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# Mergers & Acquisitions of Banks. An Evaluation Analysis of Financial Soundness During & Post the Event Including the Pandemic. Evidence from Greece

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## Abstract

The financial crisis of 2009, which invaded Greece essentially in 2010, brought about many changes in the Greek banking industry which were decisive. One of these decisive changes was the phenomenon of mergers and acquisitions which, when the year actually ended, created four Greek systemic banks. The purpose of this study is to evaluate the financial soundness of the four Greek systemic commercial banks using the CAMELS method from the beginning of the financial crisis in 2010 when all the acquisitions began. Our next purpose is to rank our sample of four Greek systemic banks that will be based upon the results generated from the implementation of CAMELS model before and after the end of the wave of acquisitions in the short- and long-term period until the beginning and during the pandemic in 2020. The year of the pandemic is considered a landmark year, as it significantly affected the financial results of Greek businesses. The event brought about an increase in the bad loans of the Greek systemic commercial banks, consequently reducing their financial strength. The study stops in the year 2020 due to the process concerning the conversion of the four Greek systemic banks into holding banking companies that started in 2021, continues and is expected to be completed at the end of 2023. The research questions of our study is if there was any improvement in financial soundness of the four Greek systemic commercial banks in a short- and long-term period and during the pandemic after they made all the acquisitions. Our findings show that there was no significant improvement of the financial soundness for the acquiring Greek systemic commercial banks. So we can assume that perhaps all these domestic acquisitions were made for some other purposes. We have to note that the basis of our analysis focuses on and is based on the principles of Basel Committee II and III. So our results were obtained during the wave of acquisitions based on the

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CAMELS model according to the principles of Basel Committee II. Our results in a short and long time period after the end of the domestic mergers and acquisitions are measured with the CAMELS model according to the principles of Basel Committee III.

**Keywords:** Systemic Banks, Mergers & Acquisitions, Financial Soundness CAMELS.

**Jel:** C13, G21, G33, G34

## 1. Introduction

It is known that the banking system is the backbone of a country's economy. Banks are financial organizations whose main function refers to intermediation between surplus and deficit units. This means in simple words that they collect funds through deposits and then proceed to grant loans (Noulas, 2005). However, apart from this basic function, banks perform other functions that contribute to the development of economic activity.

It is a fact that all global financial crises, when they break out, have very serious consequences for the banking system of a country other than the one in which they primarily occur. With the last major financial crisis that started in America in 2008, a domino effect followed in the economies of other countries and actually affected Greece in 2010 with a direct impact on banks, businesses and households.

Before the outbreak of the great financial crisis of 2008, the Greek banking system was in a phase of enormous growth and profitability both at home and abroad. In fact, in the region of south-eastern Europe, Greek banks were declared the strongest. After the crisis, however, the scene changed dramatically with Greek banks slowly withdrawing from abroad. But the most rapid and radical changes have taken place in the domestic banking system with the dramatic reduction in the number of banks and the intense degree of concentration that occurred with the four systemic banks making up 95% of the industry.

The impact on the banking industry was great and significant interventions had to be made at the pan-European level of the countries concerned to save and shield their economy. From the importance of the effects of the entry into Greece of the global financial crisis, it becomes clear that the evaluation and supervision of banks by the supervisory authorities is a process of great importance.

One of the tools that central banks use to monitor bank risk sensitivity is the CAMELS rating model. The CAMELS ratios focus on the six main risks faced by banks namely capital, asset, management, profitability, liquidity and market risk. From their results, analysts draw useful conclusions about the banks' financial situation and also contribute to the early prediction of any problematic situations so that, where necessary, the right interventions can be made and the appropriate measures taken.

The interest of financial institutions, especially banks classified under the CAMELS model, has increased in recent years, as it is one of the most important indicators of the financial performance of banks, and it also provides important information to dealers in the financial markets. As a result, dealers in these markets determine their orientations with regard to investing in the shares of these banks or not, or abandoning the existing investment according to the degree of classification, since the components of the CAMELS classification express the two main factors that affect the market value of the common stock, namely, return and risk. Therefore, the effect of the classification should be greater than the impact of each of the rating factors individually, since the

rating reflects all these factors together. So, a change in the rating, negatively or positively, is expected to be reflected on the prices of ordinary shares, negatively or positively as well (Al-Dahlaki, 2018). In light of the successive developments in the banking business, the safety and stability of the banking system depends on the success of banks in adopting sound and effective strategies and systems to manage their capital, management of various types of banking risks, and policies to improve the quality of assets in order to reduce the weights of their risks, and to develop accounting systems and practices of transparency and financial disclosure in line with what is imposed by international standards and agreements with the aim of enhancing capital adequacy in banks (Yahya, 2017).

In Greece, the competent authority for the control and supervision of financial institutions is the Bank of Greece, which, in accordance with the provisions of the second pillar of Basel Committee II on the Supervisory Assessment Process, implements an Assessment System based on International Accounting Standards, and some quality criteria. One of these systems for determining or not the financial soundness of banks, as well as the risk sensitivity which helps to predict their potential bankruptcy, is the CAMELS methodology, which is also the subject of this paper. From the extracted results of our study and analysis of ratios, it is possible to identify the strengths and weaknesses of each bank, as well as the first signs of danger of a possible financial distress. More specifically, with this work, the CAMELS early warning model is applied to the Greek banking system for the period from 2010 to 2020, which is also the period with the greatest changes, since four large Greek systemic banks were created through mergers and acquisitions during this examined period. The creation of these four Greek systemic banks happened virtually out of thin air because the other banks that were acquired could not meet the obligations according to the principles of the Basel Committee II and III commission, due to the financial crisis. The entry of the world financial crisis into the Greek economy brought about unpleasant economic events, such as the signing of memoranda, capital controls, as well as the financial distress of corporate firms. In this paper we will attempt to investigate the effect of the above events on the Greek banking industry using the CAMELS model to extract results that will to predict or correct any financial problems of the Greek systemic banks that are apparent from our relevant analysis. All the mergers and acquisitions that took place in the Greek banking system soon after the global financial crisis that affected Greece in 2010, are described in table 1.

**Table 1.** Mergers and Acquisitions in Greek Banking System soon after the global financial crisis

| Years | Bidder Bank | Target Bank |
|---|---|---|
| 2012 | Piraeus Bank | Agrotiki Bank |
| 2013 | Piraeus Bank | Hellenic Bank |
| 2013 | Piraeus Bank | Bank of Cyprus |
| 2013 | Piraeus Bank | Cyprus Popular Bank |
| 2013 | Piraeus Bank | Geniki Bank |
| 2013 | Alpha Bank | Emporiki Bank |

| Years | Bidder Bank | Target Bank |
|---|---|---|
| 2013 | Eurobank | New Postal Savings Bank of Greece |
| 2013 | Eurobank | Proton Bank |
| 2013 | National Bank | (FBB) First Business Bank of Greece |
| 2013 | National Bank | ProBank |
| 2014 | Alpha Bank | Citibank Greece |
| 2015 | Piraeus Bank | Panellinia Bank |

**Source:** Annual published financial reports of Greek systemic banks

From table 1 above we notice that the bulk of mergers and acquisitions was born by the Piraeus bank. The rest of the Greek Systemic banks realised the same number of acquisitions.

During a business research it is imperative to think about different research paradigms and topic of ontology and epistemology. These research paradigms represent a parameter that controls the research carried out - from research design to the conclusion and recommendations. That is why it is of great significance to understand these features in order to move in harmonious manner and actions leading to unambiguous investigation and making sure that researcher biases are minimized (Flower, 2009, p 1)

## 2. Literature Review

The Basel Committee issued in June 2006, a new version of the agreement incorporating the framework of the Basel Committee II, revised elements of the Basel Committee I agreement and the amendments of 1996 and 2005 (Casu, Girardone, & Molyneux, 2018).

Basel Committee II is based on above three pillars[1]. The 1st pillar is mainly related to the determination of capital requirements by improving the methodology of their calculation against the different risk categories of banks. The minimum capital requirement of 8% remains and what is mainly affected is the way of measuring banking risks, i.e. credit risk which is the risk of default of the borrower, operational risk, which is the risk linked to the possibility of system failure and market risk, which is the risk of a decrease in the value of investments due to changes in market factors. The 2nd pillar essentially defines the roles of supervisors with the aim of ensuring that the appropriate methodology is used to calculate banks' capital adequacy. The 3rd pillar concerns the publication of information and the strengthening of transparency. Supervisory authorities oblige credit institutions to publish a wide range of information so that both investors and traders are aware of the risks to which credit institutions are exposed.[2]

In June 2011, the revised version of the Basel Committee III was published and in addition in January 2013 the Basel Committee published the full text of the revised liquidity coverage ratio (LCR).[3] The principles of the Basel Committee III are now a comprehensive set of measures without any of the disadvantages of the Basel Committee II. The text of the

[1] https://www.bis.org/publ/bcbsca.htm

[2] Sylgardos, G., & Schoiniotakis, N. (2018). "Money, Banks, Markets and Risk Management". DISIGMA Publications Thessaloniki, Greece

[3] https://www.bis.org/bcbs/basel3.htm

Basel Committee III was developed for the optimal supervision of banks and for better monitoring and management of the risks of the banking sector. These measures are primarily intended to improve the banking sector's ability to absorb the shocks of financial and economic pressures and any financial crises, to improve risk management and governance, and at the same time to strengthen the banks' transparency and disclosures. Also, the new regulatory framework of the Basel Committee III contributes to increasing the quality and quantity of equity capital, protecting banks from excessive leverage, creating incentives for additional capital in periods of upswing, and strengthening the effectiveness of measures to deal with liquidity risk.[4]

In his recent research Moreira, (2022), using a sample of 2350 listed banks from 51 countries in the period 1990–2018, found that changes in capital or even the amount of capital itself are not significantly related to simultaneous changes in the probability default of banks. This could be explained by the possibility of higher risk taken to cover the cost of capital offsetting the loss-absorbing benefits of capital and by shareholders' different perceptions of losses that may reduce their incentives to monitor bank managers. Its results are confirmed by several robustness tests involving different capital and stability measures and alternative model specifications.

According to the study of Turner (2006), credit rating and credit score are very important throughout Latin America to help and solve three important economic problems. 1st improving inadequacy of financial sector, 2nd escalating private sector lending's throughout Latin America, which was previously comparatively sluggish and 3rd is to reduce the jeopardy of financial and economic crises, which usually results from unfavorable choices and moral hazards that prevail in the banking industry.

According to Abuzarqa, (2019) the security of the financial and banking sector depends on the establishment of laws and regulations that limit the risks arising from systemic crises resulting from the failure of banks and other financial institutions. In this view, managing these risks does not mean their complete elimination, but intelligent control and appropriate actions to increase profits or at least minimize potential losses to the maximum extent possible. In fact, the Basel III Commission was established with a slight delay, in response to the 2007-2008 financial crisis (mortgage crisis). On the other hand Adamowicz, (2018) in his research points out that the definition of risk types should be the first stage of the internal risk management process that is necessary for the survival of banks.

Finally Dr. Banks (2012) states that risk or uncertainty about a future event or outcome characterizes much of what banks, industrial companies and government agencies have to deal with on a daily basis. He finds that risk is indeed the driving force behind the creation of markets, products, and ultimately revenues and profits, and that in the absence of risk, the business world would be characterized by complete certainty and, arguably, little opportunity for innovation or profit.

Initially the UFIRS methodology or CAMEL as mentioned by Cox & Cox (2006) and Swindle (1995), examined five ratios: (Capital Adequacy), the source of assets (Asset quality, management), earnings and liquidity.

[4] Sylgardos, G., & Schoiniotakis, N. (2018). "Money, Banks, Markets and Risk Management". DISIGMA Publications Thessaloniki, Greece

In the mid-1990s, the "S" (Sensitivity to market ratio) was added, which refers to the sensitivity to market risks (Gasbarro, Sadguna, & Zumwalt, 2002). According to Handfort (2016), even if regulators had not added the "S" to CAMEL two decades ago, the equity market would have forced management to monitor, measure and control interest rate risk regardless of the bank's size. Research by Gaul, Jones, & Uysal (2019) concluded that the CAMELS methodology is suitable for predicting high-risk ratings within one year. In addition, Prateek Sharma (2022), focused his research on the role of management as a key factor in bank failures by studying the CAMELS model's M ratios in relation to the formation of provisions for non-performing loans. He therefore concluded that abnormal forecast values resulted in a poor M-ratios score, but a positive effect on default risk. Papanikolou & Wolff (2015), in their research used the CAMELS rating system in US banking institutions to examine whether they are affected by the phenomenon of procyclicality, which refers to the interaction between the financial system and the real economy. They found that banks' performance and behavioral risk-taking are rated higher when conditions in the economy are favorable and lower when the economic environment is weak. On the other hand, Keffala (2018) in his study on the soundness of Italian commercial banks, with data from 22 commercial banks in Italy in the period 2005-2015, found that the majority of CAMELS indices are favorably influenced by derivative instruments, especially by futures and options. The most important conclusion is that the use of derivative instruments does not threaten the financial soundness of commercial banks in Italy.

Prodanov, Yaprakov, & Zarkova, (2022) applied the CAMELS model to Bulgarian banks since the country's accession to the EU and reveal a successful integration of European practices in encouraging competition among the country's banks. This ranks Bulgaria among the leading countries in Eastern Europe in terms of the development of banking products and the efficiency of its financial system.

The study conducted by Asadi, Mohammadi, & Bakhshi (2020) concerns the assessment of Iran's banking system (including 22 state-owned and non-state banks) based on the CAMELS model, using audited financial statement information. According to the results of this survey, most of Iran's state-owned banks were categorized as inefficient in the fiscal year 2019.

Another study conducted by Alali & Al-Yatama, (2019) aimed to assess the financial soundness of Kuwaiti banks listed on the Kuwait Stock Exchange during the period 2011-2016. The results of the CAMELS indices obtained from this study showed that Ahli united bank was the best performing bank in Kuwait during the study period, while the worst performing bank was Kuwait Finance bank.

In the study of Samuel (2018) an attempt is made to evaluate the financial performance of three major commercial banks in India (IOB, Canara Bank and Syndicate Bank) using CAMELS evaluation model that includes six years of data (2011-2016). It is found that the capital adequacy of all three banks, the loan portfolio, the overall state of asset quality and the efficiency of management are satisfactory. On the other hand, profitability and liquidity are not at a satisfactory level and improvements are required in order to achieve a satisfactory performance.

Finally, Kyriazopoulos & Kondili, (2019) evaluate eight Balkan banks using the CAMELS method for the period 2009-2016.

According to the survey, the best bank in the Balkans is NCB, the next best bank with a slight difference from the first is FYROM's MBDP. The third best bank is UniCredit Bulbank of Bulgaria. In the fourth place is Croatia's ZABA, in the fifth place is its Banca Intesa, in the sixth place is Romania's BCR. In the penultimate position is the NLB of Slovenia and in the last position is the Piraeus Bank of Greece.

## 3. Methodology

The study of this paper was carried out until the year 2020. This was done because 2 of the four Greek systemic banks immediately after the year of the pandemic 2020 have turned into holding companies (Piraeus Bank and Eurobank), so that their financial results do not derive only from banking tasks and they cannot be compared with the financial results of the other two banks (National Bank and Alpha Bank). In addition, Alpha Bank was converted into a holding company from the beginning of 2023 due to the imminent sale by the Financial Stability Fund of its share to an institutional investor. Also, the National Bank has turned into a holding company within 2023, since the same process took place for the share held by the Financial Stability Fund for this bank. Thus, it becomes clear that the study and analysis of banking holding companies beyond the year 2020 will be done at least one year after the processes of conversion into holding companies of all four systemic Greek banks are completed, in order to be comparable and rational. In addition, our research covers up to the year of the pandemic, i.e. it includes the financial crisis and the pandemic and not the subsequent period that changed the economic and banking data in Greece. For this reason, our research was stopped in 2020.

As is known CAMELS is an acronym for Capital Adequacy, Asset Quality, Management, Earnings, Liquidity, and Sensitivity and is an extended approach to the CAMEL model which has been used in the USA since 1979 to judge the soundness of banks (Christopoulos et al., 2011; Roman and Sargu, 2013). Later, CAMEL was extended and used as a method to assess the soundness and financial performance of banks for the supervisory authorities in different countries (Roman and Sargu, 2013). So this particular study is not based on econometric models and therefore does not need econometric hypotheses to prove or disprove. In this case, we apply the CAMELS model to measure the financial soundness of the four Greek systemic banks according to the Basel II and III criteria. We also present our findings with our recommendations for corrections if there occurred problems, as recommended and guided by the regulatory framework of the Basel Committee.

The Federal Financial Institutions Examinations Council (FFIEC) proposed the Uniform Financial Institutions Rating System (UFIRS) in November 1979. The UFIRS system became known through the CAMELS methodology, which was applied initially to the evaluation of American commercial banks, where from 1994 until today it is the main evaluation tool for the ranking of approximately 8,500 banks in the USA.[5]

The financial weakness and soundness were measured by the International Monetary Fund (IMF) using five major handful parameters of financial system soundness with shortening of CAMEL (capital adequacy, asset quality,

[5] https://www.ffiec.gov/

management quality, earnings size and liquidity). Nevertheless, it has been extended to include the sixth parameter "S" which reflects the bank sensitivity to the deviations in the market (Roman and Sargu, 2013). This "S" measures the sensitivity to market risks like interest rate, foreign exchange and inflation risk which captures the organization's risk (Gasbarro et al., 2002; Karim et al., 2018). Currently, CAMELS is becoming an evaluation tool for bank performance (Roman and Sargu, 2013). According to the report of Evans et. al (2000), the IMF and world bank advocated the use of CAMELS as a valuable measure for financial system stability.

By using the CAMELS methodology, information is given about the capabilities of each bank in relation to the rest of the banks in the sector, and their strengths and weaknesses are determined. Also, the ranking of banks, in addition to that of their overall image, can be done for each ratio separately, such as for example in terms of capital adequacy, liquidity, profitability, etc.

The six key elements used to assess the financial condition and operations of a financial institution according to the CAMELS methodology according to Christopoulos & Dokas, (2012) are:

**i)** Capital Adequacy:

$$\text{CAR} = \frac{(\text{TIER I})+(\text{TIER II})}{\text{WEIGHTED ASSETS}} > 8\% \qquad (1)$$

The numerator shows the so-called regulatory capital Tier I, i.e. equity (common and preferred shares, convertible bonds, minority rights of the bank in subsidiaries) and Tier II, i.e. hybrid capital (funds from bonds issued by the bank which it uses as funds with equity characteristics). In the denominator appears the weighted assets which according to Basel II are the assets divided into five risk weighted groups (0%, 10%, 20%, 50%, 100%).

**ii)** Asset Quality: $\frac{\text{NPLs} - \text{LLPs}}{\text{TOTAL LOANS}}$ (2)

The asset quality ratio assesses the quality of a bank's claims, especially those related to previous loans and investments. It also evaluates the effective management of assets to generate income. The numerator shows the NPLs that is defined as loans that are more than 90 days past due, according to Basel Committee rules minus LLPs that are loan loss provisions. So NPLs are loans in payment delay over 90 days, and loan loss provisions are defined as the bank's reserve capital to deal with losses that will arise from overdue loans. Thus, the net arrears of the loans are derived from the numerator. The denominator shows the total amount of loans granted. Consequently, the smaller the value of this ratio, which is also the desired one, the less is the formation of forecasts (Christopoulos & Dokas, 2012).

**iii)** Management Quality:

$$\text{a) M2} = \frac{\text{Total Revenues}}{\text{Total Loans}} \qquad (3)$$

$$\text{b) M3} = \frac{\text{Operating Expenses}}{\text{Total Revenues}} \qquad (4)$$

As total revenues only the total interest of the granted loans were defined. As total loans we defined all kinds of loans such as corporate loans, business loans, consumer loans, mortgages loans of individuals, from all of them the Greek systemic banks have claims. The M2 ratio refers to the CAMELS calculation and scoring model according to Basel Committee II, while M3 according to Basel Committee III. Below are the results for both CAMELS ratios. The final score for the period 2010- 2013 was based on the rules of Basel Committee II and for the time period 2014-2020 it was based on the rules of Basel Committee III.

Management assessment determines whether an institution is able to properly react

to financial stress. This component rating is reflected by the management's capability to point out, measure, look after, and control risks in the institution's daily activities. It covers management's ability to ensure the safe operation of the institution as they comply with the necessary and applicable internal and external regulations.[6]

The management efficiency ratio has in the numerator the administrative expenses that come from the statement of profit and loss and are part of the general operating expenses. In the denominator, the sales that also result from the income statement as interest on granted loans and similar income are mentioned (Christopoulos & Dokas, 2012).

**iv)** Earnings Quality

To evaluate earnings quality we have to find out the profitability. So we have to calculate the ratios, ROE (Return on Equity) and ROA (Return on Assets).

a) Return on Equity:

$$\mathrm{ROE} = \frac{\mathrm{EBIT}}{\mathrm{EQUITY}} \text{ x } 100 \qquad (5)$$

ROE ratio shows the ability to generate profits from equity capital. This ratio expresses the net profit for each unit of invested capital and the higher it is, the more efficiently the bank is using its own capital. The retained earnings of the bank and the paid-in capital of the owners are considered as equity. Therefore in essence it reflects the wealth of bank shareholders.

b) Return on Assets

$$\mathrm{ROA} = \frac{\mathrm{EBIT}}{\mathrm{TOTAL\ ASSETS}} \text{ x } 100 \qquad (6)$$

ROA reflects the profitability of a bank in relation to its total assets, i.e. if it is using its assets properly to achieve profits. ROA is considered satisfactory when it takes a value between 1% and 2.5%, while the higher the value, the more efficient the bank is considered (Christopoulos & Dokas, 2012).

**v)** Liquidity (7)

Liquidity is traditionally defined as the ability of a financial organization to finance new assets and consistently fulfill its obligations when they become due (Sapuntzoglou & Pentotis, 2017). According to Basel Committee II to find out the liquidity we have to calculate L1 and L2 ratios.

$$\text{a) } \mathrm{L1} = \frac{\mathrm{TOTAL\ LOANS}}{\mathrm{TOTAL\ DEPOSITS}} \qquad (8)$$

The result of the L1 ratio reveals the bank's degree of dependence on the interbank market, i.e. the relationship between the immediately liquid able items in the current assets and the short-term liabilities. Thus, in this way, it is established whether a bank carries out rational financing through the deposits of its customers, while keeping the necessary reserve funds, or whether there is a need for the bank to borrow in the interbank market for its grants. A bank, in order to be considered to have a good liquidity, should have L1 ratio as small as possible and in fact the ideal is its value to be below unity. This means that the level of deposits is sufficient and therefore the bank can safely grant loans and by extension indicates its soundness (Christopoulos & Dokas, 2012).

$$\text{b) } \mathrm{L2} = \frac{\mathrm{CURRENT\ ASSETS}}{\mathrm{AVERAGE\ TOTAL\ \ ASSETS}} \qquad (9)$$

The result of the L2 ratio shows the degree of liquidity of the bank in relation to its current assets, i.e. in relation to its immediately liquid able elements. Therefore, it gives us an idea of how many of its obligations a bank can cover using its immediately liquid assets,

[6] https://www.investopedia.com/terms/c/camelrating.asp

especially in cases where there are some difficulties such as a reduction in deposits, and the inability to draw funds from the interbank market. In contrast to the L1 ratio, the higher the value of the L2 ratio, the better the liquidity of the bank (Christopoulos & Dokas, 2012).

According to Basel Committee III to find out a bank's liquidity we have to calculate only the L ratio that is defined as:

$$c)\ L = \frac{\text{CURRENT ASSETS}}{\text{TOTAL ASSETS}} \quad (10)$$

**vi)** Sensitivity to Market Risk.

According to Basel Committee II the sensitivity ratio is measured with S2 ratio

$$a)\ S2 = \frac{\text{SECURITIES}}{\text{AVERAGE TOTAL ASSETS}} \quad (11)$$

According to Basel Committee III the sensitivity ratio is measured with S3 ratio

$$b)\ S3 = \frac{\text{SECURITIES}}{\text{TOTAL ASSETS}} \quad (12)$$

This ratio reflects the degree to which a bank's profitability is affected by changes in interest rates, exchange rates, securities or commodity prices. Additionally, when calculating this ratio, the management's ability to monitor and control market risk as well as the complexity of the credit institution's activities are taken into account. The value of this ratio should be as low as possible as this implies a more effective reaction to market risks. This is explained by the fact that the smaller the set of securities, the lower the purchase risk due to fluctuations in their prices (Christopoulos & Dokas, 2012).

These six ratios of the CAMELS methodology correspond to the following risks faced by banks: 1) Capital risk, 2) Asset risk: credit risk and concentration risk, 3) Management risk, 4) Profitability risk, 5) Liquidity risk and 6) Market risk. (Christopoulos & Dokas, 2012).

The data required to calculate the CAMELS indices come from the following sources:

(i) Annual Usage Results, (ii) Annual Report of Proceedings, (iii) Supervisory reports submitted by the banks to the Central Bank and (iv) Reports of the Internal Audit Service of the banks and the chartered accountants who audit their financial statements. With this methodology, for each bank, both a score for the sum of its performance and a score for each ratio separately are obtained, which are weighted with a specific weighting factor as shown in table 1 below.

Financial ratios have a widespread utility in assessing financial soundness or health in banking.[7] They represent the basis for computing credit scores in proprietary models developed by credit-risk assessment agencies like Fitch, Moody etc. In addition, this applies even to emulate financial distress measures through choosing financial indicators that can capture the significant aspects of financial flows, such as the popular CAMELS rating system.[8]

In table 2 below we show a summary of presentation and scoring of CAMELS model ratios according to the rules of Basel Committee II.

[7] A. Kadim, N. Sunardi, and T. Husain, "The Modeling Firm's Value based on Financial Ratios, Intellectual Capital and Dividend Policy,'' *Accounting*, vol. 6, no. 5, pp. 859_ .870, 2020.

[8] Wanke P., Barros C. P., and Emrouznejad A, (2016). "Assessing productive efficiency of banks using integrated Fuzzy-DEA and bootstrapping: A case of Mozambican banks,'' *European Journal of Operation Research*, vol. 249, no. 1, pp. 378_389.

**Table 2.** Summary table of presentation and scoring of CAMELS model ratios

| Evaluation Data | C | A | M | E | L | S |
|---|---|---|---|---|---|---|
| Gravity Factor | 3 | 2 | 1.5 | 3 | 1.5 | 1 |

**Source:** Christopoulos, A., & Dokas, I. (2012). "Topics in Banking and Financial Theory". Kritiki Publications S.A. Athens, Greece.

The calculation of the above CAMELS ratios 1-9 must be done using a common methodology, which is based on the International Accounting Standards, but also according to some quality characteristics of each banking institution. In addition, it is necessary to take into account common criteria and elements both nationally and regionally or internationally in the banking sector.

Below is a summary of what each score means for the bank in question. Score 1: Financial institutions in this group are sound in all respects and any weaknesses are minor and can be addressed routinely by the board and management. These financial institutions are the most able to withstand financial crises since they are considered resistant to external influences, such as financial instability. These financial institutions are substantially compliant with laws and regulations. In addition, they demonstrate the strongest performance and risk management practices relative to the size, complexity and risk profile of the institution, and do not give rise to supervisory concerns. Score 2: Financial institutions in this group are fundamentally sound. There are only moderate weaknesses and they are entirely within the board and management's ability and willingness to correct. These financial institutions are stable and can withstand business fluctuations. They comply substantially with laws and regulations and overall risk management practices are satisfactory in relation to the size, complexity and risk profile of the institution. There are no material supervisory concerns and therefore, the supervisory response is informal and limited. Score 3: Financial institutions in this group exhibit some degree of supervisory concern in one or more areas. These financial institutions exhibit a combination of weaknesses that can range from moderate to severe. Management may not have the ability or willingness to effectively address weaknesses within appropriate time frames. Financial institutions in this group are generally less able to withstand business fluctuations and are more vulnerable to external influences than those institutions rated 1 or 2. In addition, they may not comply significantly with laws and regulations. Risk management practices may be less than satisfactory relative to the size, complexity and risk profile of the institution. These financial institutions require more than normal supervision, which may include formal or informal enforcement actions. However, failure seems unlikely given the overall strength and financial capacity of these institutions Score 4: Financial institutions in this group generally exhibit unsafe and inappropriate practices or conditions. There are serious financial or managerial deficiencies leading to unsatisfactory performance. The problems range from severe to critically incomplete. Weaknesses and problems are not addressed or resolved satisfactorily by the board and management. Financial institutions in this group are generally unable to withstand business fluctuations. May not comply with

laws and regulations. Risk management practices are commensurate with the size, complexity and risk profile of the institution. Close supervisory attention is required, which means that, in most cases, formal enforcement action is required to address the problems. Institutions in this group pose a risk to the deposit insurance fund. Failure is a distinct possibility if problems and weaknesses are not satisfactorily addressed and resolved. Score 5: Financial institutions in this group demonstrate extremely risky and inappropriate practices in the existing normal conditions. They underperform and often contain inadequate risk management practices relative to the size, complexity and risk profile of the banking institution. The volume and severity of the problems are beyond the management's ability or willingness to control or correct. Immediate external financial or other assistance is required to make the financial institution viable. Constant supervisory attention is required and in addition the institutions of this group pose a significant risk to the deposit insurance fund, while bankruptcy is very likely.[9]

The determination of the score of the CAMELS model ratios according to the rules of Basel Committee II are analyzed in table 3 below. Compared to table 4 below that describes the CAMELS score according to the rules of Basel Committee III we notice that the CAMELS score in table 4 is much stricter. This fact is due to the global financial crisis that affected the banking system worldwide and it was necessary to protect banks from economic insolvency. It is now well known that economic insolvency of big banks would definitely affect the economy of one or more countries. So the Basel Committee III had to create stricter operating rules and conditions for the world banking system in order to make it more resilient to the coming financial crises.

**Table 3.** Classification ratio of the CAMELS score according to Basel Committee II

| CAMELS | | GRADING | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| C | | > 14% | 11-13,99% | 7-10,99% | 4-6,99% | <3,99% |
| A | | < 1,5% | < 3,5-1,51% | <7-3,51% | < 9,5-7,1% | > 9,51% |
| **M** | M2 | < 0,011 | 0,025-0,012 | 0,038-0,026 | 0,049-0,039 | > 0,050 |
| **E** | ROA | > 1,25% | 0,9-1,24% | 0,35-0,89% | 0,25-0,34% | < 0,24% |
| | ROE | > 21% | 15-20,99% | 10-14,99% | 5-9,99% | < 4,99% |
| **L** | L1 | ≤ 0,55 | 0,62-,056 | 0,68-0,63 | 0,80-0,69 | ≥0,81 |
| | L2 | ≥ 0,50 | 0,45-0,49 | 0,38-0,44 | 0,33-0,37 | ≤ 0,32 |
| **S** | S2 | ≤ 0,20 | 0,30-0,21 | 0,40-0,31 | 0,49-0,41 | ≥ 0,50 |

**Source:** Babar and Zeb (2011) and https://www.bis.org/publ/bcbsca.htm

[9] FDIC. https://www.fdic.gov/regulations/laws/rules/5000-900.html

Since 2014, the new CAMELS model was based on the new principles of Basel Committee III. Essentially, the new CAMELS model began to be implemented in 2015. This new CAMELS model was successfully applied in the study of Ammar D. and Emad Y. (2020) on Jordanian banks. The determination of the score of the new CAMELS model ratios, for our study, according to the regulatory framework of the Basel Committee III, is described in table 4 below. It should be noted that in this new CAMELS model only the L2 ratio is used for the measurement of the liquidity of banks. We have to note that some of the CAMELS ratios are different as far as the principles of Basel Committee II and the ones of Basel Committee III are concerned. The principles of Basel Committee II for CAMELS model include the ratios Management Quality M2, Liquidity L1 & L2, and Sensitivity S2, while the principles of Basel Committee III for CAMELS model include the ratios Management Quality M3, Liquidity L, and Sensitivity S3.

The determination of the score of the CAMELS model ratios according to the rules of Basel Committee III are analyzed in table 4 below.

**Table 4.** *CAMELS GRADING score items according to Basel III*

| CAMELS | GRADING | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| C | > 12% | ≤ 8% | Less than 8% | Less than 6% | ≤2% |
| A | < 1,25% | 1,26%-2,59% | 2.60%-359% | 3.60%-5,50% | >5,5% |
| M | ≤25% | 26%-30,99% | 31%-38,90% | 39%-45,90% | ≥46% |
| E | ≥1% | 0,90%-0,80% | 0,70%-0,35% | 0,34%-0,25% | ≥ 0,24% |
| L | ≥50% | 45%-49,99,% | 44,99%-38% | 37,99%-33% | ≥32% |
| S | ≤ 25,49% | 25,5%-30,99% | 31%-37,99% | 38%-42,99% | ≥ 43% |

**Source:** Ammar D. and Emad Y. (2020) and https://www.bis.org/bcbs/basel3.htm

In table 5 below we define the CAMELS numerical rating, the analysis and their interpretation for any bank worldwide according to the rules of Basel Committee II and Basel Committee III.

**Table 5.** CAMELS numerical rating, analysis and their interpretation for any bank

| Rating | Range | Analysis | Evaluation |
|---|---|---|---|
| 1 | 1.0 – 1.4 | Strong | Suitable across all dimensions |
| 2 | 1.5 – 2.4 | Satisfactory | Favourable, with certain lags |
| 3 | 2.5 – 3.4 | Less than Satisfactory | Financial, operational, or managerial lags that require supervisory concern |
| 4 | 3.5 – 4.4 | Deficient | Financial lags up to an alarming stage |
| 5 | 4.5 – 5.0 | Critically Deficient | Critical financial lags that may lead to a bank run situation |

**Source:** https://testbook.com/banking-awareness/camels-rating-system-in-banking

In table 6 below we present CAMELS Score and we explain its implications which arise from the CAMELS score according to the rules of Basel Committee II and Basel Committee III.

**Table 6.** CAMELS Score and the Implication

| Score | Implications |
|---|---|
| 1 | Bank has a robust performance, is sound, and complies with all the practices of risk management |
| 2 | Bank is financially sound with moderate lags |
| 3 | Bank exhibits a supervisory concern across several domains |
| 4 | Bank has unsound practices and hence it is at a risk due to financial problems |
| 5 | Bank is fundamentally unsound with improper and insufficient risk management practices |

**Source:** https://testbook.com/banking-awareness/camels-rating-system-in-banking

## 4. Results and Discussion

The banking sector is an important and unquestionable determinant of the economic development as it directs the flow of the funds from surplus economic units of the economy towards deficit economic units (Khan, 2006, p. 11). Also organizations that build a financial sector are run mostly by the public money, so it is very important to measure their performance (Purohit & Mazumder, 2006, p. 21). Credit rating models supply debtors and investors essential information concerning the creditworthiness of banks, firms and even a government. The credit rating scores assist financial analysts to evaluate the financial soundness, the quantitative and qualitative risks and the potential returns of the investments. Of course, both qualitative and quantitative financial analysis must be done by comparing similar data from published financial statements and reports at equal time intervals always based on the rules of international accounting standards, as well as the Basel II and III committee, in order to present reliable results.

The primary objective of our research is to compare the similarity of the results generated from the CAMELS rating system with respect to the rating of the principles and framework of Basel Committee II and Basel Committee III. So at the end of our research we will be able to present the financial, operational and managerial position of the four Greek systemic banks operating in the Greek banking industry.

In this study, the data were extracted from the published financial statements of the four Greek systemic banks. All the calculations for the CAMELS model ratios were made by the authors based on the elements of those published financial statements.

Previous studies have used major ideas that underlie the CAMELS rating system, in its totality or as a part, collecting financial indicators and applying alternative models to compute performance levels. The underlying idea is that lower performance scores may be a proxy for eventual financial distress. At the present time, many people are interested in learning about the performance of the bank. For its efficiency in banking management, the CAMELS rating system has been widely recognized. Moreover, the agency also plays an important role in risk assessment owing to the exposure to risk that banks have as well

as in assisting the banking supervisory board with risk management.[10]

The first research limitation in our study was the application of the CAMELS ratios in the four systemic banks of Greece which is divided into two time periods, due to the fact that until 2013 the banks applied the principles of the Basel Committee II and then from 2014 the principles of the Basel Committee III. Thus, two models of the CAMELS framework are used, where in some cases different ratios are calculated for the same risk. In addition, these models have different weighting factors, and also different scoring criteria. The final score results from the combination of the two CAMELS model subsamples. Second we study the financial soundness of the Greek systemic commercial banks after the acquisitions in a short and long time period until the end of the pandemic. The second limitation was based on the fact that two of the four Greek systemic commercial banks converted into a holding company in 2021 and therefore all their financial results do not derive directly from banking operations, which does not make them directly comparable with the other two banks. Also one of the two new holding banking companies has been acquired entirely from an international non-Greek business fund and is part of another international group, with the consequence that the bank's financial results may be affected by those of the group to which it belongs. A third limitation was that the other two Greek systemic banks are in the process of becoming also holding banking companies until the end of 2023. So our research stopped in 2020 due to restrictions 2 and 3 that were set and which were necessary until the completion of the integration procedures in the year 2023 of all four Greek systemic banks in holding companies for reasons of rational comparability of the financial statements. The fourth limitation is that our research work is largely based upon consolidated annual financial reports of the banks and in some cases unavailability of these reports was a hurdle as well. For these reasons, we believe that the study of the financial soundness of the Greek systemic commercial banks should be done for the consequent 5 years in order to investigate this phenomenon of changes with more financial data.

According to the rules of the Basel II Committee the implementation of CAMELS model in our study was based on the article by Hyz A., & Gikas G., (2015). We gave each examined Greek systemic bank a score on a scale from one (best) to five (worst) for each factor. We later calculated the weighted average CAMELS score. To calculate the weighted average CAMELS rating, we use the CAMELS rating data, in accordance with the Grand Banking Final Rules, with the following standard weights: 20% Capital Adequacy, 20% Assets Quality, 20% Management Quality, 10% Earnings Quality, 20% Liquidity and 10% Sensitivity to market risk. As a result, the CAMELS ratios is obtained as follows with the principles of Basel Committee II:

$$\text{CAMELS} = [0.20\times\text{CAR}] + [0.20\times\text{A}] + [0.20\times\text{M}] + [0.10\text{xE}] + [(0{,}20\times\text{L}] + 0{,}10\times\text{S} \quad (13)$$

The principles of Basel Committee III guide CAMELS ratios to calculate as follows:

$$\text{CAMELS} = [0.25\times\text{CAR}] + [0.25\times\text{A}] + [0.25\times\text{M}] + [0.10\times\text{E}] + [(0{,}10\times\text{L}] + 0{,}05\times\text{S} \quad (14)$$

[10] Wanke Peter., Md Abul Kalam Azad, Amir Karbassi Yazdi, Felicia Ramona Birau, and Cristi Marcel Spulbar (2022). "Revisiting CAMELS Rating System and the Performance of ASEAN Banks: A Comprehensive MCDM/Z-Numbers Approach". IEEE Access, Volume 10.1109/ACCESS.2022.3171339

We have to notice that in CAMELS ratios we divided our results in two time periods. The first one is 2010-2013 because we used the CAMELS model according to the rules of Basel Committee II. The second examined time period is 2014-2020 according to the rules of Basel Committee III. This separation of the two different time periods was made because the Basel Committee II used different ratios than the ones now used by the Basel Committee III. When the ratios are the same then the results of our research are presented in a single table for the entire time period under consideration 2010-2020 without separation into two different tables.

The process to calculate the final CAMELS ratios is as follows:

1st. Calculation of the six CAMELS indicators

2nd. Selection of the weighting factors in each indicator

3rd. Grading of each indicator of each bank

4th. Multiplying the degree of each indicator by the corresponding weighting factor

5th. Sum of the products of the six indices

6th. CAMELS overall score and ranking of the banks under review from best to worst

7th. Commenting on the results, overall and individual, highlighting the strengths and weaknesses of each bank

8th. Repeating all of the above for a number of years 2010-2020

**Table 7.** Capital Adequacy ratio results and ratings

| | Years | National Bank | Rating | Piraeus Bank | Rating | Alpha Bank | Rating | Eurobank | Rating |
|---|---|---|---|---|---|---|---|---|---|
| Basel Committee II | 2010 | 18.6% | 1 | 11.2% | 2 | 13.5% | 2 | 12.5% | 2 |
| | 2011 | 12.7% | 2 | -5.8% | 5 | 9.4% | 3 | 14.4% | 1 |
| | 2012 | 12.2% | 2 | 11% | 2 | 9.1% | 3 | 13.5% | 2 |
| | 2013 | 16.9% | 1 | 15.6% | 1 | 16.7% | 1 | 12,9% | 2 |
| Basel Committee III | 2014 | 22.1% | 1 | 13.9% | 1 | 14.9% | 1 | 15.7% | 1 |
| | 2015 | 21.5% | 1 | 18.4% | 1 | 17.2% | 1 | 18.2% | 1 |
| | 2016 | 16.3% | 1 | 17.6% | 1 | 17.3% | 1 | 19.2% | 1 |
| | 2017 | 16.9% | 1 | 16.3% | 1 | 18.7% | 1 | 18.9% | 1 |
| | 2018 | 16.7% | 1 | 14.6% | 1 | 17.8% | 1 | 16.7% | 1 |
| | 2019 | 17.4% | 1 | 15.8% | 1 | 18.3% | 1 | 19.2% | 1 |
| | 2020 | 16.8% | 1 | 11.2% | 2 | 18.4% | 1 | 16.3% | 1 |
| | Average | 17.10% | 1 | 12.71% | 1 | 15.57% | 1 | 16.14% | 1 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[11]

[11] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

In tables 7-16 below we present our results of the CAMELS Score for the examined four Greek Systemic Banks during the time period 2010-2020. More specifically, in table 7 below we present the results and the ratings of the Capital Adequacy ratio for the four Greek systemic banks during 2010-2020.

The above table 7 shows how banks' capital adequacy evolves over time, both during the validity of the Basel Committee II rules framework, and later with the implementation of the Basel Committee III rules. From 2010 to 2013, a downward trend is observed in the capital adequacy ratio and the most serious problem arises in 2012 with the PSI program, which unfortunately had a very adverse impact on capital adequacy. With the subsequent recapitalizations essentially with government capital, the banks managed to improve their capital adequacy and bail out.

From 2014 onwards, in general the levels of the capital adequacy ratio are at satisfactory levels in all banks, with very small fluctuations. During the examined period 2010-2020, the bank that had the best capital adequacy is National, whose average ratio is 17%, followed by Eurobank with 16%, Alpha Bank with 15.5% and Piraeus with 12.7%.

In table 8 below we present the results of the Asset Quality ratio for the four Greek Systemic Banks during 2010-2020.

From the above table 8 we can easily establish the serious problem faced by the Greek systemic banks regarding their loan

**Table 8.** Asset Quality ratio results and ratings

| | Years | National Bank | Rating | Piraeus Bank | Rating | Alpha Bank | Rating | Eurobank | Rating |
|---|---|---|---|---|---|---|---|---|---|
| Basel Committee II | 2010 | 7.37% | 4 | 2.84% | 2 | 22.00% | 5 | 9.53% | 5 |
| | 2011 | 34.72% | 5 | 5.79% | 3 | 28.86% | 5 | 16.52% | 5 |
| | 2012 | 46.04% | 5 | 15.29% | 5 | 50.90% | 5 | 15.87% | 5 |
| | 2013 | 15.29% | 5 | 25.11% | 5 | 21.47% | 5 | 19.25% | 5 |
| Basel Committee III | 2014 | 15.26% | 5 | 24.57% | 5 | 19.97% | 5 | 21.22% | 5 |
| | 2015 | 13.97% | 5 | 24.90% | 5 | 22.14% | 5 | 21.90% | 5 |
| | 2016 | 14.20% | 5 | 19.71% | 5 | 23.52% | 5 | 21.39% | 5 |
| | 2017 | 13.88% | 5 | 21.24% | 5 | 22.07% | 5 | 21.72% | 5 |
| | 2018 | 37.78% | 5 | 41.31% | 5 | 21.53% | 5 | 40.88% | 5 |
| | 2019 | 26.92% | 5 | 40.96% | 5 | 18.54% | 5 | 32.77% | 5 |
| | 2020 | 7.20% | 5 | 14.40% | 5 | 17.28% | 5 | 12.37% | 5 |
| | Average | 21.15% | | 21.43% | | 24.39% | | 12.37% | |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[12]

[12] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

portfolio. Already, since 2010 as a result of the economic crisis and the large increase in unemployment, the majority of borrowers have faced a serious problem in repaying their loans and this is also reflected in the values of the asset quality ratio. Until 2012, the problem is particularly intense, while from 2013 to 2017 the situation is more stable with the National Bank having the lowest ratio. In 2018, we observe a new escalation of the problem in the three main banks, while Eurobank still maintains a stable course. In 2020 there is a spectacular drop in the ratios in all banks as through the "Hercules" program most of the problematic loans were transferred and will continue to be transferred to other non-bank companies until the desired level is reached. In general during the period under review, National Bank, Piraeus and Eurobank have an average ratio of around 21% while Alpha Bank is at 24%.

In table 9 below we present the results of the Management Quality ratio M2 according to the rating framework of Basel Committee II and the results of the Management Quality ratio M3 according to the rating framework

**Table 9.** Management Quality ratios M2 & M3 results and ratings

| | Years | National Bank | Rating | Piraeus Bank | Rating | Alpha Bank | Rating | Eurobank | Rating |
|---|---|---|---|---|---|---|---|---|---|
| | | M2 | | M2 | | M2 | | M2 | |
| Basel Committee II | 2010 | 0.060 | 5 | 0.062 | 5 | 0.074 | 5 | 0.103 | 5 |
| | 2011 | 0.071 | 5 | 0.078 | 5 | 0.087 | 5 | 0.125 | 5 |
| | 2012 | 0.066 | 5 | 0.063 | 5 | 0.086 | 5 | 0.099 | 5 |
| | 2013 | 0.054 | 5 | 0.052 | 5 | 0.060 | 5 | 0.057 | 5 |
| | **Average M2** | 0.063 | 5 | 0.060 | 5 | 0.080 | 5 | 0.096 | 5 |
| | | **M3** | | **M3** | | **M3** | | **M3** | |
| Basel Committee III | 2014 | 39.20% | 4 | 35.50% | 3 | 52.40% | 5 | 30.05% | 2 |
| | 2015 | 41.00% | 4 | 41.90% | 4 | 34.30% | 3 | 35.00% | 3 |
| | 2016 | 45.80% | 4 | 41.80% | 4 | 34.50% | 3 | 36.90% | 3 |
| | 2017 | 48.50% | 5 | 44.40% | 4 | 37.60% | 3 | 37.70% | 3 |
| | 2018 | 65.40% | 5 | 54.10% | 5 | 39.80% | 4 | 36.80% | 3 |
| | 2019 | 57.10% | 5 | 45.10% | 4 | 42.10% | 4 | 38.50% | 3 |
| | 2020 | 51.70% | 5 | 51.20% | 5 | 38.90% | 3 | 39.70% | 4 |
| | Average M3 | 46.20% | 5 | 38.00% | 3 | 36.00% | 3 | 35.67% | 3 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[13]

[13] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

Basel Committee III for the four Greek Systemic Banks during 2010-2020.

As can be seen from the above table 9, the managers of the banks, especially during the first three years of the examined time period, appear to be significantly behind in efficiency in terms of their initial ability to generate profits. This was certainly due to the fact that for a long time no loans were granted and consequently no interest was collected which is a very basic category of income for the banks. From 2014 onwards the situation somewhat normalizes, but still there is a significant problem. Regarding the M2 ratio, the lowest average belongs to National Bank with 0.053, followed by Piraeus with 0.055, Alpha Bank with 0.064 and Eurobank with 0.065, which, however, had a significant improvement in 2020.

Also from the above table 9 we notice that the M3 ratio, the first three years of the period moves satisfactorily with Piraeus Bank, Alpha Bank and Eurobank having the best performances. But then the situation worsens as operating costs are high while revenues are constantly decreasing. Regarding the M2 ratio average values, the highest average value belongs to National Bank and the lowest average value belongs to Eurobank. The second place is occupied by the Piraeus Bank and the Alpha Bank is in the third place

**Table 10.** Earnings Quality ROA ratio results and ratings

| | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|
| **Years** | **ROA** | **Rating** | **ROA** | **Rating** | **ROA** | **Rating** | **ROA** | **Rating** |
| 2010 | -0.37% | 5 | -0.01% | 5 | -0.09% | 5 | -0.09% | 5 |
| 2011 | -13.93% | 5 | -14.66% | 5 | -6.96% | 5 | -6.80% | 5 |
| 2012 | -3.77% | 5 | -1.28% | 5 | -2.11% | 5 | -2.15% | 5 |
| 2013 | -0.60% | 5 | 2.92% | 1 | 4.20% | 1 | -1.43% | 5 |
| 2014 | -0.47% | 5 | -2.44% | 5 | -0.09% | 5 | -1.97% | 5 |
| 2015 | -3.69% | 5 | -2.88% | 5 | -1.59% | 5 | -1.64% | 5 |
| 2016 | 0.04% | 5 | 0.01% | 5 | 0.43% | 3 | 0.02% | 5 |
| 2017 | -0.42% | 5 | 0.00% | 5 | 0.08% | 5 | 0.02% | 5 |
| 2018 | 0.10% | 5 | 0.08% | 5 | 0.11% | 5 | 0.07% | 5 |
| 2019 | 0.23% | 5 | 0.04% | 5 | 0.09% | 5 | 0.06% | 5 |
| 2020 | 0.39% | 3 | -7.23% | 5 | 0.21% | 5 | 0.02% | 5 |
| **Average** | -2.04% | 5 | -2.31% | 5 | -0.52% | 5 | -1.26% | 5 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[14]

[14] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

In table 10 below we present the results of the Earnings Quality ROA ratio for the four Greek Systemic Banks during 2010-2020.

The ROA profitability ratio is calculated in the same way both in the Basel Committee II and in the Basel Committee III. The ROA ratio shows the management's ability to generate profits using the assets. Essentially, it shows us the profitability of a bank's assets. The higher its value, the more profitable the bank is considered to be. From the above table 10 we notice that the ROA ratio until 2015 is negative due to the losses recorded by all four banks. The only exception is in 2013 for Piraeus Bank and Alpha Bank where ROA ratio is positive probably due to the many acquisitions of other banking institutions in the Greek area. In 2015, there is again a large drop in the ROA ratio due to the imposition of capital controls. From 2016 onwards, profitability returns to a positive sign, but again at very low levels. Regarding the ROA ratio average values, the highest average value belongs to Alpha Bank and the lowest average value belongs to Piraeus Bank. The second place is occupied by the Eurobank and the National Bank is in the third place.

In the table 11 below we present the results of the Earnings Quality ROE ratio for the four Greek Systemic Banks during 2010-2020.

The ROE profitability ratio is calculated in the same way both in the Basel Committee II and in the Basel Committee III. The ROE ratio shows the equity's ability to generate profits.

**Table 11.** Earnings Quality ROE ratio results and ratings

| | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|
| **Years** | **ROE** | **Rating** | **ROE** | **Rating** | **ROE** | **Rating** | **ROE** | **Rating** |
| 2010 | -4.10% | 5 | -0.12% | 5 | -1.26% | 5 | -1.62% | 5 |
| 2011 | -1140.28% | 5 | -312.34% | 5 | -648.99% | 5 | -53060.00% | 5 |
| 2012 | -77.36% | 5 | -29.30% | 5 | -280.74% | 5 | -100.69% | 5 |
| 2013 | -7.85% | 5 | 30.31% | 1 | 39.97% | 1 | -25.19% | 5 |
| 2014 | -4.41% | 5 | -27.96% | 5 | -0.85% | 5 | -25.34% | 5 |
| 2015 | -34.23% | 5 | -24.86% | 5 | -12.26% | 5 | -17.14% | 5 |
| 2016 | 0.39% | 5 | 0.11% | 5 | 2.99% | 5 | 0.16% | 5 |
| 2017 | -3.96% | 5 | 0.03% | 5 | 0.48% | 5 | 0.17% | 5 |
| 2018 | 1.34% | 5 | 0.68% | 5 | 0.80% | 5 | 0.75% | 5 |
| 2019 | 2.74% | 5 | 0.36% | 5 | 0.67% | 5 | 0.53% | 5 |
| 2020 | 6.03% | 4 | -10.82% | 5 | 1.72% | 5 | 0.31% | 5 |
| **Average** | -114.70% | 5 | -33.99% | 5 | -81.59% | 5 | -4838.91% | 5 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[15]

[15] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

The higher its value, the more profitable the bank is considered to be.

From the above table 11 we notice that the ROE ratio in 2011 and 2012 has a negative value in all banks. From 2016 onwards, it seems that there is an improvement, as the banks are returning to profitability, even if small, and the equity levels show a stability, due of course also to their large recapitalization in 2013 mainly by the Greek state. The only bank that has a consistently rising profitability appears to be National Bank. Regarding the ROE ratio average values, the highest average value belongs to Piraeus Bank and the lowest average value belongs to Eurobank. The second place is occupied by the Alpha Bank and the National Bank is in the third place as it was in ROA ratio.

In table 12 below we present the results of the Liquidity Ratios L1 according to the rules of Basel Committee II for the four Greek Systemic Banks during 2010-2020. From the results presented in the below table 12, in terms of the L1 ratio, we can see whether banks properly finance the loans they grant through deposits. This implies that the lower the ratio, the better liquidity the banks have and in fact the desired level is below unity. In general, the L1 ratio throughout the decade remains below unity for all banks with the exception of Eurobank whose ratio in 2011 marginally exceeded unity. From 2010 to 2012 all banks show an improvement, while in 2013 the L1 ratio rises again. The bank with the best average is National Bank with 0.67, followed by Piraeus with 0.7 in the second place. Alpha Bank with 0.76 is in the third place and Eurobank with 0.87 is in the last fourth place.

In the L2 ratio it is true that the higher the ratio, the better liquidity the banks have. The desired limit of the liquidity ratio L2 must be above unity but in fact there is no bank that achieved that goal during the examined time period 2010-2013 according to the rules of Basel Committee II. The results of the below

**Table 12.** Liquidity Ratios L1 Basel II ratio results and ratings

| | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|
| **Years** | **L1** | **Rating** | **L1** | **Rating** | **L1** | **Rating** | **L1** | **Rating** |
| 2010 | 0.72 | 4 | 0.76 | 4 | 0.80 | 4 | 0.89 | 5 |
| 2011 | 0.68 | 3 | 0.69 | 4 | 0.78 | 4 | 1.19 | 3 |
| 2012 | 0.63 | 3 | 0.59 | 2 | 0.67 | 3 | 0.64 | 3 |
| 2013 | 0.65 | 3 | 0.76 | 4 | 0.78 | 4 | 0.74 | 2 |
| **Average** | 0.67 | 1 | 0.70 | 2 | 0.76 | 3 | 0.87 | 4 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[16]

[16] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
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https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

**Table 13.** Liquidity Ratios L2 Basel II ratio results and ratings

| | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|
| **Years** | **L2** | **Rating** | **L2** | **Rating** | **L2** | **Rating** | **L2** | **Rating** |
| 2010 | 0.59 | 1 | 0.39 | 3 | 0.3 | 5 | 0.86 | 1 |
| 2011 | 0.51 | 1 | 0.28 | 5 | 0.38 | 3 | 0.7 | 1 |
| 2012 | 0.43 | 3 | 0.46 | 2 | 0.4 | 3 | 0.42 | 3 |
| 2013 | 0.51 | 1 | 0.59 | 1 | 0.45 | 2 | 0.31 | 5 |
| **Average** | 0.51 | 2 | 0.43 | 3 | 0.38 | 4 | 0.57 | 1 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[17]

**Table 14.** Liquidity L Basel III ratio results and ratings

| | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|
| **Years** | **L** | **Rating** | **L** | **Rating** | **L** | **Rating** | **L** | **Rating** |
| 2014 | 0.41 | 3 | 0.44 | 3 | 0.36 | 4 | 0.43 | 3 |
| 2015 | 0.41 | 3 | 0.46 | 2 | 0.34 | 4 | 0.41 | 3 |
| 2016 | 0.41 | 3 | 0.42 | 3 | 0.40 | 3 | 0.33 | 4 |
| 2017 | 0.33 | 4 | 0.32 | 5 | 0.45 | 3 | 0.26 | 5 |
| 2018 | 0.37 | 4 | 0.32 | 5 | 0.28 | 5 | 0.27 | 5 |
| 2019 | 0.43 | 3 | 0.34 | 4 | 0.32 | 5 | 0.16 | 5 |
| 2020 | 0.53 | 1 | 0.43 | 3 | 0.39 | 3 | 0.30 | 5 |
| **Average** | 0.41 | 3 | 0.39 | 3 | 0.36 | 4 | 0.31 | 5 |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[18]

[17] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

[28] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
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https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
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table 13 in terms of the L2 ratio, show us that the highest average value 0.57 belongs to Eurobank. National Bank with average L2 ratio 0.51 is in the second place. Piraeus Bank with average L2 ratio 0.43 is in the third place and the fourth place is occupied by Alpha Bank with an average L2 ratio 0.38. But we have to say that all the Greek systemic banks have values for the liquidity ratio L2 at very low levels.

We can notice that the L2 and L ratios give us an insight into the degree of banks' direct liquidity, i.e. the immediately liquidable elements present in their current assets. In this case, the higher the L2 and L ratios values, the better the liquidity.

In table 14 below we present the results of the Liquidity L ratio for the four Greek Systemic Banks during 2014-2020 according to the Basel Committee III.

Of course, during this period the flight of deposits due to fear from customers was very large, but the borrowing from the interbank market, the reinforcement from the ELA and the imposition of capital controls contributed to the strengthening of liquidity so that the banks do not collapse.

From the results that are presented in the above table 14, it is clear that the course of

**Table 15.** Sensitivity to Market Risk S2, S3 ratios results and ratings

| | | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|---|
| | **Years** | **S2** | **Rating** | **S2** | **Rating** | **S2** | **Rating** | **S2** | **Rating** |
| **Basel Committee II** | 2010 | 10.86% | 1 | 11.29% | 1 | 16.92% | 1 | 16.30% | 1 |
| | 2011 | 13.31% | 1 | 6.54% | 1 | 10.23% | 1 | 12.42% | 1 |
| | 2012 | 10.60% | 1 | 27.43% | 2 | 13.15% | 1 | 10.00% | 1 |
| | 2013 | 21.48% | 2 | 26.93% | 2 | 17.41% | 1 | 25.58% | 2 |
| | **Average S2** | 14.06% | | 18.05% | | 14.43% | | 16.08% | 14.06% |
| | **Years** | **S3** | | **S3** | | **S3** | | **S3** | |
| **Basel Committee III** | 2014 | 20.32% | 1 | 19.98% | 1 | 15.06% | 1 | 22.41% | 1 |
| | 2015 | 22.75% | 1 | 23.89% | 1 | 15.35% | 1 | 22.86% | 1 |
| | 2016 | 21.49% | 1 | 20.45% | 1 | 9.13% | 1 | 22.53% | 1 |
| | 2017 | 12.20% | 1 | 3.88% | 1 | 13.78% | 1 | 16.52% | 1 |
| | 2018 | 13.54% | 1 | 1.14% | 1 | 11.82% | 1 | 13.29% | 1 |
| | 2019 | 22.61% | 1 | 2.68% | 1 | 14.67% | 1 | 12.30% | 1 |
| | 2020 | 28.20% | 2 | 6.94% | 1 | 15.10% | 1 | 11.92% | 1 |
| | **Average S3** | 20.16% | | 11.28% | | 13.56% | | 17.40% | 20.16% |

**Source:** Authors' own calculations from the published financial statements of Greek systemic banks[19]

[19] https://www.alpha.gr/el/omilos/enimerosi-ependuton/oikonomika-stoixeia/oikonomikes-katastaseis-trapezis-kai-omilou
https://www.nbg.gr/el/the-group/investor-relations/financial-information/annual-interim-financial-statements
https://www.nbg.gr/el/the-group/investor-relations/annual-report-offerring-circular
https://www.Eurobank holdings.gr/el/enimerosi-ependuton/oikonomika-apotelesmata?pg=3
https://www.piraeusbankgroup.com/el/investors/financials/annual-reports
https://www.piraeusbankgroup.com/el/documentation/pillar-iii-disclosures

the numerical ratio L is similar to the course of the numerical ratio L2. The banks with the best liquidity appear to be National Bank and Piraeus Bank with an average value of L ratio 0.41. The second place belongs to Alpha Bank with an average value of L ratio 0.36 and the forth place is occupied by Eurobank with an average value of L ratio 0.31.

In table 15 below we present the results of the S2 and S3 ratios that show the bank's sensitivity to market risk according to CAMELS rating model and approved by the Basel Committee II and Basel Committee III. With these S2 and S3 ratios we can distinguish to what extent banks are exposed to market risks according to their portfolio of securities. The smaller the ratios, the better the banks' reaction to market risks is considered. While initially all banks are at the same level, along the way we observe a rapid increase in the S2 ratio and maintaining it at high levels until 2016, especially due to the acquisitions and mergers that took place during that time. Since 2017 there has been a large drop in the S2 ratio of the three banks, Piraeus, Eurobank and Ethniki due to the sale of EFSF bonds and ESM bonds as part of the banks' participation in the bond swap program that was part of the short-term measures to ease the Greek debt. Finally, until 2020, the S2 ratio is at low levels except for National Bank, which has a relatively high price due to the exchange of bonds with the Greek government. Alpha Bank has the lowest average, therefore the lowest risk with 13.97%, followed by Piraeus Bank with 15.06% and Eurobank with 16.06% and finally National Bank with 17%, because it was the most exposed bank to the Greek bonds. From the results of the Sensitivity to Market Risk S3 ratio, we notice that this S3

**Table 16.** CAMELS Score and Ranking of the four Greek Systemic Banks

| | | National Bank | | Piraeus Bank | | Alpha Bank | | Eurobank | |
|---|---|---|---|---|---|---|---|---|---|
| | **Years** | **CAMELS Score** | **Rating** | **CAMELS Score** | **Rating** | **CAMELS Score** | **Rating** | **CAMELS Score** | **Rating** |
| **Basel Committee II** | 2010 | 3.10 | 1 | 3.10 | 1 | 3.90 | 3 | 3.60 | 2 |
| | 2011 | 3.40 | 1 | 4.10 | 3 | 3.90 | 2 | 3.40 | 1 |
| | 2012 | 3.60 | 2 | 3.50 | 1 | 3.80 | 4 | 3.70 | 3 |
| | 2013 | 3.30 | 2 | 3.00 | 1 | 3.00 | 1 | 3.70 | 3 |
| | **Average** | 3.35 | 1 | 3.43 | 2 | 3.65 | 4 | 3.60 | 3 |
| | **Years** | **CAMELS Score** | **Rating** | **CAMELS Score** | **Rating** | **CAMELS Score** | **Rating** | **CAMELS Score** | **Rating** |
| **Basel Committee III** | 2014 | 3.35 | 3 | 3.10 | 2 | 3.70 | 4 | 2.85 | 1 |
| | 2015 | 3.35 | 4 | 3.25 | 3 | 3.20 | 2 | 3.10 | 1 |
| | 2016 | 3.35 | 3 | 3.35 | 3 | 2.90 | 1 | 3.20 | 2 |
| | 2017 | 3.70 | 4 | 3.55 | 3 | 3.10 | 1 | 3.30 | 2 |
| | 2018 | 3.70 | 3 | 3.80 | 4 | 3.55 | 2 | 3.30 | 1 |
| | 2019 | 3.60 | 4 | 3.45 | 2 | 3.55 | 3 | 3.30 | 1 |
| | 2020 | 3.25 | 1 | 3.85 | 4 | 3.35 | 2 | 3.55 | 3 |
| | **Average** | 3.47 | 2 | 3.48 | 4 | 3.36 | 3 | 3.23 | 1 |

**Source:** Authors' results extracted from tables 2,3, 5-15

ratio has a similar path to that of the S2 ratio. So according to the average results of the S3 ratio as shown in table 14, Piraeus Bank has the lowest average with 13.51%, followed by Alpha Bank with 13.88%. The third place is occupied by Eurobank with 16.11% and finally the National Bank with 17.29% is in the fourth and last place, as we said before because it was the most exposed bank to the Greek bonds.

In table 16 below we present the results of the final CAMELS score and the ranking of each of the four Greek Systemic bank per year. Also, in the last column of table 17, the mean of the scores for each year has been calculated. In the last line the average of the CAMELS scores of each bank was calculated as well as the average of the CAMELS scores of the four Greek systemic banks for each of the ten years which in essence is like representing the banking industry. From the aggregate comparative rating of the four Greek systemic banks based on the CAMELS score in table 16, we notice that they all have almost the same rating, which ranges from 2.85 to 3.9 according to the rules of the Basel II Commission, while according to the rules of Basel Committee III the score is formed at approximately the same levels, i.e. 2.90 to 3.85.

## Conclusion

As it is known the CAMELS methodology is a very useful tool both for the supervisory authorities of the banks and for the banks themselves. In combination with other banking risk measurement models, the CAMELS indicators could be used even more both in dealing with and preventing these risks. Especially after the last financial crisis, from which banks learned a lot, it would be equally important for bank managements to take into account all microeconomic and macroeconomic factors that affect not only the domestic economy but also the global one. In this way and in combination with the appropriate indicators for measuring banking risks, banks will now be able to take timely measures to adapt and protect themselves.

In this work, the CAMELS model was applied to the four Greek systemic banks, National Bank, Piraeus Bank, Alpha Bank and Eurobank. From the study that was prepared and related to the period 2010-2020, we reach the following conclusions:

- Regarding their capital adequacy, there was no problem. All four bank recapitalizations and therefore the equity capital increases ensured the required capital levels. The banks' score ranges between 1 and 2, which means that their capital adequacy is satisfactory.
- In terms of credit risk and asset quality, they all faced a huge problem. The rating of all banks for all years is 5 and raises the alarm bell for immediate interventions. This means that the mergers & acquisitions that took place in the examined time period 2010-2020 did not help the remaining four Greek systemic banks to reduce credit risk and improve the quality of their assets. But in recent years through the "Hercules" program, there has been a significant improvement and this is reflected in the results of the indicators.
- Regarding the risk of administration and management, we see that here too there is a problem for all four Greek systemic banks, as their score here also varies between 4 and 5 with a small tendency to improve. This also means that the mergers & acquisitions that took place in the time period considered 2010-2020

did not help the remaining four Greek systemic banks to improve the risk of administration and management. It is therefore necessary to take immediate measures and make significant corrective actions in the management and administration of the banks.

- In terms of profitability, banks are starting to show positive results in the last three to five years after a prolonged period of losses. In general, however, their score is very bad, between 4 and 5, and immediate corrective interventions are needed to support their profitability. This also means that the mergers & acquisitions that took place in the time period considered 2010-2020 did not help the remaining four Greek systemic banks to increase their profitability.
- Regarding liquidity, all banks faced serious difficulties both due to the flight of deposits and due to the very large percentage of non-performing loans, but along the way we see that there is an improvement in all banks. On the other hand, there is a serious problem in the immediately liquid assets and it is something that needs special attention. This also means that the mergers & acquisitions that took place in the time period examined 2010-2020 did not help the remaining four Greek systemic banks to increase their liquidity.
- In terms of market risk, all banks seem to have managed well as they have quite limited the portfolio that is exposed and prone to market fluctuations. The banks score is between 1 and 2 which means that the market risk management is satisfactory. This means that possibly the mergers & acquisitions that took place during the examined time period 2010-2020 helped the remaining four Greek systemic banks to reduce market risk.

According to the CAMELS model, banks whose performance varies in low scores show some degree of concern in one or more areas and this is exactly what we found from the above analysis for the four Greek systemic banks. In addition, it means that these banks are particularly vulnerable and sensitive to external influences and it takes a special effort especially from the management to identify and deal with any weaknesses that arise even more effectively in a short period of time. Particular attention should be paid to risk management practices to ensure greater effectiveness. In addition, what is probably required from the Central Bank's side is the further intensification of the supervision it exercises over them. However, due to their size, but also the fact that they are now systemic banks, the risk of failure seems unlikely, given the adverse financial effects their possible collapse would bring to the Greek economy.

However, the questions remain open. Why there were so many takeovers and mergers in the Greek banking system after the financial crisis. Why were these particular banks chosen to absorb all the other troubled banks. What played a role? The amount of deposits, the amount of loans, the amount of their exposure to Greek bonds or none of these. Why weren't four or five completely new systemic banks created based on their efficiency and liquidity to begin with so that recapitalizations would not be needed. Why Greece did not follow Iceland's example. Perhaps all this will be answered in further research in the future.

As a proposal for further study it would be better to evaluate the Greek systemic banks as holding companies after at least 5 years

of their operation when the process of turning into holding companies will be carried out under the new financial regime and of course after the pandemic in order to establish the results of the research with more precision in the right direction with thorough analysis over a long time period.

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