OPERATIONAL EFFICIENCY AND PROFITABILITY IN AUTOMOBILE COMPANIES – AN ANALYSIS

Praveen Jain*

The evaluation of efficiency or profitability is really a ticklish task. Large companies have not only to measure up to the profitability parameters and working capital standards but also to fulfil social obligations. However, in fulfilling these obligations the profitability of automobile companies is affected. The diverse considerations and objectives influencing the function of automobile companies render an evaluation of their performance specially is difficult. In common parlance the size of a company as represented by its fixed assets and profits is taken as a rough yardstick of its performance. This is obviously unsatisfactory and a broader and more comprehensive scale of assessment is necessary. Keeping all this in view the concept of a composite index has been explored in this study. It is based on certain indictors which will suitably represent the varied aspects of the performance of automobile companies.

Key words – Ratios, Composite Index, Efficiency, Visualized, Operational Efficiency Profitability

INTRODUCTION

Composite Index – Problems and Limitations

The composite index of efficiency visualized to measure the performance of automobile companies will naturally have certain problems and limitations. For example, such an index may not have the smoothness of index numbers of prices and production. The difficulty begins with the meaning attached to the term operational efficiency and in a way the situation is more or less analogous to defining the term capacity in connection with an industrial unit while constructing an index of capacity utilization. There is, in addition, the problem of choosing appropriate indicators of operational efficiency. These indicators must be relevant and quantifiable. It is no use having ethereal indicators for which it may not be possible to collect data. Also the choice of indicators even if based on an expert knowledge of the subject will be subjective to some extent. In as much as experts also differ among themselves, any chosen set of indicators is bound to evoke criticism of one sort or another.

*Dr Praveen Jain, Honorary Secretary General, Research Development Association and Research Development Research Foundation, Jawahar Nagar, Jaipur. Rajasthan, India

INDICATORS

A set of nineteen indicators has been chosen for the present study. These indicators can be broadly grouped under four heads, namely, (A) profitability, (B) working capital, (C) fixed assets and (D) social performance.

Under the group of profitability, the following five indicators are taken:

1. Operating Profit
2. Profit after Tax and Investment
3. Return on Capital Employed
4. Profit Margin Ratio
5. Return on Equity Shareholders' Funds

Under the group B, of working capital position, the following seven indicators are taken:

1. Inventory turnover Ratio
2. Inventory to Working Capital Ratio
3. Debtors Turnover Ratio
4. Current Ratio
5. Quick Ratio
6. Working Capital Turnover Ratio
7. Operating Cycle

Under group C, of fixed assets situation, the following five indicators are taken:

1. Net fixed Assets
2. Fixed Assets to Net worth Ratio
3. Fixed Assets (net) to long-term Funds Ratio
4. Sales to Fixed Assets (net) Ratio
5. Ratio of Depreciation to Gross Block

Under group D, of social performance, the following two indicators are taken:

1. Net value Added
2. Application of value Added

The indicators have been chosen keeping in view the availability of requisite information. A notable point about the choice of indicators is that they do not represent

either the first or the final choice. In a way they are the outcome of a series of experiments done with many more indicators, each of which satisfied the broad analytical consideration referred to earlier and hence became eligible for inclusion. Their collective performance is another important aspect and viewed thus some indicators had to be dropped or replaced while a few other were combined or modified otherwise. Yet another point to note is that an indicator which may be considered appropriate today may cease to be so in future. When the variation in an indicator is likely to come to an end for one reason or another, the indicator becomes obsolete and the search for another appropriate indicator has to begin.

A new indicator which becomes relevant on the grounds of policy or other considerations has to be inserted provided data also becomes available for it. Thus the set of indicators once fixed does not become sacrosanct for all times.

DATA

Data required to construct selected indicators for each of the nine automobile companies has been taken from official sources such as annual reports of the companies and pertains to the period from 2004-05 to 2013-14. The automobile companies have been coded suitably and these code numbers are referred to in the results.

METHODOLOGY

Given the basic data needed, there are at least two methods of measuring the indicators for each of the automobile companies included in the study. According to the first method, the measurement is by way of marginal or incremental ratios worked out for the period chosen. For the other method, the average ratios computed for the terminal year of the study period of 2013-14 constitute the matrix of observations.

Both the methods have their merits and limitations. Whereas average ratios represent the levels attained, indicator-wise incremental ratios reflect the directions and related magnitudes of changes in each of the selected indicators during a given period. From the point of view of stability, the average ratio is at times preferred, particularly when either the data used represents flows such as profits, working capital etc which are more volatile or where time intervals involved are relatively short. However, in the present case incremental ratios are particularly relevant since they show the degree of attainment of the objectives which these automobile companies were expected to achieve.

Even when indicators are chosen and the appropriate method of measurement is decided, the problem of adding them up through a weighting diagram remains. The appropriate procedure is to determine the weights of individual indicators according to their individual contributions to operational efficiency. This is one of the most difficult parts of the whole exercise. In the case of a consumer price index, one knows or at least determines the weight which logically should be in proportion to the household expenditure on items which generally go to make up the basket of consumption. In an industrial production index weights are proportional to the value added by the industrial items. Such an obvious choice of weights is not possible in the case of an operational efficiency index.

Under the circumstances, there are two possible approaches to ascertaining the performance of individual companies. They are (a) the simplistic method of ranking and (b) the ranking based on factor scores obtained by the factor analysis technique. In the first approach, equal weights are attached to indicators so that the composite index will be based on total scores obtained for each of the companies by adding their indicator-wise (see statements 4 and 5 for indicator-wise ranks). The second or the more sophisticated method makes use of the technique of factor analysis. Essentially the technique involves resolving the original set of nineteen selected indicators into a much smaller set of factors (generally one or two) which explain a substantial part of the total variance (say 60 to 80 per cent) of all the indicators. In this study the first approach ie the simplistic method of ranking has been followed.

A point which requires special mention in this context is about the application of the simplistic technique to each of the sub-sets of indicators (such as A,B,C and D) rather than to the whole set of nineteen indicators. The rationale of doing so is twofold. First, the ranks of automobile companies under study based on operational efficiency with regard to profitability and their grading with regard to social performance tend to be inversely related. Thus companies scoring higher ranks according to the former are found in the lower range in terms of the latter. Under such circumstances, it is felt that the pooling of all indicators may conceal the substantial degree of divergence that seems to exist among the four groups – A,B,C and D. Applying the simplistic method of analysis to these groups (considering each group as one composite indicator) to get a composite index also does not seem feasible.

A second and perhaps more important consideration is the problem of interpretation of the factors in terms of operational characteristics of automobile companies. The splitting

into sub-groups also enables one to have a sufficient number of observations in relation to the number of variables (or indicators). From a technical angle therefore it seems more appropriate to consider these four groups of efficiency indicators separately rather than viewing them in terms of a composite index. However, if one does need ranking based on overall efficiency a possible course will be to combine these group-rankings by giving equal weightage. So long as conventional measures of operational efficiency and those based on social performance do not move in harmony, such a crude method may have to be used. This has also been attempted and the results are presented later in Table 3.

To summarize the foregoing, there is no such thing as a single operational efficiency measure of automobile companies. It has many facets which are complementary as well as substitutive. The emphasis laid on each indicator will, however, keep on changing with reference to time as explained earlier. Some, indeed, are apparently in conflict with each other. At least in the short run profitability indicators and indicators of companies' social obligations seem to be negatively correlated. And yet, from a broader angle, it is necessary that all these indicators are included in the matrix that measures the efficiency of automobile companies. At best, they can be considered in convenient, homogenous and meaningful sub-groups or groups. Given the various aspects that different sub-groups represent, to reduce the indicators into one dimension will be devoid of content and may, at times, be misleading too. Hence, a discussion on the four aspects (A, B, C and D) is preferred to the interpretation in terms of a composite index although for the sake of this exercise, a composite index has been constructed by totaling the rankings.

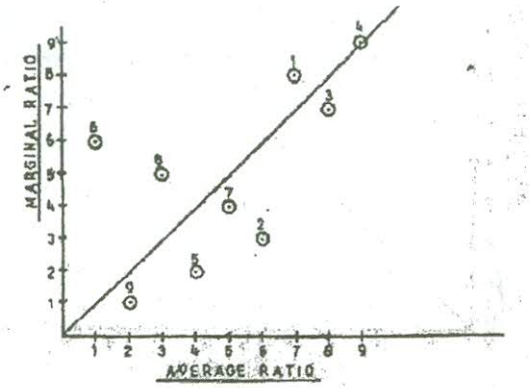
RESULTS

The results obtained from the simplistic approach are summarized for average and marginal rations in Table 3 and 2, respectively. For a proper appreciation of the automobile companies' performance, it is necessary to pay equal attention not only to the levels attained but also to the degree of attainment of growth as referred to earlier. This integrated picture of performance based on average and marginal ratios is brought out in the graphs drawn separately for groups A, B, C and D as well as for the composite set.

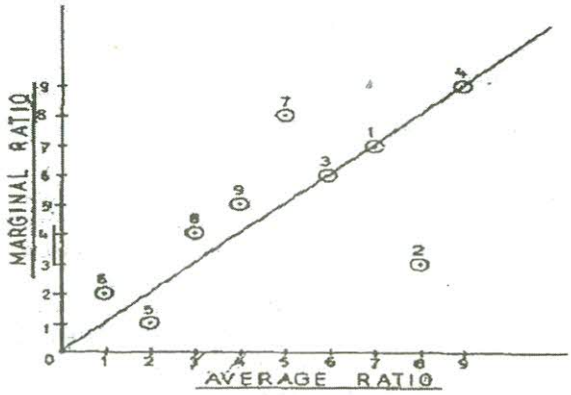
The graphs indicate that there is a close association between the ranks given to the companies based on average ratios and those obtained on the marginal basis of measurement. This is clearly shown by the cluster of points around the line of equality of ranks assigned to each of the companies using both the methods of measurement. The

farther a point/company is from the origin, the farther it goes down on the scale of efficiency. Similarly, if a point departs significantly from the line, it points out the degree of discordance between the ranks obtained by this method. The points above the line indicate comparatively good performance in terms of average ratios whereas those below the line have relatively done well in marginal terms. It will be useful to bear the foregoing remarks in mind while reading the graphs presented.

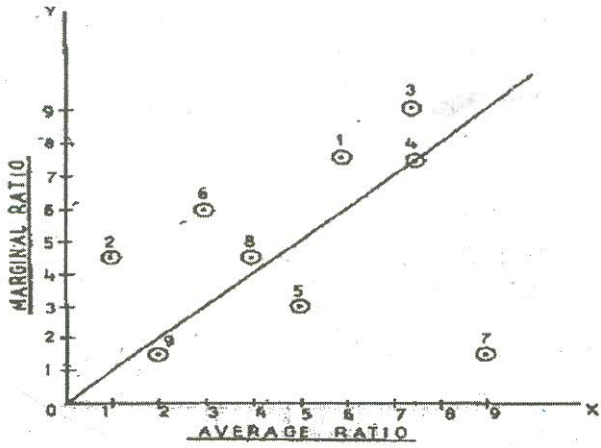
Ranking of Automobile Companies with Respect to Operational Efficiency and Profitability
COMPOSITE INDEX
X Axis – Ranks According to the Average Ratio
Y Axis – Ranks According to the Marginal Ratio



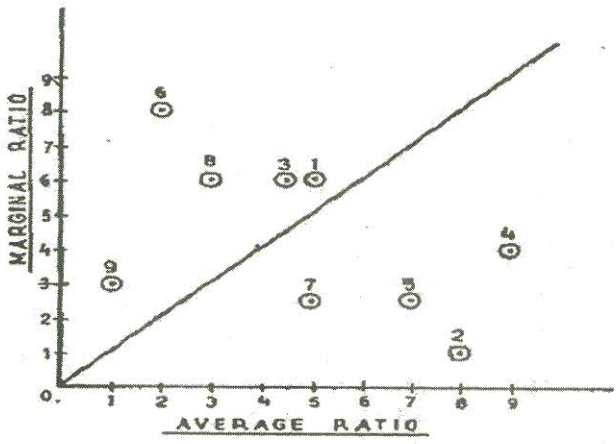
Ranking of Automobile Companies with Respect to Profitability (Group – A)
X Axis – Ranks According to the Average Ratio
Y Axis – Ranks According to the Marginal Ratio



Ranking of Automobile Companies with Respect to Working Capital (Group – B)
X Axis – Ranks According to the Average Ratio
Y Axis – Ranks According to the Marginal Ratio



Ranking of Automobile Companies with Respect to Fixed Assets (Group – C)
X Axis – Ranks According to the Average Ratio
Y Axis – Ranks According to the Marginal Ratio



Ranking of Automobile Companies with Respect to Social Performance (Group – D)
X Axis – Ranks According to the Average Ratio
Y Axis – Ranks According to the Marginal Ratio

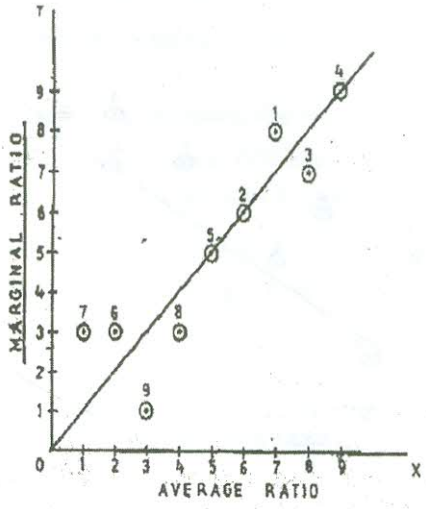


Table – 1
Ranking of Automobile Companies with Respect to Operational Efficiency and Profitability Average Ratio

Co. No.	Profitability (A)		Working Capital (B)		Fixed Assets (C)		Social Performance (D)	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
1.	28	7	39	6	26	5	14	7
2.	38	8	25	1	31	8	12	6
3.	26	6	43	7.5	26	5	16	8
4.	45	9	43	7.5	36	9	18	9
5.	13	2	34	5	30	7	10	5
6.	5	1	28	3	16	2	4	2
7.	25	5	45	9	26	5	2	1
8.	22	3	31	4	20	3	8	4
9.	23	4	26	2	14	1	6	3

Table – 2
Ranking of Automobile Companies with Respect to Operational Efficiency and Profitability Marginal Ratio

Co. No.	Profitability (A)		Working Capital (B)		Fixed Assets (C)		Social Performance (D)	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
1.	30	7	39	7.5	26	6	16	8
2.	20	3	33	4.5	20	1	12	6
3.	28	6	48	9	26	6	14	7
4.	44	9	39	7.5	25	4	18	9
5.	7	1	32	3	21	2.5	9	5
6.	11	2	36	6	27	8	6	3
7.	41	8	28	1.5	21	2.5	6	3
8.	24	4	33	4.5	26	6	6	3
9.	26	5	28	1.5	33	9	3	1

To see the effect of aggregation over the groups in the process of arriving at the composite index, it may be convenient to classify the

Table – 3
Composite Index of Operational Efficiency and Profitability of Automobile Companies

Co. No.	Average Ratio Rank						Marginal Ratio Rank					
	A	B	C	D	Total Ranks	Ranking as per Total Ranks	A	B	C	D	Total Ranks	Ranking as per Total Ranks
1.	7	6	8	7	25	7	7	7.5	6	8	28.5	8
2.	8	1	8	6	23	6	3	4.5	1	6	14.5	3
3.	6	7.5	5	8	26.5	8	6	9	6	7	28	7
4.	9	7.5	9	9	34.5	9	9	7.5	4	9	29.5	9
5.	2	5	7	5	19	4	1	3	2.5	5	11.5	2
6.	1	3	2	2	8	1	2	6	8	3	19	6
7.	5	9	5	1	20	5	8	1.5	2.5	3	15	4
8.	3	4	3	4	14	3	4	4.5	6	3	17.5	6
9.	4	2	1	3	10	2	5	1.5	3	1	10.5	1

Table – 4

Ranking of Automobile Companies with Respect to Operational Efficiency and Profitability Average Ratio

Co. No.	Profitability (A)					Working Capital (B)						Fixed Assets (C)				Social Performance (D)			
	OP	PATI	RCE	PMR	RESF	ITR	IWCR	DTR	CR	QR	WCTR	OC	NFA	FANWR	FALER	SFAR	RDTGB	NVA	AVA
1.	6	8	5	3	6	8	8	7	1	4	3	8	2	7	3	8	6	7	7
2.	8	7	8	8	7	6	7	1	3	1	4	3	8	8	2	4	9	6	6
3.	7	6	3	5	5	7	3	6	7	7	7	6	3	5	6	7	5	8	8
4.	9	9	9	9	9	9	1	5	5	9	5	9	1	9	9	9	8	9	9
5.	3	4	2	2	2	3	5	2	9	8	6	1	5	6	7	5	7	5	5
6.	1	1	1	1	1	4	2	4	6	3	8	2	7	2	4	1	2	2	2
7.	5	2	7	7	4	2	4	9	8	6	9	7	4	4	8	6	4	1	1
8.	4	5	4	6	3	5	9	3	4	5	1	4	6	3	5	3	3	4	4
9.	2	3	6	4	8	1	6	8	2	2	2	5	9	1	1	2	1	3	3

OP: Operating Profit
PATI: Profit after Tax and Interest
RCE: Return on Capital Employed
PMR: Profit Margin Ratio
RESF: Return on Equity Shareholders' Funds
ITR: Inventory Turnover Ratio
IWCR: Inventory to Working Capital Ratio
DTR: Debtors Turnover Ratio CR: Current Ratio
QR: Quick Ratio
WCTR: Working Capital Turnover Ratio
OC: Operating Cycle
NFA: Net Fixed Assets
FANWR: Fixed Assets to Net Worth Ratio
FALFR: Fixed Assets (Net) to Long-Tern Funds Ratio
SFAR: Sales to Fixed Assets (Net) Ratio
RDTGB: Ratio of Depreciation to Gross Block
NVA: Net Value Added
AVA: Application of Value Added

Note: Rankings based on the various ratios have been computed in the respective chapters.

Table – 5

Ranking of Automobile Companies with Respect to Operational Efficiency and Profitability Marginal Ratio

Co. No.	Profitability (A)					Working Capital (B)						Fixed Assets (C)				Social Performance (D)			
	OP	PATI	RCE	PMR	RESF	ITR	IWCR	DTR	CR	QR	WCTR	OC	NFA	FANWR	FALER	SFAR	RDTGB	NVA	AVA
1.	5	7	5	3	3	7	2	6	7	7	7	3	2	5	5	6	8	8	8
2.	7	6	2	1	4	6	1	1	9	9	1	6	9	3	6	1	1	6	6
3.	6	5	4	7	6	4	6	9	8	3	9	9	5	9	4	3	5	7	7
4.	8	9	9	9	9	8	9	5	3	5	8	1	1	4	2	9	9	9	9
5.	2	2	1	2	1	1	5	2	2	8	6	8	3	1	3	7	7	5	4
6.	1	1	3	4	2	5	7	7	5	4	3	5	7	6	7	4	3	3	3
7.	9	8	8	8	8	2	4	8	1	6	5	2	4	2	1	8	6	1	5
8.	4	4	6	5	5	3	8	3	6	2	4	7	6	8	8	2	2	4	2
9.	3	3	7	6	7	9	3	4	5	1	2	4	8	7	9	5	4	2	1

OP: Operating Profit
PATI: Profit after Tax and Interest
RCE: Return on Capital Employed
PMR: Profit Margin Ratio
RESF: Return on Equity Shareholders' Funds
ITR: Inventory Turnover Ratio
IWCR: Inventory to Working Capital Ratio
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RDTGB: Ratio of Depreciation to Gross Block
NVA: Net Value Added
AVA: Application of Value Added

Note: Rankings based on the various ratios have been computed in the respective chapters.

companies into a smaller number of groups (say three), namely, above average (category I), average (category II) and below average (category III). This is brought out in the following table (6) wherein it may be noted that the abbreviations shows against the different categories refer to the abbreviations assigned to the companies. The table also shows the code numbers assigned to the comapneis (see Annexure I)

Table – 6

Efficiency Index of Automobile Companies

Category	A	B	C	D	Composite Index
	FMC	MUL	TMC	GMC	FMC
I. (Above Average)	CC	TMC	FMC	FMC	TMC
	HMC	FMC	HMC	TMC	HMC
	TMC	HMC	PAL	SMPIL	CC
II. (Average)	GMC	CC	GMC	CC	GMC
	PAL	HM	HM	MUL	MUL
	HM	PAL	CC	HM	HM
III. (Below Average)	MUL	SMPIL	HML	PAL	PAL
	SMPIL	GMC	SMPIL	SMPIL	SMPIL

If one judges the overall efficiency of the automobile companies by means of the composite index taken in relation to their rankings under group A, ie profitability, one finds that FMC (Code No. 6), CC (Code No. 5) and HMC (Code No. 8) are definitely in the above average category. It is important to note that FMC (Code No. 6) stands in category I, ie the above average category, in all the groups. FMC's ranking according to the profitability group (group A), the fixed asset group (group C) and the social performance group (group D) is higher than its ranking as per the working capital group (group B). TMC (code No. 9) is in category I in all the sub-groups except group A ie the profitability group. HMC (Code No. 8) is in category I as per group A and group C. Hence, in the composite index of efficiency FMC (code No. 6), TMC (Code No. 9) and HMC (Code No. 8) lie in the above average category.

CC (Code No. 5), GMC (Code No. 7) and MUL (Code No.2) lie in category II showing average performance. According to group A (the profitability group), CC (Code No.5) is in category I lout according to group B, C and D, it lies in category II. GMC falls in category I according to the social performance group (Group D) but in category II according to the profitability and fixed assets groups. MUL (Code No. 2) is in category I as per the working capital group (group B) and in category II as per the social performance group (group D).

The comapnies HM (Code No.1), PAL (Code No. 3) and SMPIL (Code No. 4) lie in category III ie the below average category. HM (Code No. 1) falls in category II as per the working capital group (Group B) and the fixed assets group (group C) but stands in category III as per the profitability group (group A). Hence as per the composite position it lies within the below average category. PAL (Code No. 3) falls in category II as per group A and group C and rests in category III as per category III. SMPIL (Code No. 4) falls in category II as per group D but rests in category III as per groups A, B and C. Hence as per the composite position it stands in category III ie the below average category.

CONCLUSION

The main inferences from the composite index are as follows:

(i) An assessement of operational efficiency at a more desegregated level and in terms of homogeneous groups seems more realistic and meaningful than evoking an efficiency measure at the overall level.

(ii) The approach adopted has shown its usefulness in measuring the relative success achieved by the automobile companies from 2004-05 to 2013-14 with regard to the diverse aspects in which the term operational efficiency is defined or viewed in the exercise.

(iii) These companies should periodically assess their own performance vis-a-vis the other main competing companies using this approach. No definite periodicity can be prescribed since the timing of the period for such an appraisal will, to a large extent, be dictated by the phenomena measured and the time required for the policies initiated to have thier full impact felt at the opoerational level.

(iv) The study attempted here is experimental in nature and therefore the results are

provisional. However, considerable scope exists for enlarging its content through the identification of additional indicators that are crucial to the operations of automobile comapnies and the generation of reliable data for their measurement. The degree of success in so doing evidently rests on the initiative and drive of individual companies.

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Annexure I

Table Showing Codes Allocated to the Companies

Name of the Company	Code	Code No.
Hindustan Motors Limited	HM	1
Maruti Udyog Limited	MUL	2
Premier Automobiles Limited	PAL	3
Standard Motor Products of India Ltd.	SMPIL	4
Chrysler Corporation	CC	5
Ford Motor Company	FMC	6
General Motor Corporation	GMC	7
Honda Motor Corporation	HMC	8
Toyota Motor Corporation	TMC	9