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## **CAMELS AND GREEK BANKING SECTOR PERFORMANCE DURING THE CRISIS – AN ANALYSIS AND REVIEW OF THE EVIDENCE**

**Abstract.** The main objective of this study is to examine the performance of Greek banking sector and to identify the main problems and prospects of Greek banks. The analysis used the data from financial statements and statistical materials of four biggest commercial banks in Greece. The main methodology is CAMELS model. The paper is organized as follows: after the introduction, we briefly present the macroeconomic situation and the evolution of banking sector structure in Greece. This is followed by the presentation of research methodology and the data sources used in the analysis. The results are presented and discussed in next section. We conclude with study limitations and further opportunities for research.

**Keywords:** CAMELS, Greece, banking sector, crisis.

### **1. INTRODUCTION**

An efficient and competitive banking sector has a large contribution to economic growth. The contribution of efficient financial services to economic growth has been established for some time in the empirical literature (King, Levine 1993; Levine 1997; Levine, Zervos 1998; Bilski 2006).

Traditionally, banks have been considered to be potentially more exposed to instability than other industries (Carletti, Hartmann 2002). The main reasons are:

- 1) bank's balance sheet consists of short-term deposits on the liability side and long-term assets that can be difficult to liquidate quickly,
- 2) highly leveraged firms have an incentive to engage in risky investments (Kaufman 1995; Zawalinska 1999; Hyz 2001; Gikas, Hyz 2000).

The instability in the banking system can have more debilitating effects than instability in other industries. Bank failures can have substantial economic costs and since the banks are connected through a variety of networks a shock to one bank can lead to shocks to other banks (Northcott 2004). This can greatly increase

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the cost of a crisis (Gikas 2004; Hyz 2011; Bilski 2012; Gikas, Hyz, Tagkas 2012). The banking sector's performance is often perceived as the replica of economic activities of the economy as a healthy banking system plays as the bedrock of economic, social and industrial growth of an economy (Bukowski 2011; Mishra, Aspal 2012; Marcinkowska *et al.* 2014). Policy-makers should aim to facilitate a banking system that supports both economic efficiency and stability.

## 2. MACROECONOMIC SITUATION IN GREECE AND STRUCTURE OF GREEK BANKING SECTOR

The deep economic crisis in Greece for last years is reflected, *inter alia*, in the main macroeconomic ratios, like Gross Domestic Product and unemployment and some indicators of the banking sector, like deposits, total loans and non-performing loans (NPLs). Between 2008 and 2013 the Greek Gross Domestic Product decreased more than 25%, while unemployment increased to 27% in 2013.

Table 1

Main indicators of Greek economy (2008–2013)

Variables	2008	2009	2010	2011	2012	2013
GDP change (2005 prices)	-0.2	-3.1	-4.9	-7.1	-6.4	-4.0
Unemployment rate (%)	7.2	8.9	11.8	16.3	23.6	27.0
Savings (billions euro)	227.2	237.3	209.5	174.1	161.4	160.2
Loans change (preceding year = 100)	15.9	0.0	3.2	-3.7	-8.4	-3.6
Private NPLs (billions of euro)	5.1	7.3	10.5	16.0	24.5	31.2

Source: Bank of Greece, 2013.

In September 2011 the Greek banking sector consisted of 58 credit institutions with 4005 branches and 63 400 employees (Gortsos 2014). There were four main categories of credit institutions operating in Greece:

- 1) nineteen commercial banks incorporated in Greece and operating under a licence by the Bank of Greece,
- 2) sixteen cooperative banks incorporated in Greece and operating under a licence by the Bank of Greece,
- 3) the branches of nineteen credit institutions incorporated in other EU Member States,
- 4) the branches of four credit institutions incorporated in third countries (outside the EU) (Gortsos 2014).

During last years the banking sector was involved in significant consolidation process, with significant M&A activity in the 12-month period starting in July 2012, which resulted in the transformation of the domestic banking landscape. In September 2013, after the recent restructuring (marked by the first round of recapitalization covered by private investors and the Hellenic Financial Stability Fund (HFSF)<sup>1</sup>), the number of credit institutions operating in Greece has been reduced from 58 (in September 2011) to 45 but most importantly the degree of concentration has increased considerably. Four banks (Alpha Bank, Eurobank, National Bank of Greece and Piraeus Bank) acquired the bulk of medium and small banks and now control around 95% of the sector's assets and 90% of total deposits. The Greek banking system in the end of 2013 consists of:

- 1) the four systemically important credit institutions which have been recapitalised by the HFSF,
- 2) other five Greek credit institutions,
- 3) thirteen Greek cooperative banks (the number of which may also be reduced),
- 4) the branches of fifteen credit institutions incorporated in other EU Member States,
- 5) the branches of four credit institutions incorporated in third countries (outside the EU).

At the same time there were 3109 branches of Greek credit institutions (decrease by 22.4% compared to 2011) with 51 242 employees (decrease 19.2%). For future analysis it is worth to notice that in 2013 Piraeus Bank merged "good part" of ATE Bank, Greek branches of Cypriot banks, Millennium Bank SA (MBG), Elliniki Bank, Geniki Bank. In the same year Eurobank merged Hellenic Postbank, which in June 2011 absorbed T-bank and Nea Proton Bank SA, Alpha Bank merged Emporiki Bank and National Bank of Greece Probank SA and FBB in May 2013. In April 2013 Eurobank was nationalised (albeit on a temporary basis) following a failed attempt to merge with National Bank of Greece.

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<sup>1</sup> The Hellenic Financial Stability Fund was established in 2010 by Law 3864/2010 as a legal person of private law with capital 50 billion from the financial support mechanism for the Greek economy by Euro Area Member States, the European Central Bank and the International Monetary Fund. At the end of the first round of recapitalization, HFSF became the dominant shareholder, although with restricted voting rights, controlling an 81% stake in Piraeus Bank and 84% in Alpha and National, HFSF stake in Eurobank was 95.2% with full voting rights. The four banks subsequently proceeded with capital increases, in which HFSF did not participate. Since the HFSF did not participate in recent capital increases, its share in the banks' capital was diluted to an average of around 60%. More specifically, HFSF's current participation in Eurobank stands at 35.4% (with restricted voting rights), in NBG at 57.2%, in Piraeus at 67.3% and in Alpha at 69.9%.

### 3. DATA SETS AND METHODOLOGY

Starting point for the analysis were the data extracted from ICAP database, containing detailed financial reports annuals (income statements and annuals balance sheets) and statistics on Greek companies. The study covered abovementioned four biggest Greek banks, namely: Alpha Bank, Eurobank, National Bank of Greece and Piraeus Bank. The observation period starts in 2008 and ends in 2013. In the analysis we use CAMELS Rating System, which is used by bank supervisory authorities rate institutions to determine a bank's overall condition and to identify its strengths and weaknesses (financial, operational and managerial). The six factors are represented by the acronym CAMELS, where C – Capital adequacy, A – Asset quality, M – Management soundness, E – Earnings and profitability, L – Liquidity, S – Sensitivity to market risk. The choice of the six factors is based on the idea that each represents a major aspects of banking (see: Elliott *et al.* 1991; Waldron *et al.* 2006; Mayes, Stremmel 2012). There is no uniform way of deciding upon which indicators to be included to measure each of the aspects. The indicators to proxy the CAMELS dimensions are as follows:

1) Capital Adequacy Ratio (CAR) for Capital adequacy. Higher CAR ratio indicates stronger bank and bigger protection of investors. It is expressed as a percentage of a bank's risk weighted credit exposures. Tier One Capital can absorb losses without a bank being required to cease trading and tier two capital can absorb losses in the event of a winding-up and so provides a lesser degree of protection to depositors.

$$CAR = \frac{\text{Tier One Capital} + \text{Tier Two Capital}}{\text{Risk Weighted Assets}} \quad (1)$$

2) Net Non-performing Assets Ratio (NPA) for Asset quality. Due to the wide spread of banks' activities and the range of assets figures disclosed, there is a wide variety of potential indicators. Since the dominating business of commercial banks is lending, it is reasonable to focus on this asset group. An NPA are those assets for which interest is overdue for more than 90 days. Higher ratio reflects rising bad quality of loans.

$$NPA \text{ ratio} = \frac{\text{Net Non-performing Assets}}{\text{Loans given}} \quad (2)$$

3) Overhead Expenses to Net Operating Revenues for Management quality. Lower values of this indicator suggest better management quality. The measure of management quality is one of the most complicated aspects of every compa-

ny's trying to reflect the board of directors' and management's ability to identify, measure, monitor and control the risks of the activities (Uniform Financial Institutions Rating System 1997: 6).

$$ER = \frac{\text{Overhead Expenses}}{\text{Net Operating Revenues}} \quad (3)$$

4) Return on Assets (ROA) and Return on Equity (ROE) for Earnings. Return on Assets ratio is the net income (profit) generated by the bank on its total assets. The higher the proportion of average earnings assets, the better would be the resulting returns on total assets. Similarly, ROE (return on equity) indicates returns earned by the bank on its total net worth.

$$ROA = \frac{\text{Net profits}}{\text{Average Total Assets}} \quad (4)$$

$$ROE = \frac{\text{Net profits}}{\text{Average Total Net Worth}} \quad (5)$$

5) Current Assets to Total Assets Ratio (CATA) and Total Loans to Total Customers Deposits (LTD) for Liquidity:

$$\text{Current Assets to Total Assets} = \frac{\text{Current Assets}}{\text{Average Total Assets}} \quad (6)$$

$$\text{Loan to Deposit Ratio} = \frac{\text{Total Loans}}{\text{Total Customers Deposits}} \quad (7)$$

6) Total Volatile Liabilities to Total Assets for Sensitivity to Market Risk. The concern is with the impact on banks from shifts and fluctuations in the financial market.

$$\text{Volatile Liabilities Ratio} = \frac{\text{Total Volatile Liabilities}}{\text{Total Assets}} \quad (8)$$

In the next step we assigned each bank a score on a scale of one (best) to five (worst) for each factor. Later we computed the weighted average CAMELS rating score. To compute the weighted average CAMELS rating score we use the CAMELS rating components, according to Final Rules of Large Bank Pricing, with the following standard weights: Capital Adequacy 20%, Asset Quality 20%, Management 20%, Earnings 10%, Liquidity 20% and Sensitivity to market risk 10%. As a result the CAMELS Ratio is obtained as follows:

$$CAMELS = 0,20*CAR + 0,20*A + 0,20*M + 0,10*(ROA+ROE)/2 + 0,20(L_1+L_2)/2 + 0,10*S \quad (9)$$

We can distinguish five main categories of ratings:

- 1) range 1.00–1.49 with description “strong”,
- 2) 1.50–2.49 – “satisfactory”,
- 3) 2.50–3.49 – “fair”,
- 4) 3.50–4.49 – “marginal”,
- 5) 4.50–5.00 – “unsatisfactory”.

In general, if a bank has an average score less than two it is considered to be a high-quality institution, while banks with scores greater than three are considered to be less-than-satisfactory establishments. The system helps to identify banks that are in need of attention.

#### 4. FINDINGS AND DISCUSSIONS

This section presents the results for the implementation of CAMELS system rating for four main Greek banks during the five years period 2008–2013 (see tab. 2–3, fig. 1–3).

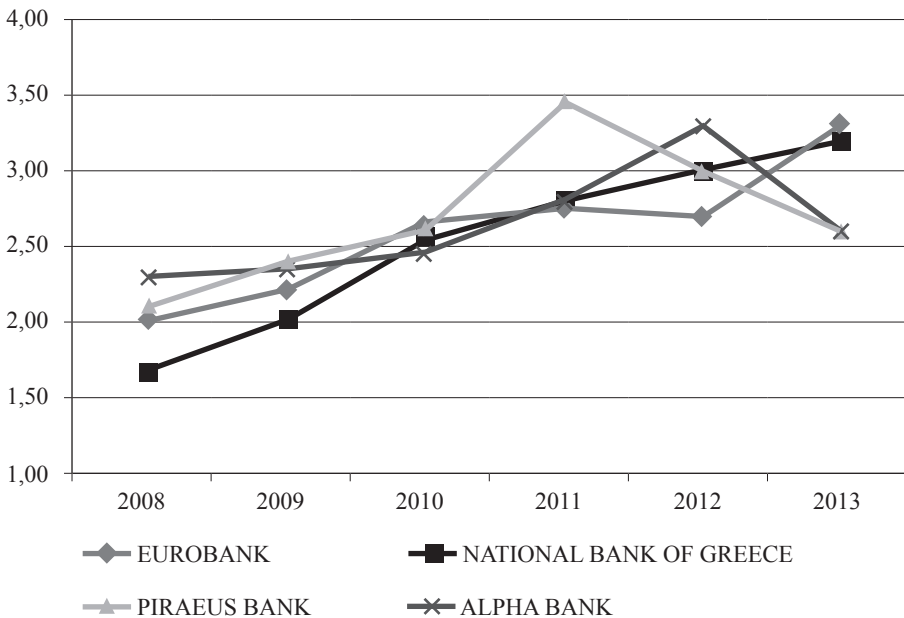


Fig. 1. CAMELS 2008–2013

Source: own construction.

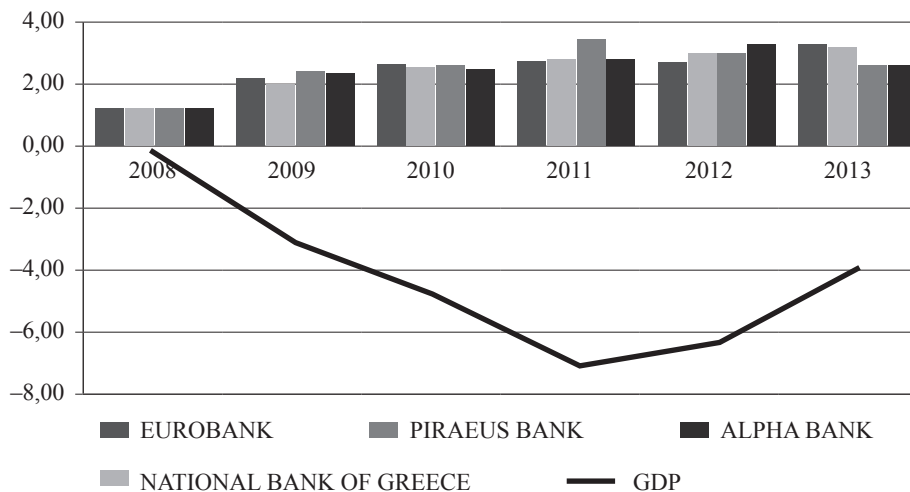


Fig. 2. Greek GDP and CAMELS 2008–2013

Source: own construction.

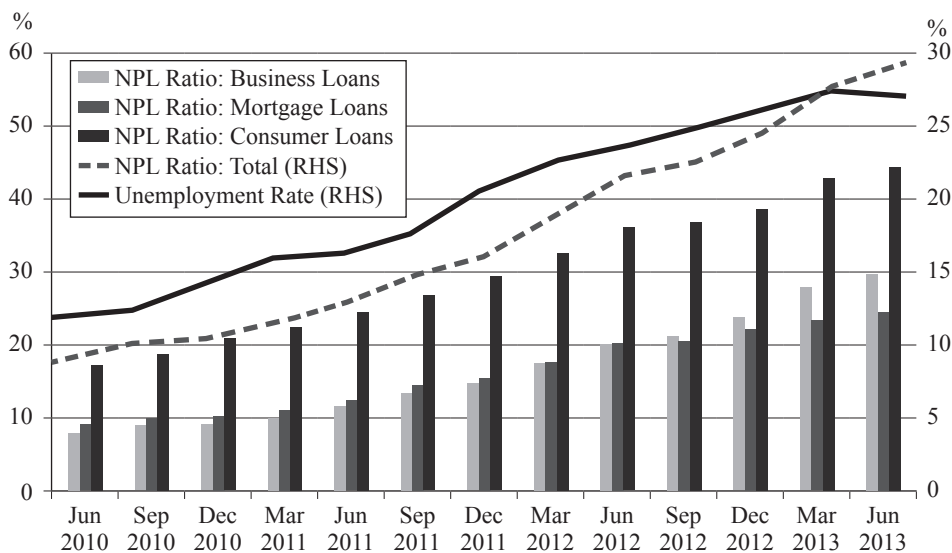


Fig. 3. Non-Performing Loans & Unemployment correlation

Source: <http://www.ceicdata.com/en/blog/ceic-newsalert-non-performing-loans-greece-surge-record-high> (accessed: 14.05.2014).

Table 2

## CAMELS calculations (2008–2013)

Year	C	0.2	A	0.2	M	0.2	E(ROA)	E(ROE)	0.1	L1	L2	0.2	S	0.1	Score
Eurobank															
2008	11.0%	3.0	1.3%	2.0	0.05	1.0	0.0%	6.0%	3.0	0.98	1.04	2.0	0.15	1.0	2.00
2009	12.0%	3.0	3.1%	3.0	0.06	1.0	0.0%	0.0%	3.0	0.92	0.93	2.0	-0.12	1.0	2.20
2010	12.0%	3.0	5.0%	4.0	0.06	1.0	0.0%	-2.0%	3.5	1.07	0.83	3.0	0.11	1.0	2.65
2011	13.0%	2.0	8.3%	5.0	0.05	1.0	-6.0%	-51550.0%	4.5	1.34	0.78	3.0	0.10	1.0	2.75
2012	14.0%	2.0	13.2%	5.0	0.06	1.0	-2.0%	-105.0%	4.0	1.43	0.74	3.0	0.09	1.0	2.70
2013	11.3%	3.0	22.8%	5.0	0.12	2.0	-1.0%	-25.0%	4.0	1.10	0.55	3.5	0.10	1.0	3.30
National Bank of Greece															
2008	16.0%	1.0	1.4%	2.0	0.08	1.0	1.0%	7.0%	3.0	0.95	0.95	2.0	0.17	2.0	1.65
2009	16.0%	1.0	2.8%	3.0	0.09	1.0	0.0%	3.0%	3.0	1.00	1.00	2.5	0.17	2.0	2.00
2010	19.0%	1.0	5.8%	4.0	0.11	2.0	0.0%	-4.0%	4.0	1.11	1.11	3.0	0.16	2.0	2.55
2011	13.0%	2.0	20.0%	5.0	0.09	1.0	-13.0%	-1140.0%	5.0	1.20	1.20	3.0	0.14	1.0	2.80
2012	12.0%	3.0	27.6%	5.0	0.10	1.0	-4.0%	-77.0%	4.0	1.15	1.15	3.0	0.16	2.0	3.00
2013	11.2%	3.0	30.0%	5.0	0.18	2.0	1.0%	10.0%	3.0	1.02	0.55	3.5	0.15	1.0	3.20
Piraeus Bank															
2008	11.0%	3.0	1.0%	2.0	0.08	1.0	0.0%	4.0%	3.0	1.39	0.93	2.5	0.12	1.0	2.10
2009	12.0%	3.0	1.6%	2.0	0.12	2.0	0.0%	5.0%	3.0	1.21	0.82	3.0	0.14	1.0	2.40
2010	11.0%	3.0	2.7%	3.0	0.13	2.0	0.0%	0.0%	3.0	1.30	0.80	3.0	0.14	1.0	2.60
2011	-6.0%	5.0	8.5%	5.0	0.10	1.0	-13.0%	-312.0%	4.0	1.55	0.78	3.5	0.09	1.0	3.45
2012	11.0%	3.0	10.1%	5.0	0.11	2.0	-2.0%	-29.0%	4.0	1.21	1.03	2.5	0.09	1.0	3.00
2013	14.0%	2.0	36.0%	5.0	0.20	2.0	3.0%	30.0%	1.0	1.18	0.67	3.0	0.09	1.0	2.60



Alpha Bank															
2008	9.0%	4.0	1.2%	2.0	0.09	1.0	1.0%	14.0%	2.0	1.25	0.98	2.5	0.18	2.0	2.30
2009	13.0%	2.0	2.4%	3.0	0.13	2.0	1.0%	9.0%	2.5	1.19	0.88	3.0	0.11	1.0	2.35
2010	14.0%	2.0	3.8%	3.0	0.13	2.0	0.0%	-1.0%	3.5	1.28	0.83	3.0	0.13	1.0	2.45
2011	10.0%	4.0	1.8%	2.0	0.11	2.0	-6.0%	-648.0%	4.0	1.52	0.8	3.5	0.10	1.0	2.80
2012	9.0%	4.0	12.6%	5.0	0.13	2.0	-2.0%	-281.0%	4.0	1.42	0.86	3.0	0.15	1.0	3.30
2013	16.0%	1.0	32.7%	5.0	0.25	3.0	4.0%	18.0%	1.0	1.18	0.62	3.0	0.10	1.0	2.60

Source: own calculations.

Table 3

Classification of Greek banks according to CAMELS Rating

No.	2008	CAMELS score	2009	CAMELS score	2010	CAMELS score	2011	CAMELS score	2012	CAMELS score	2013	CAMELS score	CAMELS score
1.	National Bank of Greece	1.65	National Bank of Greece	2.00	Alpha Bank	2.45	Eurobank	2.75	Eurobank	2.70	Alpha Bank / Piraeus Bank	2.40	2.40
2.	Eurobank	2.00	Eurobank	2.20	National Bank of Greece	2.55	National Bank of Greece / Alpha Bank	2.80	National Bank of Greece / Piraeus Bank	3.00	National Bank of Greece	3.20	3.20
3.	Piraeus Bank	2.10	Alpha Bank	2.35	Piraeus Bank	2.60	Piraeus Bank	3.45	Alpha Bank	3.30	Eurobank	3.30	3.30
4.	Alpha Bank	2.30	Piraeus Bank	2.40	Eurobank	2.65	.	.	.	.	.	.	.

Source: own calculations.

Based on the results of our research, the key developments during the last five financial years were:

1. Consolidation in the Greek banking sector. The top four banks acquired smaller players and increased their market share of loans from 67% in 2011 to 95% in 2013. The sector consolidation may create pricing opportunities and cost synergies (Gikas 1999).

2. During the examined period the situation of four surveyed banks worsened. CAMELS indicator has achieved a maximum value in 2008, in the case of the National Bank of Greece (1.65) and the lowest in 2012, in the case of Piraeus Bank (3.45). The highest range for the entire period has National Bank of Greece, although its rating gradually worsened (2008 – 1.65; 2009 – 2.0; 2010 – 2.55; 2011 – 2.80; 2012 – 3.00; 2013 – 3.2). Similarly, the performance of Eurobank steadily deteriorated with the exception of 2012, when the minimum improvement was recorded. Alpha Bank and Piraeus Bank from the last places in the classification shifted to the first despite the fact, that also in these cases CAMELS indicators have deteriorated although relatively weaker.

3. The situation of surveyed four banks according to CAMELS methodology can be described as “satisfactory” to “fair” with the tendency after 2011 to increasing share of “less-than-satisfactory” institutions (score greater than three).

4. Greek domestic banks are now among Europe’s most robust in terms of capital adequacy. At the end of 2013 Alpha Bank’s Capital Adequacy Ratio stood at 16%, while Piraeus’s was 14%, Eurobank’s was 11.3% and National’s 11.2%.

5. The main problem is bank’s Assets Quality measure by Net Non-performing Assets Ratio. The NPLs increased in 2013 to 30% of total loans. The Greek banks have to review the trouble assets, assessment of non-performing loan management policies, restructuring NPLs to increase revenues and recoverability and estimate the expected loss under different scenarios. A strong capital base is absolutely necessary for banks to get nonperforming loans under control. While bad loans elsewhere in Europe come to an average of 6.1% of all credit, in Greece they climbed to 22.8% at the end of 2013 in the case of Eurobank, 30% National Bank of Greece, 32.7% Alpha Bank and 36% in the case of Piraeus Bank, which means six times more than European average. It should be noted high increase which was posted by all banks during last years. In June 2013, the ratio of loans overdue for more than 90 days to total loans increased by 7.7 percentage points compared to the same period 2012. The increase is mainly due to the portion of consumer loans outstanding, which has displayed the most rapid growth rate over the past three crisis years, hitting 43.8% by mid-2013. Overdue business loans as a percentage of total business loans increased by 9.4 percentage points over the span of just one year since June 2012, and have now surpassed the non-performing ratio of mortgage loans. Higher NPL ratios are directly correlated with the increase in the unemployment rate as the intensification of the Greek labour market crisis impacts borrowers’ ability to service their loans (see fig. 3).

6. The other major challenge for the credit sector, which will also determine the declining rate of bad loans, is the return to an increase in the issue of loans. The sooner Greece achieves this return to credit expansion, the sooner bad loans will begin to drop.

7. On the cost front (factor “Management”), synergies stemming from the recent acquisitions should drive expenses down. These positive trends are expected to further improve the efficiency throughout the years.

8. The situation of Greek banks is correlated with the whole economic situation. As the Greek GDP decreasing during the years of crisis CAMELS indicators worsen despite the efforts of governments to strengthen the banking sector (see fig. 2). The future of Greek banking sector depending mostly on political, economical stability and on the efforts to strengthen the real economy.

## 5. CONCLUSIONS

The ongoing global financial turbulence in Greece has highlighted the importance of early identification of weak banks. The commercial banks risks come from all the uncertainty of the banking business, which have hidden features, if not timely controlled, will have a negative impact on the national economy. In our analysis we use so-called CAMELS variables based on standard balance sheet and income statement financial ratio widely used in the “supervisory risk assessment and early warning systems” to valuate four main Greek banks. CAMELS approach is significant tool to assess the relative financial strength of a bank and to suggest necessary measures to improve weaknesses of a bank. The bank with least ranking need to improve their performance to come up to the desired standards. Country supervisors have access to more detailed indicators than what is publicly available. Such information could be used to design and improve the early warning system.

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**WPLYW KRYZYSU GOSPODARCZEGO NA POZYCJĘ GRECKIEGO SEKTORA  
BANKOWEGO – ANALIZA I OCENA PRZY UŻYCIU METODOLOGII CAMELS**

**Streszczenie.** Głównym celem artykułu jest ocena zmian w pozycji greckiego sektora bankowego w okresie kryzysu i zidentyfikowanie głównych problemów oraz perspektyw dla tego sektora. W analizie zostały wykorzystane dane statystyczne i dane ze sprawozdań finansowych czterech największych banków komercyjnych Grecji. Badania oparte są na metodologii CAMELS. Artykuł zorganizowany jest w sposób następujący: po wprowadzeniu zaprezentowano analizę sytuacji makroekonomicznej Grecji i dokonano przeglądu zmian w strukturze greckiego sektora bankowego. W kolejnej części autorzy koncentrują się na omówieniu metodologii badań i źródeł danych wykorzystanych w analizie. Następnie przedstawiają i omawiają wyniki badań oraz ich analizę. Ostatnia część opracowania zawiera wnioski z badań, wskazuje na ich ograniczenia, jak też możliwości ich wzbogacenia i rozwijania.

**Słowa kluczowe:** CAMELS, Grecja, sektor bankowy, kryzys.