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PERFORMANCE OF SELECT CO-OP SUGAR MILLS IN MAHARASHTRA: DUPONT ANALYSIS

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ABSTRACT

Sugar Industry in India dominates in socio economic and political fields. It is widely criticised for mismanagement and other draw backs. Empirically, it is proved that success of Sugar Mills depend on technical and managerial efficiency. The financial discipline is one of the essentiality of the success of the Sugar Mills. In this research paper application of DuPont Analysis is assessed for the selected Cooperative Sugar Mills and the DuPont formula is decomposed to determine operational efficiency of the Cooperative Sugar Mills.

KEY WORDS: DuPont Analysis, RoA, RoInventory, RoExpenditure.

1.0 INTRODUCTION:

In India, Sugar Industry is the second largest agro processing industry after Textile. The Industry is always in discussions in political arena, media and academics for various reasons. Sugar Industry is considered as "*Cash Rich*" industry by many; leading to Scio-economic development in its region (Kute 2012, Nair Asha 2012). Many of the Researchers and policy makers criticise the industry for mis-management and siphoning off money (Herekar et al (2011),SukhtankarSandip(2012)).

The performance of sugar industry does not only depend on availability of sufficient sugarcane, sugar content in the sugarcane and related factors (Singh S.P. (2006), Manohar Rao (2006),Prahannayaki (2012))but much more depends on the technical efficiency andmanagement skills (Arora, N. (2009)). The performance of Sugar Industry mainly depends on rainfall and Indian sugar industry faces vicious circle in sugarcane production and sugar production (Pandey AP (2007)).

The managing of Sugar Industry calls for highly professional acumen in all aspects of the business, from sugarcane cultivation to marketing of sugar. It is essential to study the operational performance of the Sugar Mills especially Cooperative Sugar Mills, as these are need, to be more responsible. In this research paper, applicability of DuPont Analysis, to ascertain operational performance of the select Cooperative Sugar Mills is assed.

2.0 LITERATURE REVIEW:

The performance analysis is traditionally based on ratio analysis. This is not conclusive as impact of various ratios together is not computed. The new technique of financial performance analysis is combined use of ratios as observed in Z Score Analysis. The degree of financial health of the selected Cooperative Sugar Mills is computed with the help of Edward Altman's Z-score model. The Z score analysis is followed by DuPont analysis. The in depth analysis of Annual Reports and financial statements of the selected Cooperative Sugar Mills is carried out to ascertain the financial health by both the Models. N.Gupta (2012), S.Sathya (2016), Ashok Kumar (2015) and Reddy (2012) have used Z-Score model of Solvency prediction. The other technique in secondary financial analysis is DuPont Analysis, where in the DuPont formula is

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decomposed to find stronger and weaker areas of performance. P. Mohanansundaram (2015), Ted Mitchell(2013), S. Praveena (2014), Tare(2014), Warrad (2107), Radosevic (2013) have used DuPont method of performance analysis. Balasubramanian (2015) have used both methods, Z Score Analysis and DuPont Analysis for two sugar companies. All the researchers have studied private sugar companies or the sugar companies listed on Bombay stock Exchange.

3.0 RESEARCH PROBLEM:

A Cooperative Sugar Mill is also business enterprise and need to earn profit. Though, the mill has social obligations, it needs to win the confidence of the shareholders(members). Further, it is necessary for a cooperative Sugar Mill to operate professionally with financial discipline and management practices.It also has to obtain raw materials, finances from market at competition. This makes imperative for Cooperative Sugar Mills to undergo performance evaluation and apply corrections out of these evaluations.

In this research paper the aim is to ascertain operational performance of the select Cooperative Sugar Mills in terms of Return on Assets, Return on Inventory and Return on Expenditure as there are limitations to compute return of Equity.

4 .0 RESEARCH METHODOLOGY:

In concurrence of the research problem defined abovethe research Methodology is described in the following sections.

4.1Objectives:

The objectives for the research paper are as follows,

Objective 1: To study the Return on Assets, Return on Inventory and Return on Expenditure in the selected Sugar Mills.
Objective 2: To evaluate performance of the selected Cooperative Sugar Mills on the basis of above ratios.
Objective 3: To identify the difficulties in applying DuPont Analysis in toto the selected Sugar Mill.

4.2 Data Collection:

In this Research Paper, an attempt is made to use DuPont model to measure the efficiency of the Sugar Mill in respect of Profit Margin and management effectiveness. The DuPont formula is decomposedto compute various returns of selected Cooperative Sugar Mill.The data used is secondary data. The data analysis is carried out based on Annual Reports of selected Cooperative Sugar Mills for the financial year 2004- 2015.

4.3 Sampling:

The analysis is carried out on 11 Cooperative Sugar Mills randomly selected from the western Maharashtra region of the Maharashtra. This region has been given preference for the Study, as this region of Maharashtra is dominated by Cooperative Sugar Mills, called as "Sugar Bowl "of India. All the mills have more than adequate supply of sugarcane and good sugar recovery. A brief overview of the selected Cooperative Sugar Mills is described in the Table No. 1 below,

Table No. 1 Over view of the selected Cooperative Sugar Mills

Sugar Mills	Year of Registration	31st March 2015			Average Sugar Recovery percent
		Crushing Capacity MTCD	No. of Members	Share Capital Rs.	
CSM1 Loknete SSK		1250	14,448	12.62	11.31

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CSM 2 Chh. Rajaram SSK	11-04-1984	3500	15,864	13.98	11.98
CSM 3 H.KisanAhir SSK	29-06-1981	3500	8,613	10.46	13.26
CSM 4 Bhogavati SSK	18-01-1955	4000	39,309	33.48	12.54
CSM 5 Kumbhikasari SSK	20-06-1960	5000	23,744	28.55	13.33
CSM 6 Chh. Shahu SSK	12-01-1977	4500	16022	25.45	12.71
CSM 7 Rajarambapu Patil SSK	17-08-1968	4000	12449	6.3	12.85
CSM 8 Sahyadri SSK	26-08-1969	7200	37,387	59.48	11.98
CSM 9 YM krushuna SSK	28-07-1955	7200	47,477	49.05	11.8
CSM 10 DattaShirol SSK	09-06-1969	7000	32,242	46.0	12.55
CSM 11 Jawahar SSK	29-01-1990	9400	27,292	36.6	12.51

The 11 Cooperative Sugar Millshaving same operating environment are selected randomly from Western Maharashtra. The selected Cooperative Sugar Mills have various crushing capacities from 1250MTCD to 9400 MTCD. The age of the selected Sugar Mills differ from 25 years to 60 years. The average sugar recovery is better and at 12.43 percent.

4.4Statistical Analysis: DuPont Analysis In this Research Paper,DuPont analysis, the profound method of determining financial health of enterprises is used. It is a method of performance measurement that was started by the DuPont Corporation in the 1920s.

DuPont model was first introduced by F. Donaldson Brown, an Electrical Engineer. He joined the giant chemical company's Treasury department in 1914. The original DuPont method of financial ratio analysis was developed in 1918 by an engineer at DuPont. He noticed that the result of multiplication of two often-computed ratios, Net Profit Margin and Total Asset Turnover, equals Return on Assets (RoA).A rising RoE signals that the firm is earning more profits from its net assets relative to previous years. In addition, an enterprise generating a level of RoE in excess of industry norms is likely to be more efficient at generating earnings than its peers. Higher RoE is a positive sign.

The DuPont formula for RoE as follows:
RoE = Net Profit Margin × Asset Turnover × Equity Multiplier

Alternatively, the DuPont formula can be written as follows:
RoE = (Net Profit ÷ Sales) × (Sales ÷ Assets) × (Assets ÷ Equity)

The DuPont analysis provides information on firm's liquidity, profitability, efficiency and leverage status to see how well a firm is operating as a result of changes in one or more of factors. The use of DuPont Model can assist managers to determine the overall impact of operation decisions with respect to cash flows and asset utilization. This analysis helps in understanding how the Return on Total Assets is influenced by the Net Profit Margin and the Total Assets Turnover Ratio. Return on Equity is net income divided by total equity capital and Return on Assets is net income divided by total assets.

DuPont control method first brings together the Net Profit Margin, which measures the enterprises' profitability on sales, with its Total Asset Turnover. The Asset Turnover indicates how efficiently the enterprise has used its assets to generate sales. The multiplication of these two Ratios results in the Return on Total Assets (RoA). In the second step DuPont system employs the modified DuPont formula. Return on Equity (RoE) is calculated by multiplying RoA and Equity Multiplier. Equity Multiplier is a way of examining how an enterprise uses debt to finance its assets. It is also known as the Financial Leverage Ratio or Leverage Ratio. Use of Equity Multiplier to convert the RoA into the RoE reflects the impact of Financial Leverage on owners return.

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4.5 Limitations of application of DuPont Analysis to Cooperative Sugar Mills: Modified DuPont Formulae:

However, in case of Cooperative enterprise, it should be noted that,

1. The investor's funds/ share capital amount are very less in comparison to other business forms (Private and Public Enterprises).
2. Shares of Cooperative enterprises are neither listed at Stock Exchanges nor transferable.
3. Cooperative enterprises are restricted in distribution of dividend to Shares (at max 12 per cent and with special permission up to 15 per cent).
4. The Equity of Cooperative Enterprises is very low in comparison to their business turnover (Table No.1).

As a result, the Equity Multiplier is deceiving and Shareholders or investors will not be looking for RoE. In this case, more attention is given to Return on Assets (RoA). Chesnick (2000) states that, "Investment in cooperative is primarily based on investor's use of it. Appreciation in the value of member's equity is not common. Additionally, legal requirements often limit dividends paid on cooperative stock. As a result, the traditional theory of the firm does not fully hold in the cooperative environment". The advantage of DuPont system is that it allows the enterprise to break its Returns on Equity into a profit-on-sales component (Net Profit Margin) an efficiency of asset use component (Total Asset Turnover) and the use of financial leverage component (FLM). It is an important measure of the profitability of an enterprise. The purpose of DuPont analysis is to find the impact of performances of Profit Margins, Sales, Assets and Debts over equity of the enterprise; which one is performing better and which one is not and then to take corrective measures to improvise these functional performances and at the end, Return on Equity. As in case of Cooperative Sugar Mills Return on Equity is deceiving, no weightage is given to final results of the computed values of Return on Equity. The Net Profit Ratio, Asset Turnover Ratio and the resultant Return on Asset are interpreted to identify the performance of the select Sugar Mills.

Further, the RoE model can be modified to compute Return on Inventory (RoInv) (Isberg S. (1998)). The RoInv method is the multiplication of Net Profit Margin, Inventory Turnover and Equity Multiplier. The Net Profit Margin measures the firms' profitability on sales. The Inventory Turnover indicates how efficiently the enterprise has used its Inventory to generate sales.

The DuPont formula for RoInv is as follows:

RoInv = Net Profit Margin × Inventory Turnover × Equity Multiplier.

Similarly, Return on Business Expenditure (RoExp) is a modified DuPont Model, in which Return on Expenditure is the multiplication of Net Profit Margin, Expenditure and Equity Multiplier.

RoExp = Net Profit Margin × Expenditure Turnover × Equity Multiplier.

In this Study, all the three DuPont Methods of analysis are attempted to ascertain the financial health of selected Cooperative Sugar Mills with greater surety.

5.0 DATA ANALYSIS AND INTERPRETATION:
5.1 Return on Assets (RoA) for Selected Cooperative Sugar Mills:

In this Section Return on Asset (RoA) and Return on Equity (RoE) for the selected Cooperative Sugar Millsare presented for comparison and finally Return on Asset (RoA) is used for comparison with other DuPont Analysis components.

The Table No. 2shows the Return on Equity (RoE) and Return on Assets (RoA) for selected Cooperative Sugar Mills.

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Table No.2 Return on Assets (RoA) Return on Equity (RoE) for Selected Sugar Mills

Sugar Mills	Net Profit* Margin	Asset Turnover	RoA	Equity Multiplier	RoE
SCM1	0.12	1.8	0.22	11.49	2.43
SCM2	1.62	1.3	2.11	12.74	26.77
SCM3	1.04	1.56	1.62	44.44	71.95
SCM4	-0.67	1.56	-1.05	9.44	-9.82
SCM5	0.67	1.63	1.09	15.7	17.26
SCM6	0.25	1.83	0.46	21.14	9.73
SCM7	1.07	3.2	3.42	110.99	379.65
SCM8	1.41	1.7	2.40	11.2	26.77
SCM9	0.57	1.91	1.09	18.58	20.35
SCM10	0.32	1.2	0.38	12.23	4.64
SCM11	0.62	1.73	1.07	19.56	20.89
Average	0.6	1.8	1.2	26.1	51.9
S.D	0.64	0.52	1.21	29.76	110.68
CoV	100.89	29.59	103.83	113.87	213.37

The Table No. 2 above shows the DuPont analysis for the selected Cooperative Sugar Mills. The Net Profit Ratio for Sugar Mill SCM4 is negative (-0.67),while for all other selected Sugar Mills, it is positive with average of 0.6. The Accounting Statements of the SCM4 show that the Share Capital of this Mill is high but Sugar sale is low and hence the Profit Margin of SCM4 is negative. The Ratio differs largely from the sample average of the select Sugar Mills, indicated by the high S.D. (0.64) and CoV (100.89). The reports of the select Cooperative Sugar Mills indicate that the Sugar Mills are holding sugar stock continuously high and slowly moving out. It is observed that all these Sugar Mills needed to improve their Sales performance.
Similarly, it is observed that the Asset Turnover Ratio is moderate at an average of 1.8 and S.D. (0.52) and CoV (29.59) indicating that all Sugar Mills have the Ratio close to the selected Cooperative Sugar Mills average. The Sugar Mill CSM7 had shown best performance with the Ratio of 3.2 across the selected Sugar Mills.

As the Net Profit Ratio for Sugar Mill CSM4 is negative, due to higher Capital of Rs.33 Corers and low sale of Sugar, the RoA for this Sugar Mill is negative. The average RoA for the Sugar Mills the selected Cooperative Sugar Mills was just slightly above one, it is 1.2. It is observed that few of the Sugar Mills (CSM1, CSM6 and CSM10) are performing below average of the selected Cooperative Sugar Mills. It is observed that all the Sugar Mills need to improve their Net Profit Ratio and Asset Turnover Ratio then only Return on Assets Turn over (RoA) would improvise.

5.2 Return on Inventory (RoInv) for Selected Sugar Mills:
The Return on Inventory method is the result of multiplication of Net Profit Margin, Inventory Turnover and Equity Multiplier. The Net Profit Margin measures the enterprises' profitability on sales. The Inventory Turnover indicates how efficiently the enterprise has used its Inventory to generate Sales (Iseberg S.1998).Equity Multiplier is examining how an enterprise uses debt to finance its assets. The multiplication of these three Ratios results in the Return on Equity. Return on Inventory (RoInv) is a performance measure

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whether the enterprise is able to make a profit on its Inventory. Inventory Turnover is calculated by dividing Sales by the Inventory Cost.

The Table No.3shows the Return on Inventory (RoInv) and Return on Equity (Roe) for selected Sugar Mills.

Table No.3. Return on Inventory (RoInv) and Return on Equity (RoE)for selected Sugar Mills

Sugar Mills	NetProfit Margin	Inventory	RoInv.	Equity Multiplier	RoE
SCM1	0.12	0.85	0.10	11.49	1.17
SCM2	1.62	0.83	1.34	12.74	17.13
SCM3	1.04	0.82	0.85	44.44	37.9
SCM4	-0.67	0.79	-0.53	9.44	-5
SCM5	0.67	0.82	0.55	15.7	8.63
SCM6	0.25	0.84	0.21	21.14	4.44
SCM7	1.07	1.22	1.31	110.99	144.89
SCM8	1.41	0.84	1.18	11.2	13.27
SCM9	0.57	0.86	0.49	18.58	9.11
SCM10	0.32	0.6	0.19	12.23	2.35
SCM11	0.62	0.68	0.42	19.56	8.25
Average	0.64	0.83	0.56	26.14	22.01
S.D	0.64	0.15	0.58	29.76	42.24
CoV	100.89	18.26	103.59	113.87	191.91

The Table No.3shows the Return on Inventory (RoInv) and Return on Equity (RoE) for the selectedSugar Mills. It is observed that the Inventory Turnover Ratio is very minimal with an average of 0.83 and the ratio of the Sugar Mills of is very consistent as indicated by low S.D. (0.15) and CoV of (18.26). This indicates similarity in performance of the selected Sugar Mills. The reports show that due to better sales of sugar, the Sugar Mill SCM7 had shown good performance with the ratio of 1.22 across the selectedSugar Mills.

As the Net Profit ratio for Sugar Mill SCM4 is negative, the RoInv for this Sugar Mill is negative. With large amount blocked in Inventory, the average RoInv for the selected Sugar Mills are very low at average of 0.56. It is observed that two of the Sugar Mills (SCM10 and SCM11) are having low RoInv average than the average. It is observed that all the Sugar Mills need to improve their Net Profit Ratio and Asset Turnover Ratio then only Return on Inventory Turnover (RoInv) would improvise.

The Equity Multiplier is varying largely between 9.44 and 110.99 with average of 26.14; as evident by high S.D. (29.76) and CoV (113.87).

5.3 DuPont Analysis: Return on Expenditure (RoExp) and Return on Equity (RoE) for selectedCooperative Sugar Mills:

Return on Equity (RoExp) is the result of multiplication of Net Profit Margin, Expenditure and Equity Multiplier. Return on Expenditure is a performance measure whether the enterprise is able to make a profit on its Expenditure. Expenditure Turnover is calculated by dividing Sales by the Expenditure.In this Section

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Return on Expenditure (RoExp) and Return on Equity (RoE) are presented for comparison and finally Return on Expenditure (RoExp) is used for comparison with other DuPont Analysis components.

The Table No.4describes theReturn on Equity (RoE)and Return on Expenditure (RoExp) for Sugar Mills.

Table No.4. Return on Expenditure (RoExp) and Return on Equity (RoE) for selected Sugar Mills

Sugar Mills	NetProfit Margin	Expenditure	RoExp	Equity Multiplier	RoE
SCM1	0.12	1.12	0.13	11.49	1.54
SCM2	1.62	1.5	2.43	12.74	30.96
SCM3	1.04	1.15	1.20	44.44	53.15
SCM4	-0.67	0.94	-0.63	9.44	-5.95
SCM5	0.67	1.1	0.74	15.7	11.57
SCM6	0.25	1.05	0.26	21.14	5.55
SCM7	1.07	2.31	2.47	110.99	274.33
SCM8	1.41	1.18	1.66	11.2	18.63
SCM9	0.57	1.12	0.64	18.58	11.86
SCM10	0.32	0.02	0.01	12.23	0.08
SCM11	0.62	0.01	0.01	19.56	0.12
Average	0.64	1.05	0.81	26.14	36.53
S.D	0.64	0.63	1.02	29.76	80.65
CoV	100.89	60.37	125.93	113.87	220.78

The Table No. 4 above shows the DuPont analysis for Return on Expenditure (RoExp) for the selected Cooperative Sugar Mills.It is observed that the Expenditure Turnover Ratio is very minimal with an average of 1.05 and all Sugar Mills have ratio moderately varying from the average as evident by low S.D. (0.63) and CoV (60.37). The Sugar Mill SCM7, with good sugar sale, has shown good performance with the Ratio of 2.31 across the sugar mills.

As the Net Profit Ratio for Sugar Mill SCM 4 is negative, the Return on Expenditure (RoExp) for this Sugar Mill is negative. The average RoExp for the Sugar Mills is very low at average of 0.81. It is observed that few of the Sugar Mills (SCM1, SCM10 and SCM11) are having very low average RoExp.It is observed that all the Sugar Mills need to improve their Net Profit Ratio and Asset Turnover Ratio then only Return on Expenditure Turn over (RoExp) would improvise.

The Equity Multiplier is varying between 9.44 and 110.99 with average of 26.14; as evident by large S.D. (29.76) and CoV (113.87).

6.0 CONCLUSION:

The empirical analysis of the operational performances like Asset Turnover (RoA), Inventory Turnover (RoInv) and Expenditure Turnover (RoExp) showed that the Equity Multiplier for all the Sugar Mills is varying largely (from 3.90 to 110.00). As such the Return on Equity computed does not give a true picture. In case of few Sugar Mills it touched 1500. The aim of DuPont analysis for the Private Enterprises is to asses on Return on Equity and then if, Return on Equity is not satisfactory, then investigates the cause of low Return on Equity in Sales Margin, Total Asset turnover and or lastly inefficient handling of debts. However, for Cooperative Sector, Equity Capital is ineffective and non cognizable. This is proved empirically in the

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DuPont Analysis of selected Sugar Mills. The Researcher, therefore, has attempted to utilize DuPont Analysis to fragment the operational performances of the selected Sugar Mills and to find solution for improving profitability of the selected Sugar Mills. Here, more importance is given on Return on Assets, Return on Inventory and Return on Expenditure.

The empirical analysis through the DuPont analysis method of the select 11 Sugar Mills, observed that the Sales performance of these Sugar Mills (Avg. 0.6) is not satisfactory. The Asset Turnover is better (Avg. 1.8).

The DuPont analysis for Return on Inventory for the selected Cooperative Sugar Mills showed that the Inventory Turnover Ratio (Avg. 0.83) is very minimal and consistent. The average RoInv for the select Sugar Mills is very low (Avg.0.56). All the Sugar Mills needed to improve their Net Profit Ratio and Asset Turnover Ratio then only Return on Assets Turn over (RoA) would improvise.

The DuPont analysis for Return on the Expenditure Turnover Ratio is very minimal (Avg.1.05) and it is consistent across the select Sugar Mills. The average RoExp for the Sugar Mills is very low (Avg.0.81). The Equity Multiplier is varying and the Return on Equity also varies a lot across the select Cooperative Sugar Mills.

The conclusions are summerised as:
1. Sales performance of these Sugar Mills is not satisfactory.
2. The Inventory Turnover Ratio is very minimal.
3. The Expenditure Turnover Ratio is very minimal

This implies that the operational efficiency of the selected Cooperative Sugar Mills is weak. The mills need to improve inventory turnover, assets turnover and expenditure turnover so that the return on ratios will improvise. With collecting more share capital, the mills can get good return on equity.

7.0 SUGGESTIONS:
The above observations have important implications. The Shareholders (members) have very less financial stakes in the Sugar Mill. These stakes need to be increased. Policy Makers and Managements of the Sugar Mills should set up suitable Capital Adequacy norms and adopt strict financial discipline.

The overall observation of all these analysis is that the majority of the selected Sugar Mills are performing inefficiently and they are financially weak.

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