MERGERS AND ACQUISITIONS. AN EVALUATION ANALYSIS OF BANKRUPTCY PRE AND POST OF BOTH EVENTS. EVIDENCE FROM GREECE

Dr Kyriazopoulos Georgios¹ & Kragiopoulou Nikoleta²

¹Associate Professor
Vice President of Department of Accounting and Finance
University of Western Macedonia, Kozani, Greece
Vice President of International Conference of Development and Economy (I.CO.D.ECON)

²Msc in Banking Insurance and Finance,
Greece

Corresponding Author: Dr Kyriazopoulos Georgios
Corresponding Author Email: kyrzog@gmail.com and nikolkr84@yahoo.gr

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ABSTRACT

The banking sector is one of the most important sectors in economy of the world and occupies a prominent position in the development. The banking system in Greece is regulated by the European Central Bank (ECB) and is composed of various types of banks, including systemic commercial banks, non systemic commercial banks and cooperative banks. The purpose of this study is to study the case of the reduction or not of the occurrence of bank bankruptcy after the acquisition they made of banks with financial difficulties. For this purpose, we study the possible bankruptcy of the acquired banks before their acquisition, as well as the possible bankruptcy of the acquiring banks before and after the acquisition. There are several models for predicting bankruptcy, including financial ratio analysis Z-score model, Zeta model, financial soundness model and other models. In this study to predict bankruptcy for banks we
use the Zeta model for banks. This model is one of the commonly used in the international scientific community. The time period of the study is defined after the beginning of the global financial crisis in the year of 2008 and before the pandemic. This global financial crisis as known invaded Greece mainly in year 2010 an the pandemic started at the end of year 2019. The examined time period concerns both a short-term and a long-term period of time for the most rational drawing of conclusions. This specific study is based on the analysis of two of the most characteristic cases involving Greek banks involved in takeovers. One case concerns Greek cooperative banks and the other one concerns Greek systemic banks.

**Keywords:** Cooperative Banks, Mergers & Acquisitions, Cash Flows Ratio, Profitability, Insolvency.

**JEL Classifications:** G21, G33, G34

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**INTRODUCTION**

Banks’ financial status reflects the economic condition of a country (Othman & Asutay, 2017). Bank health is the ability of banks to carry out banking operations normally and to fulfill their obligations in ways that comply with applicable banking regulations (Santoso, 2006:51). As it is known banks and other financial institutions are characterized worldwide as service sector organizations. Banking financial services mainly concern loans, deposits and mediation operations such bankassurance, bill of exchange, letters of guarantee, and others. This fact means that the banks are exposed to various risk types such as financial risk, credit risk and liquidity risk.

The earlier the bank detects banking conditions, the faster the bank does anticipatory steps so that financial difficulties can be resolved soon (Bussiere, M. & Fratzscher, M. 2006).

A bank bankruptcy, when it happens, is an event that has a great negative impact on management, shareholders, investors, customers, creditors, stakeholders and economy. Bankruptcy is defined as the inability of the company to continue its current operations due to high debt obligations (Pongsatat et.al., 2004). Since bankruptcy risk has always been a serious matter for shareholders, investors and other participants of an economy proper assessment of bankruptcy risk is required for investments, market stability and fortune (Kumar & Kavita, 2015). Typically bankruptcy occurs “when either (i) the firm's operating cash flow is insufficient to meet current obligations which means, the inability to service its debts or (ii) when the firm's net worth is negative that means, the value of the assets is less than the value of its external liabilities” (Knox et. al., 2008).

Many banks and financial institutions were affected from 2010 due to the global financial crisis. Affected banks all over the world, and of course in Greece, were merged, acquired by other banks or financial institutions and disappeared. Some of the financial facts that the global financial crisis of 2010 brought with are too high financial leverage, too low profitability, efficiency and liquidity, too high non performing loans, collateralized debt obligations, large drop in stock market bank indices, frozen credit markets, and credit default swaps. Most banks in Greece and Worldwide took heavy risk by borrowing more money without having enough liquid assets and therefore they exposed to financial risk, credit risk. So the bankruptcy was at the doorstep of the banks and the result was that many banks were wiped off the financial map. Due to the global financial crisis in Greece alone, 13 banks
disappeared from the market because of their financial distress and as a result they were acquired by another Greek or foreigner banks.

Altman et al. (1977) can be accepted as produced first original academic studies on bankruptcy risk, developed ZETA model for assessing the bankruptcy risk of corporations using their financial ratios via discriminant analysis. Olmeda and Fernandez (1997) used 9 financial ratios of 66 bank to assess the bankruptcy risk of the banks. Vilén (2010), used 25 financial ratios of 124 bank to assess the bankruptcy risk of banks. Kumar and Kavita (2015), used Altman’s Z score to assess the bankruptcy risk of 10 Indian banks. In academic literature, bankruptcy prediction or/and assessment, discriminant analysis, logit model, probit model, neural networks and multi-criteria decision making (MCDM) techniques are used. Belovary et al. (2007:10) compared 14 academic studies, neural network models were best, and probit models were worst performers in order to bankruptcy prediction accuracy power and report.

**LITERATURE REVIEW**

Acquisition/Takeover is the process of acquiring a part or even the whole business (for cash), in which the acquiring company acquires control of the acquired business, which may still exist as a legal entity. In this way, the acquired company becomes a subsidiary company of the acquiring company (Kyriazis, D., 2016). A company/bank can buy another company/bank with cash, stock, assumption of debt, or a combination of some or all of the three. In smaller deals, it is also common for one company to acquire all of another company's assets (Hayes, A., 2023).

The success or failure of a merger or acquisition deal depends on a multitude of factors that are influenced by both the internal and external environment. Success of such an agreement is the expected outcome, however there is always the possibility of failure. (Papadakis, B., 2002) Credit scoring models are quantitative models that use observed characteristics of the borrower either to determine a number (score) that indicates the probability of defaulting or in payments or to classify borrowers into different categories depending on their credit solvency.

By selecting and combining different economic and financial characteristics of borrowers, the management of the credit institution is able to:

i) To quantify which factors are important in the interpretation of credit risk

ii) To assess the relative degree or importance of these factors

iii) To improve the pricing of credit risk

iv) To reject insolvent creditors

v) Be able to calculate provisions that may be required for expected future loan losses

vi) To use solvency scoring models, management must distinguish between economic and financial indicators of risk.

Pathan and Faff (2013) applied the Z-score model to a sample of American banking holding companies in 1997–2004 and observed that the financial manager did not cope with the additional risk.

**METHODOLOGY**

The Z-score captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns. It is estimated as (ROA+(equity/assets)) /
sd(ROA); sd(ROA) is the standard deviation of ROA. The Z-score is an indicator of a bank's probability of insolvency as it estimates the number of standard deviations that the bank's earnings would have to fall below their expected value before its equity becomes negative. The value of Z-score depends positively on the bank's profitability and capital ratio and negatively on the bank's earnings volatility. To predict bank failure, the Z-score model estimates the distance from insolvency for a given bank by combining bank profitability, capitalization and yield volatility. Z-score is defined as:

\[ Z = \frac{(\bar{ROA} + \bar{EA})}{sdROA} \]  

(1)

where \( \bar{ROA} \) is the average return on assets, \( \bar{EA} \) is the average equity ratio and \( \sigma_{ROA} \) is the standard deviation of the return on assets.

A higher values of the above Z-score indicates that the bank is more stable or that the bank is less likely to fail. That is, a higher Z-score value indicates a lower risk.

To find the value of Z-Score for banks we follow the three steps. First in the numerator we calculate the Average of the considered time period before and after acquisitions and mergers. In the second step we add to the Average the Average of the fraction of equity to total assets for the same period. In the third step we calculate for the denominator the standard deviation of the ROA ratio also for the same time period. The formula for the calculation of ROA standard deviation is below:

\[ sdROA = \sqrt{\frac{\sum (ROAi - \bar{ROA})^2}{N}} \]  

(2)

Where \( \sum \) is the sum of the difference between the ROA and the average ROA over the considered time period. (i): symbolizes the time period under consideration and (N): indicates the number of time periods considered.

The Z-score is deduced from the probability that bank’s losses exceed its capital, but under the very unrealistic assumption of normally distributed returns on assets (Ion Lapteacru 2016). Z-score for banks compares a bank's buffers (capitalization and returns) with the volatility of those returns. The Z-score is the only account-based risk measure that is founded on the risk concept and is also the most applied in the banking literature. Computed as the ratio of a bank’s leverage (capital on assets) and the mean of its ROA on the volatility of its ROA, this risk measure has been conceived from the concept of a bank’s probability of default (Boyd and Graham, 1986; Hannan and Hanweck, 1988; Boyd and Runkle, 1993; Boyd et al., 1993). All other versions of the Z-score depart even more from the original concept. Estimating the empirical mean and empirical standard deviation of ROA only on a part of the time sample (2, 3, 4 or 5 years) and rolling these calculus on this time window on the rest of the sample make the Z-score more sensitive and therefore more fluctuating (Anginer et al., 2014; Williams, 2014; among others).

RESULTS AND DISCUSSION

In the below two tables and two figures we present the results of Z-Score for banks that involved in the acquisitions that took place in Greek banking system soon after the financial crisis of 2009. The first case concerns the acquisition of a Cooperative Greek bank from also another Cooperative Greek bank. The second case analyzes the acquisition of a Greek Commercial bank from a Greek systemic bank. The third case is a little more complicate because it shows the acquisition of two Greek Commercial banks from a Greek systemic bank. We have to noticed that all the target banks in the two cases were bad bank from the financial terms of Z-Score model.

Table 1

<table>
<thead>
<tr>
<th>YEARS</th>
<th>Z-Score DRAMAS</th>
<th>Z-Score EVROU</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>3.73</td>
<td>21.2</td>
</tr>
<tr>
<td>2015</td>
<td>2.68</td>
<td>5.61</td>
</tr>
<tr>
<td>2016</td>
<td>5.7</td>
<td>4.44</td>
</tr>
<tr>
<td>2017</td>
<td>1.73</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>1.76</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors' calculations from published financial statements of the Greek Cooperative Banks.

Figure 1: Z-Score of Cooperative Banks Drama and Evrou Before and After the Acquisition

From the above table 1 and figure 1 we can see the Z-Score model for bankruptcy of banks had a very high rate in the year 2014 for the target Greek cooperative bank of Evrou. In the years 2015-2016 the Z-Score of the target Greek cooperative bank of Evrou bank had a very high downward trend. This fact shows us that the Greek cooperative bank of Evrou is one step
before bankruptcy and of course is a bad bank that is easy to acquired The bidder Greek cooperative bank of Drama had low Z-Score model for bankruptcy of banks two years before the acquisition and one year before the acquisition the Z-Score model for bankruptcy of banks had the biggest rate from all the period under consideration, before and after the acquisition. We observe that after the acquisition the Z-Score continuous to have a downward trend. This occasion shows that the Greek cooperative bank of Drama was also a bad bank according to Z-Score model for bankruptcy of banks. It's a wonder why the Greek cooperative bank of Drama took over the Greek cooperative bank of Evrou that was also a bad bank in terms of bankruptcy as Z-Score model for bankruptcy of banks showed us.

In the table 2 and figure 2 we present the course of Z-Score models for the two bidder Greek systemic commercial banks Piraeus Bank and Alpha Bank. We also present the course of Z-Score models for the three target Greek commercial banks ATE Bank, Geniki Bank, and Emporiki Bank.

In the table 2 and figure 2 below we examine an acquisition that took place a few years after the financial crisis that invaded Greece

<table>
<thead>
<tr>
<th>YEARS</th>
<th>PIRAEUS BANK</th>
<th>ALPHA BANK</th>
<th>ATE BANK</th>
<th>GENIKI BANK</th>
<th>EMPORIKI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>11</td>
<td>9</td>
<td>0.3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>12</td>
<td>13</td>
<td>0.1</td>
<td>-13</td>
<td>0.4</td>
</tr>
<tr>
<td>2011</td>
<td>-14</td>
<td>-3</td>
<td>-6</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>2012</td>
<td>-29</td>
<td>-9</td>
<td>-3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>8</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>6</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>10</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors' calculations from published financial statements of the Greek Cooperative Banks.

In the table 2 and figure 2 we can see that the bidder Piraeus Bank took over soon after the financial crisis of 2009 two of the major but financially bad banks of the Greek banking system. These two target banks are bad banks based on default index values of Z-Score model. From the above table 2 and figure 2 we can noticed that the two target banks Emporiki Bank, ATE Bank and Geniki Bank had very low rates of Z-Score model and negative values three years before they have been acquired by the bidder Piraeus bank and considered as bankrupt banks according to the Z-Score model. From the observation of the above table 2 and figure 2 we can tell that the values of Z-Score model for bankruptcy for the target Greek commercial Geniki Bank were the worst of all target banks that we analyze and examine in this article. The same course presented from the two other target banks ATE Bank and Emporiki Bank. Farther more the Z-Score model for the bidder Greek commercial Piraeus Bank had the lowest value with negative rates during the time period before the two acquisitions that it made mainly in 2012. As it is Known Piraeus Bank acquired both Geniki Bank and ATE Bank After these two acquisitions the rates of Z-Score model of Piraeus Bank were positive but not in a high level. In the formation of the positive values of the bankruptcy
Z-Score model, the main role was played by the recapitalization of Piraeus Bank and less by the two acquisitions, since the two acquired banks were bad banks from financially terms.

The same analysis more or less of the Z-Score model presented for the bidder Alpha Bank also in the table 2 and figure 2. Alpha Bank had also low and negative values from the year 2008 until 2012. The year 2013, due to the recapitalization of Alpha Bank, is the year where the price of Z-Score model is getting upper course and in the year 2014 the values of Z-Score model were the highest from all the other banks that we examined in the time period pre and post the acquisitions. In the year 2013 the values of Z-Score model turned into positive rate that affected more from recapitalization of the Alpha Bank and less by the acquisition of the Emporiki Bank, that it was a bad bank from financially terms. As we noticed in the year 2014 Alpha Bank had the highest values of Z- Score model of all the banks that we examined in this case but it was not so high that we can tell for sure that the Alpha Bank did not have the
risk of bankruptcy in the future. In the year 2015 we can see again a downward trend in bankruptcy model prices. Of course the two examined bidder banks are systemic banks in the Greek banking system. This means that they do not allow to bankrupt officially.

CONCLUSION
In this article we applied Z-Score model for banks in two different cases of mergers and acquisitions in the Greek banking system, because we would like to measure the bankruptcy of the Greek banks that they involved in the acquisitions during the financial crisis that hit Greek economy an continues until now. Of course we must notice that the specific Z-Score model we applied mainly depends from mainly from ROA ratio and the earnings before tax of all the banks that we examined in the acquisitions. We have to point out that the Z-Score model that we applied in our article it is used also from World Bank for measuring the bankruptcy of the world banking system per country. In the first case we studied the acquisition between two Greek cooperative banks and in the second case we studied the acquisition among Greek commercial banks. In our article we also tried to find out if there is any improvement of the values of Z-Score after the acquisitions and if there is any improvement in which of the three bidder banks in the two examined cases. From the analysis Z-Score model for banks in the two examined cases we found that there is not any decrease in appearance in the bankruptcy for the Greek cooperative bidder bank of Drama and also there is not any significant improvement in the bankruptcy of the Greek commercial banks, Alpha Bank and Piraeus Bank. Finally we concluded that when a bidder Cooperative bank takes over a target also Cooperative but financially bad bank with its values in the bankruptcy Z-Score model to be in very low rates, the bidder bank will be affected very much and after the acquisition the bidder Cooperative bank will also shows very low values in the bankruptcy Z-Score model and it's too difficult for the bidder bank to have high values in its bankruptcy Z-Score model. Results obtained from this model shows among other that earlier prediction of bankruptcy maybe it could be possible. We would like to notice that the bidder Greek Cooperative bank of Drama did not manage to recover from the takeover of the target Greek cooperative financially bad bank of Evros and closed its operation for good in 2022 with all the financial consequences that this fact brought to the local society of the city of Drama farther more and in Greek economy. The same conclusion we had also for the bidder banks Alpha Bank and Piraeus Bank for the low values of bankruptcy in Z-Score model but it's not as complicate as in the case of the cooperative bank because Alpha Bank and Piraeus Bank are in the group of four Greek systemic banks and it's not allowed to close down officially. Also, Alfa Bank and Piraeus Bank, because it is one of the four Greek systemic banks, can more easily promote recapitalization whenever the need arises and due to a reduction of its equity below the permitted limit according to what is defined by the Basel III committee. As final conclusion we can say that it is very difficult to a bank to have in the future good financial position if it acquires another financially bad bank either in the beginning or after the financial crisis. Then in our cases maybe there were other factors such as social or depositor protection reasons that pushed the bidder banks to take over bad banks in the Greek banking system after the financial crisis that entered Greece in 2009 and affected the entire Greek economy in both the public and private sectors. For further examination we propose that a similar analysis should be applied to all European pre and post bank acquisitions in the beginning and soon after the global financial crisis. This way we will have more
representative samples and we will be able to draw safer conclusions about takeovers of financially bad banks by other banks and what will happen to the bidder banks in a short and long time period after the acquisitions. Thus possibly we will predict a bank failure more easily, avoiding all the adverse financial consequences such an event will bring to any economy.

REFERENCES


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