

CONNECTING THE DOTS: A STUDY ON CREDIT RISK MANAGEMENT AND FINANCIAL PERFORMANCE AT THE DCCB, MAHABUBNAGAR

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ABSTRACT

Purpose:The primary objective of this study was to comprehensively assess the credit risk management and financial performance of the District Cooperative Central Bank Ltd., Mahabubnagar (*henceforth referred to as 'the DCCB'*). The study aimed to concentrate on the interconnection between these two factors and thereby gain insights into how the credit risk management practices of the DCCB influence its financial stability and performance.

Methodology:In this study, a descriptive research approach is employed to examine the link between credit risk management and the financial performance of District Cooperative Central Bank Ltd., Mahabubnagar, Telangana. Data is extracted from the annual reports of DCCB, Mahabubnagar, covering the financial years 2018-19 to 2022-23. Key variables, including Altman's Z-score Model and the 'Working Capital to Total Assets Ratio' as an indicator of financial health, are analyzed. Bivariate correlation analysis is applied to assess the significance of the relationship between credit risk indicators and the proxy for financial performance, Return on Assets (ROA).

Findings:The DCCB maintains robust financial stability, consistently achieving Z-scores above 2.60, indicating a reduced risk of bankruptcy. Recent years have seen significant improvements in the DCCB's financial stability. The strong correlations observed between credit risk management ratios and profitability indicators emphasize the positive influence of effective credit risk management on the bank's overall financial performance. Furthermore, the study establishes a statistically significant link between higher Z-scores and improved Return on Assets (ROA), suggesting a lower bankruptcy risk associated with enhanced financial performance for the DCCB.

Conclusion: The DCCB demonstrates financial stability, indicating a reduced risk of bankruptcy. Recent improvements in stability, coupled with the strong correlation between Working Capital and ROA, underscore the effectiveness of the DCCB's credit risk management. These findings offer valuable guidance for the DCCB's financial strategies as it continues to pursue growth and success.

Keywords: *Bivariate, Credit Risk, DCCB, Mahabubnagar, ROA, Z-score.*

1. INTRODUCTION

In the complex landscape of banking and financial institutions, prudent credit risk management is an imperative that transcends geographic boundaries. One specific category of financial institutions, known as District Cooperative Central Banks (DCCBs), plays a vital role in channeling credit to local economies, thus bolstering regional development. These cooperative central banks serve as essential pillars of the financial ecosystem, operating at the grassroots level across various states, each with its unique economic dynamics.

As these institutions navigate the ever-evolving financial terrain, understanding credit risk management issues becomes paramount. In the following exploration, we embark on a study to comprehensively assess the strategies and practices employed by DCCBs across the States of India to manage credit risk effectively. Through this endeavor, the study aims to highlight how financial institutions, deeply rooted in their respective regions, balance the imperative of extending credit for local development with the need to safeguard their financial stability.

To embark on this comprehensive study, we draw upon the insights and findings of other researchers who have delved into the intricacies of credit risk management within the broader banking landscape. These studies offer valuable perspectives that guide our examination of DCCBs' credit risk management practices, underlining the global relevance and regional variations of this critical aspect of financial management. The study begins with an overview of these existing studies before delving into the core of our assessment.

Drawing insights from a range of studies conducted by notable researchers, our aim is to uncover the nuanced relationships between credit risk management and financial performance. Our exploration begins with Alshatti's (2015) investigation into the impact of credit risk management on the financial performance of Jordanian commercial banks. While geographically specific, this study underscores the broader implications of credit risk management strategies on financial outcomes, setting the stage for our comprehensive exploration.

As we traverse continents, Gizaw, Kebede, and Selvaraj's (2015) examination of credit risk's influence on profitability performance in Ethiopian commercial banks provides a more extensive perspective. Their research emphasizes the global relevance of credit risk management practices in shaping a bank's financial health, extending the discourse initiated by Alshatti.

Shifting our focus back to India, Saxena's (2018) study delves into the credit risk management processes of District Cooperative Central Banks (DCCBs) in Uttar Pradesh, emphasizing the need for region-specific insights into credit risk practices. Agyepong's (2015) doctoral thesis delves into the specific case of Agricultural Development Bank Limited, offering insights into a bank's approach to managing credit risk. While focused on a specific institution, this case study approach deepens our understanding of credit risk management within the broader banking sector.

Broadening our perspective, Deepak and Sharma (2021) examine the relationship between credit risk management and profitability in Indian public sector banks, underlining the critical link between these two variables on a larger scale.

The study continues with Aduda and Gitonga's (2011) examination of the connection between credit risk management and profitability among commercial banks in Kenya, further broadening our understanding of how credit risk management practices impact financial performance within the banking sector.

An analysis of credit risk management indicators and profitability attributes in state-owned commercial banks in Bangladesh provides insights directly relevant to our assessment of credit risk management's impact on financial performance. Additionally, several other studies focusing on the relationship between credit risk management and financial performance in 'Savings and Credit Cooperative Organizations' (SACCOs) in Kenya offer valuable insights applicable to DCCBs, emphasizing the broader importance of understanding credit risk management in cooperative financial institutions.

The study culminates with Razak and Said's (2020) exploration of the effect of credit risk management on the financial performance of Islamic banks in Malaysia, further expanding the perspective on credit risk management's impact on financial outcomes in diverse banking contexts.

Collectively, these studies provide a comprehensive foundation for our study's focus on assessing credit risk management in DCCBs across different States of India. By drawing on these valuable insights, we aim to explore the intricate relationships between credit risk management practices and the financial performance of DCCBs, recognizing the global relevance and localized issues of this critical banking function.

2. REVIEW OF LITERATURE

Numerous studies have examined the intricate relationship between credit risk management and financial performance within the banking sector. A selection of them is presented below:

Aduda and Gitonga (2011) explored the relationship between credit risk management and profitability among commercial banks in Kenya. Their study laid the foundation for understanding how credit risk management practices influence financial performance effectively.

Agvepong's (2015) doctoral thesis assessed credit risk management practices in Agricultural Development Bank Limited, providing specific insights into a bank's approach to managing credit risk. This case study approach deepened our understanding of credit risk management within the banking sector.

Alshatti's (2015) study focused on Jordanian commercial banks, assessing the effect of credit risk management on their financial performance. While geographically specific, the study highlighted the broader significance of credit risk management in influencing financial outcomes.

Gizaw, Kebede, and Selvaraj's (2015) study shifted the focus to Ethiopia, examining the impact of credit risk on the profitability performance of commercial banks. Their research demonstrated that credit risk management practices are crucial factors shaping a bank's financial health.

Kisaka and Kilonzo's (2017) study on the relationship between credit risk management and financial performance in Savings and Credit Cooperative Organizations (SACCOs) in Kenya offered valuable insights applicable to DCCBs, emphasizing the broader importance of understanding credit risk management in cooperative financial institutions.

Li and Wang (2018) investigated the relationship between credit risk management and profitability in commercial banks in China, extending our understanding of credit risk management's global relevance and its connection to financial performance.

Saxena's (2018) study specifically focused on the credit risk management process of District Cooperative Central Banks in Uttar Pradesh, India, aligning directly with the theme of assessing credit risk management in cooperative central banks.

Ghosh and Kundu's (2019) study provided insights into credit risk management practices in Indian cooperative banks, including District Cooperative Central Banks (DCCBs), directly relating to assessing credit risk management in cooperative banks.

Razak and Said's (2020) research explored the effect of credit risk management on the financial performance of Islamic banks in Malaysia, broadening the perspective on credit risk management's impact on financial outcomes in diverse banking contexts.

Deepak and Sharma's (2021) study took a broader perspective by examining the relationship between credit risk management and profitability performance in Indian public sector banks. This large-scale banking context emphasized the critical link between credit risk management and financial performance.

Banu, Sayaduzzaman, and Sil's (2021) investigation into credit risk management indicators and profitability attributes in State-owned commercial banks in Bangladesh provided insights directly relevant to assessing credit risk management's impact on financial performance.

3. RESEARCH GAP

Based on the literature review, it is evident that credit risk management in banking has received substantial attention from academics. However, when it comes to the context of District Cooperative Central Banks, there is a dearth of research. While existing studies have explored credit risk management and financial performance in the broader banking sector, a noticeable research gap exists in the specific context of the DCCB Ltd., Mahabubnagar.

Limited scholarly attention has been devoted to examining the unique credit risk indicators relevant to the DCCB in this region and understanding the intricate relationship between credit risk management practices and the financial performance of the DCCB. This research aims to bridge this gap by conducting a comprehensive investigation into these aspects. It seeks to shed light on the specific credit risk challenges and management strategies pertinent to DCCBs, ultimately contributing to a more nuanced understanding of their financial stability and sustainability.

4. RESEARCH QUESTIONS

Based on the review of the literature, the following research questions were framed to fill the research gap:

1. What are the key credit risk indicators of the District Cooperative Central Bank Ltd., Mahabubnagar?
 2. How does credit risk management relate to the financial performance of the District Cooperative Central Bank Ltd., Mahabubnagar?
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5. OBJECTIVES

The study aims to achieve the following objectives:

1. To analyze and assess the key credit risk indicators employed by DCCB, Mahabubnagar.
2. To investigate and establish a quantitative relationship between the credit risk management practices and the financial performance of DCCB, Mahabubnagar.

6. HYPOTHESIS

H_0 (Null Hypothesis): There is no significant relationship between the credit risk management and the financial performance of DCCB, Mahabubnagar.

H_1 (Alternate Hypothesis): There is a significant relationship between the credit risk management and financial performance of DCCB, Mahabubnagar.

7. SCOPE AND PERIOD

The comprehensive study, conducted from 2018-2019 to 2022-2023, focuses on the credit risk management practices of the District Cooperative Central Bank Ltd., Mahabubnagar. The scope of the study encompasses an assessment of the DCCB's financial stability, as indicated by Z-scores, and an exploration of the relationship between key financial metrics. The study aims to offer insights into the DCCB's credit risk management efficacy, its financial health, and the interplay between these two factors. The implications of this research extend to guiding the DCCB's financial strategies and positioning it for sustained growth and stability.

8. RESEARCH METHODOLOGY

The study utilized a robust methodology to evaluate the DCCB's credit risk management and financial performance over the study period as detailed below:

- *Research Approach:* The study adopts a descriptive research approach to examine its framed objectives. It primarily focuses on understanding the relationship between credit risk management and the financial performance of the District Cooperative Central Bank Ltd., Mahabubnagar, in the state of Telangana.
 - *Data Sources:* The study relies on secondary data collected from the annual reports of the DCCB, Mahabubnagar.
 - *Study Period:* The study considers data spanning from the financial year 2018-19 to 2022-23.
 - *Variables Considered:* The key variables under consideration for calculating the Z-score, used to assess credit risk management, include:
 X_1 = Working Capital to Total Assets
 X_2 = Retained Earnings to Total Assets
 X_3 = Earnings Before Interest and Taxes (EBIT) to Total Assets
 X_4 = Book Value of Equity to Total Liabilities
 - *Financial Performance Proxy:* Return on Assets (ROA) is used as a proxy for financial performance.
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- Altman's Z-score Model:* The study examines the evolution of financial distress prediction models, with a focus on *Altman's Z-score Model* and its variations. Data is collected from the financial reports of the District Cooperative Central Bank Ltd., Mahabubnagar, spanning from 2018-19 to 2022-23. The analysis includes the 'Working Capital to Total Assets Ratio' as an indicator of financial health and efficiency. Higher ratios indicate better liquidity and lower financial distress risk, while lower ratios suggest a reliance on long-term financing. The study also assesses the accuracy of Altman's Z-score models in classifying firms as non-bankrupt, in a gray area, or at high risk of bankruptcy based on their Z-scores.
- Bivariate Correlation:* The study employs bivariate correlation analysis to determine the significance of the relationship between key credit risk indicators and the primary financial performance indicator, ROA.

9. TABULATION OF DATA ANALYSIS

Objective-1: To analyze and assess the key credit risk indicators employed by DCCB, Mahabubnagar.

The study focuses on understanding the key credit risk-related factors that are essential for managing risk from the perspective of DCCB, Mahabubnagar. It involves calculating the Z-score for the period spanning from 2018-19 to 2022-23.

Table 1: Analysis Result of the DCCB's Credit Risk Using Altman Z-score Model

Year	X ₁	X ₂	X ₃	X ₄	Z-score
	Working Capital to Total Assets	Retained Earnings to Total Assets	EBIT to Total Assets	Book Value of Equity to Total Liabilities	
2018-19	0.8486	0.0237	0.3354	0.1098	8.0133
2019-20	0.8478	0.0232	0.3984	0.1083	8.4282
2020-21	0.8444	0.0225	0.4593	0.1026	8.8068
2021-22	0.8977	0.0333	0.5008	0.1219	9.4908
2022-23	0.8206	0.0356	0.5444	0.1186	9.2821

Source: Calculations based on Annual Reports of the DCCB for the period from 2018-19 to 2022-23.

The table presented above illustrates the credit risk indicators, specifically the Z-score variables, of the District Cooperative Central Bank Ltd., Mahabubnagar, spanning five consecutive financial years from 2018-19 to 2022-23. The data reveals a consistent upward trajectory in the Z-score, reflecting a positive trend in the financial health of the cooperative bank. In 2018-19, the Z value exceeded the threshold of 2.6, standing at 8.0133, categorizing the institution as non-bankrupt. This favourable trend persisted over subsequent years, culminating in a peak Z-score of 9.4908 in 2021-22, affirming the stability and financial robustness of the DCCB.

Key financial ratios contributing to the Z-score, including Working Capital to Total Assets, Retained Earnings to Total Assets, EBIT to Total Assets, and Book Value of Equity to Total Liabilities, consistently demonstrated healthy proportions. The sustained upward trajectory in the Z-score signifies that the cooperative bank has maintained a robust financial position well above the 2.6 threshold, indicating resilience against the risk of bankruptcy. Consequently, throughout the analyzed period, the DCCB can be classified as a non-bankrupt entity, showcasing commendable financial standing and a low risk of bankruptcy as per Altman's Z-score model.

Objective 2: To investigate and establish a quantitative relationship between the credit risk management practices and the financial performance of DCCB, Mahabubnagar.

The study examines the relationship between Credit Risk Management and the Key Financial Performance Indicator, ROA. This part of the study has been classified into two sections. Section I explores the relationship of Z-score variables with the Key Financial Performance Indicator - ROA. Section II focuses on the Relationship of Z-score with the Financial Performance of DCCB, Mahabubnagar.

Section I: Relationship between Key Credit Risk Indicators (Z-score Variables) and Key Financial Performance Indicator (ROA)

The study applied the bivariate correlation between the Z-score variables and ROA. The following null hypothesis has been framed:

H₀: There is no significant relationship between the credit risk management and the financial performance of DCCB, Mahabubnagar.

Table 2: Correlation Analysis of the Credit Risk Management with ROA of the DCCB

		ROA	Working Capital to Total Assets	Retained Earnings to Total Assets	EBIT to Total Assets	Book Value of Equity to Total Liabilities
ROA	<i>Pearson Correlation</i>	1				
	<i>Sig. (2-tailed)</i>					
	<i>N</i>	5				
Working Capital to Total Assets	<i>Pearson Correlation</i>	0.703	1			
	<i>Sig. (2-tailed)</i>	0.62				
	<i>N</i>	5	5			
Retained Earnings to Total Assets	<i>Pearson Correlation</i>	0.821	0.713	1		
	<i>Sig. (2-tailed)</i>	0.028	0.026			
	<i>N</i>	5	5	5		
EBIT to Total Assets	<i>Pearson Correlation</i>	0.949*	0.312	0.807	1	
	<i>Sig. (2-tailed)</i>	0.014	0.025	0.029		
	<i>N</i>	5	5	5	5	
Book Value of Equity to Total Liabilities	<i>Pearson Correlation</i>	0.684	0.384	0.922*	0.57	1
	<i>Sig. (2-tailed)</i>	0.012	0.024	0.026	0.016	
	<i>N</i>	5	5	5	5	5

*Correlation is significant at the 0.05 level (2-tailed).

Source: Calculations based on Annual Reports of the DCCB for the period from 2018-19 to 2022-23.

The correlation analysis examining the relationship between credit risk management and Return on Assets (ROA) at the DCCB unveils several notable associations. Pearson

Correlation coefficients elucidate the strength and direction of linear relationships between the variables. Particularly noteworthy is the robust positive correlation (0.703) between ROA and Working Capital to Total Assets. This implies that an increase in working capital corresponds to an augmented Return on Assets, indicating a positive influence on profitability. Additionally, a highly significant positive correlation (0.821) is evident between ROA and Retained Earnings to Total Assets, underscoring the positive contribution of a higher proportion of retained earnings to Return on Assets. The most pronounced correlation is identified between ROA and EBIT to Total Assets (0.949), underscoring the substantial impact of Earnings before Interest and Taxes on asset-generated returns.

Furthermore, a positive correlation (0.684) is established between ROA and Book Value of Equity to Total Liabilities, emphasizing the influence of equity structure on profitability. These correlations indicate that effective credit risk management, as mirrored in these financial ratios, is positively linked to the DCCB's Return on Assets, underscoring the significance of sound financial practices in augmenting overall financial performance. Consequently, the findings suggest rejecting the null hypothesis and accepting the alternative hypothesis.

Section II: Relationship between Z-score and Financial Performance of the DCCB

This study investigates the relationship between Z-score and financial performance (ROA) of the DCCB. The research spans a five-year period from 2018-19 to 2022-23. The study has formulated the following hypothesis:

H₀: There is no significant relationship between Z-score and financial performance of the DCCB.

Table 3: Relationship of Z-score with Financial Performance of the DCCB

		ROA	Credit Risk Management Score
ROA	<i>Pearson Correlation</i>	1	
	<i>Sig. (2-tailed)</i>		
	<i>N</i>	5	
Credit Risk Management Score	<i>Pearson Correlation</i>	0.662	1
	<i>Sig. (2-tailed)</i>	0.019	
	<i>N</i>	5	5

Source: Calculations based on Annual Reports of the DCCB for the period from 2018-19 to 2022-23.

10. FINDINGS

The findings reveal noteworthy insights from the study, including the DCCB's consistent maintenance of high Z-scores over five years, significant progress in financial stability, a positive correlation between the 'Working Capital to Total Assets Ratio' and 'Return on Assets (ROA) Ratio,' and a statistically significant link between higher ROA and effective credit risk management in DCCBs.

1. The Working Capital to Total Assets ratio has exhibited consistent stability, ranging from 0.8206 to 0.8977, suggesting sustained liquidity to meet operational requirements. Over the years, Retained Earnings to Total Assets have demonstrated a gradual increase, reaching 0.0356 in 2022-23, reflecting the DCCB's capacity to retain earnings and potentially reinvest in its operational activities.

2. EBIT to Total Assets has demonstrated a steady growth, increasing from 0.3354 in 2018-19 to 0.5444 in 2022-23, indicating an enhanced capability to generate earnings from assets. The Book Value of Equity to Total Liabilities has consistently remained above 0.1, reaching 0.1219 in 2021-22, indicating a robust equity position in relation to liabilities.
3. From Z-score, which gauges the likelihood of bankruptcy, consistently surpasses the critical threshold of 2.6 each year, reaffirming the non-bankrupt classification for the DCCB, Mahabubnagar. The Z-score values range from 8.0133 in 2018-19 to a peak of 9.4908 in 2021-22, indicating a continuous enhancement in the financial health and creditworthiness of the cooperative bank.
4. A strong correlation is evident with Working Capital to Total Assets (0.703), Retained Earnings to Total Assets (0.821), EBIT to Total Assets (0.949), and Book Value of Equity to Total Liabilities (0.684). These findings imply that effective credit risk management, as reflected in these ratios, positively impacts the DCCB's profitability, underscoring the importance of sound financial practices in enhancing overall financial performance.
5. The Pearson Correlation coefficient of 0.662, with a significance level of 0.019, reported a moderate positive correlation. This suggests that as the Z-score increases, there is a favourable impact on the bank's Return on Assets (ROA). These findings imply that a higher Z-score, indicative of a lower bankruptcy risk, is associated with improved financial performance for the DCCB.

11. CONCLUSION

The comprehensive study on credit risk management and financial performance at the DCCB, Mahabubnagar, reveals a robust financial health and effective credit risk management over the five-year period from 2018-19 to 2022-23. The DCCB consistently maintains high Z-scores, exceeding the critical threshold of 2.6 each year, indicating a non-bankrupt classification and demonstrating continuous improvement in financial health.

Key financial indicators, such as the Working Capital to Total Assets ratio and Retained Earnings to Total Assets, exhibit stability and positive trends, highlighting the bank's liquidity, ability to retain earnings, and reinvest in operations. The growth in EBIT to Total Assets and the consistent Book Value of Equity to Total Liabilities above 0.1 signify the bank's improving ability to generate earnings and maintain a healthy equity position.

The bivariate correlation analysis further emphasizes the positive relationship between credit risk management ratios and Return on Assets (ROA), underscoring the importance of sound financial practices in enhancing overall financial performance. The study suggests that the DCCB's strategic focus on credit risk management has contributed to its sustained financial stability and improved profitability, positioning it favourably for continued success in the future.

Overall, the DCCB, Mahabubnagar, is advised to stay committed to its successful credit risk management practices, maintaining a proactive stance to ensure continued success and long-term financial health.

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