Chapter 4

THEORETICAL FRAMEWORK OF CREDIT RATING AND FINANCIAL VARIABLES

4.1 Introduction

The credit ratings are partly assigned by evaluating the financial status of the firms, seeking credit rating. This study tries to evaluate this content of financial information in credit rating. Initially, a theoretical framework has been drawn to develop a logical relationship between credit rating and financial variables. This evolved logical relationship could provide a base for exploring the required information through any other quantitative analysis. This chapter highlights the financial variables used in the study, and their relationship with the credit rating. This logical relationship is also comprehensively explained using graphs. These graphs are plotted using the median value of 600 observations of financial variables and the credit rating.

4.2 Variables Used in this Study

The company's specific variables were chosen in accordance with past empirical literature on credit rating and financial distress models. The study also uses new variables, which have not been used in any other studies. These new variables were used with the expectation of improving the predictive and discriminating power of different statistical models. The selected variables were grouped into different financial dimensions based on their components. The selected financial variables contained few absolute variables (TA and SALES) and the firm's age (AGE). The identified 39 financial variables were grouped into 9 financial dimensions (table 4.1). The computational details of the variables are given in appendix 4.

4.3 Financial Variables and Credit Rating

The financial performance of a company can be analysed by carefully examining the balance sheet and income statement of the company. The
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<td>Profitability</td>
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<td>Profitability</td>
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<td>PBIT/TA</td>
<td>Profitability</td>
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<td>CASH/CL</td>
<td>Liquidity</td>
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<td>CASH/CA</td>
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<td>INV/CA</td>
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<td>CRTURN</td>
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<td>PBIT/INT</td>
<td>Debt service coverage</td>
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<td>PBDIT/INT</td>
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<td>CAP/TL</td>
<td>Liabilities structure</td>
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<td>SALES</td>
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<td>AGE</td>
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larger quantities of data are made comprehensive and comparisons between firms made possible using financial accounting ratios. The credit analysts in a rating agency consider many attributes of a firm, financial as well as managerial, and quantitative as well as qualitative. The quantitative analysis is mainly financial analysis and is based on the firm's financial reports. The analysts ascertain the financial health of the firm, determines the sufficiency of earnings and cash flows to cover debt obligations. The quality of the firm's assets and the liquidity position of the firm is also ascertained.

The financial variables are being increasingly used as simple measures of complex financial relationships and in the prediction of credit rating and financial distress. The financial variables were used to uncover the financial information content of credit rating, since they are the effective tool for, (i) evaluating firm's performance, (ii) setting benchmark or standards of performance, (iii) highlighting the areas that need to be improved, and (iv) enabling external parties to assess the credit worthiness and profitability of the firm. The financial indicators over the last two and the current year were

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<td>TB/TA</td>
<td>Leverage</td>
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<td>CGR</td>
<td>Leverage</td>
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<tr>
<td>NS/TA</td>
<td>Sales turnover</td>
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<td>NS/CA</td>
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compared with the credit rating. This comparison is important for better understanding of the importance given to financial performance of firms in credit rating assignments. The brief details of the financial dimensions and the relationship between the variables of the dimensions and the credit ratings are explained in the succeeding paragraphs.

4.3.1 Profitability

A traditional indicator of success or failure of any business endeavour has been its ability to add value to its wealth or generate profits. The higher profitability raises a firm's equity value and also implies a longer way of revenues. The higher profitability implies greater cushion to debt holders. Profitability also determines the market perceptions, which has a bearing on the support of shareholders and other lenders. This support can be an important factor during stress. The firms with lower profitability would subsequently default more frequently. The profitability of a firm will have a direct relationship with credit rating (higher the profitability, higher the credit rating). The more profitable the firm, the more resources it has to pay debtors, and the lower its propensity to default. Hence, it is expected, that company's credit worthiness is positively related to its profitability. Profitability is a relative term. It is hard to say what percentage of profit represents a profitable firm. The profit depends on different factors like the position of the company and its products on the competitive cycle.

A profitability of firm is conventionally measured through financial ratios, in which the profit is measured as a percentage in the total assets, net sales, and capital employed. PBDIT/NS, PBIT/NS, PBIT/TA, PBIT/CE, PBT/NS, and PBT/T are the ratios which describe the profitability of the firm and avoid the volatility of earnings associated with extraordinary items. A higher value of these ratios indicates greater profitability and a positive relationship with credit rating. Since a firm's ultimate existence is based on the earning power of its assets, some of these ratios appear to be particularly appropriate for studies dealing with default risk and credit rating.
RP/TA, accounts for the proportion of total amount of reinvested earnings and/or losses of a firm over its entire life. The age of a firm is implicitly considered in these ratios. The relatively young firm will probably show a low RP/TA ratio because it had no time to build up its cumulative profits. It also measures the leverage of a firm, those firms with high retained earnings to total assets, have financed their assets through retention of profits and have not utilised as much debt. The ratios DIV/PAT and RP/PAT measure the dividend policy of firm. These ratios were also used to study the financial information content in credit rating. Fig 4.1 presents the graphical relation between credit rating and the median value of select profitability variables. Almost all the variables show an positive movement.

4.3.2 Liquidity

Liquidity is an indication of the firm's ability to respond immediately to sudden cash payments. There are many liquidity ratios in common usage, but at heart they measure similar things. The more liquid assets a firm has, the lower its propensity to default in short term. Liquidity ratios as a relevance to this study would measure the firm's ability to meet fixed cost expenses of debt outstanding. The liquidity position is affected by the state of competitions, issuers market position and policies, and relationship with customers and suppliers. The comparison of the liquidity dimension with credit rating helps to identify the corporate position in meeting the fixed expenses on capital borrowings. The funding profile with respect to matching of assets-liability tenures also has an important bearing on the liquidity position.

The companies with higher current ratios and bigger holdings of cash and marketable securities tend to have lower default probability, leading to higher credit rating. Since the profitability and liquidity are two terms which are inversely related, a company with highest profitability having a good
Fig 4.1
Credit Rating and Median Values of Profitability Variables

Fig 4 1 (a)  
PBDIT/NS

Fig 4 1 (b)  
PBIT/NS

Fig 4 1 (c)  
PBIT/TA

Fig 4 1 (d)  
PBIT/CE
Fig 4.1 continued

Credit Rating and Median Values of Profitability Variables

Fig 4.1 (e)  
PBT/NS

Fig 4.1 (f)  
PBT/TA

Fig 4.1 (g)  
RP/TA

Fig 4.1 (h)  
DIV/TA
Credit Rating and Median Values of Profitability Variables

Fig 4.1 continued

rating may not have high liquidity. Though it is argued that higher the liquidity, better the rating, it is a relative term, which could be understood that reasonable liquidity, better will be the rating. The indicators of liquidity include CASH/CL, CASH/TA, CA/CL, WC/NS, WC/TA, QA/CL, and CASH/CA. Fig 4.2 exhibits the graphical relation between credit rating and the median value of select liquidity variables. These graphs explain a complex relation between credit rating and financial variables.

4.3.3 Activity

The activity ratios reflect how were the firm's assets are being managed. The activity ratios are accounting ratios that reflect some aspects of the firm, that have less straightforward relation to credit risk than other variables. The activity ratios that use inventory in the numerator is expected to have a positive relationship with the default probability, as growing inventory reveals highest storage costs as well as non-liquidity, leading to a
Fig 4.2
Credit Rating and Median Values of Liquidity Variables

Fig 4.2 (a)  CASH/CL

Fig 4.2 (b)  CASH/TA

Fig 4.2 (c)  CA/CL

Fig 4.2 (d)  WC/NS
Fig 4.2 continued
Credit Rating and Median Values of Liquidity Variables

Fig 4.2 (e)
WC/TA

Fig 4.2 (f)
QA/CL

Fig 4.2 (g)
CASH/CA
lower credit rating. The debtors' turnover ratio shows the firm's efficiency in collecting cash from its credit sales. Some of the activity ratios include, INVTURN, INV/CA, INV/TA, REC/TA, DRTURN, and CRTURN. Fig 4.3 shows the graphical relation between credit rating and the median value of select activity variables. These graphs explain a remote relation between credit rating and financial variables.

4.3.4 Debt Service Coverage

This dimension of a firm is considered to be a primary importance to the debt holders of a firm. The level of these ratios reflects the result of business risk diverse and the funding policies. Generally, higher the level of coverage, higher is the credit rating. The business with lower level of coverage can get higher ratings if the earnings are steady (i.e., business with low industry risk). As the debt instruments are fixed income instruments, the rating awarded to these instruments are expected to be positively related to credit rating.

PBDIT/INT, PBIT/INT and OCF/INT measure the firm's ability to service its debt with internally generated cash flows. These ratios help to determine whether a business can meet all its operative needs and have sufficient funds remaining to cover interest requirements and dividends. Therefore a ratio below 1.1 indicates that the company must borrow funds to meet some of its financing obligations. This ratio also serves as an indicator of a company's capacity to incur additional debt. The ratio, CP/INT measures the cash profit as a percentage to interest to be paid, which otherwise means the cash term earnings of the firms to settle the fixed expenses (interest). Fig 4.4 presents the graphical relation between credit rating and the median value of select debt service coverage variables. These graphs explain a positive relation between credit rating and the financial variables.
Fig 4.3
Credit Rating and Median Values of Activity Variables

Fig 4.3 (a) INVTURN

Fig 4.3 (b) INV/CA

Fig 4.3 (c) INV/TA

Fig 4.3 (d) REC/TA
4.3.5 Liabilities Structure

The components of the total liabilities of a firm are also considered in major financial decisions made by the external parties to the firms. More the fixed cost capital (debt) component in the total liabilities, higher will be the probability of default. The credit ratings are expected higher for the firms with less borrowing. Usually the liabilities structure is studied using CAP/TL, RS/TL, TB/TL, BB/TB, and DEB/TB. Fig 4.4 presents the graphical relation between credit rating and the median value of select liabilities structure variables. These graphs explain a positive relation between credit rating and RS/TL, negative relation between credit rating and TB/TL, and a complex relation between credit rating and other variables.

4.3.6 Size

The firm's size is a variable that is correlated with many financial statement inputs. The typical proxies for firm size are its TA and SALES. It is
Credit Rating and Median Values of Debt Service Coverage Variables

Fig 4.4

Fig 4.4 (a)  
PBDIT/INT

Fig 4.4 (b)  
PB/IT/INT

Fig 4.4 (c)  
CP/INT

Fig 4.4 (d)  
OCF/INT
Credit Rating and Median Values of Liabilities Structure Variables

Fig 4.5

- **Fig 4.5 (a)**
  - CAP/TL
  - Graph showing CAP/TL values across different credit ratings.

- **Fig 4.5 (b)**
  - RS/TL
  - Graph showing RS/TL values across different credit ratings.

- **Fig 4.5 (c)**
  - TB/TL
  - Graph showing TB/TL values across different credit ratings.

- **Fig 4.5 (d)**
  - BB/TL
  - Graph showing BB/TL values across different credit ratings.
expected that bigger the firm, the more diversified its assets and therefore its default risk is lower. The larger firms may default less frequently than the smaller firms. So a positive relationship is expected between size and credit rating. Fig 4.6 presents the graphical relation between credit rating and the median value of select size variables. These graphs explain a positive relation between credit rating and financial variables.

4.3.7 Firm's Age

The age of the firm also determines the value of figures in financial statements. A older firm may have more of reserves than a firm which is very young. The age and track record of the firm is also considered in major financial decisions by the stakeholders. But the term is complex that a very old firm with poor performance can have a very worst fundamental leading to a poor credit rating. As this dimension is not a direct financial variable,
relation between credit rating and firm’s age are not clearly understood. Fig 4.6 presents the graphical relation between credit rating and the median value of firm’s age variable. This graph explains a complex relation between credit rating and age variable.

4.3.8 Leverage

Leverage is an important measure of the credit risk of a firm since it measures the firm’s ability to withstand unforseen circumstances. The firms with high leverage will have high exposure to default risk and as propensity to default. The credit rating for the firms with high leverage is expected to be lower, as the default probability is higher. The business risk is a prime driver, while gearing has a secondary role in determining the overall rating (especially long term). To illustrate, an issuer who’s gearing level is
favourable but relative business fundamental are weak is unlikely to get a favourable long-term rating. This is so because gearing is considered to be a "controllable" factor while business factors are relatively difficult to alter significantly. Usually leverage is measured using (i) total borrowings as a percentage of total assets, and (ii) long term debt as a percentage of equity.

D/E ratio shows the extent to which a firm is relying on debt to finance its investments and operations, and how well it can manage the debt obligations, i.e., repayment of principal and periodic interest. If the company is unable to pay its debt, it will be forced into bankruptcy. On the positive side, the use of debt is beneficial as it provides tax benefits to the firm, and allows it to exploit business opportunities and grow. It also shows the firm's reliance on external debt for financing. The lower the ratio, more conservative.
Fig 4.8

Credit Rating and Median Values of Leverage Variables

Fig 4.8 (a)
D/E

Fig 4.8 (b)
TB/TA

Fig 4.8 (c)
CGR
(probably safer) the company is. However, if a company is not using debt, it may be foregoing investment and growth opportunities. Fig 4.8 shows the graphical relation between credit rating and the median value of select leverage variables. These graphs explain a negative relation between credit rating and financial variables.

### 4.3.9 Sales Turnover

The assets turnover reflects the efficiency with which the available capital is used. A high NS/TA and NS/CA ratios are a pre requisite to obtain high returns with relatively low investment and has a positive effect on the liquidity of the firm, therefore reducing the default probability and apprehending the credit rating. These ratios show how much sales the firm is generating for every rupee of investment in assets. The higher the ratio, the better the firm is performing. Fig 4.9 presents the graphical relation between credit rating and the median value of select sales turnover variables. These graphs explain a complex relation between credit rating and financial variables.

**Fig 4.9**

Credit Rating and Median Values of Sales Turnover Variables
4.4 Chapter Summary

The credit analysts in a rating agency consider many attributes of a firm, financial as well as managerial, quantitative as well as qualitative. The quantitative analysis is mainly financial analysis and is based on the firm's financial reports. The analysts ascertain the financial health of the firm, determines the sufficiency of earnings and cash flows to cover debt obligations. The quality of the firm's assets and the liquidity position of the firm are also ascertained. The profitability of a firm will have a direct relationship with credit rating. The more profitable the firm the more resources it has to pay debtors, and the lower its propensity to default. Hence it is expected, that company's credit worthiness is positively related to its profitability. The more liquid assets a firm has, the lower its propensity to default in short term.

The activity ratios are accounting ratios that reflect some aspects of the firm that have less straightforward relations to credit risk than other variables. Generally, higher the level of coverage, higher is the credit rating. The business with lower level of coverage can get higher ratings if the earnings are steady. The credit ratings are expected higher for the firms with more borrowing. The larger firms may default less frequently than the smaller firms. The age and track record of the firm is also considered in major financial decisions by the stake holders. The firms with high leverage will have high exposure to default risk and as propensity to default. A high NS/TA and NS/CA ratios are a pre-requisite to obtain high returns with relatively low investment and has a positive effect on the liquidity of the firm, therefore reducing the default probability and apprehending the credit rating.

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