Impact of Leverages on Profitability
A Case Study on Coramondal Fertilisers Ltd.

*C.T. Sam Luther

1. Introduction

The foremost objective of finance management is to increase the shareholders wealth of a firm. The objective can be achieved based on three major decisions as functions of finance: 1. the investment decision or capital expenditure decision, 2. the financing decision or capital structure decision, and 3. the dividend decision. The investment decision relates to the selection of assets in which funds will be invested by a firm. The finance decision is concerned with the selection of right mix of debt and equity in its capital structure. The third decision is relating to the dividend policy of the firm. Needless to say, the dividend decision is based on the success of the first two decisions, i.e., the investment and financing decisions.

2. Financing Decision

The financing decision is of tremendous significance for the management, since it influences the debt-equity mix of the firm, which ultimately affects the shareholder's return and risk. In case, the borrowed funds are more as compared to owner's funds, it results in increase in shareholders earnings together with increase in risk. This is because the more debt or borrowed funds a firm has, the more likely that the firm will become unable to fulfil its contractual obligations. In other words, too much debt can lead to a higher probability of insolvency and financial distress. In contrast, debt is an important form of financing, and provides significant tax advantage because interest payments are tax deductible. If a firm uses debt, creditors and equity investors may have conflicts of interest. Creditors may want the firm to invest in less risky ventures than those the equity investors prefer.

3. Investment Decision

Investment decision pertains to fixed/long-term assets or investment in long-term assets that can yield a return over a period of time, usually exceeding one year. It involves a current outlay or series of outlays of cash resources in return for an anticipated flow of future benefits. Investments decision is of strategic importance because they will involve a significant change in the firm's expected profits and in the risk to which these profits will be subject to. Also such a decision has its impact over a long span of time and inevitably affects the firm's future cost structure. Such costs are mostly of fixed in nature and the firm is committed to incur the fixed costs over the useful life of the assets. The major threat is, if the investments turns out to be unsuccessful in future or fails to fetch the anticipated profits, the firm will have to bear the burden of fixed costs which will have the direct impact on the value of the firm.

4. Concept of Leverage

The term 'leverage' may be defined as the percent of change in one variable by the percent of change in some other variable or variables. In the field finance management, the term leverage is used to describe the firm's ability to use fixed cost assets or funds; the former is popularly known as 'operating leverage' and the latter is known as 'financial leverage'. James Horne has defined leverage as, 'the employment of an asset or funds for which the firm pays a fixed cost or fixed return. Thus, according to him, a leveraged firm employs assets or sources of funds which have a fixed cost (or return). The former may be termed as 'fixed operating cost', while the latter may be termed as 'fixed financial cost'.

4.1. Operating Leverage

Operating leverage results from the existence of fixed operating expenses to magnify the effect of changes in sales on its earnings before interest and taxes (EBIT). In general, operating leverage is greater for firms with a higher proportion of fixed operating costs. Specifically, for a given percentage increase in sales, the greater the firm's operating leverage, the greater the percentage of increase in EBIT. Weston (1986) states that high fixed costs and low variable costs provide the greater percentage change in profits both upward and downward.

* Head, Department of Management Studies, Nesamony Memorial Christian College, Marthandam-629165, Kanyakumari Dist., Tamil Nadu

According to Brigham (1995), "If a high percentage of a firm's costs are fixed and hence do not decline when demand increases, thus increases the firm's business risk. This factor is called operating leverage." However, it is worth to be noted that operating leverage is beneficial to a firm when sales are increasing and are large enough to cover fixed costs, whereas, it is shown to be detrimental when fixed costs exceed revenue due to poor sales turnover.

4.2. Degree of Operating Leverage

The degree of operating leverage (DOL) is defined as the percentage change in operating income or EBIT that results from a given percentage change in sales. In effect, the DOL is an index number which measures the effect of a change in sales (number of units) on operating income or EBIT (Weston and Brigham, 1995).

$$DOL = \frac{\%\text{ of change in EBIT}}{\%\text{ of change in Sales}}$$

4.3. Financial Leverage

Financial leverage is the name given to the impact on returns of a change to the extent to which firm's assets are financed with borrowed money. It is the use of fixed financial costs to magnify the effects of changes in earnings before interest and taxes (EBIT) on the firm's earnings per share (EPS). The two common fixed financial costs found in the income statement are:

- Interest on debt, and
- Preferred share dividends.

Franco Modigliani and Merton Miller have stated in their trade-off theory that firms should favour using debt in their capital structures because the tax deductibility of interest payments is such a benefit. Under a very restrictive set of assumptions, they showed that the value of a firm increases as it uses more and more debt. In fact, according to their theory, the value of the firm is maximized when it is financed with nearly 100 percent debt.According to Block and Hirt (1997), "Financial leverage reflects the amount of debt used in the capital structure of the firm. It measures the relationship between the earnings before interest and taxes (EBIT) and the earnings per share (EPS) and it reflects the effect of change in EBIT on the level of EPS.

4.4. Degree of Financial Leverage (DFL)

The degree of financial leverage is computed as a ratio of change in earnings available to common stockholders associated with a given percentage change in earnings before interest and taxes (Weston and Brigham (1969). According to Brigham (1995), "The degree of financial leverage is defined as the percentage change in earnings per share (EPS) that results from a given percentage change in earnings before interest and taxes (EBIT), and is calculated as follows:

$$DFL = \frac{\%\text{ of change in EPS}}{\%\text{ of change in EBIT}}$$

The greater is the degree of financial leverage, the greater the fluctuations (positive or negative) in earnings per share. The common stockholder gets higher returns when the firm's management chooses to use more financial leverage rather then less.

4.5. Sales - EBIT – EPS relationships

In terms of operating leverage, the firm will have to cover all its operating fixed costs before make any profits. Operating fixed costs consists of depreciation, insurance, rent, lease payments, executive salaries etc which do not vary in proportion to sales. As a result, EBIT varies in higher proportion than sales. But, firms should take due care in adding fixed costs because mostly they are committed costs and not easy to get rid off. Leases, for instance, may run for several years and it's very difficult to break the contract of lease at a premature stage. Similarly, assets can be tough to be disposed off once they are brought in and used and the relative costs have become an additional burden to the firm, especially during downturn and financial distress.Similarly, long term debt carries a contractual fixed rate of interest and its payment is obligatory. As the debt providers have prior claim on income and assets of a firm over equity shareholders, their rate of interest is normally lower than the expected return on equity holders. Further, interest on debt capital is a tax deductible expense. These two phenomena lead to the magnification of rate of return

to the shareholders.Earnings per share (EPS) is the reward of an investor for making his investment and it is the best measure of performance of a firm. The important objective of financial management is to maximise the EPS from the point of view of both the investor and the investee. Again the objective of financial management is maximisation of value measured in terms of market price of equity share of a corporate entity. Given the objective of the firm to maximise the value of equity share, a firm should select a desired combination of financing mix or capital structure to achieve the goal. Theoretically, optimum capital structure implies that combination of debt and equity in which overall cost of capital is in minimum and value of the firm is in maximum.

In these circumstances, if the total capital employed remains constant, increase in the financial leverage or use of debt implies that a relatively cheaper source of fund replaces a source of fund having relatively higher cost. If the company follows this practice, its net return will be attributable to the low base of equity shareholders (lower base being due to the increase in financial leverage). As a result, it will lead to the magnification of return to the equity and thus EPS. But one should keep in mind that the same holds well in favourable business environment where the firm is able to earn a rate of return on investment being higher than its cost of financing. As long as this situation continues, the return on equity or EPS will increase with the increase in financial leverage. The excess of the rate of return on investment over the fixed rate of interest and preference dividend will go to the equity shareholders. However, during the period of adversity when the company is not in a position to earn greater (or at least equal) rate of return than the cost of debt and preference share, its return on equity and EPS, instead of increase, will actually decrease with the increase of the financial leverage.

As higher earnings would result in higher dividend, the above discussion follows that increase in the use of financial leverage increases the earnings per share and thus dividend per share. Conversely, decrease in the use of financial leverage decreases the earnings and dividend per share.

4.6. Total Leverage

'Total leverage' is simply expressed as financial leverage multiplied by operating leverage. The operating leverage has its effect on operating risk and is measured by the percentage of change in EBIT due to percentage change in sales. The financial leverage has its effects on financial risk and is measured by the percentage change in EPS due to percentage change in EBIT. If both are combined, the result is total leverage and the risk associated with combined leverage is known as total risk.

Total leverage is of great importance in strategic financing decisions for new investments. For instance, if a firm begins to invest heavily in more risky assets than usual, the operating leverage will obviously increase. If it does not change its financing policy, i.e., the capital structure remains constant, there would be no change in its financial leverage. As a result, the total leverage would increase causing an increase in its total risk. The firm, in order to keep its risk constant, may like to lower its financial leverage by financing the new investments with additional equity capital which would ultimately lower the risk of leverage caused by new investments. If the operating leverage is low due to low fixed costs, the firm can afford to have a more levered financial plan to keep the total risk constant at the same time having the prospects of magnifying effects on EPS due to change in sales.

Keeping these theoretical backgrounds in view, an attempt has been made to study the operating leverage and financial leverage and their effect on EBIT – EPS of Coramandal Fertilisers Ltd, a leading fertiliser manufacturing company from South India; the details are elucidated in the following paragraphs.

5. Company Profile

Coromandel Fertilisers Limited (CFL) incorporated in 1964 belongs to Murugappa Group, is a leading company in India manufacturing a wide range of fertilisers and pesticides (technical and formulations). Along with subsidiary company Godavari Fertilisers & Chemicals Ltd., CFL markets around 2 million tonnes of phosphatic fertilisers making it a leader in its addressable markets and the second largest phosphatic fertiliser player in India. The Company also markets phosphor-gypsum and sulphur pastilles.

Coromandel Fertilisers Ltd has multi-locational production facilities and markets its products all over India and exports pesticides to various countries across the globe. It is managed by competent and committed professionals using advanced management practices. The Company is known for fostering a climate of high performance and continuous improvement. The Company also has strategic partnerships with leading companies across the globe. Voted as one of the ten greenest companies in India, this reflects the Company's commitment to the environment and society.

6. Objectives of the Study

The objectives of the study are as follows:

- To study the methods of raising finance and financial leverage practice of the Company
- To examine the impact of operating leverage on EBIT
- To examine the impact of financial leverage on EPS,
- To examine the impact of total leverage on EPS.

7. Hypothesis

To study the objectives, the following hypotheses have been formulated:-

1.DFL and EPS are positively correlated in such a manner that increase in financial leverage leads to increase in EPS

2.DOL is positively correlated with EPS,

3.Total leverage is positively correlated with EPS.

8. Research Design and Methodology

8.1. Collection of Data:

The data of CFL has been collected from the Annual Reports of the company published in various web sites. The data collected from these sources have been used and compiled with due care as per the requirements of the study.

8.2. Period of Study:

This study covers a period of 12 years from 1994-95 to 2005-06.

8.3. Techniques of Analysis:

The study has been made by converting the collected data into relative measures such as ratios, percentages rather than absolute values. For analysing the degree of association between degree of financial leverage (DFL) and EPS, degree of operating leverage (DOL) and EPS, total leverage (TL) and EPS, Pearson's correlation analysis is used. The student's't' test is used to judge whether the calculated correlation co-efficient are significant or not.

8.4. Limitations of the Study:

Though CFL was formed five decades back, the periods of study is limited to last twelve years only.

- The study is based on secondary data only,
- This study cannot be generalised.

9. Analysis and Interpretations

The details regarding sales, EBIT, EBT, net worth, and capital employed of CFL for a period of 12 years from 1994-95 to 2005-06 are presented in Table – 1.(Source : Computed from Annual Reports.)

Table-1(CAGR* -Cumulative Annual Growth Rate)
Details regarding Sales, EBIT, EBT, Net worth, Loan, Capital employed
Rs.Million

Year	Sales	EBIT	EBT	Net Worth	Loan	Capital Employed	Interest	Interest/ Loan (%)
1994-95	2820	307	145	802	1096	1898	163	15
1995-96	3118	433	270	1043	981	2024	163	17
1996-97	3069	598	408	1269	1277	2546	196	15
1997-98	3590	658	486	1532	1256	2788	172	14
1998-99	3453	853	672	1893	1290	3183	181	14
1999-00	4136	915	716	1947	1463	3410	200	14
2000-01	4275	919	704	2338	1986	4324	216	11
2001-02	6636	908	731	2149	1121	3270	177	16
2002-03	5902	594	465	2295	1779	4074	129	7
2003-04	12404	995	708	3378	2956	6334	287	10
2004-05	15544	1116	929	3852	2679	6531	187	7
2005-06	18773	1394	1154	4380	4263	8643	240	6
Average	6977	808	616	2240	1846	4085		
CAGR*	22	18	25	18	18	16		

It is evident that CFL has shown exceptional operational performance during the entire period of study. The sales have a consistent growth up to 2002-03, after that it has increased more than double and recorded an overall CAGR of 22 percent. The increase in sales from 2003-04 onwards has been due to the acquisition of Godavari Fertilisers and Chemicals Ltd, another phosphate fertiliser major of South India.

As a result of better performance in sales, the EBIT and EBT have also yielded better results during the study period. It is interesting to note that the rate of interest on loan has decreased sharply from an average of 14.5 percent during the first eight years (1994-95 to 2001-02) to just 7.3 percent during the remaining period, though the loan has increased more than double from an average of Rs.1309mn to Rs.2919mn during the same period. As a result, the EBT has a better CAGR of 25 percent as compared to the CAGR of 18 percent in the case of EBIT.

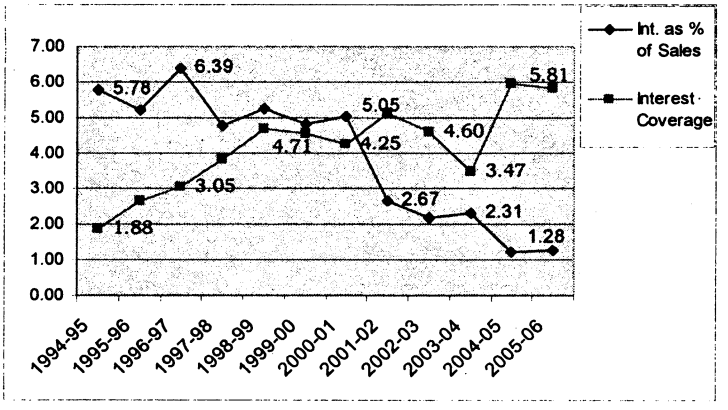
The net worth has also recorded a CAGR of 18 percent during the study period. The growth in net worth has been mainly due to the increase in the share capital and the constant use of internal reserves as a source of funds in its expansion and acquisition programmes. Empirical evidences suggest that firms with high growth rates are likely to pay lower dividends, thus retained earnings are also cheaper sources of finance. As a result of the optimum utilisation of both sources of finance, viz. debt and equity, the capital employed has also recorded a healthy CAGR of 16 percent during the study period.

Table – 2 and Figure – 1 are presented to analyse the interest as the percentage of sales and the interest coverage.

Table-2
Cost of Interest and Interest Coverage

Year	Sales	EBIT (Rs. Million)	Interest	Int. as % of Sales	Interest Coverage
1994-95	2820	307	163	5.78	1.88
1995-96	3118	433	163	5.23	2.66
1996-97	3069	598	196	6.39	3.05
1997-98	3590	658	172	4.79	3.83
1998-99	3453	853	181	5.24	4.71
1999-00	4136	915	200	4.84	4.58
2000-01	4275	919	216	5.05	4.25
2001-02	6636	908	177	2.67	5.13
2002-03	5902	594	129	2.19	4.60
2003-04	12404	995	287	2.31	3.47
2004-05	15544	1116	187	1.20	5.97
2005-06	18773	1394	240	1.28	5.81

Figure – 1
Interest as a Percentage of Sales and Interest Coverage ratio of CFL



Interest as a percentage of sales and interest coverage ratios are presented in Table -2 and Figure – 1. It is evident from the table that due to better performance in sales and decreasing interest cost (Table – 1 followed), the interest as a percentage of sales has shown a decreasing tendency over the years and the average interest as a percentage of sales was 5.33 during first seven years, thereafter, it decreased sharply to 1.93 percent during the rest of the period.

Interest coverage is expressed in number of times, dividing EBIT by interest. The interest coverage was 1.88 times in 1994-95, increased sharply to 5.81 times in 2005-06 with an overall average of 4.16 times, which clearly indicates the conservative policy adopted by CFL in its capital structure decisions and it's reserve debt capacity to easily fund the expansion and diversification programmes with debt.

The capital structure of CFL is presented in table – 3.

Table – 3
Composition of Capital Structure

	(Rs.Millions)					Debt	A. Percentage (%) to Networth		B.Percentage (%) to Capital Structure		
Year	Share Capital	R&S	Net Worth	Debt	Capital Employed	Equity Ratio	Share Capital	R&S	Share Capital	R&S	Loan
1994-95	240	562	802	1096	1898	1.37	30	70	13	30	58
1995-96	240	840	1080	981	2061	0.91	22	78	12	41	48
1996-97	240	1060	1300	1277	2577	0.98	18	82	9	41	50
1997-98	240	1330	1570	1256	2826	0.80	15	85	8	47	44
1998-99	240	1690	1930	1290	3220	0.67	12	88	7	52	40
1999-00	195	1780	1975	1463	3438	0.74	10	90	6	52	43
2000-01	195	2170	2365	1986	4351	0.84	8	92	4	50	46
2001-02	195	1955	2150	1121	3271	0.52	9	91	6	60	34
2002-03	195	2101	2296	1779	4075	0.77	8	92	5	52	44
2003-04	254	3124	3378	2956	6334	0.88	8	92	4	49	47
2004-05	254	3599	3853	2679	6532	0.70	7	93	4	55	4
2005-06	254	4126	4380	4263	8643	0.97	6	94	3	48	49
					Total	10	154	1046	81	576	543
					Average	0.85	12.83	87.17	6.77	48.01	45.21

Figure – 2
Debt vs. Equity of CFL

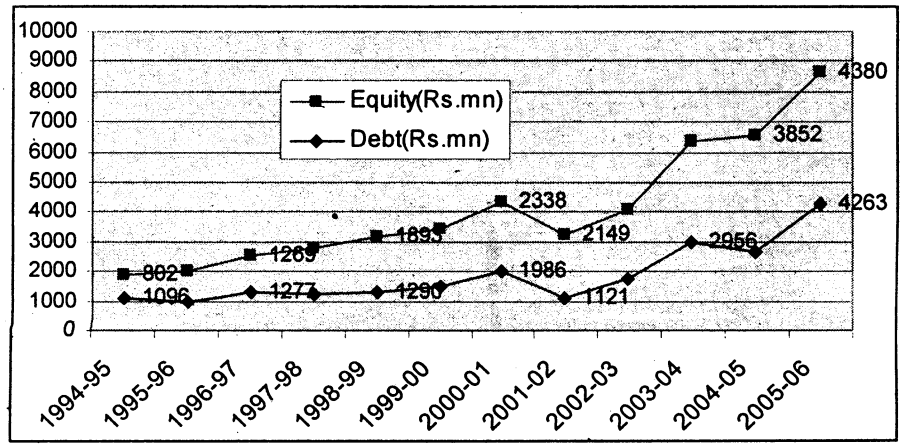


Table – 3 and figure – 2 are presented to analyse the capital structure of CFL. It is evident that CFL has adopted a conservative debt-equity policy throughout the study period except the first year. The debt-equity ratio was 1.37 (i.e. debt more than equity) in 1994-95, afterwards, the debt-equity ratios kept below 1 with an overall average of 0.85.

The second part of Table – 3 illustrates the analysis of different components of capital structure. Table

3(A) shows the components of networth, i.e. the percentage of share capital to networth and percentage of reserves and surplus to networth. The overall contribution of reserves and surplus to networth is 87.25 percent, whereas the remaining 12.5 percent is contributed by share capital. The share capital's contribution to networth was as high as 30 percent in 1994-95, declined sharply to reach a level of just 6 percent at the end of the study period. In contrast, the percentage of R&S to networth was 70 percent in 1994-95, increased steadily to reach 94 percent in 2005-06, indicates the effective use of internal sources of funds in the growth and expansion programmes of CFL.

Table – 3(B) is presented to explain the contributions of share capital, R&S and debt to total capital employed. The average contribution of share capital to capital employed is just 7 percent, R&S 48 percent and the remaining 45 percent is contributed by debt. In other words, the overall contribution of networth to the capital employed is 55 percent and the remaining 45 percent is contributed by debt again reinstates the conservative policy adopted by CFL.

Empirical evidences suggest that firms with high growth rates are likely to pay lower dividends, thus retained earnings are also cheaper sources of finance. A firm can enjoy equity as a cheaper source of finance if it's net worth is strengthened by ploughing back, which is not dividend bearing. Further analysis also reveal that the plough back operation has been done successfully by CFL to bring down the cost of equity and at the same time it has maintained the lower base of equity shareholders resulting higher amount of EPS (Table – 4 followed). The EPS was just Rs.961 in 1994-95, increased steadily and reached Rs.32.88 in 2005-06.

Table – 4
Analysis of Leverages of CFL

Year⇨	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Details ⇩												
Sales	2820	3118	3069	3590	3453	4136	4275	6636	5902	12404	15544	18773
EBIT	307	433	598	658	853	915	919	908	594	995	1116	1694.00
EBIT	145	270	408	486	672	716	704	731	465	708	929	1154
DFL		1.60	1.47	1.35	1.27	1.28	1.31	1.24	1.28	1.41	1.20	1.21
DOL*		3.88	10.74	4.19	7.92	4.24	3.86	1.45	0.86	0.66	0.58	0.63
TL		6.23	15.73	5.67	10.06	5.42	5.04	1.80	1.09	0.93	0.70	0.76
EPS		9.61	12.01	14.13	19.29	24.70	27.18	23.15	13.51	16.13	26.18	32.88

Notes and Explanations:

EBIT – Earnings before interest and taxes

EBT – Earnings before tax

DFL – Degree of financial leverage (EBIT/EBT)

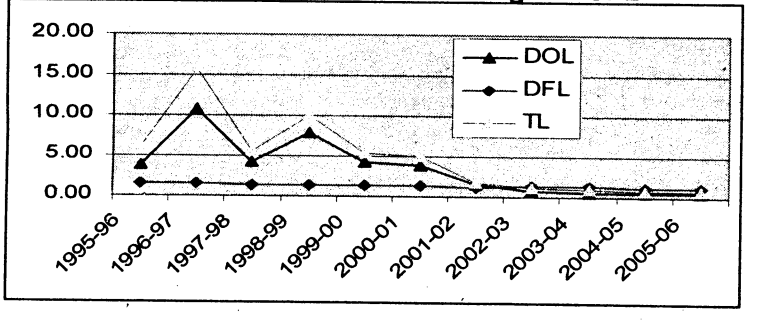
DOL – Degree of operating leverage (% of Change in sales/ % of change in EBIT)

TL – Total leverage (DFL x DOL)

EPS – Earnings per share

DOL* - In order to calculate the percentage of change in sales and percentage of change in EBIT, the year 1994-95 is taken as the base year.

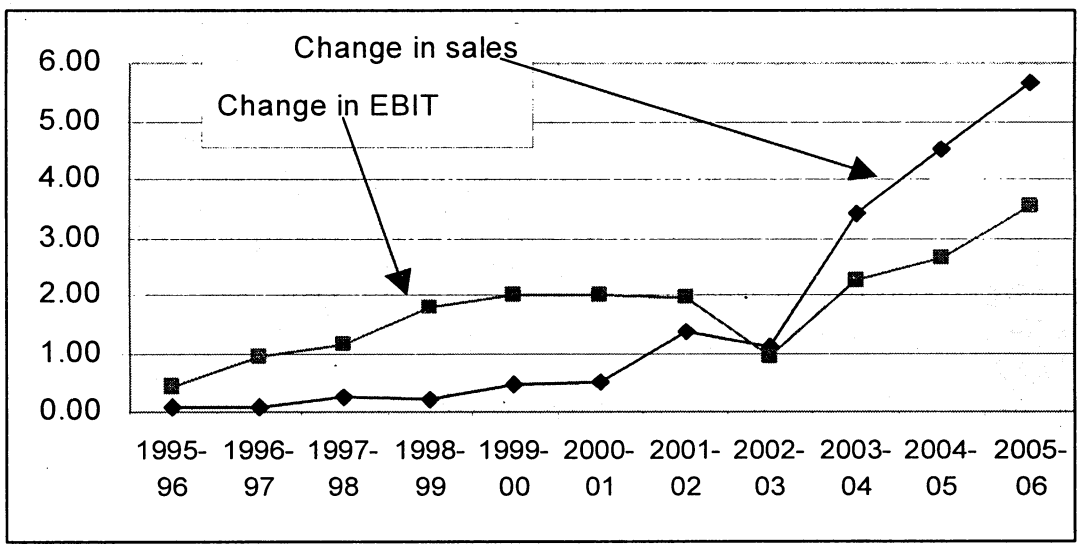
Figure – 3
Degree of Financial Leverage, Degree of Operating Leverage and Total Leverage of CFL



The different ratios relating to leverages and EPS are presented in Table – 4 and Figure -3. The degree of financial leverage (DFL) was almost consistent during the entire period of the study period. The highest DFL was noticed in 1995-96 (1.60) with a lowest one in 2004-05 (1.20) and the average DFL ratio was 1.39.

In the case of operating leverage also the same tendency can be noticed, but there was a substantial decrease in the second half as compared to the first half. CFL has maintained the operating leverage with an average of 5.80 during the first 6 years (1995-96 to 2000-01), whereas, the average operating leverage for the remaining second half of five years (2001-02 to 2005-06) was just 0.83. The reason can be better explained with the following figure.

Figure-5
Change in sales vs. change in EBIT

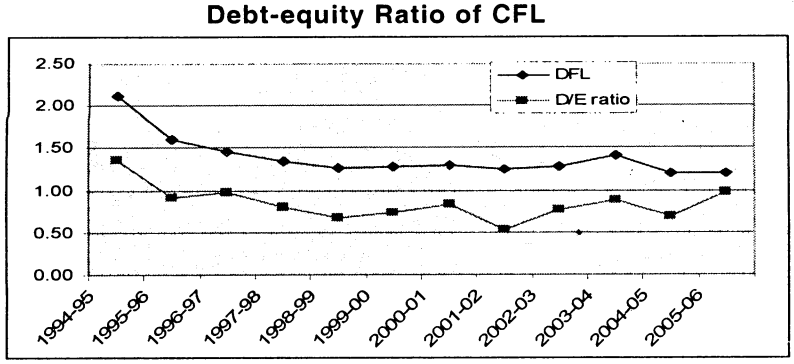


**1994-95 is taken as the base year*

Figure – 5 is presented to show the effect of sales in EBIT. If a firm is working with high operating leverage, a proportionate change in sales will bring a more proportionate change in its EBIT. Such a trend is noticed up to the year 2002-03, thereafter, the increase in sales has not made much impact on EBIT. This would have happened in CFL probably because of high input fixed costs as a result of the acquisition of Godavari Fertilisers and Chemicals Ltd in the year 2002-03. For instance, the depreciation cost, one of the major constituents of fixed costs, increased more than double from Rs.156mn in 2002-03 to Rs.326.4mn in 2003-04.

In order to explain further, the impact of DFL and its relation with debt-equity ratio, Figure – 4 is presented below.

Figure – 4
Degree of Financial Leverage and Debt-equity Ratio of CFL



It's evident from Figure - 4 that DFL and debt-equity ratios are almost positively correlated. Moreover, both the ratios show a declining tendency during the study period, which again indicates the conservative policy adopted by CFL in using the financial leverage in its capital structure.'

10. Correlation Analysis

Table – 5
Correlation Analysis and
Student's't' test

	Correlation Coefficient 'r'	Calculated Value of 't'
DFL & EPS	-0.78	/8.29/
DOL & EPS	-0.39	/6.67/
TL & EPS	-0.44	/5.67/

Source:Computed with the data obtained from table – 4

*Table value of (n-1) i.e. 10 degree of freedom at 5% level of significance is 2.28 for two-tailed test.*The coefficient of correlation between DFL and EPS, DOL and EPS, and TL and EPS are presented in Table – 5. To assess the closeness of relation between each other. Table – 5 reveals that there is a negative correlation exists between DFL & EPS, DOL & EPS and TL & EPS. The correlation coefficient between DFL and EPS is -0.78, indicating high amount of negative association, whereas, a moderate negative correlation exists between DOL and EPS and TL and EPS with -0.39 and -0.44 respectively.

The calculated 't' values are very high in all the three cases (8.29, 6.67, and 5.67 respectively) compared to the table value of 2.28 for 10 degrees of freedom at 5% level of significance. Hence, all the three hypothesis are rejected and it is concluded that CFL has failed to use both the operating and financial leverages successfully during the study period.

11. Conclusion

There is a huge potential for growth in fertiliser industry in India. It is estimated that the agricultural sector's contribution to India's GDP is just 22 percent and more than 60 percent of Indian population depends on agriculture. Moreover, the growth of the Indian agriculture is also less than 5 percent for over decades. A recent report by the RBI emphasised that for the Indian economy to maintain its growth momentum on a sustained basis, the farm sector would have to play a vital role, and needless to say, the contribution of fertilizer industry to the agricultural sector is crucial to achieve such a growth.

Scale of production is important to satisfy such a huge demand. Expansions, mergers and acquisitions can bring operating leverage, thereby reduces the cost of production and with the easy and cheaper loans available, CFL can also use the financial leverage effectively thereby increasing the earnings of the shareholders. When both these operations are carried out successfully, the sky is the limit for the growth of CFL.

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