Determinants of Profitability of Food Industry in India: A Size-Wise Analysis

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Profitability is the profit earning capacity, which is a crucial factor in contributing to the survival of firms. This paper is a maiden attempt at estimating the impact of size on profitability, considering the 'size' as the control variable. For this purpose, the selected firms are classified into three size categories as 'small,' 'medium,' and 'large' based on the sales turnover. The results show that volatility and growth are the major predictors in determining profitability in case of small size firms while growth is important in determining the profitability of medium size firms. Capital intensity has a significant positive coefficient with the profitability of large size firms. The overall result shows that the larger the size of the firm, the more the investment in long lived assets has helped to increase the profitability of the firm unlike the trend in cases of small size and medium size firms.

Key words: profitability, growth, volatility, capital intensity, return on investment

Introduction

Profitability (*P*) is the profit earning capacity, which is a crucial factor in contributing to the survival of firms. The perpetual existence of the firm depends on the profit earning capacity of the firm, which is also considered to be the main factor in influencing the reputation of the firm. The borrowing capacity of the firm is also determined by *P*. Thus, it is considered to be the main factor in determining the capital structure (*CS*) of the firm. *P* consists of two words profit and ability. It is necessary to differentiate between *profit* and *profitability* at this juncture. *Profit,* from the accounting point of view, is arrived at by deducting from total revenue of an enterprise all amount expended in earning that income, whereas *profitability* can be measured as profit shown as a percentage of sales known as profit margin. It can also be measured as return on investment (*ROI*) or return on asset (*ROA*). This study, in particular, uses *ROA* for determining *P* because sufficient *return on investment in asset* is essential for encouraging and motivating a growing industry like the food industry, as it is in the growing phase in India.

Literature Review

P is a crucial factor to judge the perpetual of a firm. A brief review of the past research works of experts in the field will help us to understand the importance of the present study. *P* is considered to be an important factor in determining the capital structure (*CS*) of the firm. Different views prevail with regard to the relation between *P* and *CS*. *Static trade off theory* works only to a certain extent. But *pecking order theory* recognizes both asymmetric information and costs of financial distress. The works on asymmetric information also give production roughly in line with pecking order theory. The managers, hence, follow the general rule 'issue safe securities before risky ones' (Myers 1984). The corporate managers are more likely to follow a financing hierarchy than to maintain a target debt–equity ratio (Pinegar and Wilbricht 1989), which supports the pecking order theory. The regression result shows a negative relation between *CS* and *P* under *market value* and *book value* bases for both US as well as Japanese manufacturing firms, although there are no significant country differences in *CS* between US and Japanese manufacturing firms after controlling the characteristics such as growth, *P*, risk, size (*SIZ*) and industry classification (Kester 1986).

Another dimension of perception is that the managers tend to avoid secured debt financing as it may increase the level of monitoring and may reduce their level of perquisites, which evidenced that the *growth rates* (*GROW*) are negatively related to *long-term debt* (*LTD*). The pecking order theory, which assumes that firms give more preference to retained earnings when deciding about financing a project, is also acceptable (Titman and Wessels 1988). A higher firm-specific predicted cost of capital (*CoC*) lowers capital intensity (*CAPINS*). Predicted *CAPINS* increase *LTD* in the firm's *CS* and predicted *P* decreases it. Increased debt financing raises the firm's systematic risk (Harris 1994). *P* is inversely related to debt, while firm *SIZ* as well as *CAPINS* are insignificantly inversely related to debt. However, the growth rate (*GROW*) is correlated positively with debt (Barton and Gordon 1988). *P* is associated positively with inside ownership and family portions of inside ownership. Performance determines ownership structure but not vice versa (Chang 2003). Raghuram and Zingales (1995), Barton and Gordon (1988) in their analysis strongly supported the hypothesis that *P* is inversely related to debt. The data collected in US and European countries showed that the more profitable the firm, the lower the debt ratio, regardless of how the debt ratio is defined, which is consistent with the *Pecking-Order Hypothesis* (Booth et al. 2001). Optimum *CS* en-

hances the *P* and the value of the firm. The results of a study on SMEs in India showed that they relied more on their own funds and comparatively less on borrowed funds (Dogra and Gupta 2009). Therefore, it is advisable that more profitable firms should hold less debt since higher profit generates more internal funds (Bevan and Danbolt 2002). Further, there are different perceptions about the impact of *CAPINS* and *SIZ* on *P*. Hutchinson and Hunter's study (1998) showed that *P* did not affect the *CS* of small firms. *CAPINS* can affect *P* because cut-throat competition might eliminate all future profits, depressing each firm's net security level (Ghemawat and Caves 1986); their study proved that profits decline with *CAPINS*. Thomsen and Pedersen (2000) found that compared to other owner identities, financial investor ownership is found to be associated with higher shareholder value and *P* but lower sales growth. *CAPINS* imposes a greater degree of risk because assets are frozen in long lived forms that may not be easy to sell. Hence, difference in *CAPINS* may be associated with difference in *P* (Bettis 1981). Fluctuation in the profit earned by firms makes debt capital costlier. Consistent profit earning capacity is also looked into as a determinant of *P*. Moreover, the competitive market creates much of such risk. In more competitive markets where price cut outs were sought for, *P* gets reduced due to the higher cost of debt, thereby the chances of financial distress and bankruptcy also increase (Pandey 2002). With reference to size of profit, more profitable firms tend to issue more debt, as debt capital may be available at a cheaper rate. The negative relation between *P* and *LEV* ratios arises from firm's preference for internal funds over external funds and the availability of internal funds (Chen and Zhao 2004).

Methodology, Objectives and Hypotheses

POPULATION AND SOURCES OF DATA

The study is based on secondary data of food products manufacturing firms, as on 30th January 2010 as shown in table 1, which are collected from Centre for Monitoring Indian Economy Prowess (CMIE) package.

SIGNIFICANCE OF FOOD INDUSTRY IN INDIA

India is the world's second largest producer of food next to China, and has the potential of being the biggest with the food and agricultural sector. The total food production in India is likely to double in the next ten years, and there is an opportunity for large investments in food and food processing technologies, skills and equip-

ment, especially in areas of canning, dairy and food processing, specialty processing, packaging, frozen food/refrigeration and thermo processing. The turnover of the food industry is expected to reach $258 billion by fiscal year 2015 and $318 billion by fiscal year 2020 from the current level of $181 billion. Although India is one of the world's major food producers, it accounts for less than 1.5 per cent of international food trade. This may be due to lack of proper infrastructure facilities in India. Foreign direct investment (FDI) in agriculture has increased six-fold, rising from $96.4 million in 2004 to $656 million in 2008. Moreover, India is becoming the eastern hub of the food industry. Not only does it have leading production of various materials like milk, fruits and vegetables, grains and animal products but the food processing sector is also growing at a rapid rate to cater to the domestic needs and the export market. The Indian food industry is growing at over nine per cent per annum. The size of the food industry is as large as Rs. 4 lakh crore and has been growing fast. It is one-fifth of the US food industry, which is $550 billion (Rs. 22 lakh crore). These facts indicate a wider scope for development of the food industry in India. Therefore, analyzing the relation between capital structure (*CS*) and *P* of food products manufacturing firms becomes significant.

CATEGORIES OF SIZES OF FIRMS

The study concentrates on three categories of the food industry viz., tea, dairy and vegetable oil firms. According to the National Sample Survey Organization (NSSO) on household consumer expenditure for 2007–8 (July–June), milk accounts for 14.9 per cent of the average rural family's spending on food and the figure stands higher at 18.3 per cent for urban India. NSSO's consumption data is based on a comprehensive survey covering a sample of 31,673 rural and 18,624 urban households, spread over the entire country. India has also emerged to be the world's leader in tea production, consumption and export. India's tea production alone accounts for 31% of global production. It is, perhaps, the only industry where India has retained its leadership over the last 150 years. India is also the largest oilseeds and vegetable oil producing country in the world, but equally it is the biggest consumer of vegetable oil too.

OBJECTIVES AND HYPOTHESES DEVELOPMENT

- To analyze the factors which influence the profitability of firms of the food industry in India.

- To analyze the impact of size of firms in terms of turnover on profitability of the food industry in India.
- To study the factors influencing profitability after controlling for size and to compare with the impact of the factors on the overall profitability of the firms of the food industry in India.

The following hypotheses have been developed to achieve the stated objectives:

H1 *Liquidity* (*LIQ*) *affects both the firm's P as well as operating risk (Papaioannou, Travlos and Nickolas 1994), hence it becomes important to study the relation between LIQ ratio and P, which leads to developing the hypothesis as:*

H_0^1 *Liquidity of a firm does not have a significant influence on profitability of the firm.*

H2 *Capital intensity* (*CAPINS*) *imposes a greater degree of risk because assets are frozen in long lived forms that may not be easy to sell; hence difference in CAPINS may be associated with difference in P (Bettis 1981). CAPINS can affect P because, in uncontestable markets, it offers the opportunity to make binding commitments of resources; thereby it does so by tilting the cost structure of production from ongoing towards sunk cost: firms that compete in CAPINS industries typically have to shoulder large, unrecoverable outlays of capital in advance of production decisions. CAPINS can affect P because cut-throat competition might eliminate all future profits depressing each firm's net security level, thus P declines with capital intensity (Ghemawat and Caves 1986). Based on this inference the following hypothesis is developed:*

H_0^2 *Capital intensity of a firm does not have a significant influence on profitability of the firm.*

H3 *Fluctuation in the profit earned by firms makes debt capital costlier. Consistent profit earning capacity is also looked into as a determinant of P, therefore a competitive market creates much of such risk. In more competitive markets where price cut outs were sought for, P gets reduced due to higher cost of debt, thereby the chances of financial distress and bankruptcy also increase (Pandey 2002). Hence volatility* (*VOL*) *in earning should be studied when considering consistent profit earning capacity; hence, based on this inference, the following hypothesis is developed:*

H_0^3 *Firm's volatility does not have a significant influence on profitability.*

H4 *More profitable firms tend to issue more debt, as debt capital may be available at a cheaper rate. The negative relations between P and LEV ratios arise from firm's preference for internal funds over external funds and the availability of internal funds (Chen and Zhao 2004). Therefore, it is recommendable that more profitable firms should hold less debt since higher profit generates more internal funds (Bevan and Dabnolt 2002). However, growing firms may have greater fund requirements to grab new opportunities, which may exceed their retained earnings, therefore they act according to the pecking order and choose debt rather than equity (Um 2001). Hence, to study the relationship between growth (GROW) and P the following hypothesis is developed:*

H_0^4 *Growth of a firm does not have a significant influence on profitability.*

H5 *Small enterprises are characterized by variability in profits and growth. Increase in P along with increase in SIZ may help them to grow at a faster rate. Hence, to study the impact of SIZ on P the following hypothesis is developed.*

H_0^5 *Firm's size does not have a significant influence on the profitability.*

SAMPLING DESIGN AND TECHNIQUE

The category-wise strength of food product manufacturing firms in India is given in table 1. The multi-stage random sampling technique is used by adopting the following stages:

- *Stage 1:* The study covers food products manufacturing firms only; firms of beverages and tobacco are not included for the simple reason that they account for a lesser proportion (10%) over total firms in the food industry. Hence, the population considered for the study is 1572 food products manufacturing firms.
- *Stage 2:* Out of 1572 food products manufacturing firms, 1314 firms are found to have details of incorporated year as on 30th January, 2010, hence 1314 firms are considered for further stage.
- *Stage 3:* Among the 1314 firms, 309 firms are found to have the BSE listing flag and 62 firms are found to have the NSE listing flag. The NSE listed firms (62), being less in number are ignored,

TABLE 1 Food product manufacturing firms in india: Category-wise strength

Category	Number of Firms	Total
Food Products		
Dairy products		72
Tea		213
Sugar		150
Vegetable oils & product		350
Coffee		21
Other products		
Cocoa products & confectionery	12	
Bakery products	37	
Processed/packaged foods	167	
Starches	14	
Marine food	102	
Poultry & meat products	42	
Floriculture	62	
Milling products	78	
Other agricultural products	252	766
Sub total		1572
Beverages & Tobacco		
Tobacco products		35
Beer & alcohol		140
Sub total		175
Total food product manufacturing firms in India		1747

Source: CMIE, 30 January 2010.

and therefore, BSE listed firms (309) are taken into account for the further stage.

- *Stage 4:* Out of the 309 BSE listed firms, 99 firms only are found to have been continuously listed, based on BSE trading dates availability over the period of study, which are considered for the further stage.
- *Stage 5:* Out of 99 firms, 87 firms only have complete data for the period of study. Considering the complete data availability, 87 firms are considered for the further stage. Out of 87 firms, 52 firms only of three categories i. e., 9 firms from *tea sector,* 11 firms from *dairy sector,* and 32 firms from the *vegetable oil sector* of the food industry constitute the ultimate sample size, ignoring 37 firms of different categories with a negligible number in each category of firms. Hence the final sample size constitutes 52 firms only.

PERIOD OF THE STUDY

The required data have been collected for a period of 10 years on year-on-year basis ranging from 1998–9 to 2008–9, which are subject to limitations such as continuous listing for 10 years and availability of data for the period under study.

Research Methods Used

Descriptive statistics such as mean and standard deviation are extensively used to neutralize the fluctuations in the value of independent and dependent variables. Correlation co-efficient is also extensively used to determine the one-to-one relationship between selected variables. Multiple regressions are also used to determine the various significant variables that influence the *P* of a firm. Factor analysis is also used to determine the factors influencing *P*.

REGRESSION EQUATION

The regression equation is formulated for the purpose of finding the factors determining *P*. The term *P* has been defined (as the average rate of return on assets) by Lowe, Jordan and Taylor (1994).

DEPENDENT VARIABLE

The dependent variable is *P*, computed using the *ROA* ratio. *P* has been considered as *ROA* = Ratio of (EBIT + depreciation charges) to fixed assets (Roden and Lewellen 1995).

INDEPENDENT VARIABLES

- Liquidity (*LIQ*)
- Capital-Intensity (*CAPINS*)
- Size of the Firm (*SIZ*)
- Growth in Total Assets (*GROW*)
- Volatility (*VOL*)

RATIOS OF INDEPENDENT VARIABLES

- *LIQ* = The average ratio of cash and marketable securities to Total Assets
- *CAPINS* = Total Assets to Sales
- *SIZ* = Logarithm of Sales over Years
- *GROW* = Compounded annual growth rate of Total Asset
- *VOL* = Standard deviation of Earnings before Interest, Taxes and Depreciation (EBITD) divided by Total Assets.

CONTROL VARIABLES

The chosen sample firms are further grouped into three categories based on the size measured based on the quantum of sales. The firms with a sales turnover up to Rs.100 crore are grouped as *'small sized firms,'* the firms with a sales turnover of > Rs.100 crore but < Rs.500 crore are grouped as *'medium sized firms,'* and firms with a turnover of > Rs.500 crore are grouped as *'large sized firms.'* The industry average of sales turnover for the study period of 10 years is considered for categorization of firms into three sub groups as stated.

$$P = \alpha + \beta_1 LIQ + \beta_2 CAPINS + \beta_3 SIZ + \beta_4 GROW + \beta_5 VOL + \varepsilon. \qquad (1)$$

Industry Analysis and Discussion

OVERALL CORRELATION AND REGRESSION ANALYSIS

Overall descriptive statistics reveals that *CAPINS* has a higher mean value and its deviation is also higher. This shows that the food industry probably doesn't block a fixed amount of capital in the form of long lived assets. Their investment in fixed assets keeps on changing over the period of study thereby leading to a higher standard deviation when compared to other variables. The deviation from mean values for *P*, *LIQ*, *SIZ*, *GROW* and *VOL*, however, remains less than one, indicating that the other variables are fluctuating less than that of the *CAPINS*. The overall correlation matrix of the independent variables shows that the correlation between *SIZ* and *P* (0.426) is highly significant (at 1% level). The *SIZ* therefore significantly influences *P*, and the positive correlation represents that *P* increases with *SIZ*. There is a significant positive correlation between *GROW* and *P* (0.351) at 5% level, which indicates that as the firm grows the *P* increases. *CAPINS* shows a negative correlation with *P* as pointed out by Ghemawat and Caves (1986). They suggested that *CAPINS* can affect *P* because cut-throat competition might eliminate all future profits, depressing each firm's net security level. *LIQ* and *VOL* show a positive correlation with *P*, which is, however, insignificant.

The results of multiple regressions on the dependent variable – *P* are shown in table 2. The multiple regression result shows that *SIZ* has a significant positive coefficient (0.136) with *P*, highlighting the significance of the impact of *SIZ* on *P*. *VOL* shows a significant positive coefficient with *P* (1.067 at 5% level), which does not match with the results of the study of Pandey (2002), who pointed out that fluctuation in the profit earned might increase the cost of capital, thereby reducing *P*. But this holds good for a well established industry, which has lesser challenges. The food industry, being a growing

TABLE 2 Multiple regressions on dependent variable – profitability

Variables	Un-standardized coefficients beta value
(Constant)	–.068 (.574)
LIQ	–.229 (.765)
CAPINS	.001 (.551)
SIZ	.136 (.021*)
GROW	.585 (.138)
VOL	1.067 (.027*)
R^2	.288
Adjusted R^2	.211
F-statistics	3.728

TABLE 3 Factor analysis on overall food industry on profitability

Factor	Eigen value	Variable convergence	Factor loadings
Factor 1	2.246	Size	.787
		Profitability	.745
		Capital intensity	–.662
		Growth	.574
Factor 2	1.262	Volatility	–.807
		Liquidity	.622

industry needs to take risks to earn more profit; hence the industry shows an abnormal positive relation between *VOL* and *P*. The adjusted R^2 also shows that the model is 21% fit; the *F* statistics is, however, highly significant (at 1% level).

Factor analysis (*FA*) is performed to test the factors significantly determining the *P* of the food industry and the results are shown in table 3. The *FA* shows that (variables are grouped into two factors) there is a high rate of interrelation between them. Factor 1, which constitutes *SIZ*, *P*, *CAPINS*, and *GROW* indicates a high level of correlation between them, while *VOL* and *LIQ* which are grouped as factor 2 also show a high degree of interrelation.

IMPACT OF SIZE OF FIRMS ON PROFITABILITY

Table 4 shows an overview of the trend of *P* of three size categories of firms of the food industry in India. The *P* has shown a sharp rise during the last four years of the study period, and a fall in the year 2008–9, however, the *large size firms* show a higher *P*. Though *P* has decreased in the last year of the study period for *large size firms* the *CS* has, however, increased.

The descriptive statistics for *small size, medium size* and *large size*

TABLE 4 Size-wise trends of profitability of food industry in India during 2000–9

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
(1)	0.167	0.17	0.21	0.21	0.207	0.18	0.245	0.410	0.819	0.529
(2)	0.247	0.23	0.20	0.29	0.376	0.24	0.252	0.268	0.399	0.277
(3)	0.276	0.30	0.26	0.29	0.330	0.30	0.467	0.447	0.482	0.426

Row headings are as follows: (1) small size firms, (2) medium size firms, (3) large size firms. Source: CMIE, 30 January 2010.

TABLE 5 Multiple regressions on dependent variable – profitability (for small size firms)

Variables	Un-standardized coefficients beta value	
	Model 1	Model 2†
(Constant)	.031 (.791)	.027 (.705)
LIQ	–.106 (.922)	–.096 (.926)
CAPINS	$7.663e^{-6}$ (.995)	$3.268e^{-5}$ (.972)
SIZ	–.003 (.966)	–
GROW	2.302 (.031*)	2.279 (.010**)
VOL	1.764 (.001**)	1.760 (.000**)
R^2	.620	.620
Adjusted R^2	.484	.519
F-statistics	4.567*	6.115**

Notes: The figures in parentheses are *p* values. ** Significant at 0.01 level.
* Significant at 0.05 level. † After removing predictor variable *SIZ*.

firms indicate that *CAPINS* has higher mean and standard deviations in all the three (*small size, medium size* and *large size firms*) categories of firms, indicating that there is a wide deviation among the firms in the investment in fixed assets.

Analysis of Small Size Firms

The correlation matrix for *small size firms* shows that *VOL* is highly significantly positively correlated with *P* (0.611) at 1% level. This shows that the *small size firms* have to face more challenges to earn additional profit and thus *VOL* increases with *P* while *CAPINS* and *LIQ* show a negative correlation with *P*, *GROW* and *SIZ* show a positive correlation with *P*.

Step-wise regression is applied to study the impact of selected variables on *P* of Small Size Firms of Food Industry and the results are shown in table 5. Multiple regressions for *small size firms* are carried out in two models, *model 1* and *model 2*. *Model 1* shows that *GROW* has a significant positive coefficient (2.302) with *P* (at 5% level), and *VOL* has also a highly significant positive coefficient

TABLE 6 Factor analysis for small size firms of food industry on profitability

Factor	Eigen value	Variable convergence	Factor loadings
Factor 1	2.168	Size	.892
		Growth	.772
		Capital intensity	–.722
Factor 2	1.563	Volatility	.936
		Profitability	.834
Factor 3	1.058	Liquidity	.926

(1.764). The variable, *SIZ* has been removed in *model 2* to better understand the impact of the variables on *P*. *GROW* and *VOL* have highly significant positive coefficients (2.279 and 1.76 respectively) with *P* (at 1% level). The adjusted R^2 value shows that it influences to the extent of 48.4% (adjusted R^2) on *P* in *model*1, which is fit (F = 4.567 at 5% level). However in *model 2,* the impact increases to the extent of 51.9% (adjusted R^2), which also reveals a good fit (F = 6.115 at 5% level) thereby leads to infer that the regression model is a good fit after removing the variable *SIZ* from the equation.

FA is performed to study the factor significantly determining the *P* of small size firms of the food industry and the results are shown in table 6. The *FA* for *small size firms* reveals that the selected variables have been grouped into three factors. The variables *SIZ*, *GROW*, and *CAPINS* constitute *factor 1,* variables *VOL* and *P* constitute *factor 2,* while variable *LIQ* forms *factor 3*.

Analysis of Medium Size Firms

The correlation matrix of *medium size firms* shows that *GROW* has a significant positive correlation (0.427) with *P* (at 5% level), while *CAPINS*, *SIZ*, and *VOL* show an insignificant negative correlation with *P*, *LIQ* has also an insignificant positive correlation with *P*. Step-wise regression is applied to study the impact of selected variables on *P* of Medium Size Firms and the results are shown in table 7. Multiple regressions for *medium size firms* are carried out in two models, *model 1* and *model 2*. *Model 1* of regression analysis indicates that *SIZ* has a significant negative coefficient with *P* (at 5% level), on the other hand, *model 2,* which has been formed after removing the impact of *LIQ* and *CAPINS* on *P* shows that *GROW* has a significant positive coefficient with *P* (at 5% level). However, *model 1* has a significant impact (higher R^2 and adjusted R^2 values) than that of *model 2,* which fact shows that *model 1* fits better than that of *model 2* on the whole.

TABLE 7 Multiple regressions on dependent variable – profitability (for medium size firms)

Variables	Un-standardized coefficients beta value	
	Model 1	Model 2†
(Constant)	1.483 (.021)	1.133 (.050)
LIQ	1.285 (.320)	–
CAPINS	–.062 (.247)	–
SIZ	–.542 (.039*)	–.391 (.100)
GROW	.746 (.056)	.763 (.050*)
VOL	–1.400 (.127)	–1.118 (.211)
R^2	.405	.311
Adjusted R^2	.219	.196
F-statistics	2.177	2.706

Notes: The figures in parentheses are *p* values. ** Significant at 0.01 level.
* Significant at 0.05 level. † After removing predictor variable *LIQ* & *CAPINS*.

TABLE 8 Factor analysis for medium size firms of food industry on profitability

Factor	Eigen value	Variable convergence	Factor loadings
Factor 1	1.643	Profitability	.866
		Growth	.800
Factor 2	1.464	Volatility	–.925
		Size	.705
Factor 3	1.065	Capital intensity	–.807
		Liquidity	.599

FA is performed to study the factors significantly determining the *P* of Medium Size Firms of the Food Industry and the results are shown in table 8. The factor analysis for *medium size firms* reveals that there exists a higher level of interrelation among the selected variables.

Analysis of Large Size Firms

The correlation matrix for *large size firms* shows a significant positive correlation between *CAPINS* and *P* (at 5% level) while there exists a negative relation between *CAPINS* and *P* in the case of *small* and *medium size firms*. The overall result also shows a negative correlation between *CAPINS* and *P*, which leads to infer that the larger the size of the firm, the more the investment in long lived assets has helped to increase the *P* of the firm, unlike the trends in *small size* and *medium size firms* where there exists a negative relation between *P* and *CAPINS*. Ghemawat and Caves (1986) have pointed out that *CAPINS* can affect *P* because cut-throat competition might

TABLE 9 Multiple regressions on dependent variable – profitability (for large size firms)

Variables	Un-standardized coefficients beta value	
	Model 1	Model 2†
(Constant)	–.131 (.914)	.360 (.425)
LIQ	–1.416 (.370)	–1.594 (.255)
CAPINS	.486 (.068)	.463 (.045*)
SIZ	.140 (.665)	–
GROW	.205 (.835)	.086 (.919)
VOL	3.695 (.518)	3.317 (.515)
R^2	.771	.759
Adjusted R^2	.486	.566
F-statistics	2.701	3.937

Notes: The figures in parentheses are *p* values. ** Significant at 0.01 level.
* Significant at 0.05 level. † After removing predictor variable *SIZ*.

eliminate all future profits depressing each firm's net security level, thereby leading the decrease in *P* to decline with *CAPINS*. Perhaps, such high competition does not prevail among *large size firms,* as the food industry is presently a growing industry. Increased *CAPINS* leads to increased risk by blocking huge capital in the form of fixed assets thereby reducing *P* only if there is a cut-throat competition.

Step-wise regression is applied to study the impact of selected variables on *P* of Large Size Firms of the Food Industry and the results are shown in table 9. Multiple regressions for *large size firms* are carried out in two models viz *model 1* and *model 2*. The regression result for *large size firms* shows that *CAPINS* has a significant positive coefficient (0.463) with *P* (at 5% level) after removing the impact of *SIZ* on *P* from the ordinary least square (OLS) regression model. The adjusted R^2 value is also higher in *model 2,* showing that this (regression) equation fits better. *GROW* and *VOL* have a positive coefficient with *P*, and *LIQ* has a negative coefficient with *P* in the case of *large size firms*.

FA is performed to study the factors significantly determining the *P* of Large Size Firms of the Food Industry and the results are shown in table 10. The *FA* of *large size firms* shows that there is a high interrelation among these variables.

Findings and Concluding Remarks

The size wise analysis of the Indian food industry has brought to light some interesting facts of the industry. The overall result shows that there is a significant positive correlation between *GROW* and *P*

TABLE 10 Factor analysis for large size firms of food industry on profitability

Factor	Eigen value	Variable convergence	Factor loadings
Factor 1	2.452	Capital intensity	.934
		Profitability	.911
		Liquidity	–.560
Factor 2	1.399	Volatility	.818
		Growth	–.585
		Size	.551

(0.351 at 5% level), indicating that as the firm grows the *P* increases. However, *CAPINS* shows a negative correlation with *P* as pointed out by Ghemawat and Caves (1986). Thus, H_0^4 is rejected. The correlation between *SIZ* and *P* (0.426) is highly significant at 1% level, throwing light on the significant impact of *SIZ* in determining *P* of the Indian food industry. Thus, H_0^5 is also rejected as *SIZ* has a significant impact on the relationship of variables in determining *P* of the food industry in India. The size-wise analysis of the firms also supports the rejection of the hypothesis. *VOL* also shows a significant positive coefficient with *P* (1.067 at 5% level), which does not match with the outcome of the study of Pandey (2002), who pointed out that fluctuation in the profit earned might increase the cost of capital, thus reducing *P*. However, the statement holds good for a well established industry, which probably has less challenges. The food industry, being a growing industry in India needs to take risk to earn higher profit. Thus, the industry shows an abnormal positive relation between *VOL* and *P*, which leads to rejecting the H_0^3.

The specific size-wise analysis reveals that the *small size firms* have to face more challenges to earn additional profit and thus *VOL* increases significantly with *P*. Therefore, H_0^3 is rejected in the case of *small size firms*. Thus, the industry shows an abnormal positive relation between *VOL* and *P*. The correlation matrix for *small size firms* also shows that *VOL* is significantly positively correlated with *P* (0.611 at 1% level). This shows that *small size firms* have to face more challenges to earn additional profit and thus *VOL* increases with *P*. Multiple regression analysis of *small size firms* shows that *GROW* as well as *VOL* have a significant/highly significant positive coefficient with *P*. When *SIZ* is removed from the regression equation, *GROW* as well as *VOL* has a significant positive coefficient with *P*, significant at 1% level and *VOL* has a positive coefficient with *P*. Therefore, H_0^3 and H_0^4 are rejected in the case of *small size firms*.

The correlation matrix for *medium size firms* shows that *GROW*

has a significant positive correlation with *P*. *Model 1* of regression analysis indicates that *SIZ* has a significant negative coefficient with *P*, whereas *model 2* of regression analysis shows that *GROW* has a significant positive coefficient with *P*, thereby H_0^5 is rejected in case of *medium size firms*.

The correlation matrix for *large size firms* shows a significant positive correlation between *CAPINS* and *P*. Therefore, H_0^2 is rejected in the case of *large size firms,* however there exists a negative relation between *CAPINS* and *P* in case of *small* as well as *medium size firms*. The overall result also corroborates a negative correlation between *CAPINS* and *P*, which fact reveals that the larger the size of the firm, the more the investment in the long lived assets has helped to increase the *P* of the firm, unlike the trends in *small size* as well as in *medium size firms* where there exists a negative relation between *P* and *CAPINS*. The increased *CAPINS* leads to increase in risk by blocking huge capital in the form of fixed assets thereby reducing *P* only if there is a cut-throat competition as stated by Ghemawat and Caves (1986). The regression result for *large size firms* shows that *CAPINS* has a significant positive coefficient with *P* after removing the impact of *SIZ* from the regression model. The adjusted R^2 value is also higher in *model 2* when compared with that of *model 1,* showing that the equation fits better.

Thus different hypotheses are rejected at different size categories, indicating that size decides the extent to which of the other predictor variables are related with *P*. H_0^1, which assumes that *LIQ* has no significant impact on *P* of the firms in the food industry in India, is accepted in all the categories irrespective of size of the firms. The overall results also commend the same.

Limitations and Scope for Further Studies

- Analysis of the study is based on financing data collected from CMIE Prowess Package; hence the quality of the study depends purely upon the accuracy, reliability and quality of secondary data.
- The analysis could not be extended to a larger period due to the problem of resources/ data availability.
- The sample firms chosen for the study are restricted to the small in number due to limitations such as lack of continuous listing, non-availability of data pertaining to those firms in the data source-Prowess Package.

The study has been restricted to a few categories of the food indus-

try only. Hence, studies could well be undertaken in other categories e. g., sugar, coffee, and other products of the food industry as well as in other industries too. A comparative study across industries can also be made.

P is studied by use of ratio of *ROA*. For further studies, the other profitability ratios can also be considered. Other than the predictor variables used in this study, age, exports, reliance on debt, employee productivity and managerial efficiency may also be used as predictor variables.

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