at the deep crisis period (Table 1). In the case of Greece, mass media information exerts a positive effect in the pre-crisis period, feeling closer to a political party exerts a positive effect at the onset of the crisis period while the effect of the placement from left to right variable turns from positive in the pre-crisis period to negative at the onset of the crisis period (Table 2).

As regards the civic culture variables, we found that in Cyprus, generalized trust is negative in the pre-crisis period and turns to positive at the onset of the crisis period. Trust in police is positive but only in the pre-crisis period. Trust in politicians is positive in the pre-crisis and the onset of the crisis period, but in the deep crisis period only trust in political parties matters. Trust in the EU Parliament is negative in the pre-crisis and the onset of the crisis period (see Table 1). In the case of Greece, trust in the police is positive for the pre-crisis period. Trust in politicians is positive in the pre-crisis and the onset of the crisis period. Trust in the EU is positive in the pre-crisis and the onset of the crisis period. Trust in the UN is negative in the pre-crisis period (see Table 2).

Finally, the effect of control variables is also different in the two countries (see Tables 1 and 2). Education negatively affects satisfaction with government throughout the crisis period (2010-2012) in Cyprus. Having children in the household positively affects satisfaction with government in the deep crisis period, while the higher the income, the higher the satisfaction with government for the onset of the crisis period. In the case of Greece, none of the control variables are statistically significant after the onset of the crisis. In the pre-crisis period education affects the level of satisfaction with government positively, while income affects it negatively.

What is the situation in the post-crisis period? We use Eurobarometer 2018 data to analyze citizens' assessment of governance in the post-crisis era. Available data are quite illustrative (see Tables 3 – 5). Greece has followed both a right-wing and a left-wing path to dealing with the crisis. As a result, it has experienced two crises that brought citizens to unhappiness (54,1% of respondents are very or not at all satisfied with their lives), low satisfaction with the state of economy (97,3% of respondents believe that the situation of the national economy is rather bad or awful) and the state of public services (84,2% of the respondents think that the situation of public services is rather or very bad). Also, low expectations (about life and country in general, economic situation, personal job, household financial situation and employment in the country) and distrust prevail. For Cyprus, a different situation is observed. Citizens are shown to be more satisfied with their lives, the state of the economy, and the situation of public services. Moreover, Cypriots are found to be more trustful relative to media, public administration and authorities, national government, parliament, and European Union than Greeks.

## **6. CONCLUSION**

The aim of the study was to analyze the role of governance as a detrimental feature of the way in which two different economies have dealt with the 2008 financial crisis. Taking Greece and Cyprus as different, in the quality of their institutional basis, countries, we do observe two opposite crisis tails. Indeed two distinct pathways to dealing with the financial crisis are observed. Individual levels of satisfaction with governance indicate Cyprus as being in a 'recovery phase'. Results show that Cyprus has managed to restore citizens' satisfaction levels with government and consequently, citizens now seem to largely provide support to the

regime that has successfully dealt with the crisis. Greece on the other hand, after a decade long period of dealing with the crisis, actually experiences a deep distrust phase, and lack of support towards the regime that handled the ‘second crisis’ and the last two, out of a total number of four, bail out adjustment programs. This evidence further substantiates the current concerns over the direction of constitutional changes in Greece (Tsiftoglou 2019) and the quality of democracy in the country (Daskalopoulou 2018).

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**Table 1. Government satisfaction in Cyprus**

	<b>Pooled OLS (2006- 2018)</b>	<b>Pre-crisis period (2006- 2008)</b>	<b>Crisis onset period (2010)</b>	<b>Deep crisis period (2012)</b>
<b>Main governance domains (economy, education, health)</b>				
How satisfied with present state of economy in country	.300*** (.032)	.266*** (.041)	.288*** (.049)	.320*** (.050)
State of education in country nowadays	.145*** (.032)	.159*** (.044)	.126*** (.046)	.233*** (.045)
State of health services in country nowadays	.193*** (.031)	.142*** (.041)	.233*** (.045)	.174*** (.040)
<b>Political culture and ideology - Formal political participation</b>				
Contacted politician or government official last 12 months	-.243 (.160)	.134 (.208)	-.766*** (.237)	-.309 (.246)
Worked in political party or action group last 12 months	.321 (.233)	-.045 (.277)	.373 (.413)	.202 (.383)
Member of political party	-.245 (.179)	-.060 (.223)	-.050 (.284)	
Voted last national elections	.184 (.214)	.294 (.382)	.038 (.036)	.463* (.259)
<b>Political culture and ideology - Latent political participation</b>				
TV watching, news/politics/current affairs on average weekday	.073 (.060)	.045 (.079)	.139 (.088)	-.112 (.074)
How interested in politics	.005 (.071)	-.098 (.091)	.128 (.109)	-.040 (.110)
Feel closer to a particular party than all other parties	.035 (.147)	.084 (.192)	.063 (.222)	.360* (.205)
Placement on left right scale	-.258*** (.020)	-.163*** (.025)	-.413*** (.032)	-.380*** (.030)
<b>Civic culture - Generalized and institutional trust</b>				
Most people can be trusted or you can't be too careful	-.010 (.024)	-.060** (.029)	.084** (.042)	.009 (.039)
Trust in the legal system	.040 (.035)	.058 (.045)	-.013 (.53)	.006 (.049)
Trust in the police	.065* (.035)	.125*** (.046)	.048 (.53)	.035 (.048)
Trust in politicians	.167*** (.062)	.152** (.079)	.176* (.096)	-.091 (.103)
Trust in political parties	-.029 (.060)	-.066 (.075)	.074 (.092)	.187* (.098)
Trust in the European Parliament	-.073** (.031)	-.092** (.040)	-.079* (.048)	.006 (.050)
Trust in the United Nations	.021 (.027)	.013 (.033)	.013 (.046)	.013 (.044)
<b>Controls</b>				
lnAge	-.038 (.216)	-.111 (.290)	-.050 (.313)	.320 (.286)
lnEducation	-.418** (.179)	-.144 (.258)	-.630*** (.245)	-.616*** (.227)
Gender	-.060 (.119)	-.252 (.155)	.110 (.178)	-.169 (.185)
Living with partner dummy	-.121 (.153)	-.284 (.211)	-.233 (.216)	-.313 (.211)



Children living at home or not	-.099 (.133)	-.035 (.174)	-.165 (.196)	.358* (.203)
Household's total net income, all sources	.040 (.032)	.011 (.050)	.093** (.041)	-.037 (.050)
Feeling about household's income nowadays	-.039 (.081)	-.141 (.111)	.114 (.115)	.137 (.110)
Time	-.638*** (.140)			
Constant	3.850 (1.152)	4.210* (1.645)	3.397 (1.555)	1.821 (1.511)
<b>Summary Statistics</b>				
<i>N</i>	4,409	2,210	1,083	1,116
<i>R-square</i>	.533	.436	.618	.569
<i>F (Prob)</i>	40.906 (p<.001)	15.499 (p<.001)	26.202 (p<.001)	28.436 (p<.001)

Source: Authors' calculations. Asterisks denote statistically significant variables at standard significance levels (\*\*\*1%, \*\*5%, \*10%).

**Table 2. Government satisfaction in Greece**

	<b>Pooled OLS (2002-2010)</b>	<b>Pre-crisis period (2002-2008)</b>	<b>Crisis period (2010)</b>
<b>Main governance domains (economy, education, health)</b>			
How satisfied with present state of economy in country	.532*** (.018)	.533*** (.022)	.483*** (.032)
State of education in country nowadays	.126*** (.019)	.069*** (.025)	.173*** (.026)
State of health services in country nowadays	.099*** (.018)	.097*** (.023)	.104*** (.026)
<b>Political culture and ideology - Formal political participation</b>			
Contacted politician or government official last 12 months	-.094 (.096)	-.055 (.121)	-.189 (.149)
Worked in political party or action group last 12 months	-.079 (.153)	-.036 (.190)	-.320 (.244)
Member of political party	.178 (.126)	-.050 (.157)	.651*** (.200)
Voted last national elections	.155 (.099)	.124 (.144)	.179 (.126)
<b>Political culture and ideology - Latent political participation</b>			
TV watching, news/politics/current affairs on average weekday	.062*** (.024)	.071** (.031)	.047 (.033)
How interested in politics	.006 (.036)	-.013 (.049)	.038 (.049)
Feel closer to a particular party than all other parties	.073 (.066)	-.071 (.087)	.171* (.096)
Placement on left right scale	.146*** (.015)	.281*** (.019)	-.071*** (.022)
<b>Civic culture - Generalized and institutional trust</b>			
Most people can be trusted or you can't be too careful	-.013 (.013)	-.013 (.017)	-.011 (.020)
Trust in the legal system	-.014 (.016)	-.020 (.022)	-.023 (.023)
Trust in the police	.027* (.015)	.050** (.021)	.017 (.021)
Trust in politicians	.150*** (.029)	.121*** (.036)	.216*** (.047)
Trust in political parties	.003 (.028)	.016 (.035)	.008 (.045)
Trust in the European Parliament	.086*** (.019)	.070*** (.024)	.094*** (.032)
Trust in the United Nations	-.049*** (.017)	-.064*** (.021)	-.015 (.030)
<b>Controls</b>			
lnAge	.161* (.098)	.102 (.129)	.209 (.142)
lnEducation	.127* (.077)	.212** (.100)	.008 (.111)
Gender	-.113* (.062)	-.123 (.080)	-.105 (.090)
Living with partner dummy	-.056 (.071)	.005 (.094)	-.097 (.100)
Children living at home or not	.000	.021	.007

	(.067)	(.087)	(.099)
Household's total net income all sources	-.036**	-.062***	-.017
	(.016)	(.021)	(.022)
Feeling about household's income nowadays	-.007	-.047	.039
	(.040)	(.053)	(.057)
Time	-.279***		
	(.074)		
Constant	-1.276	-1.227	-.920
	(.543)	(.720)	(.775)
<b>Summary statistics</b>			
<i>N</i>	9,759	7,044	2,715
<i>R-square</i>	.597	.588	.518
<i>F (Prob)</i>	170.553	105.441	48.112
	(P<.001)	(p<.001)	(p<.001)

Source: Authors' calculations. Asterisks denote statistically significant variables at standard significance levels (\*\*\*1%, \*\*5%, \*10%).

**Table 3. Citizens' assessments of main governance domains, 2018**

<b>Present state assessment</b>	<b>% Answer</b>	<b>GR</b>	<b>CY</b>
Life satisfaction	Not very or not at all satisfied	54,1	16,3
General situation in country	Rather or very bad	93,6	47,3
Situation national economy	Rather or very bad	97,3	51,3
Situation personal job	Rather or very bad	47,6	23
Household financial situation	Rather or very bad	66,8	31,5
Situation employment in the country	Rather or very bad	96,3	58,8
Situation public services	Rather or very bad	84,2	45,3
<b>Expectations</b>	<b>% Answer</b>	<b>GR</b>	<b>CY</b>
Life in general	Same	59,4	53,9
Country in general	Same	45,7	45,9
Economic situation	Worse	43,7	16,3
Situation personal job	same	67,2	57,3
Household financial situation	Same	54,2	63,2
Situation employment in the country	same	45,7	46,9

Source: Own elaborations based on Eurobarometer (2018) political data.

**Table 4. Citizens' trust in national and supranational institutions, 2018**

<b>Trust in national and supranational institutions</b>	<b>% Answer</b>	<b>GR</b>	<b>CY</b>
Media	tend not to trust	77,8	56,9
Political parties	tend not to trust	95,4	83,7
Justice / legal system	tend not to trust	43,8	47,7
Police	tend not to trust	31,7	38,0
Army	tend not to trust	17,7	27,8
Public administration	tend not to trust	79,8	54,3
Regional / local public authorities	tend not to trust	71,4	45,7
National government	tend not to trust	87,7	46,7
National parliament	tend not to trust	85,7	56,1
European Union	tend not to trust	71,3	54,3
United Nations	tend not to trust	74,3	60,2

Source: Own elaborations based on Eurobarometer (2018) political data.

**Table 5. Overall assessment**

<b>Overall assessment</b>	<b>% Answer</b>	<b>GR</b>	<b>CY</b>
Satisfaction with democracy in country	not very or not at all satisfied	77,5	46,7
Satisfaction with democracy in EU	not very or not at all satisfied	65,7	40,9
EU image	fairly or very negative	37,9	25,5
Direction of country	things are going in the wrong direction	83,0	38,2

Source: Own elaborations based on Eurobarometer (2018) political data.

## **Macro - Econometric Analysis of Business Cycles and Fluctuations, of the Greek Economy, for the past 59 years**

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### **Abstract**

The purpose of this study is the macro-econometric analysis of data from the postwar Greek Economy. Notably, in this research we process and examine the time series of various crucial macroeconomic indicators and correlate the quantitative findings with the most significant historical, political and economic facts that had a major impact and have shaped the Greek Economy. Our research differentiates from the literature in two areas: First, the observation horizon is much longer, also we intend to use greater number of variables to analyze the behavior of Business Cycles and Fluctuations and second, we do not use micro-founded models, but rather macro-econometric models, based on aggregated data. However, for this present work we intend only to study the processed data without fitting any macro-economic model. This will be the subject of the subsequent study of my PhD. The importance of this study is to give some additional information or new interpretations of the modern Greek Economy that compliments the work of Economic Historians.

**Keywords:** business cycles, variables, macro-economics, trend, fluctuations.

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## **Introduction**

The Greek Economy is currently facing a structural crisis, which is reflected in the rapid deterioration of the economic fundamentals factors and the decline of prospects for investments and further economic growth. The importance of the Business Cycles is related to the fact that the economic fluctuations in macro-econometric variables such as unemployment and many others, are economic phenomena that affect economic policy and, by extension, the fiscal one. The prosperity of large groups of people depends on the success with which each government tackles an economic recession or crisis. The experience so far in Greece and others countries of the European Union, indicates that these challenges are not controllable and fiscal policy is not always adapted to the specific features and demands of every country. The present paper will capture in graphs, but will also analyze the Business Cycles in the Greek economy during the period 1960 - 2019 (59 periods).

### *Literature Review*

According to literature review of Business Cycles in the Greek Economy, most economists studied and interpreted the existence of fluctuations in the macro-econometric magnitudes using various econometric or dynamic models. Extensive research was conducted by Kollintzas and Christodoulakis (1993), applying a Real Business Cycle model (RBC) over time series data from 1960-1993 with a quarterly and annual period of time, presented the behavior of the Greek Economy, comparing it with these of EU economies.

The same study was conducted by Vasilatos and Kollintzas (1996), also developed a DGSE (Dynamic Stochastic General Equilibrium) model in order to analyze the business cycles in Greek economy with data up to 1996.

Michailides, Milios, Vouldis and Lapatsioras (2007), analyzed the business cycles in Greece during the period 1960-2008. They conducted an econometric survey and adopted a definition according to which Business Cycles are considered as fluctuations around the central trend, specifically deviation cycles.

Tsouma (2010), in her study, attempted to create a time-series reference for the Greek Business Cycles from the early 1970s to mid-2010. Taking into account the global recession and the recent domestic developments in the late 2000s, were used quarterly GPD data and selected monthly indices covering important sectors of Greek economic activity.

Apergis and Panethimitakis (2011), in their research, analyzed the stylized events of the Greek economy during the period 1960 - 2005. Taking into account the changes in the political regime. The results designated that they were the real disturbances that drive the economy, suggesting that demand management policies are ineffective.

## **Analysis of Fluctuations of Macroeconomic Variables in a period time of 59 years**

In this paper, we have managed to appear a holistic research of some crucial macro-econometrics variables. A collection of macroeconomic data of the Greek economy with annual sampling period, has been carried out by European macroeconomic time series databases and pre-processed using appropriate filters, for the time slot of 59 years. The main indicators that were part of the research are: 1) GDP, 2) Consumption, 3) Employment, 4) Unemployment, 5) Wage, 6) Population, 7) Government Expenses, 8) Self-Employment, 9) National Net Income, 10) National Gross Income and 11) Labor Force.

After the gathering of the variables, the data were processed and normalized, in order to be correlated and comparable. At this point, of the research, that data were precisely normalized, we used a statistical econometric package (E-Views) for the analysis of the variables.

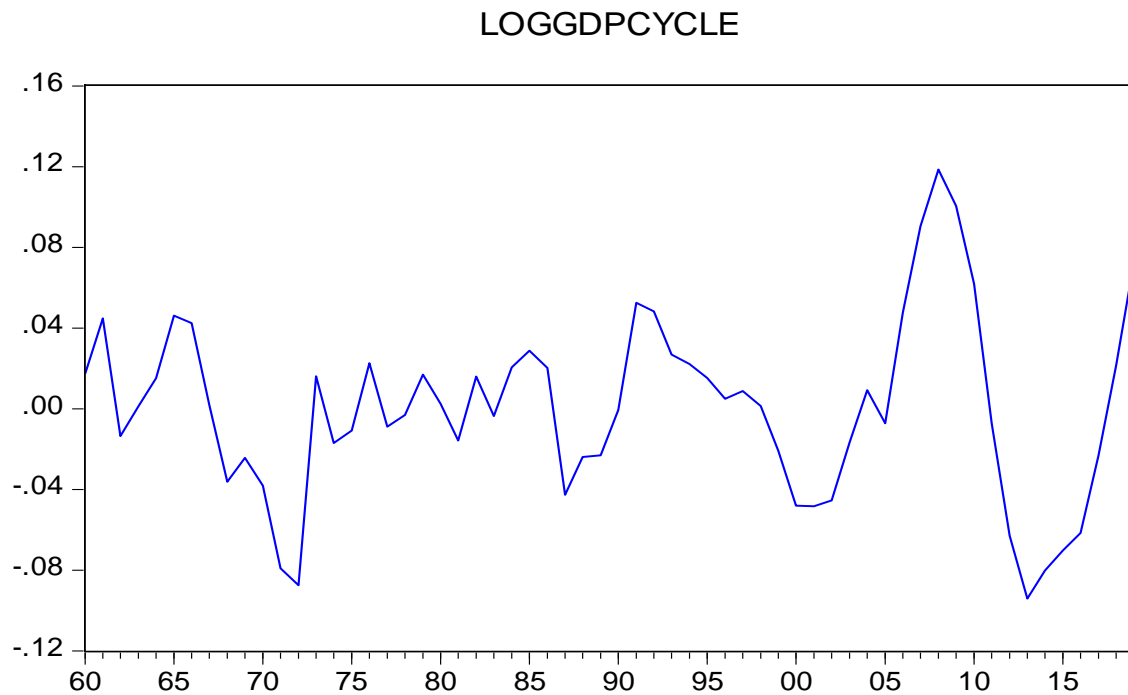
At first, the data were logged, and then by using low pass filter detrending methods such as the filter Hodrick-Prescott with the ultimate goal the modeling of cyclical part of the time series. We separated all the macroeconomic time series into a long term-trend and a cyclical part.

Initially, the logged data were analyzed in the cyclical part of the variables' fluctuations, where graphically plotted the deviation from the central trend of the examined logged sizes, e.g. GDP.

At last, we were able to observe separately the historic evolution of growth and the economic fluctuations.

### *Graphic Analysis of the Components of Macroeconomic Variables' Fluctuations*

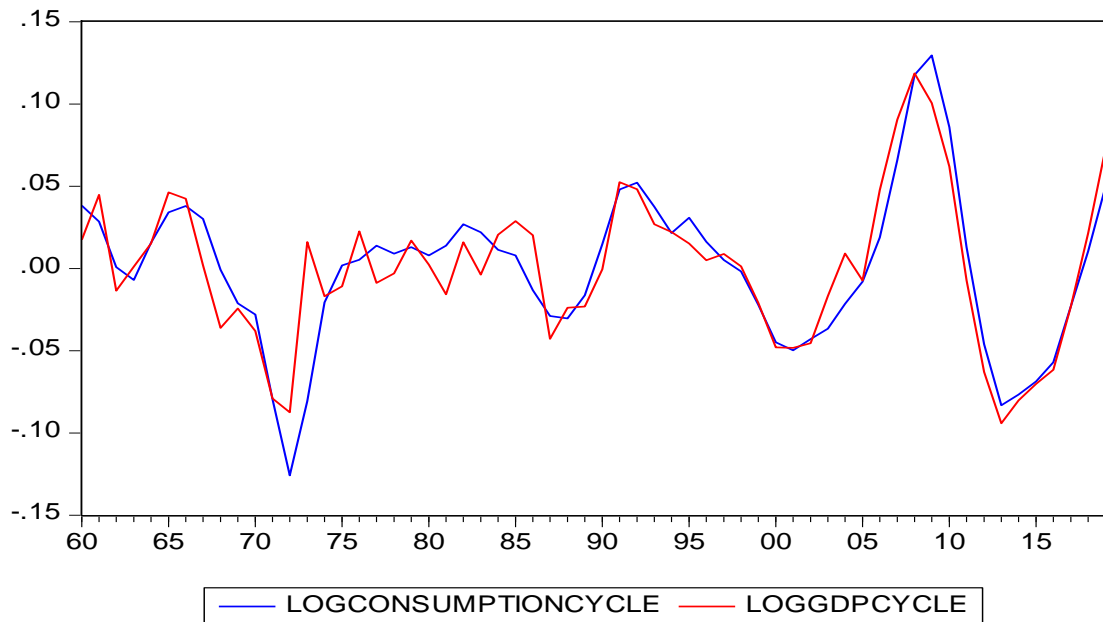
It is important to refer and analyze the graphs and the figures, after the separation of the trend and the cyclical components.



**Figure 1: Cyclical Part of the GDP Variable (Db over Years)**

Initially, an attempt was made to capture the logged element in a chart relative to the cycle of all macro econometric variables. In the above figure, the cyclical part considered by troughs and peaks that fluctuate over the years. There performed small fluctuations that might be unforeseen events and the remarkable ones due to historical and economic events. Approximately, the peaks of cyclical part of GDP are formed over the years of '66-'67, '77, '91-'93 and the noteworthy augmentations '06-'08 and '17 up today. In the other hand, the ultimate troughs that shaped the GDP variables are connected to the year of '73-'74, '86-'87, '99-'01, '06 and '13. All these fluctuations were occurred from important and notable historical events.

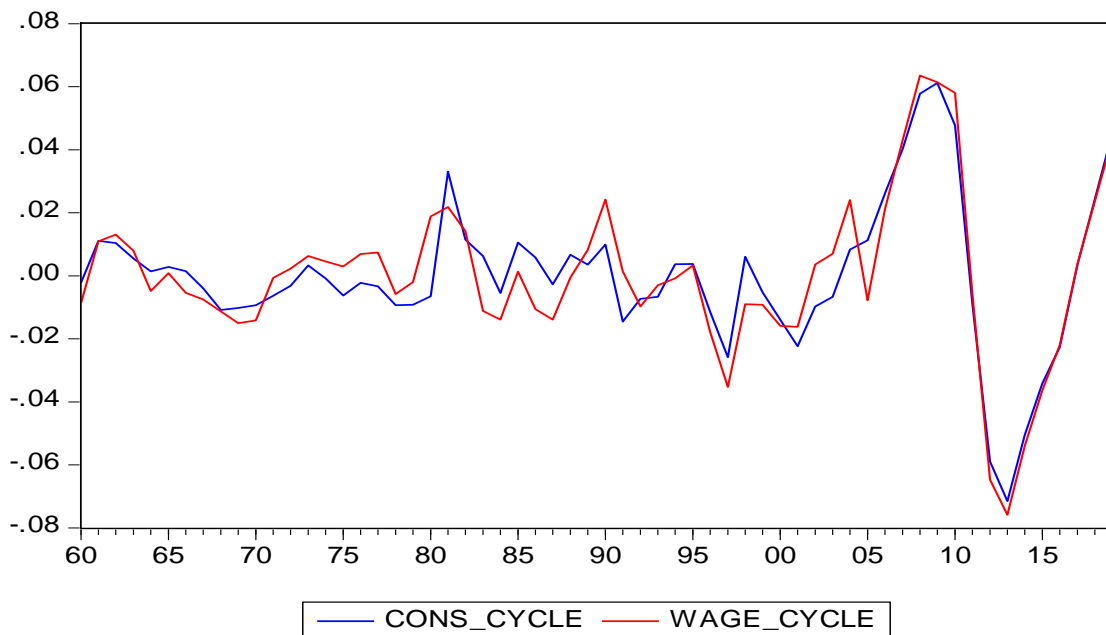




**Figure 2: Cyclical Part of the Consumption and GDP Variables (Db over Years)**

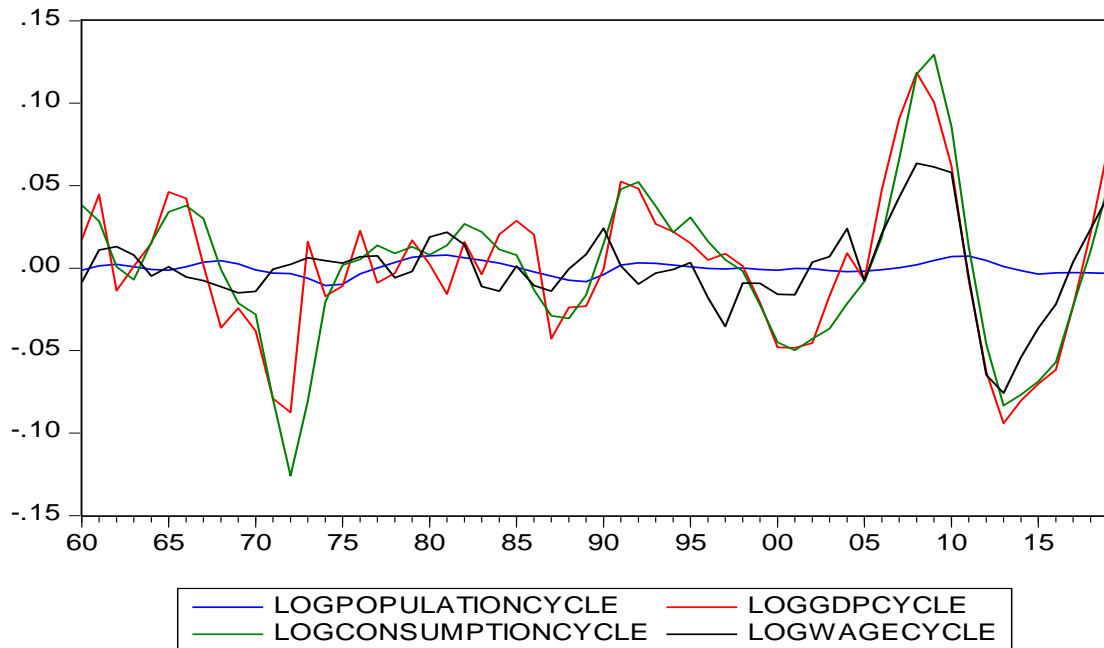
As seen in Figure 2, the factors of Consumption and GDP are approximately synchronized over the years, with significant fluctuations for both of the variables, it is obvious that these two factors interact and appear equal behavior over the years.

The most remarkable peaks were formed between the years '65-'66, '91-'92, '08 and 2019, and respectively the big decline of the cyclical part is appeared at the years '72, '86, '00 and '13.



**Figure 3: Cyclical Part of the Consumption and Wage Variables**

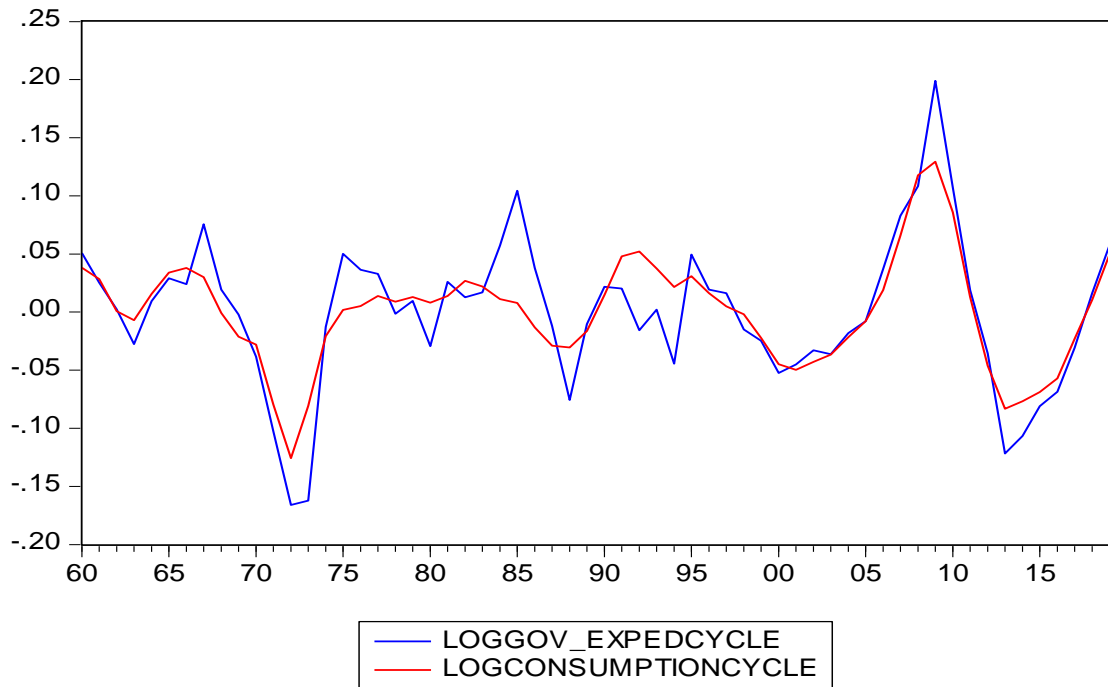
According to the above Figure, the two factors are presented the same behaviour for the timeslot of 59 years. The variables are synchronized, which means that the Consumption depends entirely from the Wage of the consumers, if the Wage is high will have the same impact to the Consumption factor. In opposite manner, the Unemployment moves inversely in relation to the Consumption and the Wage factors.



**Figure 4: Cyclical Part of the Population- Wage- GDP- Consumption Variables (Db over Years)**

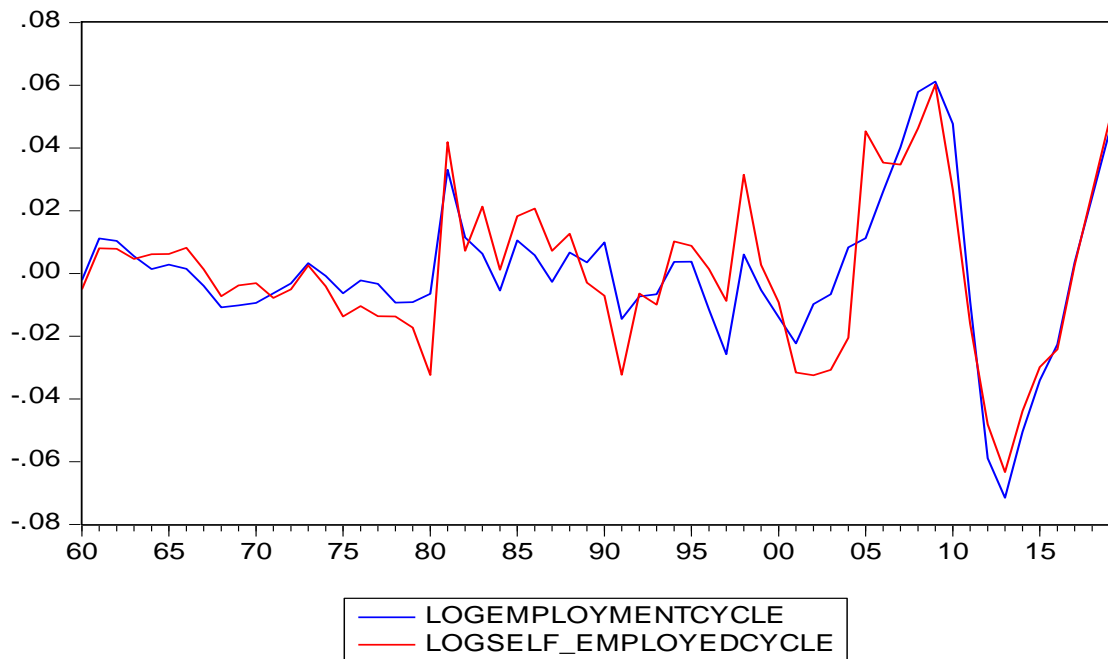
In the above graph, the variable of Population is characterized by stability in relation with the others factors Consumption, GDP and Wage, this is expected as there is not significant fluctuation for the factor of Population relatively to the other macro-econometric variables.

The major troughs that have to be referred in the current research are in the years '73-'74, '86-'87, '01, '00-'03 and '13. The most significant peak is in '08.



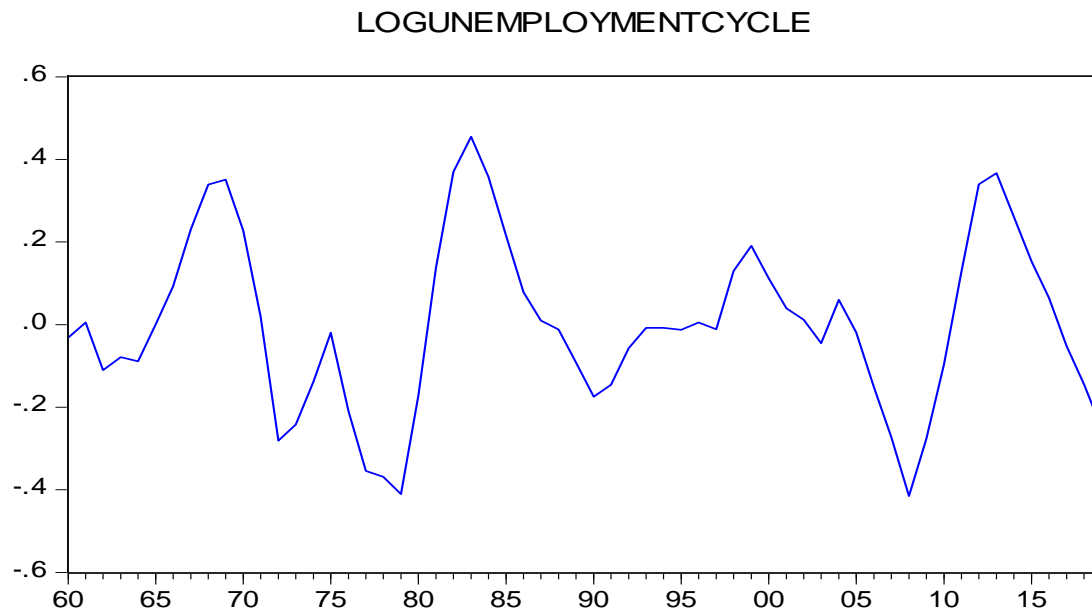
**Figure 5: Cyclical Part of the Government Expenditures and Consumption Variables (Db over Years)**

In the above sketch, the cyclical portion of Consumption factor is following Government Expenditure fluctuations with smoother capture over the years. The Government Expenditure factor figures several fluctuations with the most significant peaks occurring in the years '67, '85, '95 and 2009 and respectively significant troughs in the years '72 -'73, '88, '95, '99 - '01 and '13.



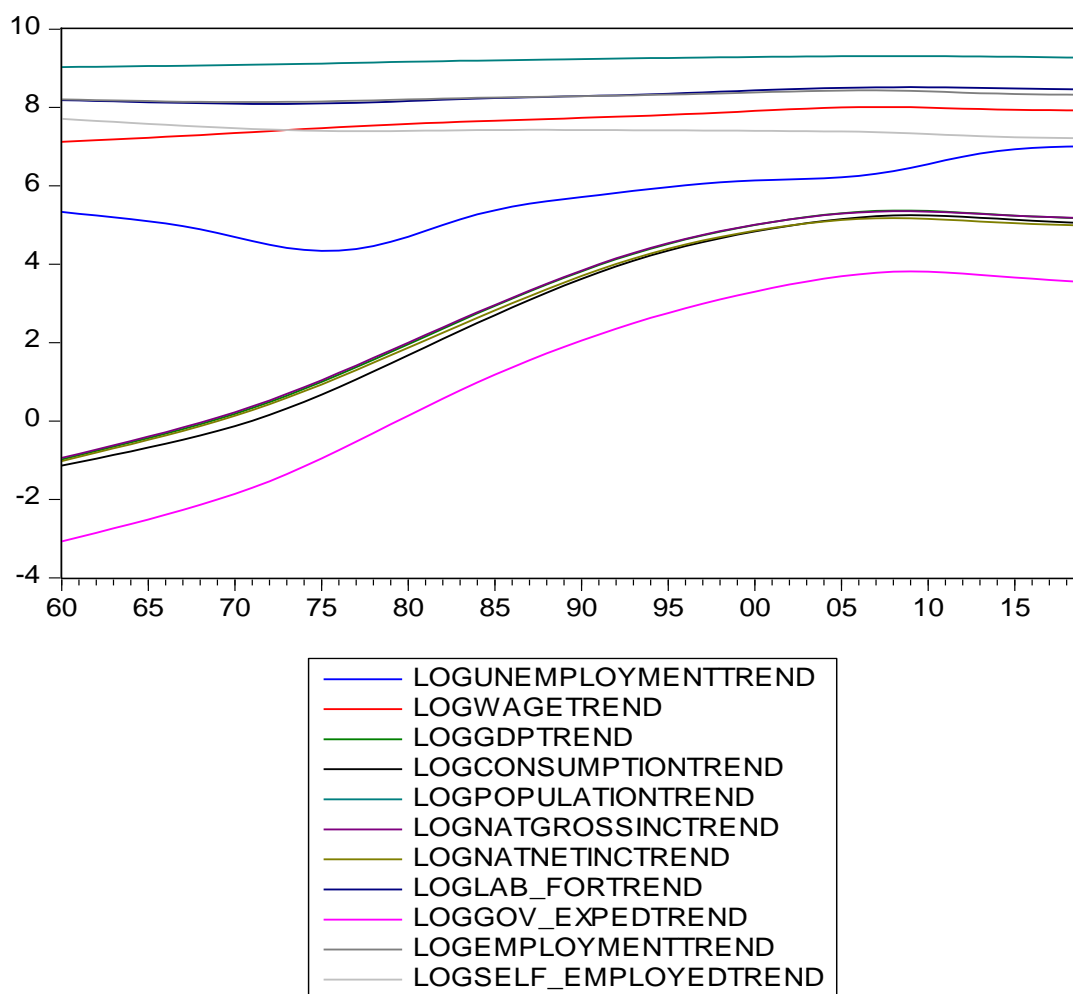
**Figure 6: Cyclical Part of the Employment - Self-Employment Variables**

In this graph, the components of the macro-econometric variables of Employment and Self-Employment are aligned as relative sizes, as one is an extension of the other factor. As seen in Figure 6, the most remarkable troughs of the fluctuations over the years for the above factors are shaped in '80, '91, '97, '01-'04, with the a significant decline to be formed in '13, the rest of the time the cyclical part of both of the factors characterized from stability or small deviation from the long-term trend. Moreover, there considered and some debatable peaks over the period of 59 years in '81, '98 and there happened a recovery for the years '05-'10 and '13 until the present time.



*Figure 7: Cyclical Part of the Unemployment Variable (Db over Years)*

The variables demonstrate a different pattern during these 59 years, where the Unemployment factor forms the most noteworthy fluctuations over time. The most remarkable peaks were formed between '68-'69, '83-'84, '99 and '12-'13 and respectively significant troughs between '62-'64, '73-'74, '77-'79, '90, '08 and 2019. It is important to refer at this point that the troughs that are appeared as fluctuations at the years of '73-'74, '77-'79, were the impact of the oil crises. The first oil crisis occurred during Arab – Israeli War (1973-1974), where there was a significant augmentation in oil prices, due to the oil embargo of the Arab countries towards the US and the Netherlands. At the same time, oil extraction and supply were reduced under the OPEC agreement (Kotios and Pavlidis 2011). The second oil crisis occurred during the Islamic Iranian Revolution (1979-1980). The political turmoil in Iran has had a significant impact on the country's oil sector, reducing production and exports respectively.



*Figure 8: Trend Part of all the Examined Variables (Db over Years)*

As seen in Figure 7, the trend part of the variables that is shaped over the time is upward for some of the examined macro-econometric variables, while for others it is characterized by stability. In the above diagram, the tension of the trend of Consumption variable for Greek Economy for the time period of 1960 – 2019, has the same behaviour as the trend of the GDP indicator for the same period. The trends are perfectly matched.

According the Figure 7, it is conceivable that the trend of the Unemployment variable does not have the same behaviour as the trend of the labour for this specific period in Greek Economy.

By the early '70s, the Unemployment was not a major problem for most of the world's economies. From that point onwards, however, combined with the two oil crises, the Unemployment factor was increasing steadily, as a result hitting the European countries and at the same time United States of America and Japan. However, in Europe the growth of the unemployment variable was even higher in the last fifteen years; the employment rate is almost 10% (Database Ameco).

Furthermore, it is important to note that the trends of employment and labour force variables, have almost the same behaviour during the period of 59 years. The labour force factor is a subset component of employment variable. Although, initially (since 1974), the employment has increased steadily, from 2005 until today, it has been blurred, compared with the trend of labour force, that has been enhanced relatively, but as seen from 2008 until today has a downward trend.

The trend of self-employment variable, from initiative year of our study 1960 to 1978 has appeared a declining trend, then is characterized by a small recovery – steady upward trend until 2005, which is justified the allocation of funds through state and European programs, as well as the tendency of individuals to develop businesses through investment.

With regard to the Business Cycles of the examined time series, it seems that for the periods '72-'74, '99-'01 and '13, the most important macro-econometric variables which are Unemployment, GDP, Consumption and Government Expenditures fluctuate in the same mode, as well as in years '67-'68 inline with the large positive shocks of the Greek economy. The "Greek miracle" of the period 1953-1973 (average real growth rate of 7.4%) was largely based on investment. In addition, there were negative shocks that hit the Greek economy and plunged it into a recession and thus an economic crisis, between 1971 - 1972, 1973 - 1974, 1987 and 2009 up to date. The events that imply these negative shocks are in fiscal policy, during the seven-year dictatorship, Greece has increased its debt by 150% within a period of 150 years. In the foreign policy that followed, the oil crisis began in October 1973 until the end of the embargo in March 1974. In 1987, there was also a turmoil that was due to the Greek-Turkish crisis of the Imia and the recession up to date, with the financial crisis of 2009.

The second part of the Chronicle of the Great Depression concerns the developments in the crucial four-year period 2010-2013. 2013 is a landmark year, marking the completion of major changes and halting the Great Depression. Adaptation of the economy was not completed in 2013, in order to be prepared to create the conditions for growth, reducing employment and improving incomes (Bank of Greece 2014). By the end of 2013, 12 banks had been recapitalized, cleared and liquidated, while the Cypriot Crisis (2012-2013) was avoided in the Greek Banking system. Furthermore, the economic crisis in Argentina was one of the most global historical economic crises. The economic situation in the country has separated through two phases: a recession of the economy in 1998-1999 and a collapse of the banking system in 2001-2002 (Papastamou 2011). The terrorist attack in New York on September 11, 2001, has caused turmoil in international markets.

In addition to all, the Olympics are an equally important event that took place in 2004, where was happened a recovery and it is emphasized in the Employment and Self – Employment variables' figure, and as seen in the graphs of cyclical part of Consumption and Wage and GDP factors.

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## **Predictive Credit Risk Models incorporating Macro Factors for the Greek Banking Sector**

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### **Abstract**

This study aims to develop models of credit portfolio risk prediction for the Greek banking sector by incorporating key macroeconomic factors through empirical analysis.

Aggregate data on the evolution of Non-Performing Loans (NPLs) have been collected from the four (4) Systemic Banks and over a period of at least 10 years 2007 -2017.

These data will be utilized either to calibrate well known modern models or to construct new ones applying mainly linear approach (the two dimensions being time and loan) adding macroeconomic and other crucial indicator indices that affect credit risk.

The variables to be used are two types: a) bank and credit risk specific b) macroeconomic variables that affect the credit cycle. Macroeconomic variables include GDP growth rate, unemployment rate, real interest rate, Consumption growth, etc. and portfolio specific include change in non-performing loans to the total loan portfolio, impairment provisions towards total loans etc.

Based on this data the models constructed among others forecasted the evolution of non-performing loans throughout the business cycle.

**Keywords:** Credit Risk, Banking, NPLs, Macro Factors, Macro-econometrics

### **Introduction**

Exploring the determinants of ex post credit risk is a matter of major importance for regulators dealing with financial stability and bank management. Ex-post credit risk takes the form of non-disbursed loans (non-performing loans). Reinhart and Rogoff (2010) point out that non-performing loans can be used to signal the start of a banking crisis.

This research topic, obviously very crucial for the banking sector, has been examined in other countries and in the majority of studies investigating the determinants of non-performing loans, the overall level of non-performing loans is taken into account, and macroeconomic or bank-specific determinants are used as explanatory variables.

Salas and Saurina (2002), which combine macroeconomic and microeconomic variables to explain the total non-performing loans of Spanish Commercial and Savings Banks for the



period 1985-1997. They focus on the NPLs for commercial banks and savings banks and find that the bank's determinants can serve as indicators of early warning for future changes to non-performing loans.

Most empirical studies address the impact of the macroeconomic environment on non-performing loans. Rinaldi and Sanchis-Arellano (2006) analyze non-performing households for a group of European countries and provide empirical evidence that disposable income, unemployment and monetary conditions have a strong impact on non-performing loans. Berge and Boye (2007) find that problematic loans are particularly sensitive to real interest rates and unemployment for the Scandinavian banking system over the period 1993-2005.

Boss et al. (2009) examines the correlation of the credit risk of the main Austrian corporate sectors with the business cycle. Other study that focus on the macroeconomic determinants of NPL include Nkusu (2011).

Conclusions of the entire analysis and suggestions for the future of the banking sector will be presented. These will involve the determination and their relative weight of the key drivers for the evolution of non-performing loans as well as prediction of the state of the various portfolios in relation to the state of the Greek Economy. Finally, these results will provide the means for more efficient calculation of credit risk provisions and capital ratios and the future state of loan portfolios and will be useful not only for Banks but also for European Regulators or for those that audit and control the Greek Banking Sector.

## **Presentation of the sample and model**

### *The sample*

The sample consists of 4 Systemic Banks in Greece for a period of 10 years (2007-2017). The choice of Greece is not accidental as it is a representative country facing problems after the 2007 crisis and worsening public finances. We chose a selection of big systemic banks and we had a large amount of NPLs. The choice of Greece is then prompted by the significant number of bank failures in recent years. Greece has been affected by the subprime mortgage crisis and the debt crisis.

The data sources for this study include the following sources: Annual Reports of the four (4) Systemic Banks and Bank of Greece (Eurosystem) for the Economic – Banking Ratios and banking information systems that affect credit risk and Reports, the European AMECO Database/ European Commission, World Development Indicators (WDI), Global Financial Development (GFDD) for the macroeconomic factors.

### *Model*

To apply empirically this study, we used both macroeconomic and economic variables. Macroeconomic Data are collected from the AMECO Database/ European Commission, World Development Indicators (WDI), Global Financial Development (GFDD).

For bank specific data, we used the Systemic Banks' annual reports for 10 years (2007 -2017) of the four (4) Systemic Banks. In this study, non-performing loans are explained by four

macroeconomic variables and three bank-specific variables in terms of total capital adequacy and bank's core equity capital against its total risk-weighted assets.

### Linear Regression, Least Squares (NLS and ARMA)

$$\text{Equation} \Rightarrow y = c + c(1) + c(2)x_1 + c(3)x_2 \dots$$

Models:

$$1) \frac{NPL}{TL} i, t = \beta_0 + \beta_1 GDP_t + \beta_2 UN_t$$

$$2) \frac{NPL}{TL} i, t = \beta_0 + \beta_1 GDP_{t-1} + \beta_2 UN_t$$

$$3) \frac{NPL}{TL} i, t = \beta_0 + \beta_1 CAR_t + \beta_2 C_t + \beta_3 C_{t-1}$$

$$4) \frac{NPL}{TL} i, t = \beta_0 + \beta_1 CAR_t + \beta_2 TIER1_t + \beta_3 C_t + \beta_4 C_{t-1}$$

### Composition

- **NPL / TL i, t:** the ratio of non-performing loans to total loans for the bank in year t.
- **CAR, Capital (tier1) + Capital (tier2) / RWAs i, t:** The ratio is calculated by dividing a bank's capital by its risk-weighted assets.
- **$\Delta$ CAR, Capital (tier1) + Capital (tier2) / RWAs i, t-1:** the annual CAR growth over the period t-1.
- **TIER1, Capital (tier1)/ RWA i, t:** the ratio of equity capital and disclosed reserves to its total risk – weighted assets.
- **GDP t:** the percentage of real GDP in the period t.
- **$\Delta$ GDP t-1:** annual real GDP growth over the period t-1.
- **C t:** the percentage consumption during period t.

- **$\Delta C_{t-1}$** : annual Consumption growth over the period t-1.
- **UN<sub>t</sub>**: the unemployment rate in the period t.
- **$\Delta UN_{t-1}$** : annual Unemployment growth over the period t-1.
- **RIR<sub>t</sub>**: real interest rate in year t.

Multiple regression models in this study:

- c1 = regression coefficient for Macro – Factor of Consumption
- c2 = regression coefficient for Macro – Factor of Unemployment
- c3 = regression coefficient for Macro – Factor of Real Interest Rate
- c4 = regression coefficient for Macro – Factor of GDP
- c5 = regression coefficient for Economic – Factor of CAR
- c6 = regression coefficient for Economic – Factor of TIER1

Estimate Equation (Regression Analysis) is used to examine the influence of independent variables individually toward dependent variable.

- Independent variables are GDP, Consumption, Unemployment, Real Interest Rate, CAR and TIER1.
- Dependent variable is NPL / TL Ratio.

*Determinants Factors of NPLs (Non-Performing Loans)*

Data analysis method used in this study is multiple linear regressions. Purpose of this analysis method is to identify relationship of independent variables toward dependent variable (NPLs) in order to predict the NPLs' evolution. Hypothesis testing used to understand the influence of independent variables (which will be analyzed below) towards NPLs' prediction.

Data collected from for the period of 2007-2017. The analysis tool for this research is regression using E-views 9 Statistical Software Program.

*Statistical Significance*

If the study's p-value is  $< 0.01^{**}$  then significant\*\*, it would have statistically highly significant result.

If the study's p-value is  $< 0.05^*$  then significant\*, it would have statistically significant result.

If the study's p-value is  $> 0.05$  then insignificant, it would not be reasonable to use the study as a basis for the NPLs' evolution.

## Results

The object of this study is for project NPLs evolution the period of 2007-2017. Sampling technique used for this study is purposive sampling method, the sampling based on certain criteria.

Economic Data are collected from 4 systemic Banks: NBG, Alpha Bank, Piraeus Bank and Eurobank and Macroeconomic Factors from the AMECO Database/ European Commission, World Development Indicators (WDI), Global Financial Development (GFDD).

**Table 1:** Regression Results for Model 1 for the Systemic Banks

<b>Systemic Bank</b>	<b>GDP Coefficient / P - Value</b>	<b>Unemployment Coefficient / P - Value</b>	<b>R-Squared</b>	<b>Statistical Significance - GDP</b>	<b>Statistical Significance - Unemployment</b>
Alpha Bank	-4.5625 / 0.0019	0.7124 / 0.0365	0.9835	Significant*	Significant*
NBG	-3.1930 / 0.20	1.35 / 0.0491	0.9333	Insignificant	Significant*
Eurobank	-4.2537 / 0.0396	1.0015 / 0.0759	0.9601	Significant*	Insignificant
Piraeus Bank	-9.5910 / 0.0009	-0.9485 / 0.3196	0.9350	Significant**	Insignificant

Quite consistent with theory, the results we have found show a significant and negative relationship between the growth rate of GDP and the NPL (Dash and Kabra 2010; Espinoza and Prasad 2010; Fofack 2005; Jimenez and Saurina 2006; Khemraj and Pasha 2009). Improving the real economy causes a decline in non-performing lending portfolios of Systemic Banks and accordingly, worsening the real economy increases the unsecured loans.

The result of the coefficient GDP indicated that the GDP has negative effect on NPLs evolution. Statistical test showed the p-value of Alpha Bank, Eurobank and Piraeus Bank is  $< 0.05$ . As GDP decreases, the Bank Loan are increasing, especially in Piraeus Bank NPLs Portfolio.

**Table 2:** Regression Results for Model 2

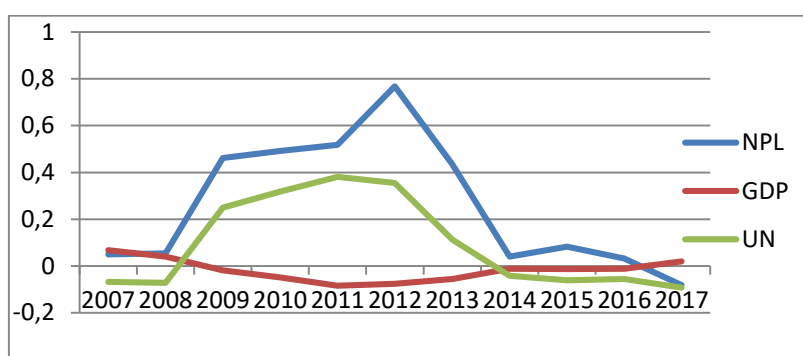
Dependent Variable: NPL  
Method: Least Squares  
Sample (adjusted): 2007 2017  
Included observations: 10 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Statistical Significance
C	-1.682265	0.079984	-21.03254	0.0000	
GDP(-1)	-2.841031	0.748262	-3.796841	0.0067	Significant**
UNEMPLOYMENT	1.326011	0.230965	5.741176	0.0007	Significant**
R-squared	0.971445	Mean dependent var	-1.841441		
Adjusted R-squared	0.963286	S.D. dependent var	0.928333		
S.E. of regression	0.177876	Akaike info criterion	-0.372137		
Sum squared resid	0.221479	Schwarz criterion	-0.281362		
Log likelihood	4.860687	Hannan-Quinn criter.	-0.471718		
F-statistic	119.0705	Durbin-Watson stat	1.487823		
Prob(F-statistic)	0.000004				

The result of the coefficient Unemployment showed the influence of Macro – Factor Unemployment on NPLs is high. Statistical test showed the p-value of Alpha Bank and NBG is  $< 0.05$ . The result of this study reported Unemployment has a positive effect on NPLs evolution. As Unemployment increases, the Bank Loan is harder deprived. Thus, the Non-Performing Loans are increasing.

As far as the unemployment rate is concerned, we found a positive and important relationship with the ratio of non-performing loans to 1%. In fact, unemployed clients cannot fulfill their obligations and return loans that can increase the level of non-performing loans.

In this case, the dynamics of the two variables (GDP growth rate and unemployment rate) is closely linked to households and businesses and the ability to meet their financial obligations. GDP growth usually leads to higher household income and increased profitability. The increase in the unemployment rate limits the current and future purchasing power of households and is generally linked to the decrease in the production of goods and services. Unemployment negatively affects household cash flow and increases debt. As far as businesses are concerned, rising unemployment could lead to a decrease in production due to a decline in real demand. This can lead to a reduction in revenue and a fragile public debt. In this study, the results are similar to those obtained from Louzis et al. (2010) for the case of the Greek banks and Bofondi and Ropele (2011) for the Italian banks.

**Figure1:** Macro – Variables Evolution in Greece since 2007**Table 3:** Regression Results for Model 3 for the Systemic Banks

Systemic Bank	CAR Coefficient / P - Value	Consumption Coefficient / P - Value	Consumption t-1 Coefficient/ P - Value	R - Squared	Statistical Significance - CAR	Statistical Significance – Consumption	Statistical Significance - Consumption t-1
Alpha Bank	-0.3084 / 0.0155	-9.5642 / 0.0003	3.9568 / 0.0008	0.9951	Significant*	Significant**	Significant**
NBG Greece	-0.6921 / 0.01411	-10.2965 / 0.0003	4.6108 / 0.0202	0.9693	Significant	Significant**	Significant*
Eurobank	-1.4670 / 0.0061	-9.0591 / 0.0005	4.6138 / 0.0014	0.9910	Significant**	Significant**	Significant**
Piraeus Bank	-0.0670 / 0.8201	-9.8906 / 0.0002	3.4288 / 0.0122	0.9893	Insignificant	Significant**	Significant*

The result of the coefficient CAR (Total Capital Adequacy Rate) displayed the influence of CAR (Bank Ratio) has a negative impact on NPLs. Statistical test showed the p-value for all banks is  $< 0.05$  and is statistical significant. The result of this study indicates CAR has a negative impact on NPLs evolution. In fact, the sign of the coefficient is the same as in the international evidence showing that an increase of the CAR will cause a reduction of the NPLs Ratio.

The capital adequacy ratio (CAR) is an international standard that measures a bank's risk of insolvency from excessive losses.

**Table 4:** Regression Results for Model 4

Dependent Variable: NPL  
Method: Least Squares  
Sample (adjusted): 2007 2017  
Included observations: 10 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Statistical Significance
C	0.136261	0.609642	0.223510	0.8320	
CAR	-1.657026	1.151912	-1.438500	0.209	InSignificant
TIER1	2.410210	0.868595	2.774837	0.0391	Significant*
CONSUMPTION	-7.194752	0.854101	-8.423769	0.0004	Significant**
CONSUMPTION(-1)	2.663911	0.901136	2.956170	0.0317	Significant*
R-squared	0.996475	Mean dependent var		-1.841441	
Adjusted R-squared	0.993656	S.D. dependent var		0.928333	
S.E. of regression	0.073943	Akaike info criterion		-2.064202	
Sum squared resid	0.027338	Schwarz criterion		-1.912910	
Log likelihood	15.32101	Hannan-Quinn criter.		-2.230170	
F-statistic	353.4001	Durbin-Watson stat		2.044454	
Prob(F-statistic)	0.000003				

The result of the coefficient Consumption displayed the influence of Consumption has a negative impact on NPLs in time t, while is positive in time t-1. Statistical test showed the p-value is  $0.0004 < 0.01$ . It has high statistical importance. Thus, if the Consumption – Macro econometric Factor is rising, non-performing loans are decreasing.

Consumption is the value of goods and services bought by the employed clients. If the clients have purchasing power to raise the consumption, they can fulfil their loans obligations.

In fact, the increase of consumption raises GDP by the same amount.

Consumption is normally the largest GDP component. Moreover, since current income (GDP) is an important determinant of consumption, the increase of income will be followed by a further rise in consumption: a positive feedback loop has been triggered between consumption and income. Thus GDP, Consumption have the same relationship on NPL's evolution.

On the other hand the banking ratio TIER1 has positive relationship with the NPLs portfolio.

## Conclusions

In this study, we attempted to create predictive models of NPLs evolution. So identify variables that can affect and affect doubtful accounts in Greek credit institutions from 2007-2017. The results show that GDP growth, Consumption Growth and Capital Adequacy Ratio of credit institutions have a negative impact on non-performing loans. It was found that the banks' capital adequacy ratio, when it grows, is negatively related to NPLs Ratio.

The manifestations of the development of the loan, GDP growth and the evolution of unemployment rates indicate that GDP decline and rising unemployment lead to an increase in NPL. The negative relationship between NPL and GDP growth rates and the positive relationship between NPL and unemployment rate are clearly observable by the 2008 crisis.

These trends confirm the explanations we provide about the relationship between these three variables.

Unemployment rate and real interest rate positively affect impaired loans, so as TIER1 ratio. Every one of these three factors leads the NPL Ratio at a high level and deteriorate the performance of the banks.

The results show that banks should be interested in many variables when offering loans in order to reduce the level of non-performing loans. Banks should also take into account the consumption growth and Unemployment rate of the real economy when extending the loans. Impaired loans are expected to be significant during the economic downturn. Systemic banks should also extend the scope of macroeconomic and banking surveillance to include prudential indicators such as GDP, Inflation, RIR and the banking ratios to assess the robustness and stability of the banking system.

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