THE LINK BETWEEN OPERATIONAL EFFICIENCY AND SOLVENCY: THE CASE OF FOOD PROCESSING INDUSTRY IN INDIA

by

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Abstract

The concept of operational efficiency is the key determinant for long-term solvency for any business. This paper attempts to construct an efficient evaluation of food processing industry in India regarding their resources deployment and solvency prospects. It also tries to find out the relationship that exists between operating efficiency and solvency and highlights the need of operational efficiency for long-term viability. The empirical results show that performance evaluation of the companies under study can be more streamlined with due focus of the intrinsic factors.

Key Words: Operating efficiency, solvency**,** performance, financial ratios, food processing industry

1. INTRODUCTION

The concept of operational efficiency is central to finance, emphasising the way resources are employed to facilitate the operation of the firm. If business is sufficiently efficient, then investors can expect to achieve superior profits from their investment strategies and last longer. This is where, Solvency is interlinked. It is the ability of a company to pay all past debts. Because of the dramatic change the business operation environment, firms face serious competition. That's why, a good operating performance is critical for successful business. Accordingly, performance evaluation is a main concern of this study.

This paper attempts to provide an acceptable evaluation of the performance of food processing firms in India and to study the interrelationship between their operating efficiency and solvency for future viability. The evaluation of a firm's performance usually employs the financial ratio method, because it provides a simple description about the firm's financial performance in comparison with previous periods and helps to improve its performance of management.

Overview of the Indian Food Processing Industry

Between 1991 to November 2006 the total inflow of foreign direct investment in the food-processing sector accounts Rs 52.7bn (US$ 1.2bn). The highest investment towards the food-processing sector in a single year was recorded in 2001-02 amounting to Rs 10 bn. During the last five years, FDI witnessed an inflow of over Rs 24bn of foreign investment.

During the last five years Maharashtra received the highest share of FDI in food processing. The dairy and consumer industries received FDI worth Rs 2.7bn each as foreign investment. Countries of European Union such as Netherlands, Germany, Italy and France contribute nearly 30% of FDI in food-processing sector. Perfetti, Cadbury, Godrej-Pilsbury, Nutricia International, Manjini Comaco are some of the successful ventures from EU countries.

With the advent of the multinational companies in the Indian market the competition in food processing industry has increased. These multinational companies are facing tough competition from strong Indian brands. Such competition has obviously increased innovations. It has also facilitated a sustained growth of the sector and improved global competitiveness. The emerging new growth phase of the sector is just in its initial stages with the potential for India to emerge as a leading food supplier to the world.

2. LITERATURE REVIEW

There are a lot of studies on supervision of solvency and on prediction of insolvency. In the following we briefly describe some of the significant articles related to our work.

Bernstein (1988) found financial ratios could divide into four kinds: solvency, capital structure, profitability, and turnover. According to this information, financial ratios actually have the function to evaluate firm performance. Feng (2000) tried to construct performance evaluation process for airlines taking financial ratios into consideration. He used grey relation analysis and the TOPSIS method to overcome the problem of small sample and outranking of airlines.

Hobarth (2006) studied the correlation between financial indicators and firm's performance of listed firms in USA for 19 years period by using 17 financial indicators and three variables to measure firm's performance, namely market performance (measured by changes in stock market value), cash flow performance (dividend per share), and profitability (ROI).

Ambrose and Seward (1988) used multivariate discriminant analysis (MDA) in order to compare the insolvency prediction abilities of Best's ratings, sets of financial ratios and a two-stage prior probability approach. They have incorporated Best's general policyholder rating and financial size rating with variables created from firms' readily available financial information. The rating variables were then used to alter the prior probabilities of classification under MDA.

Sandstrom (2007) presented a historical review and some pragmatic solutions for Solvency II. More specifically he discussed the four fundamental issues needed for constructing solvency systems, i.e. the valuation of assets and liabilities, the risk margin for uncertainty in liabilities and assets, the risk measures and the modeling (risk categories, risk mitigation, diversification, etc.).

Abramovitz (1950) and Modigliani (1957) highlighted the impact of capacity utilization on inventory investment. The studies of Metzler (1941) and Hilton (1976) have found this variable, inventory-sales ratio, to be statistically significant. Fixed investment is generally expected to affect inventory investment inversely because of competing demand for the limited funds.

3. GAP AREAS

As evident from the literature, relationship between operational efficiency and solvency for a business firm has been the topic of interest for researchers for decades but the food processing industry and that too in developing countries, like India has not received the considerable attention it deserves. *In the present paper we have tried to cover issues related to need of operational efficiency and solvency and their interrelationship for future viability in Food Processing Industry in India.*

4. OBJECTIVE OF THE STUDY

This study is designed to achieve the following objectives:

- To measure the relative operating efficiency and solvency level in relation to operational size of firms.
- To study the relationship between the above two financial parameters of the companies under consideration.

5. RESEARCH METHODOLOGY OF THE STUDY
Sample selection

'Convenience Sampling' has been used here for sample selection. The top 5 companies have been chosen with total sales for the year 2010-11 as the parameter (*http://www.moneycontrol.com/stocks/top-companies-in-india/net-sales-bse/food processing.html*). Out of these 5, Parle is the only unlisted company. It has been taken to appreciate the diversity of financials, if any between the listed and unlisted company in the same sector. Also, it is the largest biscuit selling company in the world.

1. Nestle

Nestle's relationship with India dates back to 1912, when it began trading as The Nestle Anglo-Swiss Condensed Milk Company (Export) Limited, importing and selling finished products in the Indian market. Nestle set up its first factory in 1961 at Moga, Punjab. Nestle India is a subsidiary of Nestle S.A. of Switzerland. Nestle India manufactures products of truly international quality under internationally famous brand names such as Nescafe, Maggi, Milkybar, Milo,Kit Kat, Bar-One, Milkmaid and Nestea.

2. Britannia Industries Limited

Britannia was started as a biscuit company in 1892 in Calcutta, with an initial investment of Rs. 295.. In, 1979, Britannia Biscuit Company was renamed as Britannia Industries Limited (BIL). In 1997, the company revealed its new corporate identity 'Eat Healthy, Think Better' and the company made its way into the dairy market.

3. REI Agro

REI Agro (REIAL), incorporated in 1994, manufactures and markets basmati rice. The company has emerged as a major player in India in basmati rice segment. REIAL has been successful in creating brands namely Kasauti, Real Magic, Mr Miller, Hungama, Hansraj and AI-Tahaan.

4. GlaxoSmithKline Consumer Healthcare Ltd.

GlaxoSmithKline Consumer Healthcare's (GCH) core business is the manufacturing of health drinks under the brand of Horlicks. The history of the company dates back to 1950s when bottled Horlicks was imported from England. But, because of the change in import policy in the year 1955, the import of Horlicks was stopped.

5. Parle Products

Parle Products has been India's largest manufacturer of biscuits and confectionery for almost 80 years. Makers of the world's largest selling biscuit, Parle-G, and a host of other very popular brands of biscuits, sweets and snacks, the Parle name symbolizes quality, nutrition and great taste. With a reach spanning even to the remotest villages of India, the company has definitely come a very long way since its inception.

Period of the study

The period to be covered in the present research study would be of five years, ranging from 2006 to 2010. It has been taken as:

(a) five year period is reasonably long enough to reveal the short-term and long-term changes and permit the valid conclusions thereof. Therefore, the choice of the research period has not been a matter of an arbitrary decision.

Data used

For the purpose of the present study, the main data used is secondary in nature, keeping in view the nature of the study. The study employs both accounting and market data. The accounting data was obtained from the annual reports of the units and other such records for the relevant period.

Tools and techniques

To accomplish the aforementioned research objectives, the data for this study was gathered from the companies' published financial statements. *Financial Ratios* have been calculated in order to assess the short-term and long-term performance of the units under study (as discussed below). In addition, *Correlation analysis* has been used to establish and study the relationship between the liquidity and solvency performance.

A. Operational efficiency ratios

1. Asset turnover

This ratio is a rough measure of the productivity of a company's <u>fixed assets</u> (<u>property, plant and equipment</u> or PP&E) with respect to generating sales. The higher the yearly turnover rate, the better it is for the firm.

$$Fixed\ Asset\ Turnover\ Ratio = \frac{Revenue}{Property, Plant\ and\ Equipment}$$

2. Inventory turnover

Stock turnover ratio/Inventory turnover ratio indicates the number of time the stock has been turned over during the period and evaluates the efficiency with which a firm is able to manage its inventory.

Inventory Turnover Ratio = Cost of goods sold / Average inventory at cost

3. Debtors turnover

Accounts receivable turnover ratio or debtors' turnover ratio indicates the number of times the debtors are turned over a year. The higher the value of debtors' turnover the more efficient is the management of debtors or more liquid the debtors are and vice-versa.

Debtors Turnover Ratio = Net Credit Sales / Average Trade Debtors

4. Working capital turnover

The working capital turnover ratio measures the efficiency with which the working capital is being used by a firm. A high ratio indicates efficient utilization of working capital and a low ratio indicates otherwise.

Working Capital Turnover Ratio = Cost of Sales / Net Working Capital

B. Solvency Ratios

1. Debt Equity Ratio

The debt-to-equity ratio (D/E) is a financial ratio indicating the relative proportion of shareholders' equity and debt used to finance a company's assets. It is calculated as:

$$\text{Debt Equity Ratio} = \frac{\text{Long term Debt}}{\text{Shareholder's Funds}}$$

2. Interest Coverage Ratio

Interest Coverage ratio is used to determine how easily a company can pay interest on long-term debt. The ratio is calculated as:

$$\text{Interest Coverage Ratio(ICR)} = \frac{\text{Operating Profit/EBIT}}{\text{Interest on long term loans}}$$

Larger the ICR, greater is the safety of the lender's interest.

6. RESULTS AND ANALYSIS

A. Degree of Efficiency and Solvency

In this discussion, we have tried to analyze the sample companies regarding their efficiency of resources and soundness using the financial ratios.

1. Nestle India

1. Operational Efficiency

Table1: Operational Efficiency

	2010	2009	2008	2007	2006
Asset Turnover(x)	8.9	9.9	10	8.8	7.6
Inventory Turnover(x)	11.9	11.2	10.7	10.8	11.1
Debtors Turnover(x)	100	95.1	90.2	66.8	68.2
Working Capital/Sales(x)	-10.2	-9.2	-11.6	-11.4	-12.6
Fixed Capital/Sales(x)	0.3	0.3	0.3	0.3	0.3
Receivable days	3.6	3.8	4	5.5	5.3
Inventory Days	30.8	32.6	34.1	33.9	32.8
Payable days	51.9	51.9	54.1	55.2	59.5

The asset turnover ratio has declined in the year 2010 which indicates that the operating efficiency of converting assets to sale has decreased. Inventory turnover has shown continuous improvement over the last couple of years. This shows that the average inventory holding has decreased and Nestle Ltd. is able to improve their inventory management. Inventory holding days has decreased from 34.1 to 30.8 days. The management of debtors has also improved over the years. The liquidity of the debtors has increased and Nestle is able to manage them efficiently. The efficiency of using fixed assets of Nestle Ltd. has more or less been the same.

Payable days has decreased which shows that operational management has deteriorated over the years but still there is a significant difference between the receivable and payable days which shows that company is able to negotiate well with both the debtors and creditors. This shows that Nestle Ltd. has good market hold and reputation. Inventory days have decreased which shows improvement in the operational efficiency.

2. Solvency

Table2: Solvency

	2010	**2009**	**2008**	**2007**	**2006**
Total Debt/Equity(x)	0	0	0	0	0
Interest Cover(x)	0	656.7	471.4	736.7	0

Nestle Ltd. is a debt free company with no long term debt. Hence, no obligations in real terms re there and degree of financial risk is low.

2. Britannia Ltd.

1. Operational Efficiency

Table3: Operational Efficiency

	2010	2009	2008	2007	2006
Asset Turnover(x)	4.1	3.7	3.5	3.9	3.6
Inventory Turnover(x)	13.1	11.3	10.1	11.6	11.4
Debtors Turnover(x)	76.9	65.5	69.9	93.7	55.8
Sales/Fixed Asset(x)	6.5	6.5	6.2	6.6	6.4
Working Capital/Sales(x)	92.2	24.9	12.8	39.7	55.8
Fixed Capital/Sales(x)	0.2	0.2	0.2	0.2	0.2
Receivable days	4.7	5.6	5.2	3.9	6.5
Inventory Days	27.8	32.2	36	31.5	32
Payable days	11.9	11.8	14.5	15.3	19.6

There is a sharp increase in the asset turnover ratio from 3.6 in 2006 to 4.1 in 2010. Except for the year 2007-08, the company has witnessed greater utilization of assets which is good. Britannia has witnessed an increase in the inventory ratio in the past four years which means that the inventory with the firm is adequate and is utilized properly.

For the period 2007 to 2009, Britannia has seen a decrease in the debtors' turnover ratio which implies that the management of debtors deteriorated during that period. It showed an improving trend in 2010. The efficiency of using fixed assets of Britannia Ltd. has more or less remained the same. There have been some fluctuations but no trend can be seen.

2. Solvency

Table 4: Solvency

Year	2010	2009	2008	2007	2006
Total Debt/Equity(x)	1.1	0	0.1	0	0
Interest Cover(x)	15.7	15.5	24.9	14.3	15.7

Britannia's debt in the period 2006 to 2009 was close to zero. But in the year 2010 the debt equity ratio has become 1.1 which means the company has taken huge debt. The interest coverage ratio has decreased over the period which means that the company is unable to cover its interest.

3. GlaxoSmithKline Ltd.

1. Operational Efficiency

Table5: Operational Efficiency

	2010	**2009**	**2008**
Asset Turnover(x)	2.6	2.4	2.4
Inventory Turnover(x)	8.4	7.5	7.2
Debtors Turnover(x)	59.4	58.3	48.
Sales/Fixed Asset(x)	4.2	3.7	3.2
Working Capital/Sales(x)	3.9	3.1	3.1
Fixed Capital/Sales(x)	0.2	0.3	0.3
Receivable days	6.1	6.7	7.6
Inventory Days	43.4	49	50.7
Payable days	62	53.2	44.4

Note: Data not available for 2006 and 2007.

The asset turnover ratio has increased over the year. The company was able to produce approximately two-and-half times the value of its assets. It means that the company is able to increase production capacity relative to the value of assets it possesses.

The Inventory Turnover ratio has increased over the year signifying that here has been efficient utilization of the resources as compared to the previous year. This is a much desired situation of a company. The debt turnover ratio in this company has increased by small margins over the past three years.

As there is an increase in the working capital ratio for the year 2010-11 there is a reduction in the net current assets of the company. The Receivable days' ratio has been decreasing gradually over the past years. The Payable ratio has been increasing over the previous years.

2. Solvency

Table6: Solvency

	2010	**2009**	**2008**
Total Debt/Equity(x)	0	0	0
Interest Cover(x)	174.7	88.8	54.5

The lower the debt-equity ratio, better it is for the investors. Since, there is zero debt-equity ratio, we can say that the company is risk free. Here, interest ratio has more than doubled over the past year signifying a healthy position of the company.

4. Parle Biscuits

1. Operational Efficiency

Table 7: Operational Efficiency

Year	2010	2009	2008	2007	2006
Performance Ratios					
Asset Turnover(x)	3.00	2.50	2.10	2.30	1.90
Inventory Turnover(x)	12.40	13.90	13.50	17.30	23.30
Debtors Turnover(x)	75.90	75.90	106.40	359.10	174.60
Sales/Fixed Asset(x)	4.90	4.50	4.80	6.20	6.40
Working Capital/Sales(x)	11.90	7.60	6.20	8.60	9.20
Efficiency Ratios					
Fixed Capital/Sales(x)	0.20	0.20	0.20	0.20	0.20
Receivable days	4.80	4.80	3.40	1.00	2.10
Inventory Days	29.40	26.20	27.10	21.10	15.70
Payable days	24.60	15.40	19.40	14.90	15.50

Asset Turnover Ratio has continuously increased since 2005-06 except in the year 2007-08. This shows that company is continuously improving upon the utilization of its assets in an efficient way and thereby on improving their productivity with respect to generating sales.

The inventory turnover of the company is continuously declining since 2005-06. This shows that the company is not managing its inventory in an efficient way. The rate at which stock turns into sales is decreasing every year, it means that more money is being spent every year on financing and managing the inventory. It indicates dull business, accumulation of obsolete items and slow movement of goods which have a negative impact on the profit of the company.

The company has been effectively managing its debtors every year after 2006-07. This means that the debtors are becoming more liquid every year. Cash flow from credit sales is turning up early which could be invested by the company in future

inventing and financing activities or otherwise to strengthen their cash and bank balance.

The fall in the fixed assets ratio from 2006-07 to 2008-09 indicates that company has failed to utilize their fixed assets in an efficient way over this period with the efficiency and productivity falling every year. However, some effort has been made in the financial year 2009-10 to improve upon this ratio and hence, increase the productivity of the assets towards the sales. But this still needs to be improved to the level of 2005-06 in order to earn more profits.

The company has a significant working capital but the same is not being used in an efficient way. The working capital to sales ratio is continuously increasing from 2007-08 which is equivalent to a declining working capital turnover ratio.

Receivable days is increasing every year since 2006-07 which means that the time for realizing the accounts receivable is increasing every year. This is not an efficient way to conduct business as the amount if realized could have been utilized in other investing and financing activities of the company which could have generated more profits. The payable days have followed an alternately increasing and decreasing pattern over these five years. Because it has increased in 2009-10 from that of 2008-09, the company may have lost on some discounts offered by the creditors for early payments.

Table 8: Solvency

Year	2010	2009	2008	2007	2006
Total Debt/Equity(x)	0.0	0.0	0.0	0.0	0.0
Interest Cover(x)	-	97.2	300.3	167.4	699.9

The company is a debt-free company and runs entirely on the money of shareholders. It is a risk free concern and hence, better for the investors. The interest ratio has fallen last year which means that the company may have some problems this year in paying interest on its debts. This doesn't reflect the company in good light in the minds of investors.

5. REI Agro

1. Operational Efficiency

Table9: Operational Efficiency

	2010	**2009**	**2008**	**2007**	**2006**
Asset Turnover	0.8	0.8	0.8	0.8	1.1
Inventory turnover	1.3	1.2	1.3	1.4	1.7
Debtors Turnover	5.2	4.7	3.8	3.1	5
Working Capital/Sales	0.8	0.7	0.8	0.7	1.2
Sales/ Fixed Assets	8.6	5.8	4.6	3.6	4.3
Receivable days	70.4	77.4	95.2	116.8	73.2
Inventory days	274.5	295.4	271.4	256.3	211.1
Payable days	6.5	7.9	6.5	9.4	4.5

In case of REI Agro, data for the past five years indicates that the utilisation of assets for generating revenue has either remained the same or has decreased marginally. *The inventory turnover ratio* over the last five years also has marginally decreased

Debtors turnover ratio has fluctuated for the past five years and hence nothing substantial can be said about the debtor turnover ratio for this company. The fixed assets ratio has gone up significantly over the years, signifying a better utilisation of its fixed assets. The working capital ratio has depleted over the years, signalling increasing working capital per unit of sales recorded.

The fluctuation in the receivables ratio over the years does not help in analysing the same for this company. We see that REI Agro has increased its payable days by almost 4 times from the past year, which can be beneficial in order to retain cash and use it in the business.

2. Solvency

Table 10: Solvency

	2010	**2009**	**2008**	**2007**	**2006**
Total Debt/equity	5	4.9	4.2	2.6	2.6
Interest Cover	1.7	1.3	1.7	2.4	3.6

Though the debt has increased considerably in the last few years from 2006, the company has been able to bring down the ratio in its favour in this last fiscal year.

Whilst in the earlier part the interest ratio was decreasing, being a positive sign for the company as well as the investors, we see ratio turning upwards in the last 2 years which is an unfavourable scenario.

B. Relationship between Operational efficiency and Solvency

Here, we try to find out the relationship between operating efficiency and solvency prospects. Higher the correlation between the two, higher is the viability of a company in the long run. This is always a win-win situation for the shareholders.

Variables, like assets turnover, inventory turnover, debtors' turnover and working capital turnover represent operational efficiency, whereas 'Receivable Days' represent solvency prospects. The reason being is that the solvency of any business is determined by its paying capacity to pay loans and repay interest at due intervals and paying capacity is determined by the cash collection policy of a firm.

The *relationship matrix* has been studies as follows:
(i)   Asset Turnover to Receivable Days
(ii)   Inventory Turnover to Receivable Days
(iii)   Debtors Turnover to Receivable Days
(iv)   Working Capital turnover to Receivable Days

Table11: Degree of Correlation between Operating efficiency and Solvency

	Parle	Britannia	Rei Agro	GSK	Nestle
Asset Turnover(x) to Receivable Days	0.65	-0.61	-0.42	-0.80	-0.68
Inventory Turnover(x) to Receivable Days	-0.69	-0.48	-0.19	-0.92	-0.52
Debtors Turnover(x) to Receivable Days	-0.92	-0.99	-0.99	-0.95	-1.00
Working Capital/Sales(x) to Receivable Days	0.18	-0.39	-0.60	-0.95	-0.72

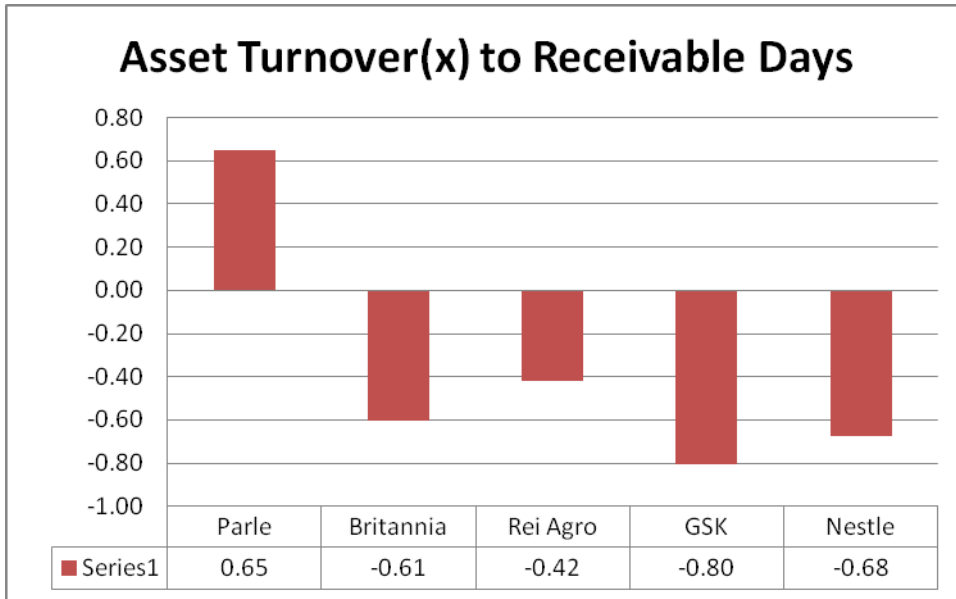**Figure 1: Asset turnover to Receivable days' relationship**

Asset Turnover(x) to Receivable Days

	Parle	Britannia	Rei Agro	GSK	Nestle
■ Series1	0.65	-0.61	-0.42	-0.80	-0.68

Figure2: Inventory turnover to Receivable days' Relationship

Inventory Turnover(x) to Receivable Days

	Parle	Britannia	Rei Agro	GSK	Nestle
■ Series1	-0.69	-0.48	-0.19	-0.92	-0.52
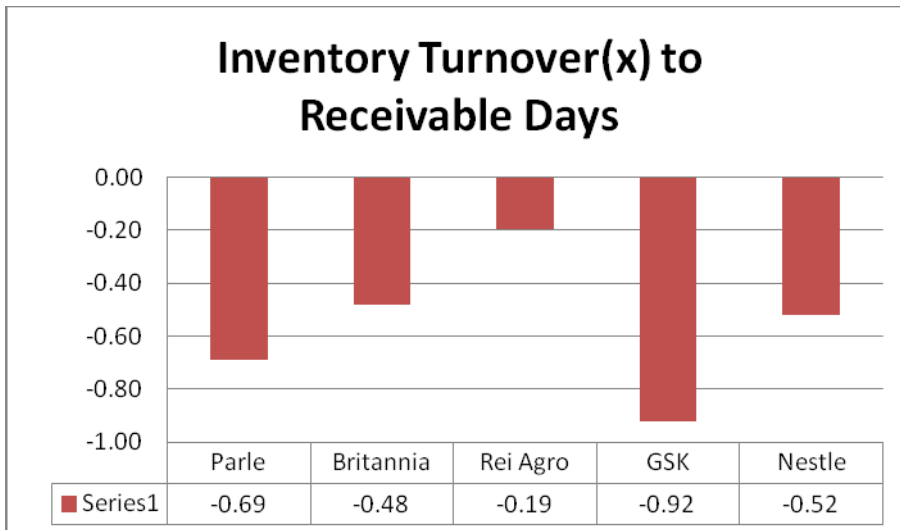
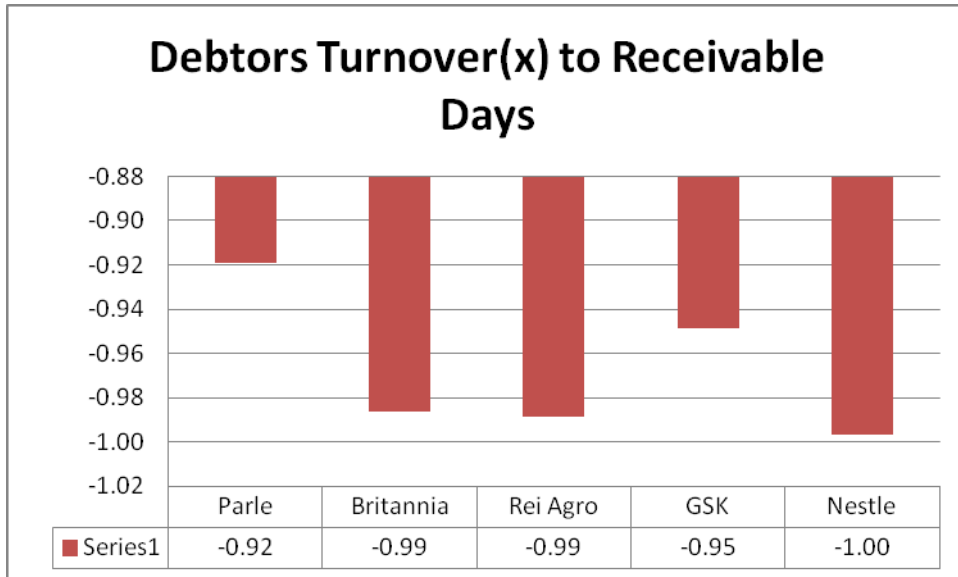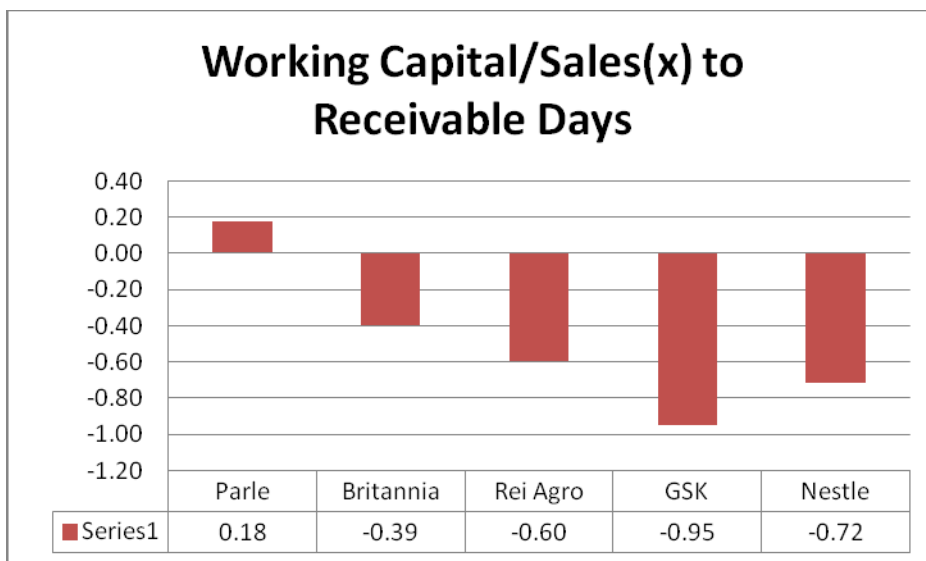**Figure 3: Debtors' turnover to Receivable days' Relationship**

Figure4: Working Capital turnover to Receivable days' Relationship

It can be seen from the above table and graphs that between debtor's turnover and receivable days, the correlation is highly negative. But the correlation between inventory turnover and receivable days varies between different companies. For example, for GSK it is as high as 0.92 but for Rei Agro it is just 0.19.

Similarly, working capital/sales to receivable days also fluctuate for companies and no industry standards can be established. It is slightly positive for Parle but highly negative for GSK.

Asset turnover to receivable days also shows variations across companies. For Parle, it is positive whereas for the other companies it is negative.

7. CONCLUSIONS AND SUGGESTIONS

Operationally efficiency is typically used to analyse how well a company uses its assets and liabilities internally whereas solvency aspect is used to measure long term obligations of the company. The presence of one does not necessarily imply the other. It has been verified in the present study.

All the units under present study have been efficient in managing their resources, but in parts. None of them have shown complete efficiency in resources utilization. Regarding solvency, all the units except Rei Agro have been close to zero debt company. But, despite low financial risk they have not shown a consistent efficient performance. So, there is insignificant relationship between efficiency and solvency parameters of the sample companies. *It has been proven statistically by correlation analysis as well.*

It is very tricky for companies to balance their efficiency and solvency. Some companies like Rei Agro have undertaken huge loans in recent years and reduced their solvency, but their assets' utilisation has more or less remained constant. Other firms like Nestle and Glaxo follow a zero debt policy, but their efficiency ratios are not very encouraging either.

So, it depends on the company's management and its long term objectives as to which parameter should be focused upon.

We also conclude that the relatively low efficiency observed in firms is important to increasing the solvency, and hence the increased working capital requirements associated with long-term debt have not impaired the ability of firm to remain efficient and profitable.

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