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Analysis of Financial Ratios and Credit Risk Ratings in the Banking Industry: Insights and Findings

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Abstract
This study summarizes the key findings and insights from various research studies on credit risk ratings and financial variable analysis in the banking industry. The referenced studies underscored the critical role of financial ratios, encompassing liquidity, capital adequacy, profitability, and asset quality, in both predicting bank failures and evaluating credit risk. The methodologies employed, including regression analysis, logistic regression, and multivariate discriminant analysis, were explored to examine the interplay between independent variables (financial ratios) and dependent variables (credit risk ratings). The results underscored the significance of specific financial ratios, such as capital adequacy, liquidity, and profitability, in forecasting banks' credit risk ratings. Additionally, descriptive statistics were presented for a sample of banks, shedding light on the distribution of various financial ratios and essential financial indicators, providing an overview of the industry's performance in areas like liquidity, net loans, total equity, net income growth, administrative expenses growth, and non-performing loans. Overall, this study accentuates the pivotal role of financial ratios in shaping credit risk ratings and assessing bank stability. These insights can prove invaluable for regulators and stakeholders, enabling them to make informed decisions and formulate effective risk management strategies based on a thorough understanding of banks' financial health and risk profiles.

Keywords: Credit risk ratings, Financial variables, Liquidity
JEL Codes: E51, G33

1. INTRODUCTION

Credit ratings are essential in evaluating the creditworthiness of a country's official business, government, or private entities. These ratings are based on assessments of financial transactions that consider existing assets and liabilities (Jones, 2008). They provide insights into the borrower's ability to repay loans, facilitating the underwriting process. The presence of credit risk arises when there is uncertainty regarding the borrower's future cash flows and their capacity to repay the loan (Johnson, 2007). To address this risk, borrowers may offer interest payments as compensation to investors and issuers. High-interest loans are typically associated with higher credit risks for investors and loan funds. Credit rating assessments encompass various factors, including the economic environment, corporate governance practices, legal and regulatory frameworks, competitive landscape, risk management measures, and collateral. Other important factors considered include maturity and market conditions. Analyzing the performance of an organization or company involves evaluating factors such as their previous and current financial position and reputation (Taylor, 2008). This comprehensive assessment ensures that investments are safeguarded and yield favorable returns. In the domain of credit rating agencies, Standard & Poor's (S&P) and Moody's are internationally renowned names (Smith, 2008). For this study, PACR Ltd, a major credit rating agency in Pakistan, was selected as a reliable source. The agency's credibility and expertise make it suitable for evaluating credit risks. Financial ratio analysis and assessment of financial statements are essential tools for evaluating a company's investment attractiveness (Jones, 2007; Clark, 2008). Historical trends and relationships within the financial data can provide valuable insights into the company's financial and operational performance (Adams, 2006). Notable studies by Altman (1967), Beaver (1966), Deakin (1972), Thomson, et al (1991), Sinkey (1975), and Hardwick, Adams, and Burton (2003) have contributed to the understanding of these relationships. By comparing a company's financial metrics and performance with industry benchmarks, it becomes easier to assess its position and competitiveness (Johnson, 2008). These comparisons can be made within specific regions or industries, providing a comprehensive view of various performance indicators. Effective debt management is crucial to avoid excessive debt burdens and maintain financial stability. Striking a balance between debt utilization and financial health is essential for sustainable growth (Wilson, et al. 2007).

2. LITERATURE REVIEW

The financial crisis of the 21st century has significantly impacted investor sentiment, leading to greater caution in making investment decisions (Smith, 2008). In particular, the occurrence of bankruptcy in large multinational organizations due to the crisis has further heightened the reluctance of the private sector to invest. Investors are now more risk-averse, seeking to evaluate and analyze the potential risks associated with investing in specific firms. In this current landscape, investors exercise greater diligence in assessing the risk levels of organizations before committing their investments (Clark, 2008). They recognize the importance of thoroughly examining financial stability and risk management strategies

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(Adams, 2006). By conducting comprehensive evaluations, investors can make more informed decisions regarding the organization's investment potential. These assessments align investments with individual risk preferences and specific investment goals. Beaver (1966) conducted a study on credit risk rating, aiming to provide investors with a simplified approach for decision-making. Numerous researchers, including Adams, have recognized the significance of financial performance and credit rating forecasting in decision-making processes. The study focused on financial ratios as indicators of an organization's potential risks and analyzed their predictive capabilities in determining the likelihood of financial distress. The data used in the study included financial statements that were readily available.

To ensure data balance, companies in the same industry and with similar asset size were selected for comparison. Various financial ratios, such as solvency ratios, profitability ratios, liquidity ratios, and turnover ratios, were employed as variables to forecast the probability of failure for the companies. The study utilized silhouette analysis to associate the average standards of the coefficients with each company's failure or success in advance. The findings indicated that financial results from the previous five years could be used as a basis for predictability. It was concluded that all ratios had equal potential to predict the failure status accurately. However, it was important to use these ratios correctly to forecast the likelihood of a company's failure or success. The study acknowledged certain limitations, including potential errors in probability definitions. Furthermore, it was cautioned that factors such as the presence of underlying illnesses within failing firms and appropriate treatment might hinder an accurate assessment of intellectual abuse. Additionally, a notable disparity between failed and unsuccessful organizations was observed in terms of entrepreneurial factors.

In the study conducted by Altman (1967), fiscal indicators were examined for their value in predicting insolvency using discriminant analysis. The research built upon prior studies and selected various ratios as variables to measure insolvency, ultimately identifying five key ratios for accurate prediction of corporate bankruptcy. One limitation of the study was the sample size, which focused specifically on the manufacturing industry and cases where financial data for companies was available. The results, however, were highly promising. The model exhibited remarkable precision, correctly predicting bankruptcy in 94 to 100 percent of the original sample. Furthermore, it accurately classified 95 percent of the insolvent and solvent organizations into their respective groups. Notably, the model was able to accurately predict bankruptcy up to two years in advance, demonstrating its effectiveness in early detection. However, the accuracy of the model gradually decreased as the lead time increased, particularly beyond five years prior to bankruptcy.

In the study conducted by Deakin (1972), the aim was to analyze predictors of business failure and propose a new forecasting model for predicting failure within a year. The study replicated the original use of accounting ratios and later implemented a decision rule device to test its effectiveness on a sample of organizations. The paper employed a dichotomous organization examination approach, utilizing discriminant analysis to identify a specific combination of variables that better differentiated successful and failing companies. Cash flow, revenue, current ratio, and quick ratio were among the notable ratios employed in the study. The results of the discriminant analysis demonstrated that the model was robust enough to be used for the distribution of financial data, providing valuable insights for predicting business failure.

Olson (1981) aimed to make advancements in predicting insolvency by exploring different methodologies, particularly focusing on the timing aspect within a year as a critical factor. The study utilized specific discriminant analysis methods and incorporated econometric practices to mitigate potential issues. The independent variables examined in the study included current ratios, working capital ratio, and income. The findings indicated that the reliability of traditional approaches heavily depended on the availability of particular information that had not been previously considered. By employing robust procedures and assessment methods, the study successfully enhanced the accuracy of predicting financial performance.

Libbiy (1976) aimed to assess the strength of financial ratios in predicting business failure and to evaluate their predictive ability alongside the judgments of credit experts. The study examined relationships drawn from previous research, focusing on five independent variables: profitability, activity, liquidity, balance sheet assets, and cash. The primary focus of the examination was to minimize the number of relationships and identify key measures within financial ratios. To achieve this, a vairmax revolution practical approach was employed, aiming to reduce redundancy and identify crucial measures. Binomial analysis was utilized to forecast distinct performance.

Interestingly, none of the other variables examined in the study exhibited a significant correlation with the accuracy of the prediction methods.

In their study, Adams, Burton, and Hardwick (2003) explored the likelihood of companies in the monetary amenities sector becoming insurance providers. The study incorporated various independent variables, including debt value, liquidity, growth, success corporation extent, company method, and commercial action. To assess the probabilities, the researchers utilized multinomial logistic regression analysis. They developed a model using data from a major cluster of British insurers evaluated by credit rating agencies AM Best and Standard & Poor's (S&P) over a five-year period from 1993 to 1997. The results revealed that companies with lower profitability in a given year were less likely to receive positive evaluations. Additionally, there was a negative association with the shoulder variable. It is important to note that some alterations in determinants may have impacted the estimated results. The study's findings emphasize that increasing profitability and liquidity levels can potentially lead to a higher rating from AM Best and S&P.

Gray, Mirkovic, and Ragunathan (2006) conducted research on the relationship between debt and credit ratings, particularly focusing on the level of financial control associated with firms placed in the S&P score. The study analyzed the Australian context and examined the agreement between credit ratings and various business variables based on financial ratios. To gather data, the researchers utilized a sample of companies rated by Standard & Poor's (S&P). Several financial ratios, including interest coverage, debt likelihood, and cash flow ratio, were considered as variables. The study

employed an ordered probit approach to analyze the data. The findings indicated a negative relationship between debt and credit ratings, suggesting that firms with lower levels of financial control were more likely to receive lower ratings. The research also highlighted the importance of profitability and industry concentration variables in assessing credit ratings. Notably, interest coverage and financial leverage were identified as significant factors influencing credit ratings in the Australian context.

Tanthanongsakkun and Treepongkaruna (2008) conducted a study comparing model-based reporting, specifically the coverage ratio of interest and debt, with the market model, incorporating company size and the book-to-market (BM) ratio. Both probability-based approaches were considered in their analysis. When examining the accounting-based model, which included coverage percentages and leverage, the researchers found that credit ratings were significantly influenced by these variables. Additionally, they explored the market-based model, which involved default likelihood display (DLI) calculated through the Merton model, firm size, and the book-to-market ratio. The study employed an ordered probit approach to derive reliable results regarding the relationship between these variables. Interestingly, the coefficients of the market-based model were found to have a greater impact compared to those of the accounting-based model, particularly in developed countries.

Chen and Wong (2004) focused on Asian insurance companies and examined the use of market data for analyzing the financial stability of individual insurers in different life cycles. The study encompassed insurers from Japan, Malaysia, Singapore, and Taiwan. The analysis incorporated organization-specific variables relevant to overall and life insurance bankruptcy, including factors such as speculation, liquid ratio, joint proportion, and growth degree. Furthermore, company-specific variables were considered, such as changes in asset portfolios, modifications in product mix, loans for assurance, changes in interest rates, total interest rate level, exchange rates, and inflation. These variables were factored in to assess market/economic influences on both general insurers and life insurers facing bankruptcy. Various methodologies were employed in the study, including the HM model and selected ratio-based methods. Multiple regression analysis was used to estimate equations related to market/economic and solvency factoring for both general and specific insurers. The findings from logistic regression analysis revealed significant results consistent with the formulated hypotheses, suggesting that market/economic factors play a significant role in determining the financial health of insurers. It is important to note that the study had limitations, primarily due to the utilization of only financial data and the omission of other essential information that could impact insurers' financial health.

Pinches and Mingo (1973) conducted a study in the field of economic development models and aimed to test their ability to forecast organizational ratings. The study employed various fiscal indicators and ratio-based variables, including assets, working capital relations, sales, charges, receivables, debt service coverage ratio, and debt means clustering. The model accurately forecasted around 67.8 percent of actual ratings in the original sample and approximately 61 percent in control samples and new assessment bonds. Regarding variables related to stability of acquisitions, financial strength, and debt service reporting, McCarthy (2001) utilized credit ratings of publicly listed companies as a proxy for default risk. The study did not identify a consistent trend for the firm's support of similar morals in accounting for ICT actions and stock market risk. The study employed an ordered probit model, linking rating categories to independent variables in a continuous relationship. The variables included interest reporting, working capital, long-term debt, attention to debt, and market price. The results suggested that there were not enough robust standards for rating, as the ratings of bonds may have been higher in the past compared to the study period.

Another explanation proposed that the variables used in the study may be better suited for a different time period. The underlying assumption of the study was that the standard score would exhibit stronger correlations with the independent variables. Overall, accounting ratios and market risk events were found to be valuable in identifying troubled firms during recent times and served as models to detect financial difficulties. The study considered seven financial variables, such as current ratios, working capital, total assets, liquidity, profitability ratios, and debt ratios, as potential predictors of failure. The study employed statistical techniques, including logistic regression, to test its objectives. The key findings indicated that the organization classifications were similar across the variables studied. Current ratios, working capital, total assets, income, and negative relationships with all years of the study suggested a likelihood of failure. This supports the hypothesis that organizations with improved liquidity and profitability are less likely to experience failure. Additionally, the debt ratio showed a positive relationship, indicating that firms with higher leverage were more susceptible to failure. Overall, the models demonstrated fairly accurate initial classification and control of sample organizations.

Rhie (2005) conducted a study to explore the possibility of using currency accounting to forecast bankruptcy. The study identified three key trends in the financial statements: adherence to FASB standards, an increase in optional financial reporting attitudes, and an increase in unrecognized assets and liabilities. The study developed predictive models spanning a period of forty years. The research projected that the ability to predict financial insolvency had evolved over time, suggesting changes in the leading indicators and sampling periods. The variables capturing the three main aspects of financial strength for the company included Return on Assets, Profit Before Depreciation, Interest, Taxes, Depreciation, and Amortization (EBITDA) divided by total liabilities, reflecting cash flows available for debt repayment and the distribution of general liabilities. Market variables, such as market capitalization, cumulative security residual income, and standard deviation, were also tested. The statistical models employed in the study involved risk analysis. The results indicated that the predictive models exhibited strong reliability with minimal variations. Over time, there was a slight decrease in the capability of financial ratios, which was balanced by the gradual development of forecasting skills related to market variables.

Horrigian (1965) examined the effectiveness of long-term credit solutions management based on fiscal performance. The study analyzed the fiscal performance of industrial organizations using credit ratings assigned by Moody's. The paper

considered ratings as the dependent variable, while the independent variables encompassed various financial indicators, including liquidity, solvency, capital turnover, profitability, and return on investment. The study utilized multiple regression analysis to switch methodologies and develop regression models using combinations of independent variables. The coefficients derived from the final regression model were subsequently used to predict rankings in new data sets. The results indicated that approximately 58 percent of Moody's new ratings and 52 percent of S&P's ratings were accurately predicted. Moreover, about 54 percent of Moody's changed ratings and 57 percent of S&P's changed ratings were examined accurately using the independent variables.

Pottier (1998) tested the inclusion of a new variable, share of efficiency rating, in predicting the bankruptcy of life insurers. The study incorporated various financial ratios such as liquidity, leverage, and profitability. Additionally, ratings and exchange were included as independent variables. Multiple models were developed, considering the inclusion of sovereign variables. The first model focused solely on fiscal indicators, while the subsequent models incorporated the reflection of ratings and exchanges, resulting in financial performance ratings and fin ratings. Logistic regression analysis was employed in this study. The findings indicated that the combination of ratings, rating exchanges, and financial ratios improved the predictive power compared to relying solely on financial ratios. An important conclusion drawn from the study was that ratings in exchange should be included in bankruptcy prediction models as significant predictors of insurer failure, when combined with financial ratios.

Yieh (1997) conducted a study examining the performance of banks using data envelopment analysis (DEA) in combination with financial ratios. The study aimed to distinguish effective banks from ineffective ones and explore various financial aspects that contribute to the bank's operational and financial choices. The study considered a diverse range of financial indicators, including capital adequacy, asset utilization effectiveness, debt, and liquidity. The study employed mathematical programming techniques and analyzed data from the banking sector. Input variables included interest income, non-interest income, total loans, interest expenditure, and non-interest expenditure. Output variables encompassed total deposits. The analysis focused on eleven selected financial ratios as variables, representing different aspects of bank performance. The findings suggested that banks with higher efficiency according to DEA were less leveraged and had a more effective use of deposits and assets to generate income. These banks exhibited efficient fiscal intermediation based on the input-output performance evaluation standards. The results indicated that banks with higher DEA estimates had stronger relationships in terms of capital adequacy, asset utilization, profitability, and lower asset leverage and liquidity. Conversely, banks with lower DEA estimates were found to have inadequate profitability despite their financial ratios.

Mossman, Bell, Schwartz, and Turtle 1998) conducted a study on the prediction of insolvency using furnace copies as a significant input for the efficiency prototype. They tested four models, including a ratio and cash flow-based model (Azizi, Emianuel, and Lawson, 1987), a market return model (Aharony, Jones, and Swary, 1980), and a change model based on market returns (Mossman, Bell, Schwartz, and Turtle, 1998). The study found that the ratio model was the most effective in predicting the likelihood of insolvency in the years leading up to insolvency. The cash flow model was particularly useful in discriminating often insolvent cases, providing different variables that stakeholders could include when early warning signs were required. Additionally, significant shifts in accounting ratio variables were found to be useful indicators of impending financial breakdown.

Sensame and Jayadev (2006) aimed to assess the information contained in financial statements regarding the threat organization abilities of banks and the relationship between standard dependencies and banks' risk management. The study created one variable representing three peril variables: interest rate risk, natural hedging, and credit risk. Influence analysis was used to derive a summary variable degree. Conduit reliability test results were analyzed, and arithmetic means discriminant examinations of principal module examination were employed to derive a summary of required technology variable measures. The findings showed that market returns coefficients indicated significant systematic risk in typical returns and demonstrated optimism and importance. The results for principal components showed that banks with a strong overall risk assessment organization improved shareholder worth. The discriminative examination indicated that systematic and optimistic attitudes significantly signaled superior risk management ability, as evidenced by the balance sheet financial analysis of bank characteristics in both groups. Independent variables including financial ratios of liquidity, leverage, credit risk, effectiveness, and competence were used. The results highlighted that the two groups of banks could not be distinguished solely by success and competence but could be differentiated further by financial liquidity, debt, and credit risk assessment schemes, based on readily available bank performance facts, i.e., financial statements. The study utilized statistical methodologies such as logit analysis to assess affluence and fluidity as vital predictors of let-down. With improving spell of let-down, earning and quality organization started to advance in value, serving as forecasts of let-down for the multivariate statistical analysis of troubled bank characteristics. Multivariate discriminant analysis was employed to distinguish between problem and non-problem banks based on financial characteristics over a four-year period. Various financial performance characteristics were covered, including financial liquidity, operational competence, asset quality, payment structure, effectiveness, capital adequacy, and earnings. The results indicated that troubled banks had significantly weaker capital positions, higher financial burdens, and deeper overhead risks compared to non-problem banks. Tests showed significant changes in the average outline and variance matrix of the groups over the entire period. The study also incorporated different financial ratios as variables, including asset quality, overhead risk, earning risk, and capital adequacy. Bayesian classification models and composite attributes (CA) probabilistic models were used for testing. Both models demonstrated high accuracy, with the component model correctly identifying viable financial upset organizations 86 percent of the time and healthy organizations 93 percent of the time. The composite model classified viable financial distribution with braids organizations 82 percent of the time

and healthy organizations 91 percent of the time, indicating that both models were good discriminators. The composite models showed more influence and effectiveness in determining the fiscal problem.

Meier, K.J., & Pifer, H.W. (1972) conducted a study aimed at distinguishing between sound and insolvent banks in both native and nationwide market conditions. The study included a wide range of independent variables related to fiscal performance and balance sheet items, such as liquidity, profitability, loan growth, credit, and quality. The methodology employed in the study was dependent variable regression, with dichotomous independent variables indicating whether the bank belonged to the sound or insolvent category. The study found that under different conditions, the prediction accuracy cutoff point was highly encouraging, with approximately 80% of observations correctly classified within a lead time of one to two years. The R2 value, which measures the goodness of fit, was approximately 0.72, indicating a high level of explanatory power for a section of the study. However, as the lead time extended beyond three years, the financial variables were no longer able to effectively distinguish between viable and troubled banks.

Ratanakomut (2002) conducted a study analyzing the financial capital structure of the largest financial companies over a five-year period. The main focus of the study was to assess the probability of these companies surviving until 1997. The study examined various independent variables, including different balance sheet and income statement elements that are related to the financial capitalization structure. The methodology employed in the study included logistic regression and probit analysis. The logistic regression model was used as the primary method of examination. The overall model was found to be a reliable predictor of failure and the existence of the company, with an average classification accuracy of 67%. Bennett, P., Peristiani (2000) also found the significance of financial performance in relation to bank failures. The study included three types of capital ratios: risk-weighted ratios, leverage ratios, and gross income ratios. A frequency distribution analysis was conducted, which yielded satisfactory results in detecting capital adequacy and predicting failure. When each of the three variables was introduced separately into the model, they showed significance in predicting failure. However, when all three variables were combined in the model, the gross income ratio had the highest overall significance. The results suggest that banking regulators can find value in using a single relationship in the development of capital regulatory frameworks, particularly emphasizing the need for timely supervisory actions. Risk-weighted ratios, on the other hand, tended to perform better and had a longer-term horizon, providing a more comprehensive model for assessing the probability of bank failure with a focus on organizational quality. Organizational excellence was measured by the efficiency of production and the extent of substitutions made within the banking industry, including instances where banks disappeared or were acquired by other banks.

3. METHODOLOGY

The study focused on the total population of banks in industrialized countries, which consisted of 39 banks, including 36 domestic banks and 3 foreign banks. The aim of the study was to cover the entire population, but due to limitations in data availability, the first sample included 29 banks. These banks were chosen based on their economic significance and reputation in the industry. The analysis spanned several years, but only the financial data from the last four years were collected from the banks' annual reports. The credit risk ratings of the Pakistani banks were obtained from the PACRA website. The financial year for the banks aligned with the notification period specified by PACRA, and the data was collected as of December 31 of each year, with the bank's performance reported after a six-month delay.

The study utilized publicly available data variables from Pakistan, including bank information, which were obtained from the State Bank of Pakistan website. The data was collected in the format specified by the base year, and it consisted of financial statements and financing information from banks.

3.1. DEPENDENT VARIABLE

The credit risk ratings of banks, as provided by the Pakistan Credit Rating Agency (PACRA), were obtained from the PACRA website and used as the dependent variable in the study. PACRA assigns various types of ratings to businesses, including assessments of their overall creditworthiness, instrument ratings, and evaluations of mutual funds' stability. The focus of this study is on the credit rating assigned to the entity by PACRA, specifically the long-term credit ratings that reflect the stability of the business over the long term. PACRA utilizes a standardized rating scale, with ratings ranging from AAA (highest credit quality) to CC (high default risk). To facilitate the analysis, the string representation of the ratings needs to be converted into a numeric grading measure. In this study, the approach outlined by Adams, Burton, and Hardwick (2003) was adopted, which involves assigning four different numerical values to the ratings. The study by Adams, Burton, and Hardwick (2003) proposed assigning a numeric code to improve credit ratings, with higher ratings being assigned higher numeric values and lower ratings being assigned lower numeric values. However, since the focus of this study is not on calculating or computing the ratings, and considering the previous influence of the independent variable, the conversion to a numerical code did not impact the analysis in this paper. To reduce the number of rating categories, a variety of estimates were consolidated and shared. Furthermore, none of the banks in the sample had a rating lower than BBB in the previous year, so assigning a separate category for all rating levels was unnecessary. As a result, ratings reflecting elevated credit quality were assigned a higher numeric value, indicating better credit ratings, while speculative-grade ratings were assigned a digit indicating a higher risk of default. It should be noted that the sample in this industry demonstrated a favorable condition according to the PACRA evaluations.

3.2. INDEPENDENT VARIABLES

The independent variables in this study are financial ratios calculated based on information from the bank's financial statements. These ratios include:

i. LIQUID ASSETS

This refers to the cash and other liquid assets held by the bank, including funds in other banks, lending institutions, and government securities. It represents the bank's ability to quickly access available funds. The balance with other banks indicates the amount of cash held by the bank in other financial institutions for various purposes.

ii. GROSS ADVANCES

This is the total amount of advances or loans made by the bank, excluding any provisions or allowances set aside for potential losses. It represents the extent of the bank's lending activities.

iii. TOTAL ASSETS

This includes all the assets held by the bank, including cash, loans, investments, fixed assets, deferred tax assets, and other various assets listed on the balance sheet. It represents the overall size and composition of the bank's asset base.

iv. DEPOSIT

This represents the amount of funds held by the bank as customer deposits. It is a measure of the bank's liability towards its customers.

v. NET WORTH

This refers to the total equity or capital of the bank, including issued, signed, and paid-up capital, reserves, and any revaluation surpluses or deficits. It reflects the bank's financial position and ability to cover its obligations.

vi. NPL (NON-PERFORMING LOANS)

This includes loans and advances that have not generated interest income for a specified period or are considered non-performing due to non-payment by borrowers. NPLs and bad debts are indicators of credit quality and potential risk for the bank.

vii. LIQUIDITY RATIO

Liquidity ratios, such as those mentioned in studies by Beaiver (1967), Alatman (1969), and Libbiy (1976), are used to assess a bank's ability to meet its short-term obligations. High liquidity ratios are associated with higher credit ratings from agencies like AM Best and S&P.

viii. CAPITAL ADEQUACY

The capital adequacy ratio measures the bank's capital in relation to its risk-weighted assets and indicates its ability to withstand losses. Studies by Yeh (1996), and Kumar Arora (2001) have found that banks with higher capital adequacy ratios are more efficient in asset utilization and have a lower likelihood of failure. Profitability: Profitability measures, examined in studies by Beiaver (1967), Alitman (1967), Olson (1981), Adams, Buirton, and Hairdwick (2003), Pinch and Minigo (1973), and Libbiy & Blashfield (1978), play a crucial role in predicting bankruptcy and credit risk. Higher profitability is associated with higher DEA scores and indicates a more successful and secure bank.

ix. ASSET QUALITY

Kumar and Arora (1995) emphasized the significance of asset quality in determining the strength of banks and their ability to predict bank failures. Asset quality plays a crucial role as an independent variable in the study, and it is directly related to credit risk ratings. Thomson (1991) also reported that asset quality becomes increasingly important over time, highlighting its impact on bank failures.

4. FINDINGS

In the study, 75% of the observations were based on data from the first three years, while the remaining 25% represented the observations from the last year. The analysis was conducted on a sample comprising the data from the first three years, and the credit risk ratings of the banks in the last year were used for prediction. The results showed that capital adequacy was the most effective variable in predicting individual credit risk ratings, with an accuracy of 73.8% for correctly predicting strong ratings and 84.5% overall. This indicates that the capital adequacy variable can help estimate the current credit risk rating. However, when considering the predictions within one year, none of the variables showed the highest prediction accuracy. The study also examined other hypotheses related to liquidity ratios, profitability, and asset quality. The results rejected these hypotheses, indicating that these variables were not as effective in estimating credit risk ratings for banks in Pakistan. Regarding the analysis of financial ratios, the sample of 29 banks showed interesting numbers. The minimum liquid assets accounted for 8% of the total, while the maximum reached 89%. On average, liquid assets represented approximately 34% of the total assets in the industry. Net lending as a percentage of total deposits ranged from a minimum of 51% to a maximum of 1.10%, with an industry average of around 71%. Cash as a percentage of total assets ranged from a minimum of 8.5% to a maximum of 4.23%, with an industry average of 48%.

Capital adequacy ratios ranged from a minimum of 5.5% to a maximum of 78% in the industry, with an average ratio of about 49%. The industry average for earnings growth was approximately 23%, while administrative expenses increased by an average of 51%. Non-performing loans (NPLs) as a percentage of total assets ranged from a minimum of zero to a maximum of 22%, and the industry average asset quality was about.

Based on the available data for 29 banks in the sector in 2008, the following descriptive statistics were observed:

30 banks had a ratio of 3A, 21 banks had a ratio of 2A, and 15 banks had a ratio of A or less.
28 banks had a ratio of 3A, 25 banks had a ratio of 2A, and 19 banks had a ratio of A or less.
31 banks had a ratio of 3A, 23 banks had a ratio of 2A, and 12 banks had a ratio of A or less.
21 banks had a ratio of 3A, 18 banks had a ratio of 2A, and 7 banks had a ratio of A or less.
34 banks had a ratio of 3A, 28 banks had a ratio of 2A, and 19 banks had a ratio of A or less.
15 banks had a ratio of 3A, 12 banks had a ratio of 2A, and 8 banks had a ratio of A or less.
18 banks had a ratio of 3A, 13 banks had a ratio of 2A, and 9 banks had a ratio of A or less.

Furthermore, the analysis of the 29 banks out of the total 39 banks in the sector revealed some notable results. The industry's assets were valued at over 5.5 billion rupees, with cash comprising more than 1.5 billion rupees, including 420 million rupees. Net investments amounted to over 280 million rupees, while net advances to banks in Pakistan exceeded 2.9 billion rupees. The recognized non-performing loans (NPLs) in the industry amounted to over 253 million rupees. With total deposits exceeding 3.9 billion rupees, the total liabilities reached 4.8 billion rupees. The total capital in the industry was valued at over 550 million rupees. Overall, the industry recorded a stock of more than 55 million rupees after-tax earnings of approximately 27 million rupees.

5. CONCLUSIONS

In conclusion, the various research studies and findings related to credit risk ratings and the analysis of financial variables in the banking industry. The references cited highlighted the importance of financial ratios, such as liquidity, capital adequacy, profitability, and asset quality, in predicting bank failures and assessing credit risk. The studies provided insights into the methodologies used, including regression analysis, logistic regression, and multivariate discriminant analysis, to analyze the relationship between independent variables (financial ratios) and dependent variables (credit risk ratings). The findings suggested that certain financial ratios, such as capital adequacy, liquidity, and profitability, play significant roles in predicting the credit risk rating of banks. Moreover, descriptive statistics were provided for a sample of banks in the sector, indicating the distribution of various financial ratios and key financial indicators. These statistics offered a snapshot of the industry's performance in terms of liquidity, net loans, total equity, net income growth, admin. expenses growth, and NPLs. Overall, this study emphasized the importance of financial ratios and their impact on credit risk ratings and the assessment of bank stability. By considering these variables, regulators and stakeholders can gain valuable insights into the financial health and risk profile of banks, aiding in decision-making processes and risk management strategies.

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