CHAPTER 1. INTRODUCTION

1.1 Financial Distress

1.1.1 Introduction

Financial distress in companies indicates a situation where the firm is not able to meet its obligations due to poor financial performance manifested through reduction in revenues, low profitability, under-utilization of assets and poor working capital management. This leads to default in payment to lenders, creditors, employees and government. This state of affairs can lead a company to probable bankruptcy. Once bankruptcy sets in, all the stakeholders are adversely affected. A distressed company not only leads to erosion of investors’ wealth but also depresses the investment climate in an economy. A financially distressed company can turnaround itself through remedial measures taken at appropriate times. This is possible if the distress signals are identified in advance by the company’s management.

During the financial crisis of 2007-08, many organizations across the world filed for bankruptcy leading to loss of wealth for investors and creditors. Bankruptcy is not an overnight phenomenon. A company passes through various stages of distress before it becomes bankrupt or insolvent. One of these stages is financial distress. It is a stage when the company finds it difficult to meet their contractual obligations. When financial distress cannot be mitigated, bankruptcy or insolvency sets in, (Avenhuis, 2013). In a study on US bankrupt companies for the period 1980-2013, it was observed that financial distress of a company adversely impacts the capital structure of its suppliers. Financial leverage of suppliers increases to improve bargaining power. This leads to increase in financial risks of its capital suppliers, (Kadapakkam and Beyhaghi, 2017).
Thus it becomes more important to understand the indicators of financial distress in companies. If these indicators are reviewed and interpreted, then distress can be arrested and bankruptcy avoided, thereby protecting wealth of stakeholders.

Theoretically financial distress (Chandra, 2008) can be understood as under:

(i) Stock based – Negative net worth.
A situation where the total liabilities of the firm exceeds the value of assets held by it.

(ii) Flow based – Operating cash flows are insufficient to meet the business obligations.
A situation indicating liquidity problems in a firm where the cash flows generated from its operating activities cannot meet its liabilities.

Financial distress cannot be limited to one event. It is a series of events and state of affairs ultimately leading to bankruptcy, insolvency and closure of the business.

**Reserve Bank of India** has defined a sick unit as:\(^1\):

Any of the borrowal account of the enterprise remains NPA for three months or more

or

There is erosion in the net worth due to accumulated losses to the extent of 50% of its net worth during the previous accounting year.

**Section 253(1) of the Companies Act, 2013** defines sick unit as:

*When on demand by the secured creditors of a company representing 50% or more of its outstanding amount of debt, the company has failed to pay the debt within 30 days*

---

\(^1\)[https://www.rbi.org.in/scripts/Notification.doa: 30/01/2017]
of the notice of demand, the creditors may file an application for a determination that the company be declared as a sick company.\textsuperscript{2}

**Sick Industrial Companies (Special Provisions) Act, 1985** has defined sickness as:

*An industrial company existing immediately before the commencement of the Sick Industrial Companies (Special Provisions) Amendment Act, 1993, registered for not less than five years and having at the end of any financial year accumulated losses equal to or exceeding its entire net worth, shall be deemed to be a sick industrial company*\textsuperscript{3}. The provisions of this Act has since been repealed and merged with Companies Act, 2013.

In simple words, a company becomes sick when its cash inflows are insufficient to meet its cash outflows leading to default in payment of its contractual liabilities and consequently eroding the capital invested in the business.

For this study, financially distressed company is defined as one which has reported net losses for three consecutive years.

**1.1.2 Indicators of Financial Distress**

Business failure or bankruptcy is a systematic decay of financial health of a company. Indication of financial distress can be identified up to 5 years before failure or bankruptcy actually sets in. Financial distress precedes business failure and demise. Jim Collins (Chandra, 2008) in his book ‘How the Mighty Fall’ has listed five stages of corporate decline.

Stage 1: Firms becomes dogmatic about their practices.
Stage 2: Firms scale up more than that the fundamentals allow or move into industries where their strength do not apply.

\[\text{http://indiamicrofinance.com/revival-and-rehabilitation-of-companies.html doa: 15/03/2017}\]
\[\text{https://india.gov.in/sick-industrial-companies-special-provisions-act.doa 10/01/2017}\]
Stage 3: Firms tend to ignore warning signals and become comfortable with strong existing performance.

Stage 4: With increasing problems, the firm changes top management, radically change strategies without focusing on improving fundamentals.

Stage 5: Slowly the firm becomes irrelevant and dies. However firms may also turnaround itself from Stage 4.

Analysing the financial information of a business on a regular basis can provide valuable insight about the state of affairs of the business, (Bhunia and Sarkar, 2011). A company’s financial statements are a very important source of information to assess its financial health. Financial ratios as a tool to identify financial distress has found acceptance by researchers across the globe and has been used in numerous studies on financial distress. Signs of financial distress manifests itself in the following situations:

1. Low or negative operating margins
2. Slow built up of current liabilities
3. High non-moving inventory
4. Increasing debt levels
5. Non-conversion of capital work in progress to fixed assets
6. Inability / delay in payment of wages and other contractual liabilities
7. Underutilisation of fixed assets
8. Delay/ default in payment of statutory dues
9. Low capacity utilisation

A study conducted by RBI on causes of industrial sickness observed that poor production management, poor labour management, poor resource management and lack of professionalism are most often responsible for industrial sickness, (Chandra, 2008). All the above situations can be reviewed and analysed using appropriate financial and cash flow ratios. Researchers have accepted financial ratios as a useful predictors of financial distress since a ratio can reflect the financial state of affairs in a company, (Lakshan and Wijekoon, 2013). Existing literature has extensively used ratios reflecting operating efficiency, long term solvency, asset utilisation, working capital management, growth capacity, cash flows generated from operations in corporate distress studies, (Xie et al, 2011).
1.2 Manufacturing Sector in India

1.2.1 Introduction

Manufacturing refers to the industry which involve manufacturing and processing of products to be used as end products. It is the wealth producing sector of any economy. This sector is very important to the country as they employ a huge share of labour force and produce materials used by critical sectors like infrastructure and defence. This sector is the principal indicator of economic development in a country, (Mohommad, 2010). Manufacturing activity is the key driver of economic growth in any economy. Post independence, all efforts by Indian Government were focused on manufacturing sector however the policies failed to make India a manufacturing powerhouse, (Kumar, 2014). It contributed to only 16% to GDP in the year 2015-16. Manufacturing sector in India has undergone various phases of development in the last few decades. Indian manufacturing sector can be analysed from two time periods – pre- liberalization and post- liberalization. Prior to 1980, the sector was plagued by ‘License and Permit Raj’.

Import substitution strategy also was ineffective. This period saw stagnation in industrial growth due to slow growth in demand for industrial products, slowdown of public investments and poor management of infrastructure sector. Liberalization brought the following reforms: a) Relaxation of import restrictions b) Provision of export incentives c) Abolition of industrial licensing. d) Encouraging Foreign Direct Investment in important industrial and service sectors. The sectors which gained prominence in this era were Automobile, Textiles, Machinery, Pharmaceuticals, Steel, Engineering and Petroleum.4

Figure 1.1 tracks the contribution of manufacturing sector to GDP from 1950-51 to 2015-16.

FIGURE 1.1: % SHARE OF INDIAN MANUFACTURING SECTOR IN GDP

The contribution of manufacturing sector in 1950-51 was 8.98% of GDP which has gradually increased to 16% in 2015-16\(^5\)

1.2.2 Financial Distress in Indian Manufacturing Companies

The important indicators of financial distress leading to bankruptcies are debt default, negative net worth, negative operating margins. Reports and statistics on financial distress in Indian companies reveal the extent and depth of financial distress in Indian companies.

(i) As per the Financial Stability report of RBI, June 2015, the stressed advances of scheduled banks have shown an increasing trend over the last few years.

FIGURE 1.2: STRESSED ADVANCE RATIO

Of the broad sectors, 44.8% of the total advances have been made to industry sector. 17.9% of the total advances to industry sector has been classified as stressed\(^6\). Figure 1.2 gives sector wise stressed advance ratio.

ii) The gross NPAs (Net Performing Assets) in select sectors as a percentage of total advances have shown a rising trend. Figure 1.3 gives industry wise distribution of Gross NPAs.

\[\text{FIGURE 1.3: GROSS NPA TO TOTAL ADVANCES}\]

\(^6\) https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs.doa:15/09/2016
(iii) Of the sub sectors in the industry, mining, iron and steel, textiles, infrastructure and aviation constituted 24.8% of the total advances of which 51.1% are stressed. These statistics indicate the widespread existence of financial distress in Indian Industry.

(iv) It is more disturbing to note that for highly leveraged weak companies with a Debt Equity Ratio of more than 3, the share of debt is showing an increasing trend. The leveraged weak companies with lower debt servicing capacity and high leverage may put pressure on the already deteriorated asset quality of bank loans in adverse situations. The credit extended by scheduled commercial banks (SCBs) to all Non-Government Non-Financial (NGNF) companies was about 32.4 per cent of total bank credit as at end March 2014.

Table 1.1 provides as insight into the debt servicing capacity of Non-Government Non-Financial Companies (NGNF) and their leverage for the periods ending

---

8 https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs.doa:20/10/2016
September 2014, March 2015 and September 2016. 19.5% of the borrowing NGNF companies are highly leveraged with a Debt Equity ratio of more than 2. 30.5% of loans advanced by banks are to this group of high risk companies. This also shows the default risk exposure of Indian Banks.

**TABLE 1.1: DEBT SERVICING CAPACITY OF LEVERAGED COMPANIES**

<table>
<thead>
<tr>
<th>Leverage</th>
<th>Number of companies (as percentage of total companies)</th>
<th>Share of debt to total debt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sep'14</td>
<td>Mar'15</td>
</tr>
<tr>
<td>Negative Net worth or DER &gt;= 2</td>
<td>18.4</td>
<td>19.0</td>
</tr>
<tr>
<td>Negative Net worth or DER &gt;= 3</td>
<td>13.6</td>
<td>14.2</td>
</tr>
</tbody>
</table>

*source: RBI (Half-yearly statements of select NGNF listed companies).*

(v) As per CRISIL’s Annual Default Ratings and Transition Study, 2015, the overall annual default rate was 4.1%. Of the total 13500 firms rated, more than 75% of the firms were rated either ‘CRISIL BB’ or lower. The number of defaults increased from 378 firms in 2014 to 395 in 2015. 10

(vi) A report by Credit Suisse on Corporate Health indicates that 39% of the companies having debt has an interest coverage of less than 1.3700 listed Non-financial companies has a debt of $ 500 billion.11

---


(vii) According to a study done by Kotak Institutional Equities, the aggregate earnings of members of BSE Sensex fell by 10.9% which was worse than the 10.6% loss in earnings borne by investors during the financial crisis of 2008.\textsuperscript{12}

(viii) There are around 6500 companies listed in Bombay Stock Exchange and National Stock Exchange. 1155 listed companies have negative net worth totaling Rs.88681.91 \textit{crs} for the financial year ended 2015, (Capitaline Database).

(ix) 186 companies have registered with Board for Industrial and Financial Reconstruction (BIFR) under Sick Industries Companies Act, 1985 in the year 2015\textsuperscript{13}. Figure 1.4 shows the number of companies registered with BIFR for restructuring.

**FIGURE 1.4: NUMBER OF COMPANIES REGISTERED WITH BIFR**

<table>
<thead>
<tr>
<th>Companies registered with BIFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>2008</td>
</tr>
<tr>
<td>2009</td>
</tr>
<tr>
<td>2010</td>
</tr>
<tr>
<td>2011</td>
</tr>
<tr>
<td>2012</td>
</tr>
<tr>
<td>2013</td>
</tr>
<tr>
<td>2014</td>
</tr>
<tr>
<td>2015</td>
</tr>
</tbody>
</table>

Source: bifr.in

During the last decade 1091 companies have registered with BIFR since 2005. There has been an increasing trend since 2009.

(x) A study of 1000 manufacturing companies in India by McKinsey & Co revealed that more than half of India’s manufacturing companies do not return their cost of capital\textsuperscript{14}. Most of the sectors studied including durables, automobiles, food and

\textsuperscript{12}http://www.livemint.com/Money/p5Lg55kD4GqW4A1Uq0BMW85O/March-quarter-corporate-results---The-gap-between-reality-an.html.doa:20/10/2016

\textsuperscript{13}http://www.bifr.nic.in/casesregd.htm.doa: 03/06/2016

beverages, metals and mining had a Return on Capital Invested (ROIC) < Weighted Average Cost of Capital (WACC). Consumer Durable industry tops the list with 79% of the companies not making minimum returns.

**FIGURE 1.5: PERCENTAGE OF COMPANIES WITH ROIC<WACC**

![Graph showing percentage of companies with ROIC<WACC in different industries.]

*source: McKinsey report on India’s manufacturing companies, 2015*

Figure 1.5 highlights the percentage of companies with ROIC<WACC in different industries. All the above figures and statistics point to the presence of severe financial distress in Indian companies.

In a volatile global economy, no company is completely insured from the vagaries of the business environment. Empirical research provides evidence that financial distress may arise from internal risk factors also. High levels of debt, inefficiency in operations, lack of adequate governance can lead to financial distress, (Kahya and Theodossiou, 1999)
The erosion of net worth leads to damaging investor’s confidence in capital market. Industrial sickness in India has resulted in loss of employment to millions of people. It is highly essential to design and develop a forewarning system so that timely remedial measures can be taken to curb the menace of industrial sickness, (Murty and Misra, 2004). Financial distress induces contraction in growth of enterprises and employee welfare. It also has an adverse effect on levels of employment, (Inekwe, 2016). All the above indicate an urgent need to identify signals which indicate financial distress in companies. This can serve as an early warning system to the company’s management as well as investors to adopt appropriate strategies to protect wealth. Timely interception of distress factors will help a company revive and restructure itself and thereby prevent bankruptcy.

1.3 Bankruptcy Laws in India.

A strong and well laid down bankruptcy law in any country can, to a large extent, minimise the impact of financial distress eventually leading to bankruptcy and consequent erosion of stakeholders wealth. It gives the company a chance to revive and reconstruct itself by taking appropriate remedial measures.

In India, the legal provisions related to bankruptcy can be found in Sick Industrial Companies (Special Provisions) Act, 1985, Debt Recovery Act, 1993, Reserve Bank of India guidelines for reconstruction of debt, Companies Act, 2013, SARFAESI Act, 2002 and Insolvency and Bankruptcy Code, 2016.

1.3.1 Sick Industrial Companies (Special Provisions) Act, 1985 (SICA, 1985)\(^\text{15}\)

As per SICA, 1985, an industrial company is termed as sick if it is registered for not less than five years and has at the end of any financial year accumulated losses equal to or exceeding its entire net worth. A quasi-judicial body, Board for Industrial and Financial Reconstruction (BIFR) has been set up to rehabilitate sick industries. The Board after due inquiry may provide schemes for the following remedial measures:

---

\(^{15}\) [https://india.gov.in/sick-industrial-companies-special-provisions-act.doa 10/01/2016](https://india.gov.in/sick-industrial-companies-special-provisions-act.doa 10/01/2016)
(a) The financial reconstruction of the sick industrial company;

(b) The proper management of the sick industrial company by change in, or takeover of, management of the sick industrial company;

(c) the amalgamation of- (I) the sick industrial company with any other company, or (ii) any other company with the sick industrial company; (hereafter in this section, in the case of sub-clause(i), the other company, and in the case of sub-clause (ii), the sick industrial company, referred to as “transferee company”);

(d) the sale or lease of a part or whole of any industrial undertaking of the sick industrial company;

(da) the rationalization of managerial personnel, supervisory staff and workmen in accordance with law;

(e) such other preventive, ameliorative and remedial measures as may be required.

1.3.2 Recovery of Debt Act due to Banks and Financial Institutions Act, 1993

This Act provides for the establishment of Tribunals for fast recovery of debt which are owed to banks and financial institutions.

1.3.3 Companies Act, 2013

Chapter XIX of the Companies Act, 2013 contains provisions for liquidation and winding up of companies. Sec 269 addresses insolvency by incorporating provisions for rehabilitation and revival of sick companies based on Balance Sheet. A company can also voluntarily file for liquidation or the Tribunal can order the liquidation.

---


17 indiamicrofinance.com/revival-and-rehabilitation-of-companies.html. doa 15/10/2016
1.3.4 Reserve Bank of India guidelines on Corporate Debt Restructuring\textsuperscript{18}

The main purpose of the Corporate Debt Restructuring (CDR) framework as laid down by RBI is to ensure timely mechanism for restructuring the corporate debts of companies in distress outside the purview of BIFR and other legal procedures so that the interest of all stakeholders are preserved. This mechanism is especially for those companies which can be revived.

1.3.5 The Securitisation and Recovery of Financial Assets and Enforcement of Security Interest Act (SARFAESI ACT), 2002\textsuperscript{19}

SARFAESI Act, 2002 allows banks and financial institutions to auction residential or commercial properties to recover loans. It is an instrument whereby lenders can enforce securities held as collaterals if borrowers default in debt repayment.

1.3.6 Enforcement of Security Interest and Recovery of Debt Laws and Miscellaneous Provision (Amendment) Bill, 2016 \textsuperscript{20}

This Bill seeks to make SARFAESI Act, 2002 and DRA Act, 1993 more effective.

1.3.7 Insolvency and Bankruptcy Code, 2016 (IBC) \textsuperscript{21}

IBC seeks to consolidate all the existing laws related to Bankruptcy in India. It provides time bound resolution process for companies, partnership firms and individuals. Insolvency and Bankruptcy Board is set up as an independent body for the administration of the law. Under this law a creditor, a lender and even an employee can seek redressal.

\textsuperscript{18} https://www.rbi.org.in/Scripts/Notification. doa 15/10/2016

\textsuperscript{19} www.drat.tn.nic.in/Docu/Securitisation-Act.pdf. doa:15/10/2016

\textsuperscript{20} financialservices.gov.in/Banking/LAWS.pdf. doa. 10/02/2016

\textsuperscript{21} www.indiacode.nic.in/acts-in-pdf/2016/201631.pdf. doa 12/02/2017
1.3.8 Effectiveness of above legal mechanisms

The failure of business adversely affects employees, shareholders, lenders and economy at large. In India, viability analysis of business is not given adequate importance. Company promoters delay reorganisation or change in management due to which jobs, income generated and economic growth is severely impacted. Measures like Securitisation and Enforcement of Security and Corporate Debt Restructuring are available but due to inefficient enforcement and lengthy litigation, these laws are ineffective. The Companies Act winding up procedure is very time consuming. The institution of BIFR has not effectively worked for the rehabilitation of the sick companies. SICA, 1985 could not cater to the needs of distressed companies. The new Bankruptcy Code’s implementation is yet to be reviewed. There is no cogent bankruptcy law in India which provides for reconstruction and revival of the distressed company. India has the dubious distinction of being among the countries where it takes the longest time to go through bankruptcy procedure in the world (10 years on an average). Consequently recovery rates are also very low, (Allen et al, 2007). The existing legal framework of corporate insolvency has several issues to contend with. The study of insolvency reforms introduced in different countries during the period 2005-13 for resolving financial distress revealed that empowerment of creditors, out of court procedures, regulating insolvency practitioners, transparency and early filing are some of the major reforms undertaken, (Nigam and Boughamni, 2017).

The Indian system provides neither an opportunity for speedy and effective rehabilitation nor for an effective exit, (HJayesh, 2015). The average time taken for insolvency proceedings in India is about 4.3 years and the recovery rate is 26 (cents to a dollar) as compared to 71 (cents to a dollar) in US. (Doing Business, World Bank Report, 2015).

Timely identification of distress can help companies get restructured or sold off to minimise loss for all stakeholders. Delaying a decision on whether to revive a sick company or to close it down destroys value for all stakeholders. An efficient insolvency regime can boost availability of funds or credit for business. Central Budget 2015 has highlighted the need for legal reforms to stimulate business and economic growth. A Bankruptcy Law Committee was set up by the Ministry of Finance in 2014. The
committee has reported that early recognition of financial distress and timely intervention are very important for designing strategies for revival. It also recommended that unviable companies should be liquidated as soon as possible to minimise losses.\footnote{http://www.thehindu.com/opinion/editorial/bankruptcy-law-reform-needed/article6955949.ece, doa: 10/09/2016}

*Where does all this leave the investors and other stakeholders of the company?*

In the absence of a robust statutory mechanism to address bankruptcy, the stakeholders will have to take the onus of protecting their wealth. Hence it becomes imperative to develop distress prediction models so that timely intervention can be made and wealth erosion minimised. The consequences of companies filing for bankruptcy can have a damaging impact on dependent businesses, suppliers, associates and private individuals. This fact makes the development and use of accurate bankruptcy prediction models a valuable preventive tool for creditors, managers, lenders and shareholders, (Leano Hector, 2004).

Another important point to note is that businesses fail gradually after some years of financial distress. If financial decay can be arrested at appropriate time through recognition of signs of decay, proper steps can be taken to turn around the company thereby saving investor’s wealth. Creditors, investors, auditors and government can put pressure on the company’s management to take remedial measures to help the company sail through difficult times. Distress prediction models can prove to be very useful in identifying distress from the early stages.

**1.4 Need for this Study**

The review of existing literature and the current scenario observed in Indian manufacturing sector highlights the following w.r.t to corporate distress in Indian manufacturing companies:
1. Financial distress has permeated the Indian corporate fabric. Recent financial numbers and statistics also indicate distress in Indian corporate sector. In view of the serious adverse effect of financial distress and bankruptcy on the investment climate of a country, it has become very important and urgent to develop a robust distress prediction model to protect the interest of corporate stakeholders.

2. There are many studies done for predicting business failure, however, very few studies have been done to predict financial distress in business. Financial distress occurs at a later stage of financial decay of a business. This stage usually precedes bankruptcy or failure. Shortage of incomes to cover expenses and low working capital levels are two distinct stages before bankruptcy, (Platt and Platt, 2002). Identification of early signs of distress can be of immense value to all stakeholders.

3. The need for country specific models for corporate failure prediction has been established by empirical research because of differences in legal, cultural and regulatory systems. Inclusion of country specific information, regional or industry indicators can improve the accuracy of prediction models, (Altman et al, 2014). In the past, many researchers have developed bankruptcy prediction models. Beaver (1966) developed a univariate model to predict bankruptcy. Later, a five variable discriminant model was developed by Altman (1968) to predict bankruptcy. Ohlson (1980) used Logit Analysis to develop a model using nine financial variables. Zmijewski (1984) developed a distress prediction model using Probit Analysis. However it remained to be validated across different time period and economies. Altman et al (2014) reviewed the efficiency of Altman’s model across 35 countries. It was observed that the predictive ability of the models varies across different countries and at different points of time. No model can be universally applied in all countries. A detailed study of Indian companies to identify factors which influence distress in Indian companies is not conducted.

4. Macro-economic factors like inflation, GDP growth, interest rates, exchange rates and monetary policy can influence financial distress in companies. Influence of macro-economic factors on corporate health is a very important area to be explored. Studies have established the relationship between business failures and macroeconomic conditions. (Turner et al, 1992). Inflation affects survival of new firms adversely, (Bhattacharjee et al, 2009). Monetary policy and credit policy can influence business
failures, (Jia Liu, 2009). However no study has been done in this respect in the Indian scenario.

A comprehensive distress prediction model for Indian companies is the need of the hour. Altman’s ‘z’ score model continues to be used for predicting business failure in India inspite of its obvious limitations. There is a need for country specific model incorporating the aspects unique to the business and economic environment of this country. Inclusion of macroeconomic factors can increase the predictability of distress prediction models. Influence of macroeconomic factors on corporate health of India is a very important area to be explored.

1.5 Research Objectives

The research objective has been designed to address the need for current study after reviewing gaps in existing research. The primary objective of this research is to analyse financial information of listed manufacturing companies in India to identify the financial factors indicating distress and develop a distress prediction model to serve as a warning system to companies so that steps can be taken to minimize and mitigate the distress. Such a model would help the company and its stakeholders to identify distress signals in advance for taking preventive measures. This will also minimize the probability of companies becoming bankrupt leading to losses to the stakeholders. India is a developing nation with an economy growing at an average rate of 6%. As one of the most important emerging market, along with micro economic factors, macroeconomic factors also influence the performance of the companies. The second objective of this research is to study the effect of inflation, net national income, interest rates, and exchange rates on the financial health of the company. The research objectives are framed as:

**Research Objective 1-** To identify the ratios which are significant in indicating financial distress for listed manufacturing companies in India.

To achieve this objective, Discriminant Analysis was done using financial ratios as variables to establish (i) Financial ratios are different for distressed and non-distressed
companies and (ii) Identification of significant financial ratios which can differentiate a distressed company from a non-distressed company. Factor Analysis was also done to extract important factors comprising of financial ratios which can distinguish a distressed company from a non-distressed company.

**Research Objective 2** - To develop distress prediction model through appropriate statistical techniques that can serve as an early warning system for listed manufacturing companies in India.

Discriminant Analysis and Logistic Regression was used to develop Distress Prediction model. The classification accuracy of the models were tested and the model with greater classification accuracy was identified.

**Research Objective 3** - To study the relation between macro-economic factors and financial distress in listed manufacturing companies in India.

To attain this objective, Pearson’s Correlation Coefficient was used to check the relation between macro-economic factors and financial distress. A distress prediction model using both financial ratios and macro-economic factors was developed using Logistic Regression to test whether the model with financial ratios and macro-economic factors increased the classification accuracy of the model with only financial ratios.

1.6 Research Hypotheses

**Objective 1:** To identify the ratios which are significant in indicating financial distress for listed manufacturing companies in India.

**Research Hypothesis 1**

(i) Null Hypothesis (H01): There is no significant difference between financial ratios of distressed and non-distressed listed manufacturing companies in India.
(ii) Alternate Hypothesis (H11): There is significant difference between financial ratios of distressed and non-distressed listed manufacturing companies in India.

**Research Hypothesis 2**

(i) Null Hypothesis (H02): Financial ratios cannot identify financial distress in listed manufacturing companies in India.

(ii) Alternate Hypothesis (H12): Financial ratios can identify financial distress in listed manufacturing companies in India.

**Objective 2: To develop financial distress prediction model that can serve as an early warning system for listed manufacturing companies in India.**

**Research Hypothesis 3**

(i) Null Hypothesis (H03): The selected financial ratios are not significant in prediction of financial distress in listed manufacturing companies in India.

(ii) Alternate Hypothesis (H13): The selected financial ratios are significant in prediction of financial distress in listed manufacturing companies in India.

**Objective 3: To study the relation between macro-economic factors and financial distress in listed manufacturing companies in India.**

**Research Hypothesis 4**

(i) Null Hypothesis (H04): There is no significant relation between macro-economic factors and financial ratios of distressed manufacturing companies in India.
Alternate Hypothesis (H1): There is significant relation between macro-economic factors and financial ratios of distressed manufacturing companies in India.

1.7 Overview of Research Methodology

The study is conducted on listed manufacturing companies in India. The period of study is the ten year period, 2005-2015. All the companies exhibiting losses for 3 consecutive years in this ten year time frame form the sample of distressed companies. The sample is matched with equal number of financially healthy companies. 18 financial ratios and 5 macro-economic factors is used as variables to study, analyse and identify the significant factors indicating financial distress. These factors are then used to construct the distress prediction model. The initial model uses only financial factors. Macroeconomic factors are subsequently added to the model to test the increase in predictive capacity of the model.

Discriminant Analysis and Factor Analysis is used to identify the independent variables from the 18 financial ratios which can discriminate a distressed company from a non-distressed company. Distress Prediction model is developed using the following techniques – a) Discriminant Analysis and b) Logistic Regression. The developed model is tested on the sample companies for classification and predictive accuracy. The relation between macro-economic factors and financial distress is studied using Pearson’s Correlation Coefficient and Logistic Regression. Detailed methodology has been explained in Chapter 3 after review of literature on methodology.

1.8 Scheme of Chapters

Chapter 1 discusses the background of the study, research problem, research objectives, research hypothesis, overview of research methodology and scheme of chapters.
Chapter 2 reviews the literature on research and studies conducted in the field of corporate distress from three different perspectives, A) Studies on corporate distress and bankruptcy B) Statistical tools and Techniques used in such studies and C) Financial and Non-financial variables used in such studies. This chapter also reviews the existing distress and bankruptcy prediction models.

Chapter 3 lays down the research methodology which includes sample selection procedure, definition and meaning of financial and macroeconomic variables used in the study, statistical techniques used for data analysis and model development.

Chapter 4 explains data analysis, result interpretation, model development and testing. This chapter also provides summary of research hypothesis testing.

Chapter 5 summarises the findings and gives conclusion of the study, limitations of the study, recommendations and scope for future study.