Beyond Financial Ratios: A Novel Approach to Bankruptcy Prediction for Indian Firms

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Abstract

The purpose of this study was to develop a new bankruptcy prediction framework that considers a wider range of factors beyond traditional financial ratios and improve the efficiency and accuracy of bankruptcy prediction models in the Indian ecosystem. The financial statements of three Indian firms, DHFL, Reliance Communication, and Jet Airways, from 2011 to 2021 were analyzed. A combination of liquidity ratios, activity ratios, and leverage ratios were used to analyze the relationship between profitability, capital structure, and assets to predict bankruptcy. The study proposed a new bankruptcy prediction model that outperforms traditional financial ratio-based models in predicting bankruptcy risk for Indian firms. The model considers a wider range of factors beyond traditional financial ratios, including macroeconomic conditions and fraudulent activities. The proposed model provides a more comprehensive analysis of bankruptcy risk, enabling businesses and policymakers to better identify and manage bankruptcy risk and ensure financial stability in the Indian ecosystem. This study takes a novel approach by adopting multiple models to establish a bankruptcy prediction framework that can be used across the Indian ecosystem. This comprehensive approach to bankruptcy prediction was essential given the increasing complexity of the business environment and the need for more sophisticated methods for assessing bankruptcy risk.

Keywords: Bankruptcy; Predicting bankruptcy models; Management Systems; Knowledge-based organizations; Financial Ratios

JEL Classification: G33, G17, G32

INTRODUCTION

Bankruptcy has been defined by Ellias and Stark (2020) as the financial state in which a company is unable to currently meet its debt obligations and hence makes attempt to dissolve its assets and establish a repayment plan with consent from the different public as well as private creditors who have provided finance to the organisation. It should be noted that Bankruptcy is a legal procedure and can be initiated both by businessmen as well as creditors based upon the legal requirements established by different government bodies and the decision of different stakeholders in the business. Bankruptcy is generally predicted using a financial ratio which must be defined. Financial ratio as defined by Kadim et al. (2020) refers to several technical indicators which can be used to analyse short-term and long-term liquidity, solvency, and profitability of the firms in both short as well as long timeframe, hence helping the company to manage operations as well as ensure it can stay sustainable in foreseeable future. It should be noted that there exists an ideal ratio, which is usually considered an effective ratio for different firms in a similar industry based on the size and scale of operations. Such comparison helps in them undertaking several business decisions to improve performance. In accordance with the above studies, and analysis of research conducted by prior scholars, the current study will try to adopt different financial ratios in the analysis of the state of affairs of three major companies DHFL, Reliance Communication, and Jet Airways and try to develop a novel bankruptcy prediction model which is developed using prior prediction models with the aim to improve the rate of bankruptcy prediction primarily in Indian Market.

Aim and Objectives of the Study

The primary aim of the current study is to develop a new bankruptcy-predicting model based on the advantages and limitations offered by other existing frameworks. In order to accomplish the above aim, the study will focus on addressing the following objectives:

- To analyse the existing bankruptcy predicting models used in Indian companies.
- To scrutinise various coefficients determinable from financial statements and their relationship with the bankruptcy of the company.
- To determine and design a new bankruptcy prediction model based on past variables.

LITERATURE REVIEW

Financial Ratios and Implications

Liquidity ratios as asserted by Dirman (2020) are financial ratios which are primarily used to measure the ability of a company under a given financial situation and current assets owned by the firm to meet short-term debt obligations which have been noted by the firm. These ratios also help in understanding the swiftness and timeframe under which the company will be able to convert its inventory into cash and then use it to finance the debts. The higher the ratio, the easier it is considered for the firm to be able to manage its debts. Another ratio category or activity ratio has been defined in the study by Arsyad et al. (2021), as such ratio determines the efficiency of an organisation in paying different debt obligations based on different short-term as well as long-term assets which are owned by the organisation. It also helps to analyse the level of revenue

which is generated with respect to the different levels of assets owned by the organisation and is done by placing the total revenue earned by the organisation in the numerator and different assets owned by the organisation in the denominator. Here, the price value of the asset should be considered as there is a chance of different companies adopting different models. Leverage ratio as defined by Finishtya (2019) analysed the ability of the company to manage its different debt and other expenses obligations while taking into consideration the current level of sales as well as ownership of assets. The debt undertaken by the company is usually measured against different assets such as cash flow, the total capitalisation of the company, and different assets owned by the organisation which aids in understanding the impact different business operations may have on the financial stability of the organisation. These ratios when combined help in the analysis of the entire state of affairs in the organisation.

Different Bankruptcy Prediction Models and Implications

The bankruptcy prediction model as suggested in the study conducted by Shi and Li (2019) started development around the world after the 2008 financial crisis, in order to ensure that companies do not get dissolved, and investors are able to have security and stability in their portfolios. Subsequently, different bankruptcy prediction models developed which took into consideration distinct aspects of the industry as well as were results of the modification of the primary model based on changing global scenario. The current models have been based on data analysis and identification of trends which are then analysed using artificial intelligence and Machine learning. Several bankruptcy models were analysed in the study conducted by Elviani et al. (2020) who suggested Springate and Altman models as more effective. Under the Springate

model, several financial indicators such as total assets and working capital in the organisation, the level of profit before payment of interest and taxes, level of profit before taxes, and total sales figure are used to analyse the current financial performance of the firm, as well as measure the probability of company getting bankrupt in the given timeframe. Altman's model on the other hand uses such data to predict the changes of bankruptcy of a business organisation in the next two years. Here, the study conducted by Sitorus (2023) should be taken into consideration, which suggests any investor or organisation shall not rely upon a singular tool but should focus on multiple tools to analyse the probability of bankruptcy over both shorter as well as longer time frame, in order to ensure the company has sufficient resources to meet both short as well as long-term debt obligations faced by the company. Here, it should also be noted that each company which comes under the prediction of bankruptcy may not become dissolved in future, but such analysis ensures sufficient steps are taken to avoid such a state.

History of Selected Companies

DHFL or Dewan Housing Finance Corporation Ltd. Is one of the major bankrupt firms which have been taken into consideration for the current study. The firm was established in 1984 with the aim of providing affordable finance to lower and middle-class Indian society and subsequently went on to become the second-largest housing finance organisation in the country. DHFL faced a major crisis when in 2018, the IL and FS crisis emerged and the company was unable to address 900 crore debts, despite the company's attempt to sell several subsidiaries leading to debt taken by the company being termed as D or default status (NDTV Profit, 2023). The second firm taken into consideration is Jet Airways which according to Her Airways (Jet

Airways, 2023) was registered in 1993, and eventually followed a path of gradual expansion covering up to 65 destinations including both domestic as well as foreign destinations. The company have had faced significant financial challenges which lead to the imitation of the corporate insolvency process against the company, which lead to the dissolution of the company in 2019 as the company had become bankrupt to pay debts and other expenses. The company during its prime had a fleet of over 190 airplanes and covered approximately 1000 routes (domestic and international combined). The third company selected is Reliance Communication which was established in 2002 as per Jain (2020) as Reliance Infocomm and has been one of the major players in the industry. The company, however, has been involved in the 2G scam as well as faced the pressure of growing debts which it was not able to address primarily due to the negative growth rate of sales as well as revenue of the business, which lead the company to file for bankruptcy in 2019. The dissolution of the non-compete agreement and the entry of Jio into the Indian market soon has been considered one of the major reasons behind bankruptcy.

Research Gap

The analysis of different studies as mentioned previously as well as bankruptcy studies by Kovacova et al. (2019) and Kristóf and Virág (2019) have suggested a lack of an extensive bankruptcy prediction model which can cater to different industries within a dynamic changing economy like India, which will be addressed in the current study along with financial ratio and bankruptcy models analysis.

METHODS AND MATERIAL

The current study has been based on secondary data which is publicly accessible and has been collected in accordance with the research objectives. Such data here represents the financial statements which are published by the organisation annually until their bankruptcy procedures have happened or the late financial statements which have been published by the company. A comparative analysis method has been adopted under which financial statements of three successful organisations (one each in the respective industry of the bankrupt company) which are being considered for the study are selected. The data has been collected for the time period of 2011 to 2021 to ensure sufficient data is available for the development of long-term trends which can then be used to analyse the data in accordance with the study objectives. The data collected has not been modified or manipulated to ensure easier understanding, but the data is presented in a natural format for analysis.

Data Analysis Tools

A qualitative research methodology as suggested by Haven and Grootel (2019) and Allan (2020) has been adopted in the study under which data has been collected in the methods which have been suggested above. Firstly, the data has been sorted and presented in Excel in order to ensure similarity, accuracy, and consistency is maintained throughout the analysis aspect in which data from three distinct companies have been analysed. Different financial ratios have then been used to analyse the data which can be broadly classified as liquidity ratio, financial leverage ratio, and activity ratio. Here, different tools such as current ratio, quick ratio, total asset turnover ratio, fixed asset turnover ratio, working capital turnover ratio, debt ratio, operating profit ratio, return

on assets and several other tests have been done in accordance with research objectives. The analysis tools discussed above have been used to evaluate the data and the results have been discussed in the section below.

RESULTS AND DISCUSSION

Figure 1 shows the liquidity ratio trend for DHFL from 2011 to 2021. Liquidity ratios measure a company's ability to meet short-term financial obligations. The positive correlation between the profitability ratio and the current ratio and quick ratio indicates that the company has the ability to meet its short-term obligations and generate profit at the same time. The negative correlation between the basic defense ratio and absolute liquidity ratio suggests that the company may face difficulties in paying debts within the prescribed period.

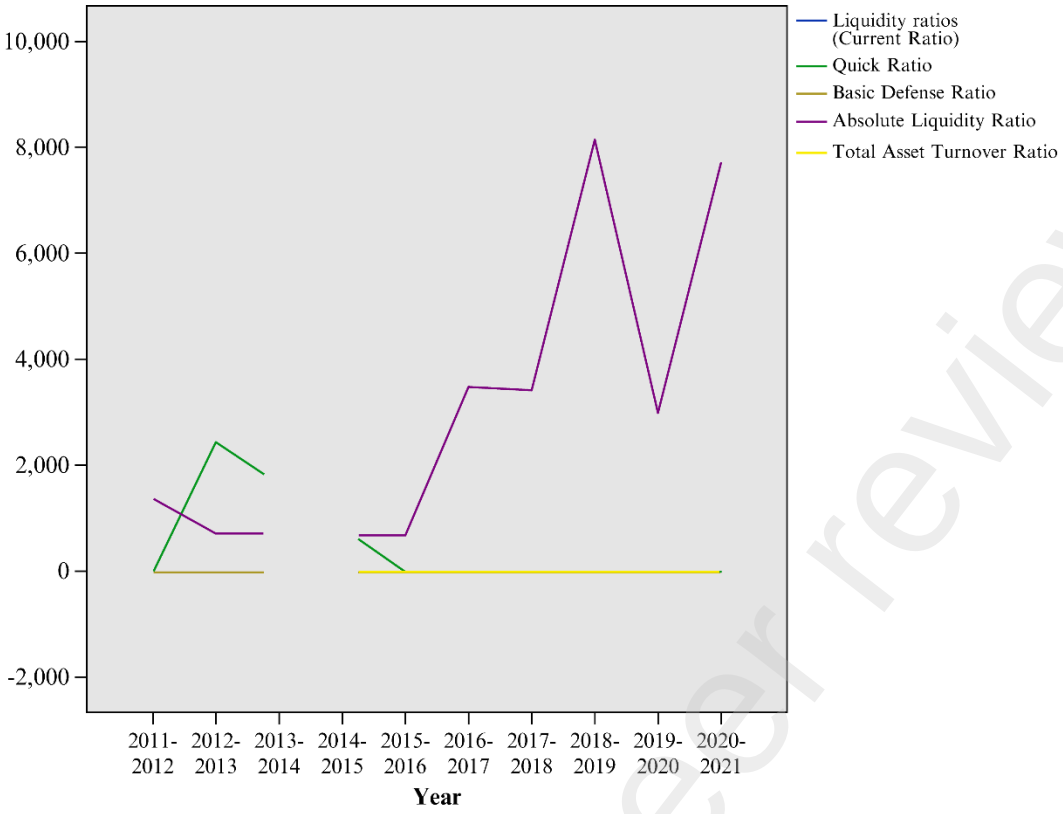

Figure 1: DHFL Liquidity ratio

Figure 2 shows the activity ratio trend for DHFL from 2011 to 2021. Activity ratios measure a company's ability to generate revenue through its assets. The negative correlation between profitability ratio and asset turnover ratio indicates that the company may not be utilizing its assets efficiently to generate revenue. The negative correlation between the profitability ratio and working capital turnover ratio suggests that the company may not be using its working capital efficiently.

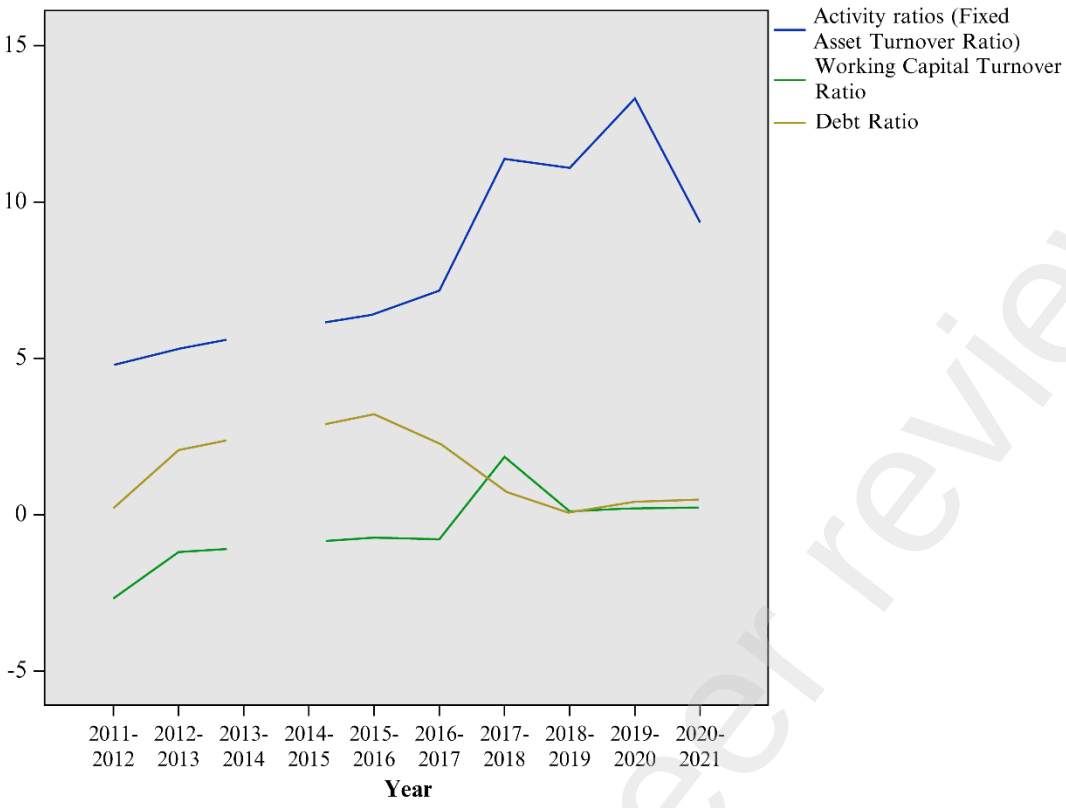

Figure 2: DHFL Activity ratio

Figure 3 shows the financial leverage ratio trend for DHFL from 2011 to 2021. Financial leverage ratios measure a company's use of debt to finance its operations. The positive correlation between debt ratio and profitability indicates that the company may have successfully managed its debt and used it to generate profit. The negative correlation between debt-to-equity ratio and profitability suggests that the company may face the risk of bankruptcy or dissolution.

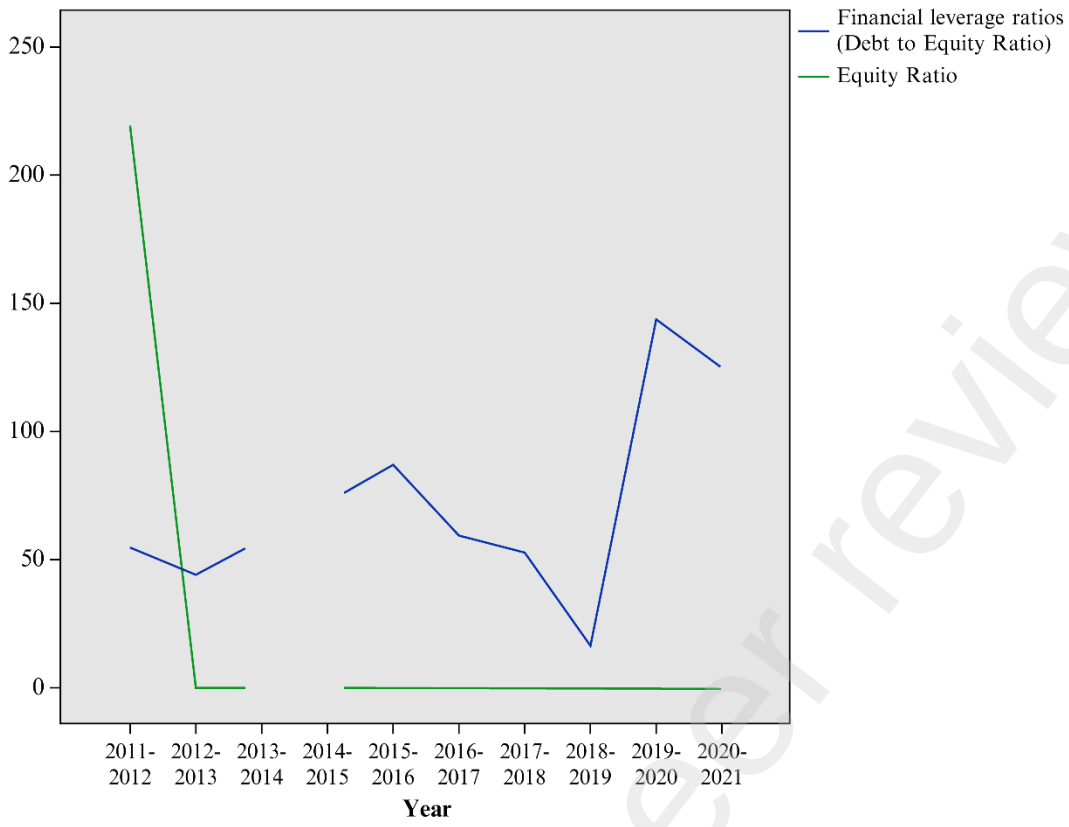

Figure 3: DHFL Financial Leverage ratio

The three figures attached below show trends of liquidity, activity, and financial leverage ratio for DHFL from 2011 to 2021. It should be noted a positive correlation has been witnessed between the profitability ratio and current ratio and quick ratio, while a negative correlation between the basic defense ratio and absolute liquidity ratio, which is in alignment with the study conducted by Saran and Balakrishnan (2021) suggesting an inability to pay debts within the prescribed period. The profitability ratio has been also suggested to have a negative correlation with the quick ratio and asset turnover ratio, while the same can be suggested for the relationship between the working capital ratio of DHFL and profitability. However, a positive correlation has been witnessed between the Debt ratio and profitability which is in contrast with the study conducted by Parakh and Deshmukh (2020) who considered the company not being able to

manage debt and current debt structure to be significantly high. However, both studies have agreed to the negative correlation between profitability and debt to equity and positive with equity establishing the stage of bankruptcy as well as dissolution in the firm which leads us to another firm Reliance Communications.

Figure 4 shows the liquidity ratio trend for Reliance Communication from 2011 to 2021. The positive correlation between profitability and different liquidity ratios indicates that the company had the ability to meet short-term obligations while generating profit. This is in contrast to the study conducted by Khan & Raj (2020), who suggested a negative trend in liquidity as a major factor leading to bankruptcy.

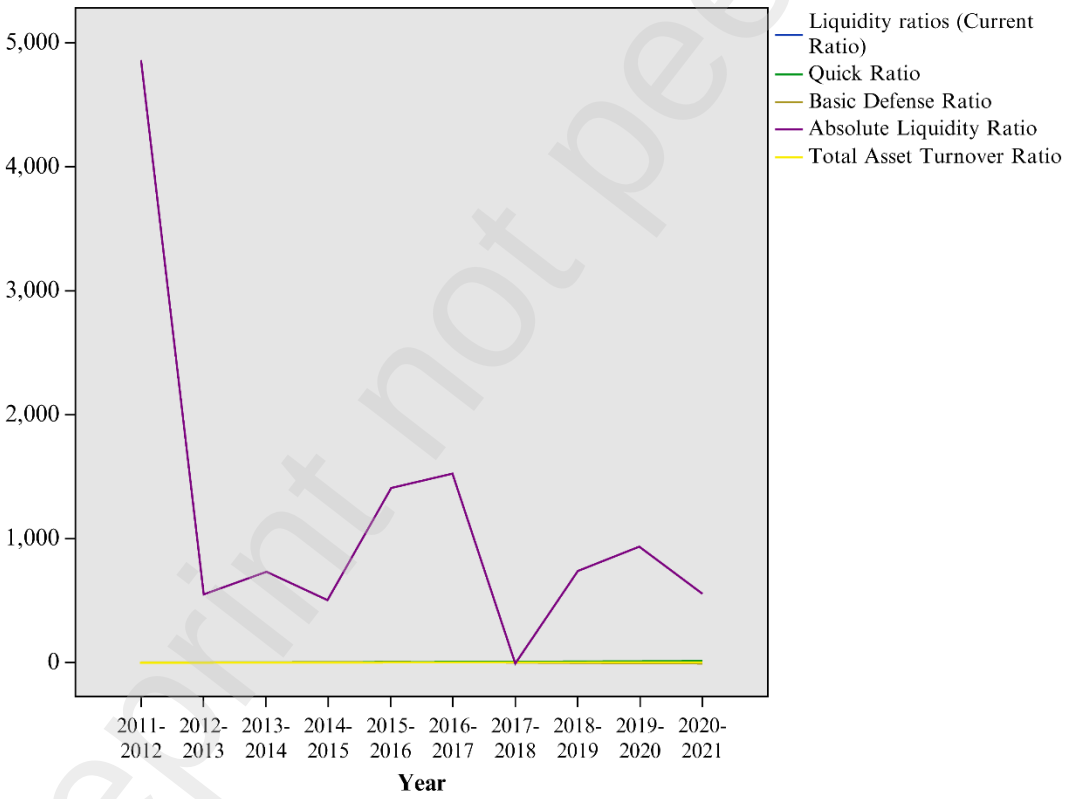

Figure 4: Reliance Communication Liquidity ratio

Figure 5 shows the activity ratio trend for Reliance Communication from 2011 to 2021. The negative correlation between profitability and fixed asset turnover ratio and working capital turnover ratio indicates that the company may not be using its assets efficiently to generate revenue. The positive correlation between profitability and debt ratio suggests that the company may have used debt efficiently to generate profit.

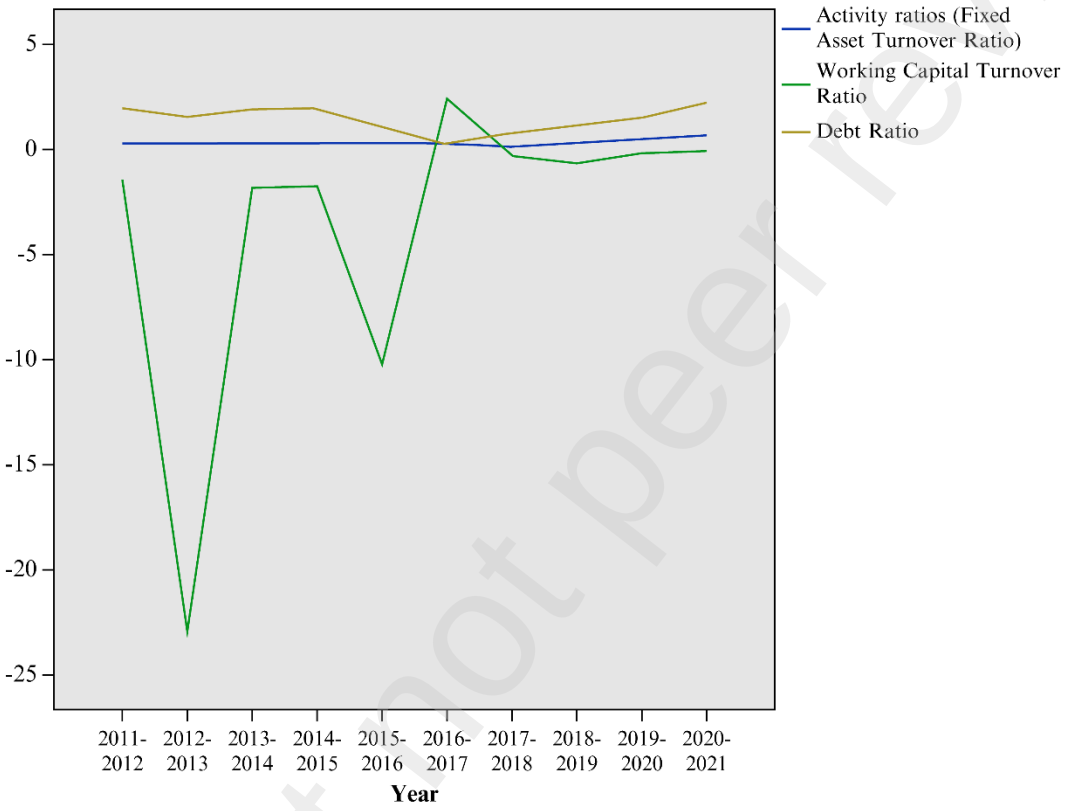

Figure 5: Reliance Communication Activity ratio

Figure 6 shows the financial leverage ratio trend for Reliance Communication from 2011 to 2021. The negative correlation between debt to equity ratio and profitability suggests that the company may face the risk of bankruptcy or dissolution. This is in line with Shankhdhar's (2021) study, which found that Reliance Communication had a lower debt to equity ratio compared to other telecom companies.

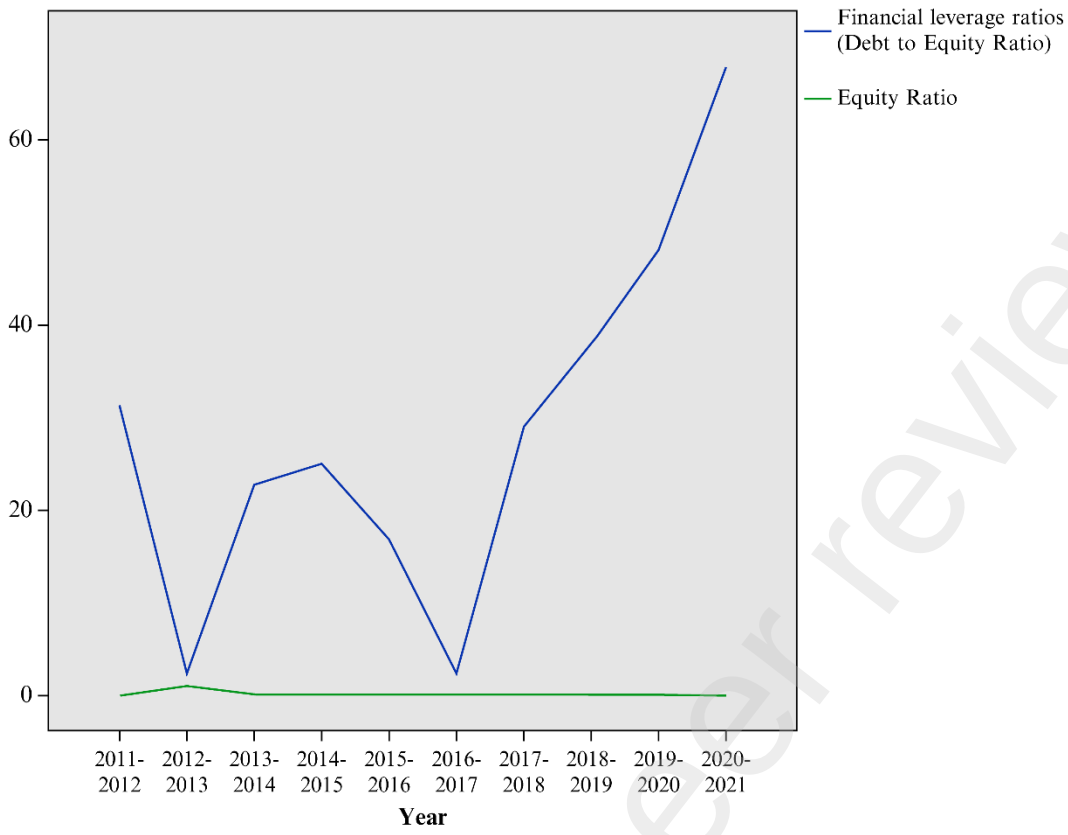

Figure 6: Reliance Communication Financial Leverage ratio

In the current study, a positive correlation has been found with respect to the profitability of the organisation with different liquidity ratios such as current ratio, quick ratio, absolute liquidity ratio, and total asset turnover ratio which is in contrast with the study conducted by Khan and Raj (2020) who suggested a negative trend in liquidity as a major factor leading to such bankruptcy. In the case of analysis with respect to different activity ratios, a negative correlation has been found between profitability and fixed asset turnover ratio, working capital turnover ratio, but a positive correlation with debt ratio which is in accordance with the study conducted by Joshi (2019) who suggested lack of focus on such negative correlation lead to distressed financial results as well as performance for the organisation. A negative correlation has also been recorded with debt-to-equity ratio as well as equity ratio, which has also been suggested by

Shankhdhar (2021) when different telecom companies were compared and reliance communication was found to have a lower ratio.

Figures 7 to 9 depict the trends of liquidity, activity, and financial leverage ratios for Jet Airways.

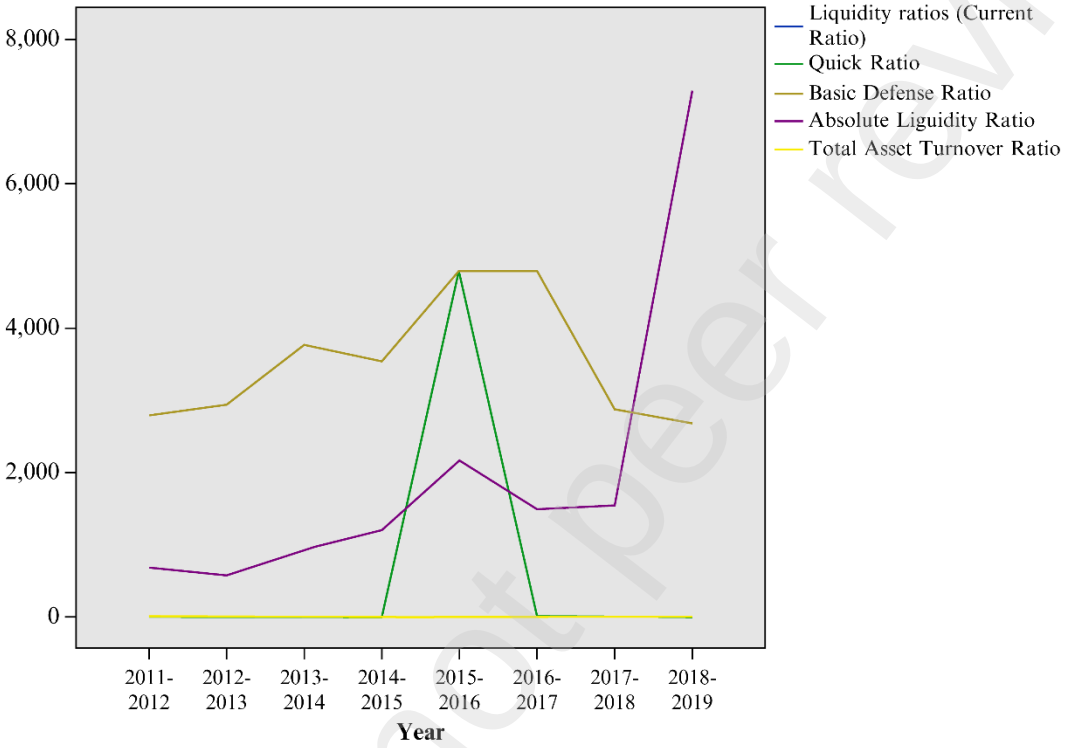

Figure 7: Jet Airway Liquidity ratio

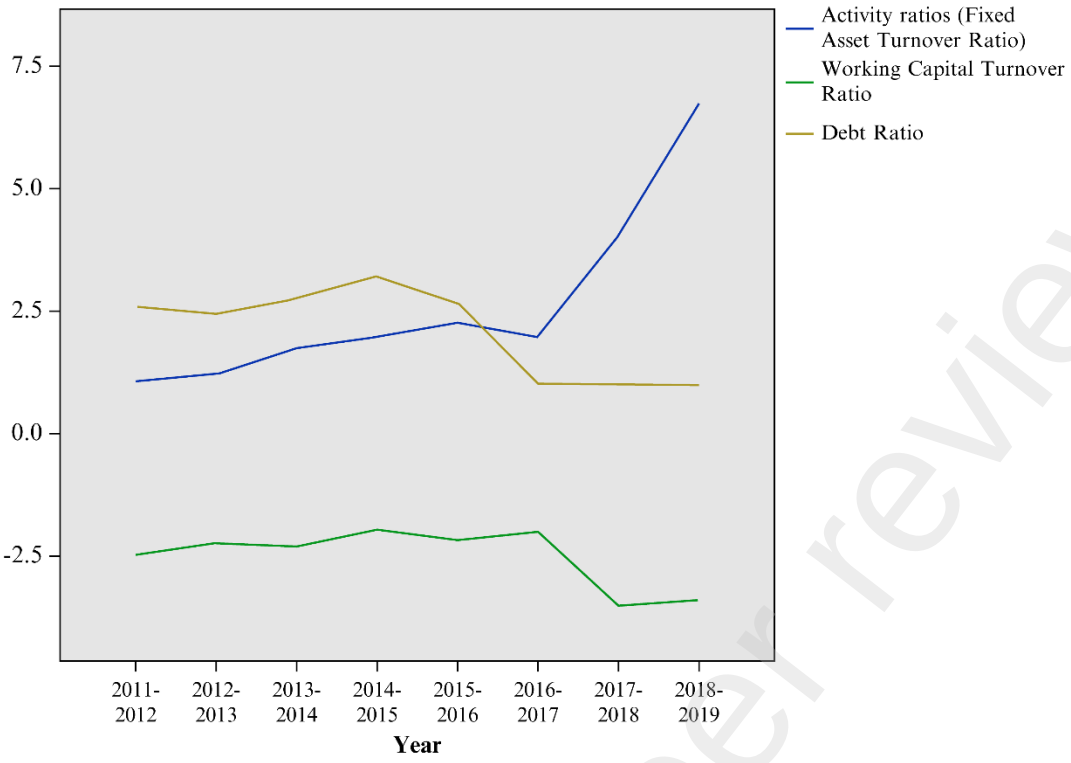

Figure 8: Jet Airway Activity ratio

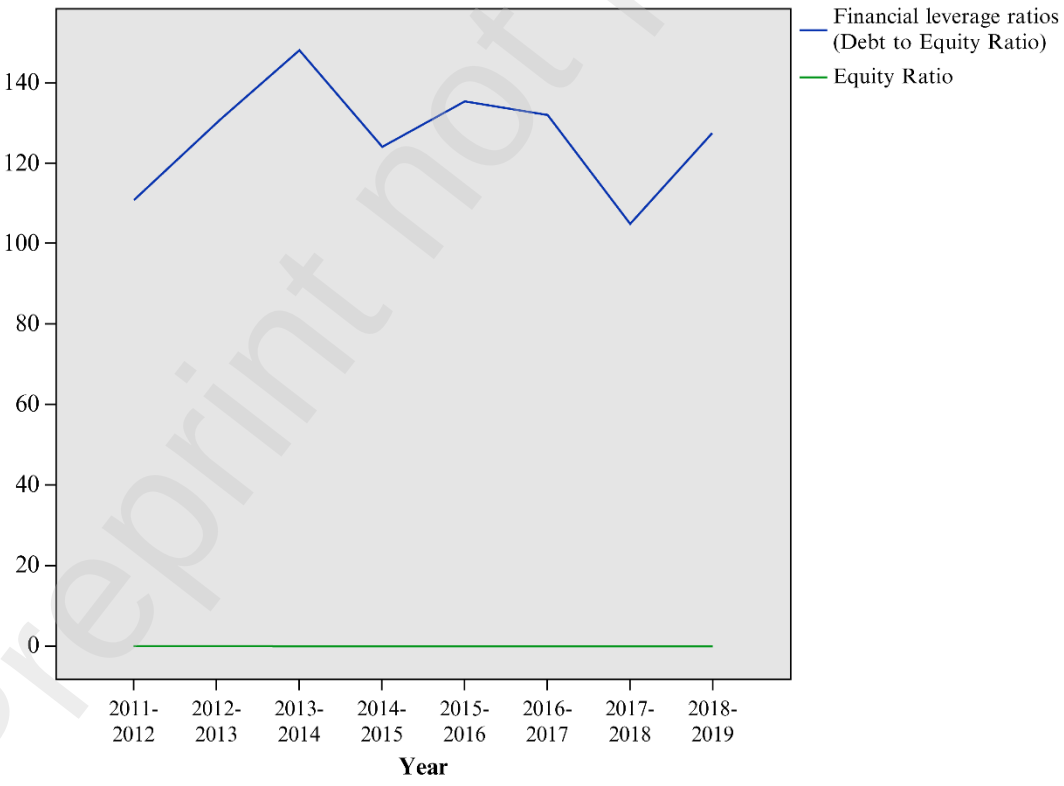

Figure 9: Jet Airway Financial Leverage ratio

Overall, the trends of liquidity, activity, and financial leverage ratios for the three Indian firms provide important insights into their financial health and performance. The positive and negative correlations between these ratios indicate areas of strength and weakness for each firm and can be used to inform future financial decisions.

Jet airways have had a strange relationship between profitability and different financial ratios, as evident from the current study where it has a negative correlation with the current ratio and basic defense ratio, while it has a positive correlation with quick ratio, total asset turnover ratio, and absolute liquidity ratio. In a similar way, when the activity ratio is analysed, the profitability of jet airways is suggested to be negatively correlated with the working capital turnover ratio but has a positive correlation with fixed asset turnover and debt ratio. Similarly, under financial leverage, the company enjoys a positive correlation with equity ratio while a negative correlation with debt to equity ratio, which is in alignment with the studies conducted by Ghosh (2020) and Rossi et al. (2021) who have suggested the presence of fraudulent activities in the company which makes adoption of a singular bankruptcy model inefficient due to several complexities and assumption associated rather stressed upon the need to utilise multiple financial ratios which have been done in the current study.

CONCLUSION AND RECOMMENDATIONS

The current study has suggested the adoption of several ratios under liquidity, activity, and financial leverage to establish the correlation of profitability with assets as well as the debt and

equity structure of the organisation. The adoption of multiple ratios will ensure that different aspects like financial breaches and lack of focus on sales or a specific asset are observed, and the company takes adequate steps to prevent the occurrence of bankruptcy. It is also suggested that such analysis is conducted regularly and continuously to ensure the company does not face short-term challenges as well and is prepared to handle different challenges as well.

Theoretical Implications or Managerial Implications

The study has significant theoretical as well as managerial implications in the domain of corporate ecosystems, financial analysis, and bankruptcy prediction. The study has aided in the analysis of different bankruptcy models as well as a different financial ratio which are adopted in the research. The study will also aid future scholars by providing a logical framework which can be utilised to analyse the effectiveness of different bankruptcy models for different industries, which would aid in the developed of novel bankruptcy prediction as well as prevention frameworks around the world. Such will also aid in the development of new financial tools which will also aid future scholars. The study will also aid managers in different organisations around the world as well as investors around the world in analysing the financial performance of the organisation to determine past trends and then predict the bankruptcy probability of the organisation. Such would allow both retail as well as commercial investors to ensure effective returns and the safety of their funds and would also allow managers to focus on those aspects which need improvement and ensure the sustainability of the organisation. Hence such research will indirectly aid in the growth of economic systems around the world which will lead to balanced growth throughout the world.

Limitation of the Study and any Future Research Direction

The current study has only focused on three selected companies and has been limited to the Indian ecosystem, the data may show deviation if more companies or more countries are also taken into consideration. Additionally, the study has been conducted using different financial ratios, hence there exists a chance of deviation if quantitative interviews are taken from people. Future scholars shall focus on more industries or on more companies within the same industry, in order to build a more comprehensive bankruptcy prediction model based on past trends. Future scholars should also focus on emerging technologies like artificial intelligence and how much can be adopted to analyse the prospects of bankruptcy in different organisations. Future scholars shall also use the model prescribed here in different industries and further modify the model and make it effective in the long run.

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Conflict of Interest: The author declares no conflicts-of-interest.

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