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Mergers and Acquisitions of Cooperative Banks. Before and After a Takeover. A Financial Analysis.

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Abstract

The purpose of this paper is to present and study the evaluation of mergers and acquisitions of cooperative banks. In this paper we present and afterwards we calculate Financial Ratios that extract from Financial Cash Flow Statements. The purpose is to show a methodology that help us to evaluate the profitability, efficiency and insolvency before and if any after mergers and acquisitions in the Cooperative Banks, using mainly Financial Cash Flow Statements. So, we evaluate the Cooperative Bank of Drama and the Cooperative Bank of Evros three years before the acquisition and then we evaluate four years after the acquisition the Cooperative Bank of Drama which is the bidder and remain bank. This acquisition was completed in recent years and the purpose was for the acquiring cooperative bank of Drama with the completion of the acquisition and the full integration of the acquired bank of Evros, to become more attractive in relation to its competitors mainly in terms of profitability, efficiency and to improve its insolvency ratio, but in the end this did not happen. We start our study with the introduction and we go on with the literature review, the methodology, the results, the conclusions and the references.

JEL classification numbers: G21, G33, G34.
Keywords: Cooperative Banks, Mergers & Acquisitions, Cash Flows Ratio, Profitability, Insolvency.

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1. Introduction

The primary function of the financial system is to transfer capital from heterogeneous sources of savings to investors. The mediating role of banks in the economy, apart from the mobilization of savings, consists in the collection and utilization of information on the business environment and economic prospects, and consequently, in-depth analysis and better risk management (Moschos and Hortareas, 2011). The development of the financial system contributes to economic growth by providing more complete information and reducing transaction costs. In addition, it contributes to improving the productivity and efficiency of the financial sector, encourages savings and facilitates investment. More generally, more developed financial systems are able to efficiently channel larger amounts of funds from savers to investors. At the same time, the financial system mitigates the risk of investment decisions and mainly the risk of liquidity (Pagano 1993). Cooperative banks are included in the wider financial circuit and they link their profitability with the development of the local economy, identifying their efficiency with the development of their own place (Tragakis, 1996).

The Cooperative Banks in Europe were primarily aggregations at the local or trade union level, either to protect their members against the economic exploitation of the stronger, or to exercise a rudimentary policy of social solidarity and welfare, or to serve the financial needs of farmers, farmers and fishermen, small professionals and micro-farmers as well as consumers with low and usually fixed incomes. That is why credit cooperatives or cooperative banks still today have a local or regional, cooperative character and deal only with their members, who to a certain extent have identified with them in specific types of banking operations.

Based on the European standard for the exercise of cooperative credit, we can note that the fundamental operating principle of cooperative credit institutions is to serve the financial needs of small and medium-sized enterprises at a local or regional level and to provide financial support for local and regional development projects and activities, by granting low-interest loans to their members. At the same time, of course, they also accept deposits with interest rates that apply to commercial banks and distribute a high annual dividend to their members (Tragakis, 1996).

In the last twenty years, credit cooperatives and cooperative banks in the European Union, according to data from the European Union of Cooperative Banks, without differentiating their institutional background, have increased their participation in the common banking market. This is also due to the fact of the introduction of the Euro and the lack of significant currency risk that banks faced in the past.

By their nature Cooperative Banks are, historically, leaders in the provision of financial services tailored to certain customer categories, such as farmers and small and medium enterprises (SMEs) for whom access to credit, in other banks, is limited. Around 32% of small and medium-sized European businesses are customers of Co-operative Banks. Also, Cooperative Banks are more stable in the economy than commercial banks. This is because they can use in difficult economic times the surplus of their customers since we said that their customers are also partners at the

same time (Hesse and Cihak, 2006). As the primary purpose of Cooperative Banks is the recycling of money (deposits - loans), there is continuous monitoring of available funds that can be allocated for financing, without the risk of credit extensions. The lending portfolio includes only businesses belonging to the local market, making it easier to contact and guide the client in a difficult economic situation. The existence of a small percentage of housing and consumer loans enables them to call their banking 'Business' and not 'Housing' (Hesse and Cihak, 2006).

Cooperative Banks make a significant contribution to the European economy. They are part of the cooperative societies, whose role in Europe is recognized and encouraged by the EU institutions, as evidenced by the recent statute of the "European Cooperative Society", as well as by the European Commission's communication on the "promotion of cooperatives societies in Europe". Even if co-operative traditions and legislation differ from one European country to another (as do some of the characteristics of Co-operative Banks) there are nevertheless several essential common factors at the heart of the European co-operative banking sector. Their basic principle is that they operate democratically. European Cooperative Banks are owned by their members, who participate in their democratic management, according to the principle: one person, one vote, (Hesse and Cihak, 2006).

Cooperative Banks have corporate capital and their members can be individuals or businesses, natural and legal entities. These members may be in whole or in part customers, employees or suppliers. Thus, Cooperative Banks can play a large role in local communities as they operate exclusively in the private sector of the economy, without any dependence, financial or otherwise, on the state. They create locally a short circuit of money circulation with minimal cost, as they collect local savings and reposition them in the market, in the form of credits, maintaining and developing all the productive activities of the local economy (Tragakis, 1996).

The present topic was chosen because acquisitions and mergers have been increasingly developed in recent years and large companies and groups tend to be acquired and merged but also absorbed so that they can continue to exist even through other companies.

An important motivation for choosing this topic is that acquisitions and mergers of cooperative banks are not so widespread and cooperative banks after the financial crisis are close to disappearing. The topic of this work was chosen because mergers and acquisitions in recent years are growing more and more large companies and groups tend to be acquired to merge but also absorbed so that they can continue to exist even through other companies. An important motivation for choosing this topic is also that the mergers and acquisitions of cooperative banks are not so widespread and the Greek cooperative banks after the financial crisis of 2010 are about to disappear. At the same time, this specific work applies a case study demonstrating the importance of the evaluation methods it uses for the evaluation of acquisitions and mergers before and after the acquisition or merger. In this case study, the whole theoretical framework of the examined methodology is applied

with financial analysis to the financial and accounting data of the involved banks.
The aim of this work is to present and study the evaluation of acquisitions and mergers of cooperative banks with cash flows. The main objectives are to study the evaluation of acquisitions and mergers in the economy, even to study whether acquisitions and mergers contribute and help both in the internal and external environment of businesses and banks. It should also be studied whether, through the mergers of businesses and banks, they can evolve and contribute to the economy as a whole. For this reason, the main financial and accounting methods for evaluating the mergers and acquisitions of Cooperative Banks in Greece are presented and we study the case of Cooperative Bank of Drama, which acquired the Cooperative Bank of Evros.

2. Literature Review

The term mergers and acquisitions (M&A) refers to the consolidation of companies or their major business assets through financial transactions between companies. A company may purchase and absorb another company outright, merge with it to create a new company, acquire some or all of its major assets, make a tender offer for its stock, or stage a hostile takeover. All are M&A activities. The term M&A also is used to describe the divisions of financial institutions that deal in such activity. (Hayes, 2023)
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, 2016). A company can buy another company 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, 2023).
Merger is the consolidation of two or more companies, in which the assets (Assets & Liabilities) of the absorbing company are transferred to the absorbing company, (in exchange for shares) based on a defined exchange ratio). Following these, the absorbed company ceases to exist as a legal entity (it is dissolved without being liquidated), while the absorbing company succeeds it in all its rights and obligations (Kyriazis, 2016).
Mergers can be structured in a number of different ways, based on the relationship between the two companies involved in the deal (Hayes, 2023):

- **Horizontal merger**: Two companies that are in direct competition and share the same product lines and markets.
- **Vertical merger**: A customer and company or a supplier and company. Think of an ice cream maker merging with a cone supplier.
- **Congeneric mergers**: Two businesses that serve the same consumer base in different ways, such as a TV manufacturer and a cable company.
- **Market-extension merger**: Two companies that sell the same products in different markets.

- **Product-extension merger**: Two companies selling different but related products in the same market.
- **Conglomeration**: Two companies that have no common business areas.

Mergers may also be distinguished by following two financing methods, each with its own ramifications for investors. With this merger, a brand new company is formed, and both companies are bought and combined under the new entity. The tax terms are the same as those of a purchase merger.

According to Bower (2001) there are five main motives for mergers and acquisitions: a) limiting the number of competitors, b) geographical expansion, c) expansion in product lines and international presence, d) acquisition of know-how instead of internal development and e) consolidation competitive position in a growing market. 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. An important factor in avoiding a failed agreement is the careful planning of the moves that are followed and the precise application of the factors that will be analyzed below (Papadakis, 2002).

Information related to cash flow helps financial statement users receive the relevant information concerning the use and source of financial resources over a given time period (Rose et al., 2007). Cash flow statement contains information associated with operating, investing purposes of financial analysis, because the effect of the traditional ratio analysis techniques has been well established in literature, and financial activities (Macve, 2000).

Cash flow-based ratios are especially surprising. This is because they not only play a significant role in the credit rating of evaluation, but also forecast the failure of a corporation. However, this does not indicate that traditional ratios are no longer relevant. Traditional ratios, if anything, help to reveal significant associations and trends that may not be obvious on an assessment of individual figures that appear in the books of account (Macve, 2000).

Nevertheless, because cash flow ratios are endowed with at least a single factual element (the denominator, numerator, or even both), their lack in importance, from accounting literature, may be regarded as quite puzzling (Somnath Das, 2018).

Cash is the only post the most important in the balance sheet, since it applies as a medium of exchange in our economy. Cash also become so important because companies must maintain adequate liquidity, that is, they must have sufficient money to pay its obligations at maturity so that the continuity of the company can continue to operate (Lufriansyah, 2019).

Hutauruk (2020), carried out a study for the purpose of determining the impact of difference in accounting and fiscal profit, and operating cash flows, on earnings persistence, using levels of liabilities as control variable. Hayati, et al. (2021), studied the effect of debt level, operating cash flows, sales volatility, and managerial ownership on earnings persistence of the real state listed firms at Indonesian Stock Exchange. Ahmed and Abu Saleem (2020) intended to explore whether cash flow

affects the quality of profits of listed hoteling firms at ASE. Abdul Rahman (2017) analyzed the relationship between solvency and profitability ratios. Tareq Mohammad Almomani, et al. (2023) found that the most important conclusion is that each of liquidity, solvency, and cash flows from operations, has a positive impact on earnings persistence of the listed manufacturing firms at ASE. Catanach (2000) showed that all bankrupt firms have problems in the cash flow information, which is reflected in the cash flow indexes calculated through the cash flow statements. The study of Nguyen, Nguyen & Nguyen, (2019 & 2020) provides a model to predict the bankruptcy of firms based on information from cash flow statements and the said that the cash flow statement and other information may distinguish healthy firms and firms in financial crisis, where information of operating cash flows is the most important indicator of business failure. Firms with a negative operating cash flows is a warning of financial crisis in the following one or two years. In addition to cash flow from operating activities, there are a number of studies on cash flow from investment and financial activities related to predicting the financial situation of firms.

3. Methodology

Our study is based in the relevant International Financial Reporting Standards 3 and 7 that analyze mergers and acquisitions. The reason that we calculate financial ratios extracting from cash flow statements is that they are more accurate than the financial ratios extracting from balance sheet and financial results of use. The financial ratios from a cash flow statement shows the real cash and profit of a firm or bank. The financial ratios from a balance sheet and financial results of use shows only the accounting cash and profit of a firm or bank. So, the data for all the calculations extract from the cash flow statements three years before the acquisition for the two banks, bidder and target, which they took place in our study and three years after the acquisitions only for the bidder.

Cash flow ratios compare cash flows to other elements of an entity's financial statements. A higher level of cash flow indicates a better ability to withstand declines in operating performance, as well as a better ability to pay dividends to investors. They are an essential element of any analysis that seeks to understand the liquidity of a business. These ratios are especially important when evaluating companies whose cash flows diverge substantially from their reported profits (https://www.accountingtools.com/articles/cash-flow-ratios.html).

Financial cash flow ratios are a basic tool of a bank and a firm analysis as they allow, with relatively simple operations, comparisons to be made in relative sizes and not in absolute numbers (Arnold et al. 2018).

In this section, we try to find out if there is a better value for the bidder cooperative bank four years after the acquisition of the target cooperative bank. Thus, we calculate financial ratios using the cash flow statements of the bidder and target cooperative banks. These financial ratios are:

1) Cash Flow Earnings Quality Measurement Ratio (CFEQMR)

$$\text{CFEQMR} = \frac{\text{Net Cash Flow from Operating Activities}}{\text{Net Earnings from Operating Activities}} \quad (1)$$

Earnings Quality refers to the ability of reported income/earnings to predict a company's future earnings. It can be defined as earnings which sketch accurate image of a company performance, predict future performance of the company, and help investors in optimizing investing decisions. Earnings quality helps to predict a company's future earnings and an important aspect of evaluating the company's financial health (Sucharita and Lokeswari, 2019).
The above Cash Flow Earnings Quality Measurement Ratio (CFEQMR) shows a healthy bank if it is close to 1. It shows at what rate accounting profits are converted into liquid funds, that is, to what extent they can be used to pay off liabilities and pay dividends. When the ratio is less than 1, it means that the bank has "accounting profits" that are not converted into cash and therefore inefficient management of assets and relationships with depositors, as it may also hide the use of creative accounting methods with the aim of misleading the lenders.

2) Cash Flow Dividend and Interest Coverage Ratio (CFDICR)

$$\text{CFDICR} = \frac{\text{Net Cash Flow from Operating Activities}}{(\text{Dividend+ Interest})} \quad (2)$$

The above Dividend and Interest Coverage Ratio (CFDICR) should be above 3-4 to be quality. When the ratio is close to 1, it means that the bank is not generating sufficient profits from operating activities to pay its investors and cut dividends.
Operating profit is the accounting profit that includes the discretion of the manager, which is calculated by the accruals. On the other hand, the cash generated from the business shown in the cash flow statement represents the degree to which the bank/company generates cash necessary for repayment of borrowings, maintenance of sales capability, payment of dividends, and new investment through business. It is the amount that represents the ability of a pure bank/enterprise to generate cash related to operations that the entity does not fund from outside. Therefore, the fact that the cash based interest plus dividend coverage ratio is lower than 1 means that the cash generated from the actual cash inflows is less than the actual cash outflow (Hyunmi Ji 2017).

3) Cash Flow Total Liabilities Coverage Ratio (CFTLCR)

$$\text{CFTLCR} = \frac{\text{Net Cash Flow from Operating Activities}}{(\text{Long Liabilities+Current Liabilities})} \text{ X } 100 \quad (3)$$

The above Cash Flow Coverage Ratio (CFTLCR) is calculated as operating cash flows divided by total debt. This ratio should be as high as possible, which indicates that an organization or a bank has sufficient cash flow to pay for scheduled principal and interest payments on its debt.
(https://www.accountingtools.com/articles/cash-flow-ratios.html).
If the operating cash flow Coverage Ratio is below 1, it means there is a possibility that the bank/company could not afford to pay current liabilities, without using cash flow from other activities.

4) Cash Flow Current Liabilities Coverage Ratio (CFCLCR)

$$\text{CFCLCR} = \frac{\text{Net Cash Flow from Operating Activities}}{\text{Current Liabilities} - \text{Cash}} \text{ X } 100 \quad (4)$$

The Current Liability Coverage Ratio (CFCLCR) is calculated as cash flows from operations divided by current liabilities. If this ratio is less than 1:1, a bank or a firm is not generating enough cash to pay for its immediate obligations, and so may be at significant risk of bankruptcy.
(https://www.accountingtools.com/articles/cash-flow-ratios.html).

5) Cash Flow Margin Ratio (CFMR)

$$\text{CFMR} = \frac{\text{Net Cash Flow from Operating Activities}}{\text{Total Sales}} \text{ X } 100 \quad (5)$$

The above Cash Flow Margin Ratio (CFMR) shows how much cash money come into the bank from the cycle of total sales in a year. The higher the percentage, the better it is for the profitability of the business. The Cash Flow Margin Ratio is calculated as cash flows from operations divided by sales. This is a more reliable metric than net profit, since it gives a clear picture of the amount of cash generated per dollar of sales.
(https://www.accountingtools.com/articles/cash-flow-ratios.html).

6) Operating Cash Flow Return on Equity (OCFROE)

$$\text{OCFROE} = \frac{\text{Net Cash Flow from Operating Activities}}{\text{Total Equity}} \text{ X } 100 \quad (6)$$

The above Operating Cash Flow Ratio Return on Equity (OCFROE) on the numerator use Operating Cash Flow instead of net income and is similar to ROE. This is a basic ratio to show you how well the bank uses its equity to generate cash flow. Cash Flow from Operative Activities (CFOROE) is a term that refers how much cash flows seems to one unit of money of the invested capital. It is derived from the ratio ROE - Return on Equity, in which profit is replaced on the numerator by cash flows from operative activities.
(https://managementmania.com/en/roe-cf-cash-flow-return-on-equity).

7) Operating Cash Flow Ratio Return on Assets (CFOROA)

$$OCFROA = \frac{\text{Net Cash Flow from Operating Activities}}{\text{Total Assets}} \text{ X } 100 \quad (7)$$

The above Operating Cash Flow Ratio Return on Equity (OCFROA) in the numerator use Operating Cash Flow instead of net income and is similar to ROA. This is a basic ratio to show us how well the bank uses its assets to generate operating cash flows. It is derived from the ratio ROA - Return on Assets, in which profit is replaced on numerator by the cash flows from operative activities. (https://managementmania.com/en/roa-cf-cash-flow-return-on-assets).

8) DuPont Analysis ROE = ROA x EM (8)

Where ROE = (EBIT / EQUITY)x100
ROA = (EBIT / ASSETS)x100
EM = ROE / ROA = Total Assets / Total Equity

DuPont Analysis is a framework used to break apart the underlying ratio components of the return on equity (ROE) metric to determine the strengths and weaknesses of a company. Originally devised in the 1920s by Donaldson Brown at DuPont Corporation, the chemical company, the model is used to analyze the return on equity (ROE) as broken down into different parts in order to analyze the contribution of each part.
(https://www.wallstreetprep.com/knowledge/dupont-analysis-template/).
The main utilities of DuPont Analysis are described below:
(https://www.financestrategists.com/accounting/financial-statements/dupont-analysis/).

- Asset turnover measures the efficiency of the company in generating sales for every dollar/euro of assets.
- The Equity Multiplier (EM) shows how leveraged a bank/company is by computing how much financing stockholders have provided for every dollar/euro assets.
- DuPont Analysis is considered a useful tool for predicting future changes in Return On Non Operating Assets (RNOA)
- DuPont Analysis helps CEO of a bank/company to identify the factors that increase profits, improving the efficiency of the bank/company.

In mergers and acquisitions DuPont Analysis is used to measure the profitability of bidders and targets banks/companies before any mergers and acquisitions and compare to the new profitability of the remain banks/companies after mergers and acquisitions. If we are an external financial analyst it is too difficult to discover EBIT of banks from their balance sheets because the IASB give them the right not to display it prominently. For this reason we use operating profits before tax instead of EBIT to calculate ROE and ROA for DuPont Analysis.

There are several advantages associated with DuPont analysis. (https://www.financestrategists.com/accounting/financial-statements/dupont-analysis/):

- First, using DuPont analysis, investors can evaluate alternative stock investments and, in turn, compare why the ROEs of the stocks differ.
- This is achieved by identifying the impact of operating efficiency, asset use efficiency, and financial leverage on ROE.
- DuPont Analysis helps to analyze the factors that contribute to the differing ROEs stocks, which can guide portfolio management
- Finally, DuPont analysis, as a tool, is a measure for an investment portfolio.

There are some disadvantages that they concern DuPont Analysis and we write them below:
(https://www.financestrategists.com/accounting/financial-statements/dupont-analysis/).

- It is a before tax measurement of a short term nature
- It does not link to the cost of capital time value of money, or value its self
- It is difficult to set a target for good ROCE
- Using the gross value of assets as a measure instead of net value is contradictory to accounting practices based on principles and standards.

9) Return on Capital Employed (ROCE) (9)

ROCE = [EBIT / (TOTAL ASSET - CURRENT LIABILITIES)]x100

Return on Capital Employed (ROCE) refers to a financial ratio that can be used to assess a bank's/company's profitability and capital efficiency. In other words, this ratio can help to understand how well a bank/company is generating profits from its capital as it is put to use. ROCE is one of several profitability ratios financial managers, stakeholders, and potential investors may use when analyzing a bank/company for investment (https://www.investopedia.com/terms/r/roce.asp).
Some of the main Advantages and Disadvantages of ROCE ratio are mentioned below. There are various reasons why banks/companies should track ROCE. ROCE provides a comprehensive measure of a bank's/company's overall performance by considering both profitability and capital efficiency. It helps assess the effectiveness of capital allocation decisions and the ability to generate returns on invested capital. Therefore, ROCE allows for meaningful comparisons between banks/companies operating in different industries and highlights a bank's/company's ability to generate profits from the capital it employs. ROCE is an important metric for investors as it reflects the bank's/company's ability to generate returns on their investment. A consistently high ROCE indicates that the bank/company is generating attractive returns, which can instill confidence in investors and potentially attract more capital. ROCE also serves as a useful management tool for assessing the performance of different business units or projects within a

bank/company. It helps identify areas where capital may be tied up inefficiently and allows for better decision-making regarding resource allocation and investment strategies. More specifically, ROCE provides a long-term perspective on a bank's/company's profitability and efficiency. It considers the profitability generated over an extended period and relates it to the capital employed. (https://www.investopedia.com/terms/r/roce.asp)

As we explained before in the DuPont Analysis definition we also use operating profits before tax instead of EBIT to calculate ROCE for banks. We do not use the tax rate on the operating profit so as to be able to compare banks in different countries with different tax rate.

ROCE is commonly used to compare the efficiency of capital usage of businesses within the bank/company that they belong to the same sectoral industry. It is basically used to demonstrate how much a business is earning for its assets, or how much it is losing for its liabilities. It also indicates whether the bank/company is earning sufficient revenues and profits in order to make the best use of its capital assets. High ROCE is a validation of a bank's/company's competitive advantage. It indicates that the bank/company has something special to offer-products or services that command a high return. It usually follows that margins are above average (Jeet Singh Preeti Yadav 2017).

ROCE is an important shareholder value metric, but most of the annual financial statements of banks/companies do not even mention it. It has been observed that banks/companies which have a superior ROCE compared to others similar banks/companies, have a relentless focus on driving their banks/companies towards achieving their goals. Such banks/companies link all their strategic and operational initiatives, including performance metrics across functions and levels, to the key ROCE value drivers such as, fixed asset productivity, working capital turns, and operating margins. Targets are set against these during the planning and budgeting process, and initiatives are prioritised based on how important they are in preserving or enhancing ROCE (Shyam Pattabiraman 2013).

10) Z-score for banks (10)

The calculation formula for the Z-Score model for banks is $\mathbf{z}=\frac{\overline{ROA}+\overline{EA}}{\sigma_{ROA}}$

To find the value of Z-Score for banks we follow the three steps. First in the numerator we calculate the Average $\overline{ROA}$ of the considered time period before and after acquisitions and mergers. In the second step we add to the Average $\overline{ROA}$ the Average of the fraction of equity to total assets $\overline{EA}$ 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:

$$\sigma = \sqrt{\frac{\sum \left(ROAi - \overline{ROA} \right)^2}{N}}$$

Where **(Σ)** is the sum of the difference between the ROA and the average $\overline{ROA}$ 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 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).

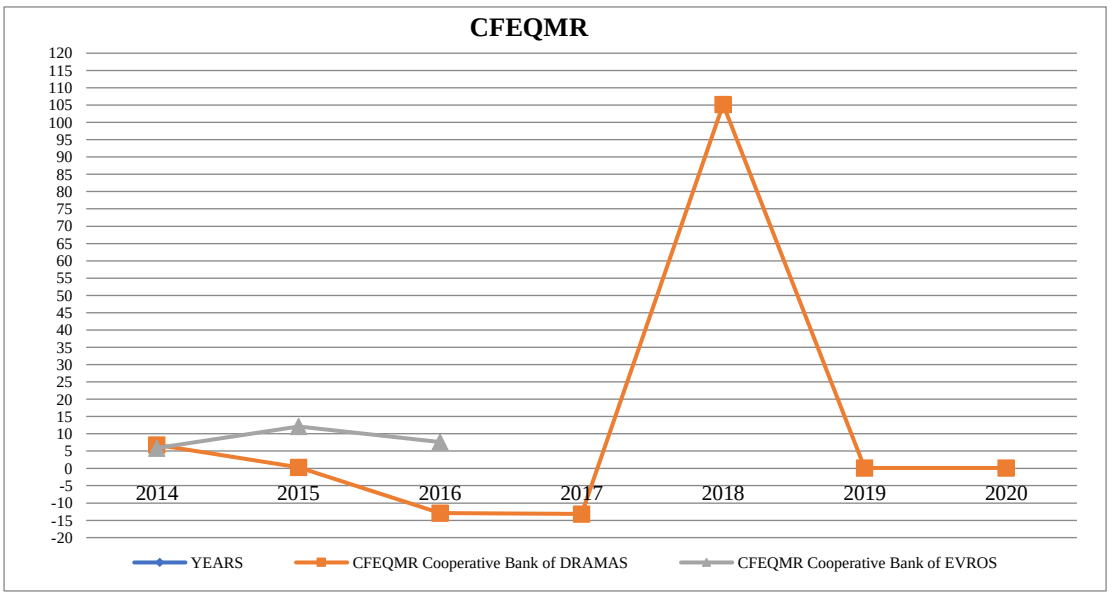
4. Results

All the calculations and measures in the below tablets are made using the financial elements of financial statements and cash flow statements of the Cooperative Banks of Drama as Bidder and Evros as Target.

Table 1: (CFEQMR) before and after the acquisition

YEARS	Earnings Quality Measurement Ratio (CFEQMR)-Cooperative Bank Drama	Earnings Quality Measurement Ratio (CFEQMR)-Cooperative Bank of Evros
2014	6.82	5.9
2015	0.27	12.11
2016	-12.91	7.6
2017	-13.16	
2018	105.21	
2019	0.11	
2020	0.11	

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



Source: Table 1

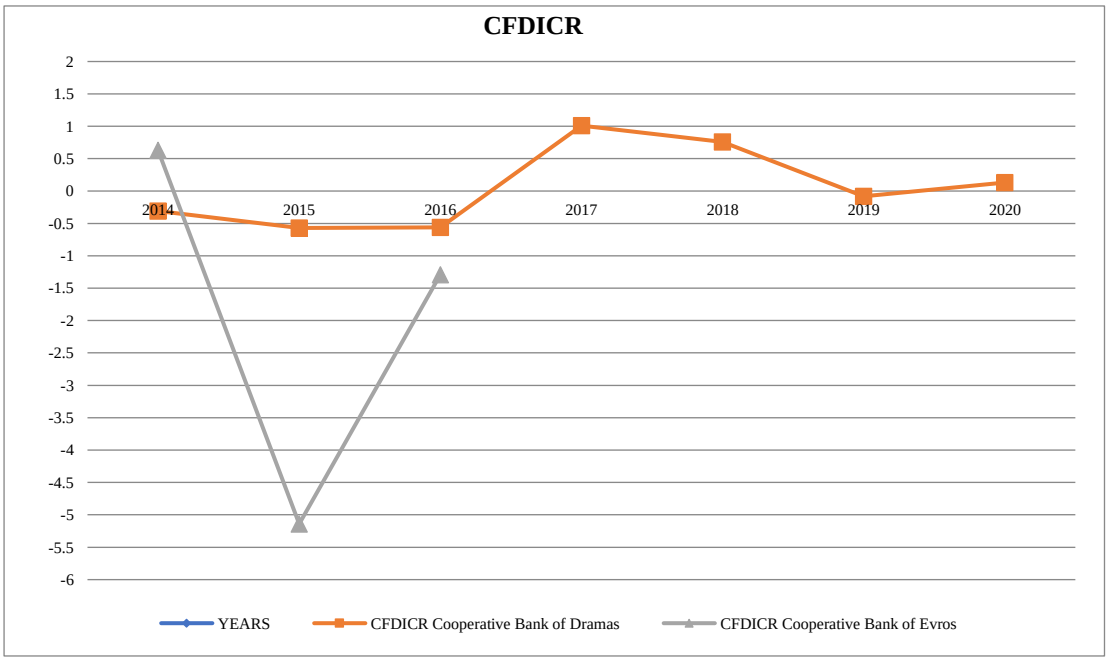
Figure 1: (CFEQMR) before and after the acquisition

From the above table 1, figure 1 we observe that during the time period 2014-2016 before the acquisition the CFEQMR ratio for the target bank was a little higher than the bidder's. After the acquisition the CFEQMR ratio of the bidder had increased in a very high rate in the year 2018, but afterwards it fell to a low level as it was two years before the acquisition.

Table 2: (CFDICR) before and after the acquisition

YEARS	CFDICR Cooperative Bank of Drama	CFDICR Cooperative Bank of Evros
2014	-0.31	0.63
2015	-0.57	-5.14
2016	-0.56	-1.29
2017	1.01	
2018	0.76	
2019	-0.08	
2020	0.13	

Source: Authors' calculations from published financial statements of the Greek Cooperative Banks.
Figure 2: (CFDICR) before and after the acquisition



Source: Table 2

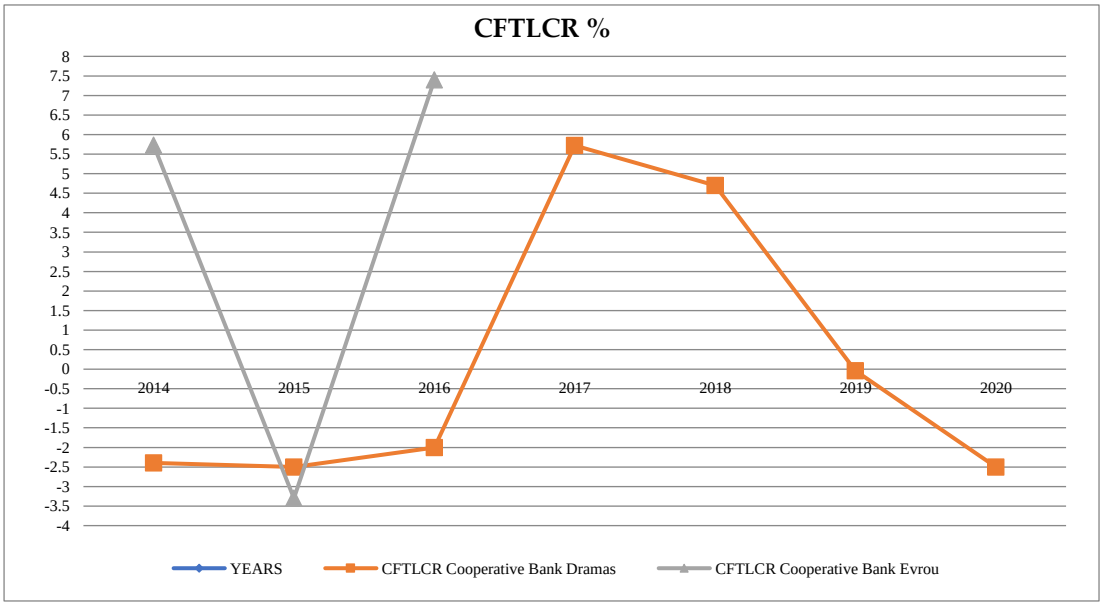
Figure 2: (CFDICR) before and after the acquisition

From the above table 2, figure 2 we observe that during the time period 2015-2016 before the acquisition the CFDICR ratio for the target bank was very low and lower than the bidder's. After the acquisition the CFDICR ratio of the bidder had increased in the year 2017, but afterwards it starts to decrease to a lower level.

Table 3: (CFTLCR) in % before and after the acquisition

YEARS	CFTLCR Cooperative Bank Dramas	CFTLCR Cooperative Bank Evros
2014	-2.9	5
2015	-1.1	-3.3
2016	3.2	7.4
2017	5.7	
2018	4.3	
2019	-0.6	
2020	-2.5	

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



Source: Table 3

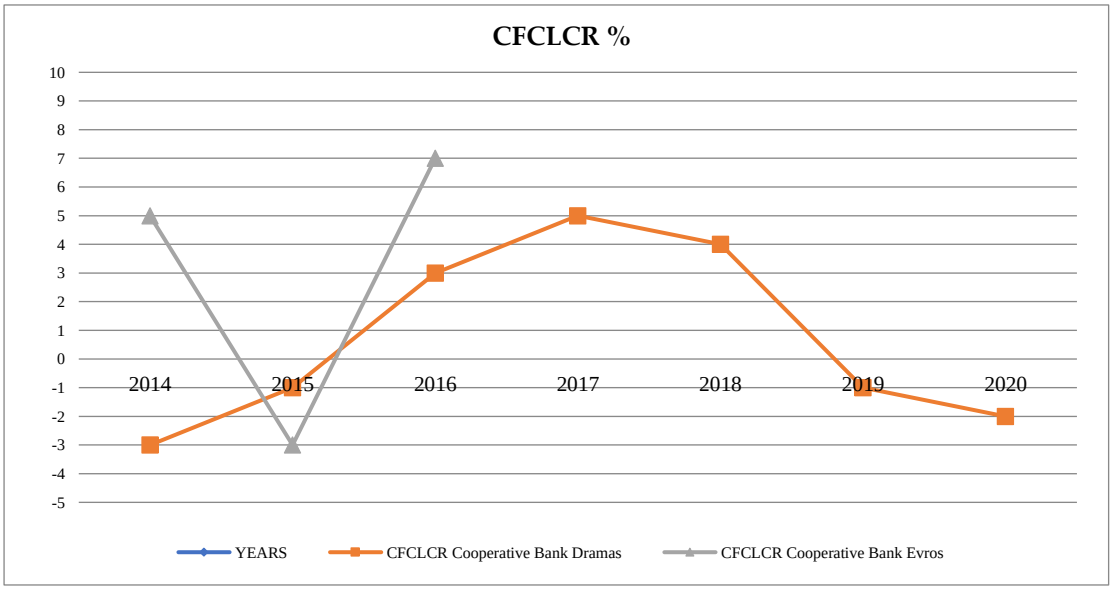
Figure 3: (CFTLCR) in % before and after the acquisition

From the above table3, figure 3 we observe that during the time period 2014-2016 before the acquisition the CFTLCR ratio for the target bank had greater volatility than the bidder's. The bidder had negative CFTLCR ratio. After the acquisition the CFTLCR ratio of the bidder had increased in the year 2017 in a very high level, but afterwards it had a downward trend and it fell to low negative level as it was before the acquisition.

Table 4: (CFCLCR) in % before and after the acquisition

YEARS	CFLCR Cooperative Bank Dramas	CFCLCR Cooperative Bank Evros
2014	-3	5
2015	-1	-3
2016	3	7
2017	5	
2018	4	
2019	-1	
2020	-2	

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



Source: Table 4

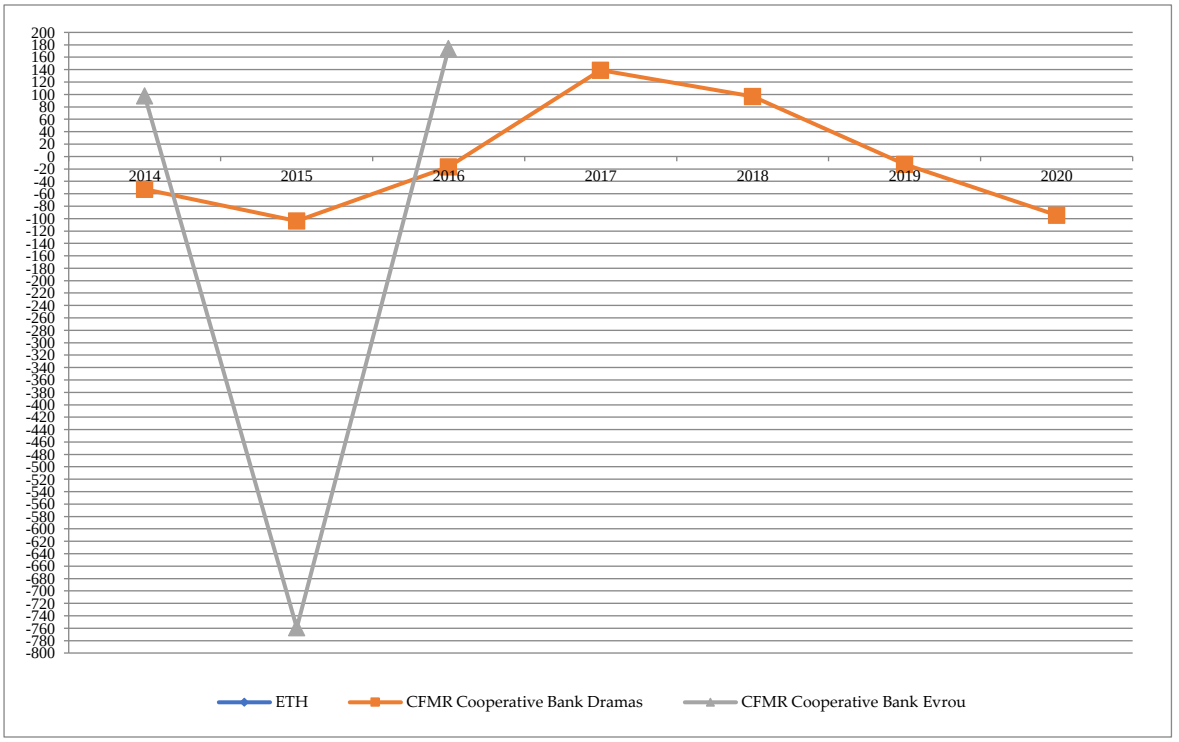
Figure 4: (CFCLCR) in % before and after the acquisition

From the above table 4, figure 4 we observe that during the time period 2014-2016 before the acquisition the CFCLCR ratio for the target bank had greater volatility than the bidder's. The bidder had negative CFCLCR ratio at the first two years before the acquisition took place. After the acquisition the CFTLCR ratio of the bidder had increased in the year 2017 in a high level, but afterwards it had a downward trend and the years 2019 and 2020 fell to negative level as it was before the acquisition.

Table 5: Cash Flow Margin Ratio (CFMR) before and after the acquisition

YEARS	CFMR Cooperative Bank Dramas	CFMR Cooperative Bank Evros
2014	-52.57	98
2015	-103.91	-759.35
2016	-16.52	174.38
2017	139.19	
2018	97.01	
2019	-12.64	
2020	-94.72	

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



Source: Table 5

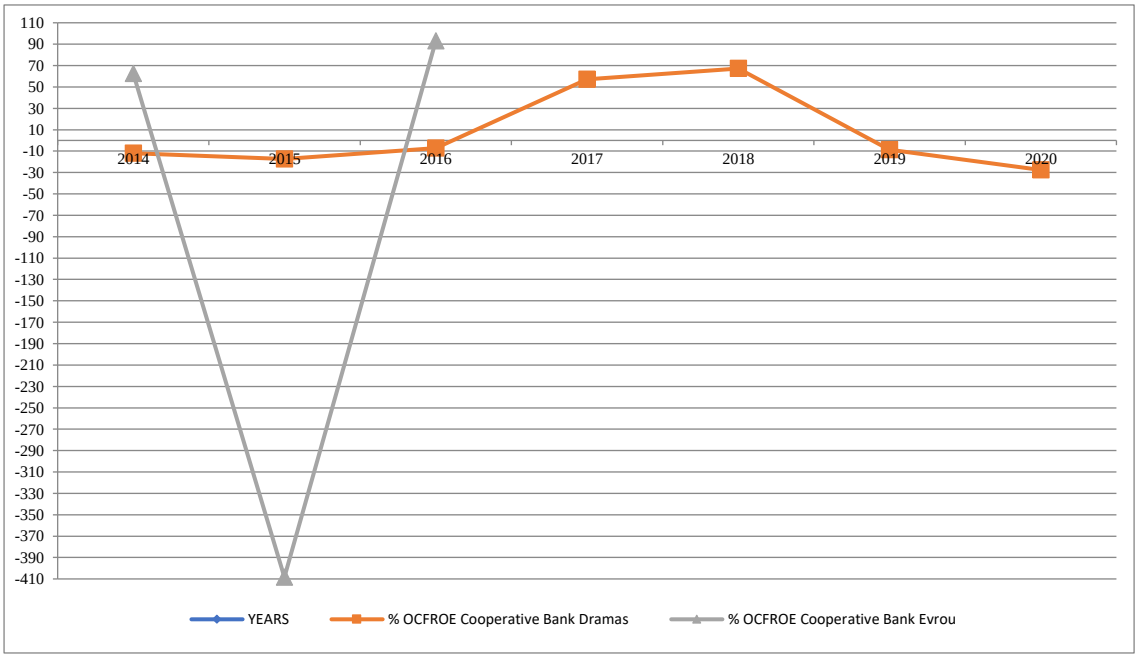
Figure 5: Cash Flow Margin Ratio (CFMR) before and after the acquisition

From the above table 5, figure 5 we observe that during the time period 2014-2016 before the acquisition the CFMR ratio for the target bank had a too high negative rate in the year of 2015 and greater volatility than the bidder's. The bidder had also negative CFMR ratio before the acquisition took place. After the acquisition the CFMR ratio of the bidder had increased in the year 2017 in a high positive level, but afterwards it had a downward trend and the years 2019 and 2020 fell to negative level as it was before the acquisition.

Table 6: Operating Cash Flow Return on Equity (OCFROE) before and after the acquisition

YEARS	% OCFROE Cooperative Bank Dramas	% OCFROE Cooperative Bank Evrou
2014	-12	62.5
2015	-17.4	-408.40
2016	-7.2	-9.1
2017	57.2	
2018	67.2	
2019	-8.8	
2020	-27.6	

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



Source: Table 6

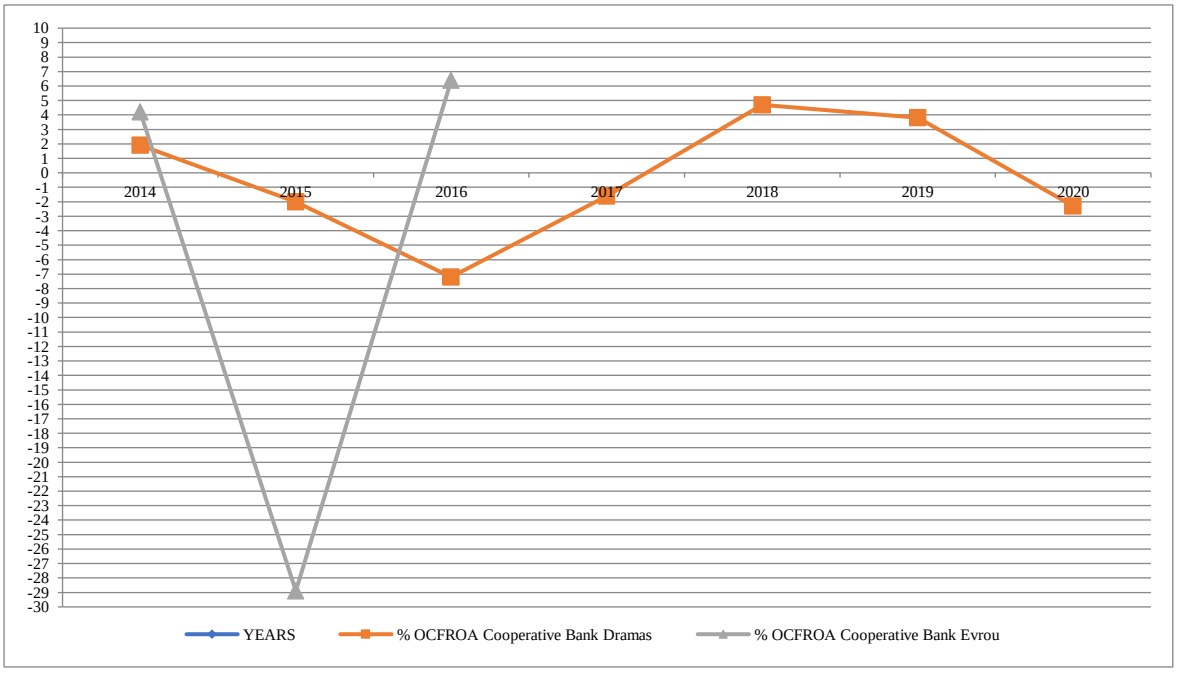
Figure 6: Operating Cash Flow Return on Equity (OCFROE) before and after the acquisition

From the above table6, figure 6 we observe that during the time period 2014-2016 before the acquisition the OCFROE ratio for the target bank had a too high negative rate in the year of 2015 and greater volatility than the bidder's. The bidder had also negative OCFROE ratio before the acquisition took place. After the acquisition the OCFROE ratio of the bidder had increased in the year 2018 in a high positive level, but afterwards it had a downward trend and the years 2019 and 2020 fell to negative level as it was before the acquisition.

Table 7: Operating Cash Flow Return on Equity (OCFROA) before and after the acquisition

YEARS	% OCFROA Cooperative Bank Dramas	% OCFROA Cooperative Bank Evrou
2014	1.9	4.2
2015	-2	-28.90
2016	-7.2	6.4
2017	-1.6	
2018	4.7	
2019	3.8	
2020	-2.3	

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



Source: Table 7

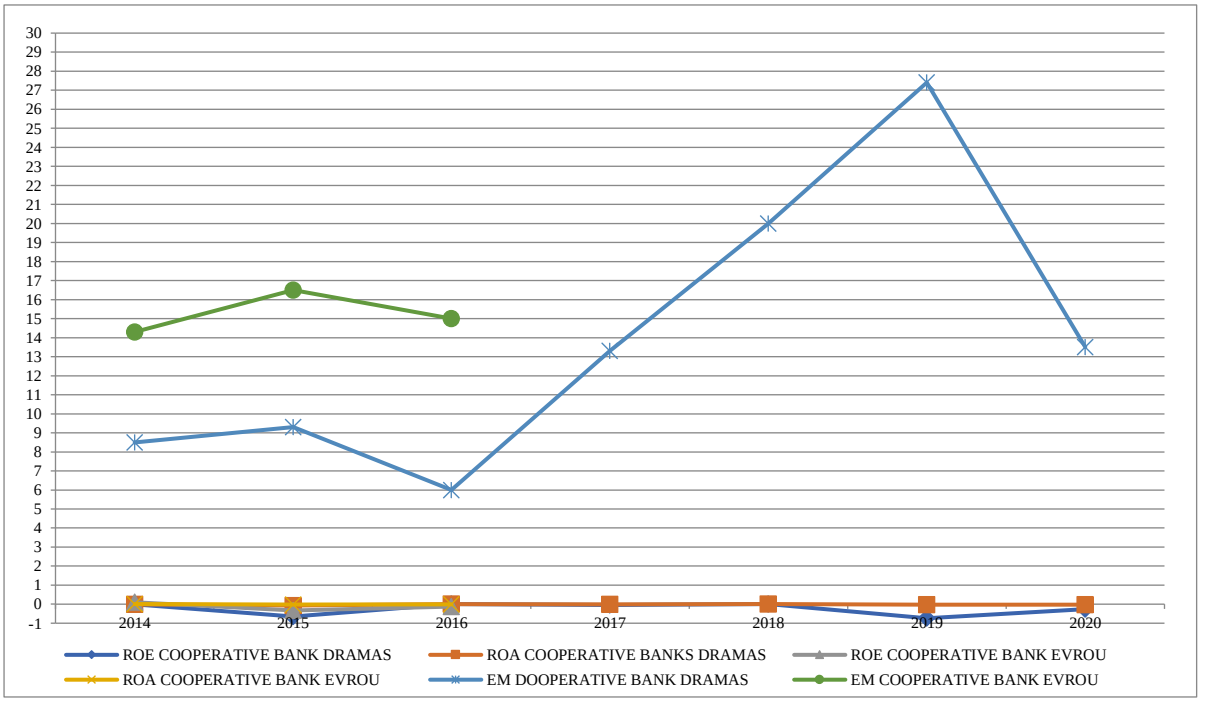
Figure 7: Operating Cash Flow Return on Equity (OCFROA) before and after the acquisition

From the above table 7, figure 7 we observe that during the time period 2014-2016 before the acquisition the OCFROA ratio for the target bank had a too high negative rate in the year of 2015 and greater volatility than the bidder's. The bidder had also negative OCFROA ratio before the acquisition took place. After the acquisition the OCFROA ratio of the bidder had increased in the year 2018 in a high positive level, but afterwards it had a downward trend and the years 2019 and 2020 fell to negative level as it was before the acquisition.

Table 8: DuPont Analysis before and after the Acquisition

Years	ROE Cooperative Bank Drama	ROA Cooperative Bank Drama	EM Cooperative Bank Drama	ROE Cooperative Bank Evrou	ROA Cooperative Bank Evrou	EM Cooperative Bank Evrou
2014	-0.017	-0.002	8.5	0.10	0.007	14.3
2015	-0.65	-0.07	9.3	-0.33	-0.02	16.5
2016	0.006	0.001	6	-0.12	-0.008	15
2017	-0.04	-0.003	13.3			
2018	0.006	0.0003	20			
2019	-0.74	-0.027	27.4			
2020	-0.27	-0.02	13.5			

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



Source: Table 8

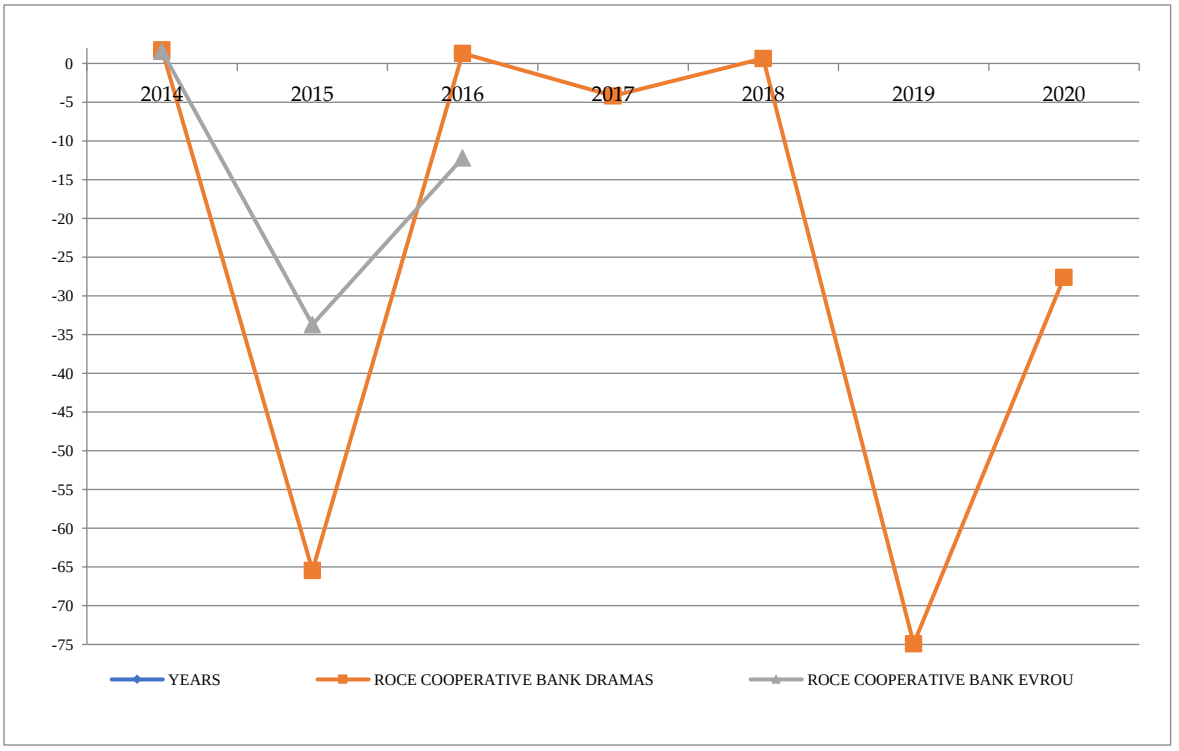
Figure 8: DuPont Analysis before and after the acquisition

From the table 8, figure 8 DuPont Analysis shows that the ROE and ROA ratios had very low positive rates and the years 2015 and 2019 negative rates. The target bank had a greater financial leverage rate (EM) than the bidder before the acquisition took place. After the acquisition the EM ratio of the bidder had increased and in the year 2019 had a high level position, but afterwards it had a downward trend and fell the year 2020 to a level as it was before the acquisition of the target bank.

Table 9: ROCE before and after the acquisition

YEARS	ROCE COOPERATIVE BANK DRAMAS	ROCE COOPERATIVE BANK EVROU
2014	1.76	1.57
2015	-65.45	-33.71
2016	1.31	-12.21
2017	-4.2	
2018	0.64	
2019	-74.91	
2020	-27.62	

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



Source: Table 9

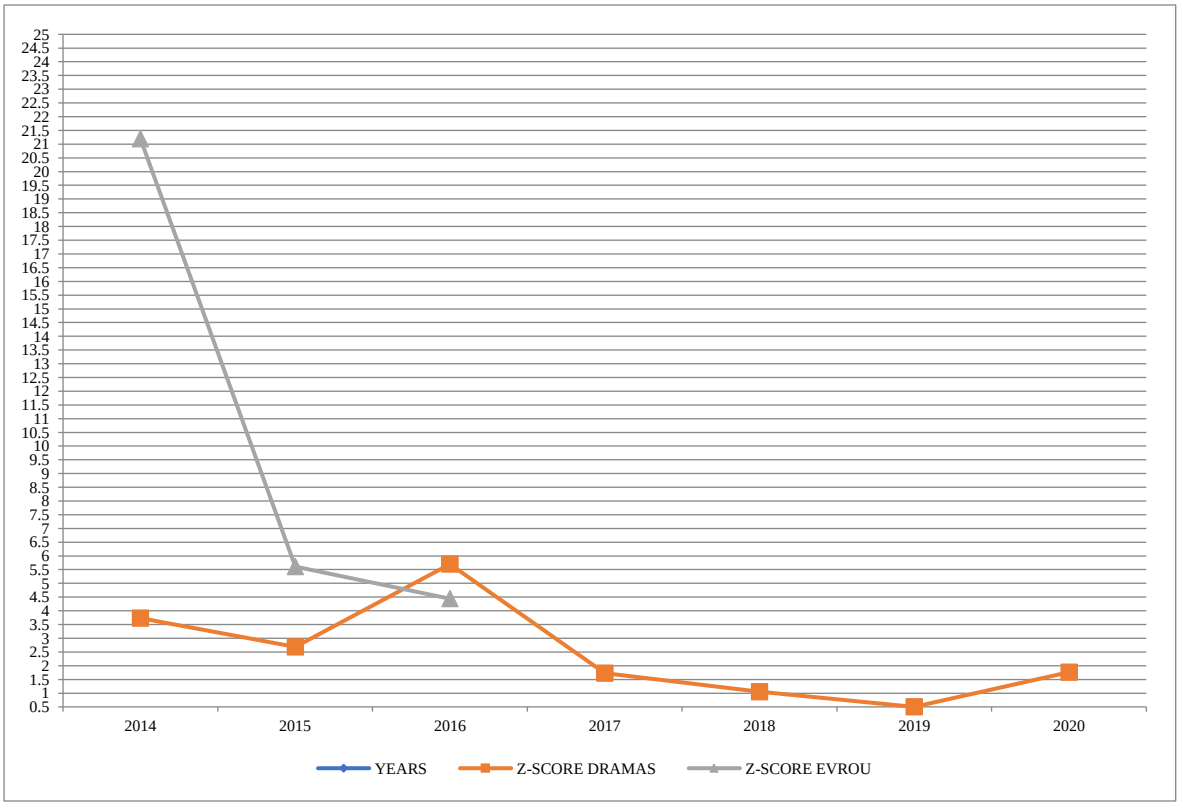
Figure 9: ROCE before and after the acquisition

From the above table9, figure 9 ROCE ratio had a very low negative rate in the year 2015 for both cooperative banks before the acquisition took place. After the acquisition the ROCE ratio of the bidder had a steady course near zero until 2018 and in the year 2019 had the highest negative position. The year 2020 had also negative position but not as much as in the year 2019.

Table 10: Z-Score before and after the acquisition

YEARS	Z-SCORE DRAMAS	Z-SCORE EVROU
2014	3.73	21.2
2015	2.68	5.61
2016	5.7	4.44
2017	1.73	
2018	1.05	
2019	0.5	
2020	1.76	

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



Source: Table 10

Figure 10: Z-Score before and after the acquisition

From the above table 10 figure 10 Z-Score had a very high rate in the year 2014 for the target bank. In the years 2015-2016 the Z-Score of the target bank had a very high downward trend. The bidder bank had low Z-Score two years before the acquisition and one year before the acquisition the Z-Score 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.

5. Conclusion

In this paper we tried to present a financial analysis mainly with cash flow ratios. We used also DuPont Analysis and Z-Score so as to be able to find out what would happen if one cooperative bank took over another one in the same country. We should point out that the present financial analysis showed us that both banks before the acquisition had low rates in cash flow ratios, ROE, ROA, ROCE and in Z-Score, but the financial leverage (EM) was in a high level. All these findings support the fact that both cooperative banks mainly the cooperative bank of Evrou were in an unfavorable financial position. So, we observed from the financial analysis after four years of the acquisition that the buyer's financial position became more difficult every year culminating in the year 2020.

The main point of this financial analysis is that it is very difficult for a bidder to absorb a target with profitability and without any risk of insolvency. And even more if the target is a bank near the edge of bankruptcy. So, we have to say that the forecast of bad operative cash flow ratios and insolvency ratios are very important information for banks.

We would like to stress that the cooperative bank of Drama which was the bidder went bankrupt and closed down in the year 2022 with all the implications for the economy and local society of the city of Drama.

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