Long Term Solvency Strength in the Plastic Industry of Gujarat during 2001-2010

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Abstract: In this research paper author have attempted to analyse the solvency aspect of growing sector of plastic industry of Gujarat (India) during 2001- 2010 by taking a sample of 15 public limited listed companies which are working in the Gujarat state region of India on the basis of different size, age ,area etc.

Then the researchers have collected 10 years financial data of these 15 companies for the period 2001- 2010 and found out 02 composite ratios out of it. From all 02 ratios author have worked out composite ratios using ` paid-up capital` as weight and found out weighted mean of these ratios for 10 years.

Researcher have applied Mann- Kendall Trend detection test to test the hypothesis. Debt-equity ratio had linear rising trend. Plastic industry in Gujarat was able to generate borrowed capital reasonably well. The plastic industry of Gujarat had poor ability to offer assured payment of interest to the lenders .Long term solvency strength of plastic industry of Gujarat is exposed to serious strain.

Keywords: Plastics Industry, Financial Analysis, Composite Ratios, Weighted Mean, Mann-Kendall Test, Solvency Ratios.

I. INTRODUCTION

Over the years, India has made significant progress in the industrial world with healthy economic growth. On purchase power parity basis, it is one of the top five global economics and is expected to be the third largest by the turn of this decade.

Plastics are one of the fastest growing industries in India. Indian Plastics Industry is expanding at a phenomenal pace. Major international companies from various sectors such as automobiles, electronics, telecommunications, food processing, packing, healthcare etc. have set-up large manufacturing bases in India. Therefore, demand for plastics is rapidly increasing and soon India will emerge as one of the fastest growing markets in the world. The next two decades are expected to offer unprecedented opportunities for the plastic industry in India. This would necessitate industry initiatives to foster investments, expand the market, upgrade quality standards, enhance global participation, encourage Indian industry, to adopt and adapt to world class technology and manufacturing practices.

II. GROWTH OF PLASTIC INDUSTRY

2.1 Global Scenario

Last few years have been tumultuous for plastics and petrochemical sector due to steep rise in oil prices, which has adversely affected the global economies. However, considering the feed stock advantage and abundance of oil reserves newer petrochemical complexes are being established in Middle-east countries i.e. Oman, Saudi Arabia, UAE, etc. It is projected that, Ethylene capacity in Middle-East would reach to about 35 million tons per annum and Polypropylene (PP) capacity to touch about 7 million tonnes per annum. The US Petrochemical sector may lose Export competitiveness as most of the Ethylene capacities in USA are Ethane based, which are not cost competitive and are capable to produce only Polyethylene (PE). Similarly the revamping of European Petrochemical Complexes would be imperative as they are based on old and expensive technology and are not cost competitive with the Middle-East companies having the biggest

advantage of raw material at their doorstep. China, Middle-East and India would be the major global players, where expansion and augmentation of existing petrochemical capacity would take place in the next 5 years.

Worldwide Plastics Industry witnessed a steady growth in the last decade which is reflected in the increased consumption figures of all types of plastics materials. Asia has been world's largest plastics consumer for several years, accounting for about 30% of the global consumption excluding Japan, which has share of about 6.5%. Next to Asia is North America with 26% share, then Western Europe with 23% share in the global market.

2.2 Indian Plastic Industry

The plastic processing sector in India comprises about 55,000 units employing around 3.6 million people – directly and indirectly; Gujarat contributes about one-fifth of the total number of units in the country. They are involved in producing variety of items through injection moulding, blow moulding, extrusion and calendaring.

The country in general and Gujarat in particular possess necessary technical skills to produce high quality plastic goods, required machinery, efficient moulds and dyes. In view of the versatility of operations and low cost of production, the state has been ideally suited to serve as a sourcing base. Major international companies from various segments of industry including automobiles, electronics and communication, food processing and packaging have set up large manufacturing plants in the country and have helped to develop the market. India is emerging as one of the fastest growing markets and is expected to grow annually by 12 to 15% in the coming years. Indian Plastics Industry gained momentum in early 90's when the economy opened up with liberal industrial policies. Since 2000-01, virgin polymer consumption in the country increased from 3.3 MMT to 7.5 MMT in 2009-10 with annual growth of 9.4%.

Plastics Industries' contribution to India's manufacturing GDP touched around 10% in 2009-10. Polymer demand is expected to touch 16.2 MMT by 2015-16 and 20 MMT by 2020.

2.3 Plastic Industry in Gujarat

The Plastics Industry in Gujarat is one of the oldest in India and among the earliest initiatives towards polymer raw material manufacturing. Majority of India's plastics business revolves around packaging, and as Gujarat contributes 65-70 % to the country's plastics industry, it is home to many small and medium packaging industries. The Plastics Industry in Gujarat contributes 2.17% of India's total exports and is worth $3513 millions.

Thus, so far as growth of Indian economy is concerned, the plastic industry of Gujarat and therefore that of India is making considerable contribution. Therefore, the present study has got motivation from these aspects.

2.4 Some facts about Gujarat

- Gujarat contributes more than 60% of Indian petrochemical industry.
- 70 % of polymers are produced in Gujarat.
- Contributes one-fifth of the total number of SMEs in the plastic sector in the country.
- Gujarat plastic industry is witnessing an annual growth of more than 15 %.
- Gujarat's share in exports of plastic is around 15 %.
- Gujarat share in the production of plastic products is around 14 %.
- Gujarat has the highest plastic machinery manufacturers.

III.   LITERATURE REVIEW

Most of the studies have focused on some aspects of plastic industry like environmental impact of plastic shopping bags, risk faced by plastic industry, adopting new technology in plastic industry, traditional performance index of plastic industry, plastic debris and steps to support and to enable policy makers to develop plastic industry. Very few research works has been done on the field of financial aspect of plastic industry.

Meng-yi Wang (2007) analyzed the issues concerning risk-bearing issue faced by the public listing companies in Taiwan's traditional industries, including the food and plastic industries. The study covered the period from 2001 to 2006, and its results were as follows:

In both the food and plastics industries, if a company had greater operating leverage, it faces greater total risk and specific risk. If the company had greater shareholding ratio of board directors and greater amount of assets, it faces less total risk and specific risk.

As for the establishment years of a company, due to the stability and cycle of the products, a food company with longer establishment faces great risks and risk bearing. On the contrary, for a plastics company, the longer it has been established, the lower the risk and risk-bearing it was subjected to.

Povl A Hansen, Goran Serin (1993) showed that development of new materials and material shifts play an increasing role in the development of industrial production. The main issue of this paper was the ability of the industry to adapt to new materials. This study showed that it has been difficult for established firms in Denmark, both within the plastics industry and outside, to undertake shifts in technology. The study also showed that firms most open to material adaptation have been firms based on product ideas not on materials. Another finding was that the Danish plastics industry had been characterized by high growth rates despite low R&D figures. The reasons for these were on the one hand the ability of Danish plastics firms to exploit existing know-how and on the other hand the increased specialization of the firms.

Furthermore the study shows that neither institutional R&D nor institutional education had played any noticable role in the adaptation process of the Danish plastics industry Santanu Mandal (2011) in his study "Porter's Five Forces of Analysis of the Indian Plastic Industry" he has analyzed the plastic industry of India in terms of Michael E. Porter of Harvard Business School in 1979. Porter's five forces are

1. Bargaining power of suppliers

2. Bargaining power of buyers

3. Internal Rivalry

4. Entry

5. Threat of substitutes.

So far as the porter's five forces analysis of this industry is concerned, bargaining powers of suppliers is low while that of buyers is high. Entry is difficult and it entails the incumbent to have significant capital to invest if it wants to enter this industry. On the substitute front, there are lot of researches going on and recent anti plastic campaigns have already given way to many new replacements for plastic as seen above, thereby indicating high threat from substitutes. On the internal rivalry context, the rivalry is high and firms often engage in price wars. It is easy for small firms to change prices and increase market share but the large ones finds difficult to switch quickly. On the whole plastics are essential for today's standard of living and they help in improving the quality of life. It is expected that plastics will continue to grow dynamically.

Yuan-Tien Su (2003) investigated whether Economic Value Added (EVA), could beapplied for the traditional plastic industry in Taiwan stock market and had betterAdjusted R2 with Market Value Added (MVA) than the traditional performance index,and was a better tool in the decision- making of investment by the management and in evaluating the value of an enterprise by the investor.

The following results in this study were obtained:

1. EVA was proved to be highly related and explainable with MVA for the traditional plastic industry in Taiwan.

2. EVA could reflect the operational performance better than RI for the traditional plastic industry in Taiwan.

3. EVA applied for the traditional plastic industry was more appropriate than the traditional performance index in Taiwan.

Dr. Tuong Thi Hoi (2002) analyzed four plastic manufacturing companies, impact on environment, their policies and target, standards of emission, waste water, etc in his study. Plastic Industry Environmental Review: An assessment of the significant environmental aspects and impacts associated with plastic manufacturing in Ho Chi Min city Vietnam, June 2002. Vietnam cleaner production centre. Dr. Tuong Thi Hoi concluded the following:

All four plastic companies have not adopted any of the EMS nor environmental policies, environmental purposes and targets. Companies' managers and staffs are not aware of significant environmental aspects related to their company operation and they do not know which environmental standards on emission, wastewater, and noise etc. need compliance.

Tammemagi Hans (1999) "The Waste Crisis: Landfills, Incinerators and the Search for a Sustainable Future" stated that incineration of plastic wastes also significantly reduces the volume of waste requiring disposal. It is said that the volume reduction brought about by incineration ranges from 80 to 95%. It is also a suitable option for disposing waste that cannot be recycled further or is non-recyclable.

D`Mello, Pamela (1998) in their study alerts that faulty and inefficient way of waste management causes severe health problem. It has been observed that due to an inefficient and faulty waste collection and transit system, a large amount of plastic waste fails to reach landfills or incinerators. Instead they are left behind to find their way into the soil, the sewage system and the water bodies. They choke the gutters and drains and during the monsoons flood streets causing severe health problems.

Bast Joseph L, Hill Peter J and Rue Richard C backed the Government`s role as regulator in their study: Government as Command and Control Regulator, reported that the government's role as command and control regulator involves the promulgation and enforcement of rigid and uniform standards and the requirement of specific behavior from various parties. It formulates a set of ☐dos☐ and ☐don☐ts☐ that are backed by penalties (fines and imprisonment).

J N Fobil and J N Hogarh (2009) in their study they have suggested the ppp levy system to make the responsible three key stakeholders: the producer of the plastic, the consumer of the plastic and appropriate authorities responsible for plastic waste management. In principle, the proposed PPP levy system spreads the responsibility of management of plastic waste among three key stakeholders: the producers of the plastics (those with high propensity of ending up as litters), the consumers of the plastics and the appropriate authorities responsible for plastic waste management. The concept was to be able to create direct value in plastic wastes such that people will be willing to collect them from the ground. Most waste scavengers in Accra (Ghana), for instance, would quickly pick up metallic waste because locally it has ready market value. It was concluded that itinerant waste buyers would start moving from house to house to buy plastic waste.

Piyush Kunnapallil & Sruthijith K K (2002) the paper examines the viability of the command-and-control approach and that of the market-based alternatives in addressing the environmental problems caused by plastics.

The methodology adopted in this paper was the following. First, the composition and the life cycle of plastics were briefly discussed. Second, the benefits from plastics were elucidated and their inevitability in India established. Third, the ecological harms and health hazards caused by plastics were elaborated. Fourth, the viability of command-and-control measures for addressing these harms and hazards was investigated. Finally, the competence of market-based solutions in this regard was suggested.

IV.   RESEARCH METHODOLOGY

The present study focuses on the Long Term Solvency Strength of the plastic industry of Gujarat for the period 2000-01 to 2009-10 with the help of Trend Analysis.

4.1 Research Statement:

Long Term solvency Strength in the Plastic Industry of Gujarat during years 2001-2010

4.2 About the research problem

The present study focuses on Long Term Solvency Strength of selected plastic manufacturing industrial unites of Gujarat for the period 2000-01 to 2009-10.For carrying out this study, the financial data reported by company have been used and from such data, various ratios have been worked out for the selected units as well as the plastics industry of Gujarat in general. One of the major factors affecting the functioning of an industrial unit is the size of that unit. So far as financial analysis is concerned, one of the most important parameters of judging the size of a industrial unit is the paid –up share capital of that unit. Obviously the paid-up share capital may vary from year to year. Therefore it is bound to lead to variation in the functioning, including the financial performance of that unit. Therefore, when certain ratios are considered for judging the financial performance of the unit such ratios must be used along with the paid-up share capital of that unit at that given point of time, particularly when the financial performance is to be studied over the years together. Considering this aspect, in the present study researcher have tried to innovate in analyzing the ratios by combining them with the paid-up capital, at respective point of time and working out composite ratios for ten years duration for the companies. Then such composite ratios have been used in carrying out trend analysis and comparative analysis through various tests of hypothesis.

4.3 Research Design

The present study entitled"Long Term solvency Strength in the Plastic Industry of Gujarat (India) during 2001-2010 "is a descriptive, conclusion oriented and hypothesis testing type of research study. Here the researchers have tried to analyze the financial performance of the selected plastic manufacturing units of Gujarat with the help of solvency ratios.

4.4 Objectives of the study

The main objectives of the present study are as follows.

- To assess the ability of the firms to meet its long-term liabilities as and when they become due.
- Firm's ability to meet the interest costs regularly and long-term indebtedness at maturity
- To analyze and evaluate the solvency aspect of selected companies in particular and the plastic industry in general.
- To make suggestions/comments about the functioning and development of plastic industry in Gujarat.

4.5 Nature and Sources of data

The present study is mainly based on secondary data that have already been published in annual reports of companies. These data has been collected from annual reports of the selected companies. Further information has been collected from CMIE (Centre for Monitoring Indian Economy) sources, RBI bulletin, annual survey of industries reports of Gujarat State Plastic Manufacturing Association, reports of All India Plastic Manufacturers Association, reports of Indian plastic federation, Life and Health library, libraries of various Institutions and search engines like Money control.com, Economic Times etc.

4.6 Period of Study

The present study covers the period of ten (10) years spanning from the year 2001 to 2010.

4.7 Population

For the present study all the plastics manufacturing industrial units of Gujarat region which are listed in the Bombay Stock Exchange were the members the population. There were total 55 such companies in the population.

4.8 Sampling units and sample size

Out of 55 total numbers of units, researcher have selected 15 units in a sample on the basis of share capital, annual turnover, installed capacity, total number of workers and the date of incorporation of the company, researcher have classified all the units of population on the basis of size of the company, age of the company and area of the company. Following table shows the details of the selected companies such as Paid-up Share Capital, Annual Turnover, Installed capacity, year of incorporation and location.

Table No-4.9.1

Sr. no	Name of the company	Share Capital (in crore Rs.)	Annual Turnover 2010(in crore Rs.)	Installed Capacity (ton/year)	Incorporation (year)	Location
1.	JBF Industries ltd	31.2	3562.86	3000	1982	Sarigam
2.	Sintex Industries ltd	27.2	2618.85	60000tpa	1975	Kalol
3.	Nilkamal plastics ltd	14.92	1251.70	75120tpa	1985	Rakholi
4.	INEOS ABS industries (India) ltd	17.58	743.13	2000	1973	Baroda
5.	Essel propack ltd	31.31	418.34	5.7 crore units	1984	Vapi
6.	Plastiblends India ltd	6.5	276.90	50000	1991	Daman
7.	Gopala Polyplast ltd	15.51	190.96	489	1984	Kadi
8.	Shaily Engineering plastic ltd	7.32	126.66	NA	1980	Rania, Baroda
9.	Shree Rama Multi-Tech ltd	38.43	96.33	NA	1993	Kalol
10.	Acrysil India ltd	2.97	55.45	220000 units	1987	Bhavnagar
11.	Shree Jagdamba Polymers ltd	0.88	39.44	12000	1984	Ahmedabad
12.	Gujarat craft Industry ltd	3.11	38.99	200	1984	Kadi
13.	Polylink Polymers(India) ltd	15.51	33.36	NA	1993	Dholka
14.	Promact Plastics ltd	6.51	9.40	300	1985	Mehsana
15.	Ashish polyplast ltd	3.4	7.32	850000	1994	Naroda, Ahmedabad

[Source: - Money control.com, The Economic Times]

4.9 Sampling procedure

The selection of the sample of 15 companies out of 55 companies has been on the basis of following criteria and by the proportional stratified sampling method.

1. Whether the sample represent the companies of different sizes i.e. small, medium and large.

2. Whether the sample represents the companies of different age group.

3. Whether the sample represents the different areas of the company.

Table no-4.9.2

Classification of companies based on different sizes

Size of the company	No. of companies	Sample units
Small	17	4
Medium	17	5
Large	21	6
Total	**55**	**15**

Table No-4.9.3

Classification of companies based on age

Year	No. of companies	Sample units
1951 to 1960	1	-
1961 to 1970	3	-
1971 to 1980	8	3
1981 to 1990	22	8
1991 to 2000	20	4
Total	**54**	**15**

Table No-4.9.4

Classification of companies according to the area or location

Area / Zone	Total no. of companies	Sample units
Ahmedabad	23	4
Baroda	6	2
Mehsana	6	3
Saurashtra	5	1
Panchmahal	6	1
South Gujarat	9	4
Total	**55**	**15**

So the sample represents whole population in terms of sizes, age and area of location.

Table No-4.9.5

Proportion of installed capacity represented by the selected companies

No. of companies	Data available	Total installed capacity of all companies	Total installed capacity of sample units	Percentage of installed capacity of sample
55	55	8.5 MMT	1.5 MMT	17.65

Table no-4.9.6

Proportion of paid up capital presented by the sample companies

No. of companies	Data available	Total paid up capital	Total paid up capital of sample	Percentage of total paid up capital of sample
55	55	3942.48	222.36 crore Rs.	6 %(round of)

The analysis of above table shows that the sample represents companies of different sizes, ages, areas, installed capacity and paid up share capital. Moreover the above mentioned plastic companies have been selected because the data of these companies are available for the entire period of the study.

The total installed capacity of 55 plastic companies, the data of which are available for the study purpose is 8.5 MMT. The total installed capacity of sample units is

1.5MMT. It indicates that the sample represent 17.65 percent of the total capacity of population.

The total paid up capital of the above 55 companies amounted to Rs 3942.48 (Paid-up capital of 20 companies are not available). In comparison to this the total paid up capital of the sample units is estimated about Rs. 222.36 crore which represent about 6 % percent of the total paid up capital. The percentage share installed capacity and paid up capital of sample units justified the selection of sample.

4.10 Tools and techniques

For the purpose of financial analysis of the plastic industry of Gujarat following accounting and statistical tools and techniques are used.

Accounting Technique:

1. Ratio analysis

Statistical technique:

1. Weighted Mean (R_c)
2. Coefficient of Determination (R^2)
3. Trend Analysis (Mann-Kendall Test)

4.11 Scope of the study

This study will serve the following objectives.

- One will have an overview on borrowing and interest paying capacity of plastic industry of Gujarat.
- It will throw light on solvency aspects relating to financial performance of plastic industry of Gujarat.
- It will help in judging the trading on equity of selected plastics manufacturing units and plastic industry.
- It will help in studying the pattern of growth and development of plastic industry in Gujarat in terms of long term financial strength.
- It studies the trend of plastic industry in Gujarat.

V.   SOLVENCY RATIOS

These ratios are calculated to assess the ability of the firms to meet its long-term liabilities as and when they become due. Long term creditors including debenture holders are primarily interested to know whether the company has ability to pay regularly interest due to them and to repay the principal amount when it becomes due. Solvency ratios disclose the firm's ability to meet the interest costs regularly and long-term indebtedness at maturity. Solvency ratios include the following ratios; -

1. Debt-Equity Ratio
2. Interest Coverage Ratio

5.1 Debt-Equity Ratio:

In this section Composite Debt-Equity Ratios of the industry from the Debt Equity Ratio of the companies were obtained for ten years period under study. Theseratios are presented in the following table:

Table No-5.1.1

Composite Debt Equity Ratios based on Weighted Mean where weights (Wi) are Paid-up capital and Ri are ratios

WiRi

| Company	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Σ(wiRi)	Σw	wei $\bar{R}$	$\bar{W}$
JBF	39.395	39.395	34.742	26.057	24.506	69.580	72.869	56.475	73.443	70.331	506.794	445.020	1.139	44.502
Sintex	-	10.220	11.066	12.376	12.382	25.649	23.286	28.382	32.166	31.355	186.880	199.980	0.934	22.220
Nilkamal	10.713	8.313	6.428	5.913	5.571	5.142	9.684	19.681	17.253	14.186	102.883	98.330	1.046	9.833
INEOS ABS	8.267	3.518	-	-	-	-	-	-	-	-	11.785	35.180	0.335	17.590
Essel Propack	17.472	8.736	7.493	6.890	5.638	8.456	14.094	21.924	29.754	24.743	145.200	312.860	0.464	14.520
Plastiblend	-	2.080	1.755	1.235	0.975	0.520	1.560	1.820	0.910	3.380	14.235	65.000	0.219	7.222
Gopala	8.069	15.084	23.247	35.784	32.307	29.924	29.195	42.758	94.441	455.236	766.046	85.270	8.984	76.605
Shaily	-	-	-	-	7.450	9.428	11.233	18.449	16.324	16.470	79.354	37.920	2.093	6.320
Shree Ram	16.960	25.175	35.245	51.410	-	-	-	-	-		128.790	106.000	1.215	26.500
Acrysil	2.673	3.084	2.673	3.855	4.703	4.266	4.189	3.547	2.377	1.544	32.911	26.490	1.242	2.649
Jagdamba	-	-	-	-	0.616	0.431	0.625	1.074	1.417	1.839	6.002	5.280	1.137	0.880
Gujarat Craft	4.167	5.598	4.696	3.639	2.301	2.892	3.421	6.562	6.531	6.749	46.557	31.100	1.497	3.110
Polylink	-	-	-	-	235.741	75.068	117.876	111.517	-	-	540.203	59.540	9.073	14.885
Promact	-	14.390	11.186	10.263	10.154	16.399	-	49.671	-	47.783	159.845	58.620	2.727	8.374
Ashish	0.238	0.306	0.136	0.204	0.204	0.170	0.136	0.170	0.102	0.204	1.870	34.000	0.055	0.187
ΣWjRj	107.954	135.899	138.666	157.626	342.547	247.927	288.168	362.029	274.718	673.821			2.144	
ΣWj	127.060	156.980	139.410	139.510	139.640	161.370	164.730	188.640	168.430	175.080				
wei $\bar{R}$	0.850	0.866	0.995	1.130	2.453	1.536	1.749	1.919	1.631	3.849	1.698			
$\bar{W}$	12.706	13.082	12.674	12.683	10.742	12.413	13.728	14.511	15.312	14.590				

where, weighted $\bar{R} = \sum(wiRi)/\sum(wi)$ $\bar{W} = \sum wi/n$ n = no. of years

Table No.-5.1.2

Year	Composite Debt Equity Ratio	Estimated ratio (from the line)
2000-01	0.8496	0.6630
2001-02	0.8657	0.8920
2002-03	0.9947	1.1210
2003-04	1.1299	1.3500
2004-05	2.4531	1.5790
2005-06	1.5364	1.8080
2006-07	1.7493	2.0370
2007-08	1.9192	2.2660
2008-09	1.6311	2.4950
2009-10	3.8486	2.7240

The chart showing the trend in Debt-Equity Ratios of the industry is presented below.

Chart No.-5.1.3
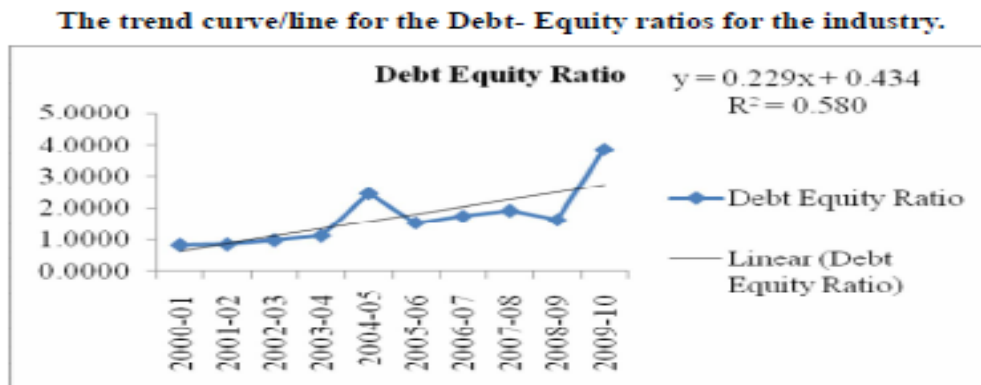
To test the following H_0 related to goodness of fit, the Mann-Kendall test is applied to test the following hypothesis.

H_0: There is no trend in the series of Composite Debt-Equity ratio of the industry.

H_1: There is some trend in the series of Composite Debt-Equity ratio of the industry.

From the above trend detection test we found that there is an upward trend. From fitted linear regression line the R^2 value is 0.58, and p-value is 0.001, from which we can say that the model is a good fit.

Conclusion: From the above table no. 5.1.2 and chart no. 5.1.3 it can be seen that the debt-equity ratio had linear rising trend with the regression coefficient as 0.229 which means during the decade the plastic industry in Gujarat was able to keep the long liabilities (debt) at Rs 1.23 crore against the capital of Rs 1 crore. It is also indicate that the plastic industry was able to generate the capital from the sources other than the equity reasonably well. This also means that during the decade the investors' interest remained protected very well.

5.1.2 Interest Coverage Ratio

In this section Composite Interest Coverage Ratio of the industry from the Interest Coverage ratios of the companies are obtained for ten years period under study. These ratios are presented in the following table:

Table No-5.1.2.1

Composite Ratios of Interest Coverage based on Weighted Mean where weights (Wi) are Paid-up capital & Ri are ratios
WiRi

Company	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	∑(wiRi)	∑w	wei $\bar{R}$	$\bar{\bar{W}}$
JBF	9.616	39.706	62.350	99.264	129.353	327.810	302.353	316.506	291.906	275.723	1854.587	445.020	4.167	44.502
Sintex	-	28.829	31.450	40.331	71.518	86.615	109.039	150.017	176.506	176.236	870.539	185.370	4.696	20.597
Nilkamal	15.169	19.968	26.139	36.851	29.052	24.767	15.426	27.988	18.659	48.053	262.072	98.330	2.665	9.833
INEOS ABS	78.627	176.252	482.142	-	-	-	-	-	-	-	737.021	52.770	13.967	17.590
Essel Propack	182.520	98.592	142.051	176.645	238.032	196.690	115.884	128.099	56.689	52.931	1388.132	312.860	4.437	31.286
Plastiblend	-	41.405	83.980	102.895	152.880	204.230	152.425	57.395	39.990	44.915	880.115	58.500	15.045	6.500
Gopala	3.477	5.877	0.653	0.522	12.294	13.437	14.495	-0.661	-13.004	-22.481	14.609	85.270	0.171	8.527
Shaily	-	-	-	-	21.767	16.994	11.233	2.735	10.394	11.200	74.323	37.920	1.960	6.320
Shree Ram	80.030	63.600	-3.180	-7.685	-335.225	-15737.070	-1459.555	-52.086	-36.842	-2105.370	-19593.383	286.760	-68.327	28.676
Acrysil	3.701	7.299	8.224	6.476	4.523	5.269	7.736	16.011	15.395	43.748	118.382	26.490	4.469	2.649
Jagdamba	-	-	-	-	1.857	2.015	4.066	2.332	2.719	1.901	14.890	5.280	2.820	0.880
Gujarat Craft	3.888	3.919	3.950	4.261	5.007	5.380	5.163	4.960	4.247	4.247	45.021	31.100	1.448	3.110
Polylink	1.821	0.520	7.156	5.594	4.293	32.261	8.375	17.371	-0.465	3.567	80.494	142.600	0.564	14.260
Promact	-	6.245	9.611	10.860	10.697	-9.177	-48.890	4.883	-3.450	2.604	-16.618	58.620	-0.283	6.513
Ashish	10.234	12.920	7.208	3.740	8.330	10.778	18.700	14.484	18.734	47.770	152.898	34.000	4.497	3.400
∑WjRj	389.083	505.131	861.733	479.755	354.378	-14820.001	-743.551	690.033	581.479	-1414.957			-0.514	
∑Wj	140.250	169.990	170.010	152.520	166.140	190.870	200.720	220.400	222.210	222.350				
wei $\bar{R}$	2.774	2.972	5.069	3.146	2.133	-77.644	-3.704	3.131	2.617	-6.364	-6.587			
$\bar{\bar{W}}$	14.025	13.076	13.078	12.710	11.867	13.634	14.337	15.743	15.872	15.882				

where, weighted $\bar{R} = \sum (wiRi) / \sum (wi)$ $\bar{\bar{W}} = \sum wi / n$ n = no. of years

Table No.-5.1.2.2

Year	Composite Ratios of Interest Coverage	Estimated ratio (from the line)
2000-01	2.77421	-1.275
2001-02	2.971531	-2.455
2002-03	5.068717	-3.635
2003-04	3.145521	-4.815
2004-05	2.13301	-5.995
2005-06	-77.6445	-7.175
2006-07	-3.70442	-8.355
2007-08	3.130821	-9.535
2008-09	2.616797	-10.715
2009-10	-6.36365	-11.895

The chart showing the trend in Interest Coverage Ratios of the industry is presented below.
The trend curve/line for the Interest Coverage Ratios for the industry.

Chart No.-5.1.2.3
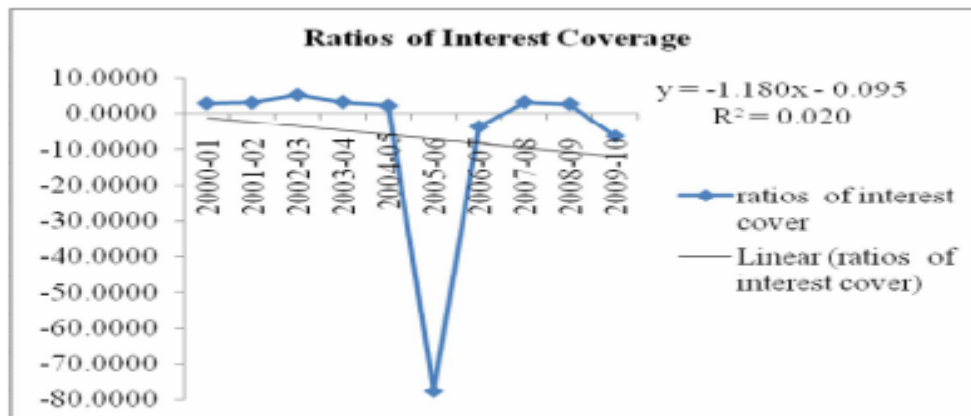
To test the following H0 related to goodness of fit, the Mann-Kendall test is applied to test the following hypothesis.

H0: There is no trend in the series of Composite Interest Coverage Ratio of the industry.

H1: There is some trend in the series of Composite Interest Coverage Ratio of the industry.

From the above trend detection test we found that there is no trend. From fitted linear regression line the R^2 value is 0.020, and p-value is 0.099, from which we can say that the model is not a good fit.

Conclusion: From the table no. -5.1.2.2 and chart no.5.1.2.3 it shows that the industry has poor interest cover ratio during the whole decade. It had declining trend. It was -1.28 in the year 2000-01 and it continuously worsened to -11.9 in the year 2009-10. It shows that the industry's capacity to pay the interest is doubtful and creditors are less secured. It also indicates the industry was over burdened with debt.

Summary: The trend in various Composite ratios of plastic industry of Gujarat during the period of study is summarized in the following table

13.	Debt-Equity Ratio	Linear (Rising)	y = 0.229x + 0.434
14.	Interest Coverage Ratio	No Trend	-

On the aspect of Solvency there is no discernible trend in Interest Coverage Ratio and the Debt-Equity Ratio had a linear rising trend, which means on the Solvency aspect the performance of the industry was good.

Findings:

- Debt-equity ratio had linear rising trend.

- Plastic industry in Gujarat was able to generate borrowed capital reasonably Well.

- The plastic industry of Gujarat had poor interest coverage ratio.

- Interest coverage ratio had no trend.

- Interest coverage ratio showed poor ability to offer assured payment of interest to the lenders.

- Long term solvency strength of plastic industry of Gujarat is exposed to serious strain.

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