

**CAPITAL STRUCTURE AND FINANCIAL PERFORMANCE OF FOOD INDUSTRY: AN AGRO-BASED EMERGING ECONOMY PERSPECTIVE**

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**ABSTRACT**

*This study aims to investigate the relationship between capital structure and profitability of food industry from an agro-based emerging economy perspective. To attain the objective, we have compiled panel data food and allied companies, representing 64% of total population, listed in Dhaka Stock Exchange and administered ordinary least square (OLS), fixed effect model (FEM), and random effect model (REM) estimate to test the impact of capital structure on the profitability of listed food companies in Bangladesh. The current study usage three proxy variables as the measure of profitability, viz., return on assets (ROA), return on equity (ROE), and earnings per share (EPS). Our panel data estimation using EViews 10 demonstrates that short term leverage has a significant negative impact on ROA (OLS model) and a strong positive impact on ROE (REM estimation) of the listed food and allied firms. However, the study do not produce any significant effects of long term debt on the firm profitability. The findings of the current study help develop the understanding of the corporate managers, investors, policy makers, and academics about the relationship between optimum financing mix and financial performance of food industries and provides valuable insights from an agro-based emerging economy perspective.*

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**INTRODUCTION**

Financing decision has always been considered the most crucial managerial task for robust and sustainable business growth. It is assumed that an optimum mix of debt and equity financing may enhance the financial performance of companies by reducing the cost of capital and providing tax shield benefits to the firms (Kraus & Litzenberger, 1973; Miller, 1977). Since the first capital structure assumption was proposed by Modigliani and Miller (1958), many studies have been undertaken to investigate various aspects of capital structure choice and the effects of capital structure on corporate financial performance (Kraus & Litzenberger, 1973; Jensen & Meckling, 1976; Myers & Majluf, 1984; Ngatno, Apriatni & Youlianto, 2021; Abdullah & Tursoy, 2021). More clearly, numbers of studies have been carried out to investigate the relationship between capital structure and firm performance from different perspectives (Chaganti & Damanpour, 1991; Berger & Di Patti, 2006; Margaritis & Psillaki, 2010; Abdullah & Tursoy, 2021; Ahmed & Bhuiyan, 2020) and documented different outcomes. For example, Abdullah and Tursoy (2021) revealed a positive association between capital structure and the performance of companies listed in Germany. On the other hand, employing 2012 cross-sectional sample, Li, J. Niskanen, and M. Niskanen (2019) found a negative association between the capital structure and firm performance. Besides these two outcome dimensions, Ebaid (2009) found no significant association between capital structure and firm performance from the Egyptian company setting.

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Therefore, the existing capital structure literature left the debate on capital structure and firm performance relationship unsettled, opening up the demand for further investigation of the association between the capital structure and firm performance from different countries and industry settings. However, the extant capital structure literature reveals that most of the capital structure studies are from the developed country settings (Chathoth & Olsen, 2007; Margaritis & Psillaki, 2010; Abdullah & Tursoy, 2021) concentrating on cross-sector analysis (Mardones & Cuneo, 2020; Abdullah & Tursoy, 2021). In contrast, empirical research on capital structure and firm performance relationship from developing country perspectives with special concentration on the food industries is still rare, providing logical grounding to undertake the study on leverage and firm performance relationship from the perspectives of food industries in developing countries.

Bangladesh is an agrarian country nested in the Bay of Bengal with a high population density and concentrated on inclusive, sustainable economic development. It is a big challenge for Bangladesh to ensure food security because of its massive population and limited resources. Thus, Bangladesh requires a sound and sustainable food sector, which will play a pivotal role in the achievement of the economic goal of the country by meeting up the most important basic need of the people.

It is essential to mention that the food industry is a major player in the country's manufacturing sector. Since the key input of the food industry comes from the agricultural sector, this sector makes an important contribution to the country's economy by bridging up the two most influential streams of the economy, viz., agriculture and industry. The food sector holds about an 8% share of the total manufacturing output and accounts for 20% of the country's GDP (Kashem, 2021). According to The Business Standard report, in the financial year (FY) 2018-2019, Bangladesh earned 1410 million US dollars from food and allied industries' export (Mahmood, 2019). Besides that, the food and allied sector hold a 7.81% share of the total market capitalization of the stock exchange (Dhaka Stock Exchange, 2019). Thus, it is commendable to understand that the food and allied industry has great significance to the country's economy, which, therefore, motivates us to examine the most important relationship of companies which stays between the capital structure choice and the financial performance of the listed food and allied companies in Bangladesh. The current study will help understand the capital structure choice of food industries from an emerging country setting which will also assist as a guide to the financial managers to design optimum capital structure for the firms to enhance the firms' financial performance.

## LITERATURE REVIEW

Since the introduction of Modigliani and Miller's (1958) capital structure theory, plenty of theoretical and empirical studies have been initiated to examine the capital structure and firm performance relationship worldwide. Modigliani and Miller (1958) proposed that capital structure and firm value relationship is irrelevant in a perfect market where personal and corporate tax provision is ignored. Later, they considered the imperfect market context and argued that financial leverage might enhance the firm value by benefiting from tax shield; therefore, the authors proposed a positive association between capital structure and firm performance (Modigliani & Miller, 1963). Thus, this argument has led researchers to investigate the relationship between leverage and firm performance from different perspectives.

For example, Jensen and Meckling (1976) argued that managers of highly levered companies might be restricted from operating freely and are, thus, instigated to invest in profitable schemes. Further, Myers and Majluf (1984) extended the concept based on information asymmetry between the managers and the new investors, and thus, proposed the pecking order theory. The basic proposition of this theory ignores the optimal leverage concept where firms follow a preference order (e.g., internal finance, debt, & equity) to choose financing options (Mardones & Cuneo, 2020).

Therefore, the debate on the capital structure and firm performance relationship always got a different dimension from each significant study which exhibits different outcomes, such as, some authors found positive relationship while some got negative association between capital structure and firm performance, and there is mixed evidence as well. For example, Sheikh and Wang (2012) investigated the effects of capital structure on the performance of non-financial listed companies on the Karachi Stock Exchange and found a negative relationship between the capital structure and firm performance in terms of ROA. In addition, their pooled OLS estimate shows a negative relationship between capital structure (total debt ratio and long-term debt ratio) and market-to-book ratio, whereas the fixed effect estimate shows the opposite. Based on the data of non-financial firms listed in Germany, Abdullah and Tursoy (2021) revealed a positive association between capital structure and firm performance. Their study also revealed that firms listed in Germany are highly levered compared to similar countries.

In contrast, Vo and Ellis (2017) discovered the negative impact of financial leverage on the shareholder value of companies based on data of listed companies in the Ho Chi Minh City Stock Exchange. Li et al. (2019) employed 2012 cross-sectional sample and found adverse effects of capital structure on European SMEs' performance. Apart from these, there are studies documenting no significant impact of leverage on firm performance. For instance, Ebaid (2009) examined the effects of leverage choice on firm performance in accounting-based measures (ROA, ROE, and gross profit margin) and found no significant impact on Egyptian listed non-financial firms' performance.

However, the existing capital structure literature exhibits little evidence on study from food industry perspectives. A recent study administered by Tripathy and Shaik (2020) shows a positive relationship between leverage and firm profitability. They analyzed data of 56 food processing companies listed on the Bombay Stock Exchange from 2000 to 2018 using pooled OLS, fixed effects, and the random-effects model. Their empirical evidence has shown a significant positive impact of leverage on the firm value from the Indian food processing industry perspective. Besides, Salim and Susilowati (2019) assessed the determinants of capital structure and its impact on firm value from the perspective of Indonesian food and beverage companies. Their study reveals no significant effect of leverage on firm value but is positively associated with it. Thus, countable numbers of research initiatives are present in academia and are still contributing the existing knowledge

of capital structure from different country and company settings. Therefore, the current study is one of the contemporary attempts to examine the impact of capital structure choice on the financial performance of food and allied companies listed on the Dhaka Stock Exchange (DSE) to understand the leverage and firm performance relationship from an agro-based emerging economy perspective.

### DATA AND METHODOLOGY

#### Data and Variables

Based on the availability of data, a sample of nine companies among the fourteen food & allied companies listed in the DSE has been selected to collect and compile the panel data over the period of 2015-2019 where the sample size represents 64% of the total population. Thus, the study has compiled 45 firm-year observations, which meet the requirements for ten observations for one predictor variable (Anas, Rashid, & Annuar, 2015).

To examine the impact of capital structure on firm performance, we employed accounting-based measures of firm performance, i.e., ROA, ROE, and EPS as the dependent variable. The current study used short-term debt to total assets ratio and long-term debt to total assets ratio as the representative of capital structure, which is the study's key explanatory variables. Furthermore, this study considered firm size, firm age, sales growth, liquidity, and tangibility as control variables to explain firm profitability, which would also help minimize the model specification bias. Table 1 presents detailed explanations of the variables used in the study.

Table 1. Definition of variables

Variable	Definition	Previous Study
<b>Dependent Variables</b>		
<b>Return on Assets (ROA)</b>	Ratio of profit before tax to total assets	Ebaid (2009); Abdullah and Tursoy (2021); Hossain, (2021)
<b>Return on Equity (ROE)</b>	Ratio of profit before tax to total equity	Gill, Biger, and Mathur (2011); Abdullah and Tursoy (2021); Hossain, (2021)
<b>Earnings Per Share (EPS)</b>	(Net Income -Preferred Dividend)/ Weighted average common stock outstanding	Nguyen & Nguyen (2020)
<b>Independent Variables</b>		
<b>Short-term debt ratio (STD)</b>	Ratio of short-term debt to total assets	Ebaid (2009); Abdullah and Tursoy (2021)
<b>Long-term debt ratio (LTD)</b>	Ratio of long-term debt to total assets	Hasan et al. (2014); Abdullah and Tursoy (2021)
<b>Control Variables</b>		
<b>Firm Size (FSZ)</b>	Log of total assets	Hasan et al. (2014)
<b>Firm Age (AGE)</b>	Difference between the observation year and establishment year	Li et al. (2019); Rouf and Abdur (2015)
<b>Sales Growth (GROWTH)</b>	Ratio of difference between observation year revenue and previous year revenue to previous year revenue.	Sheikh and Wang (2012); Abdullah and Tursoy (2021).
<b>Liquidity (LIQ)</b>	Ratio of current assets to current liabilities	Nguyen and Nguyen (2020)
<b>Tangibility (TAN)</b>	Ratio of net fixed asset to total asset	Dawar (2014)

Thus, we construct the following empirical model to test the relationship between the capital structure and financial performance of Bangladesh's listed food and allied companies.

$$ROA_{it} = \beta_0 + \beta_1STD_{i,t} + \beta_2LTD_{i,t} + \beta_3AGE_{i,t} + \beta_4SIZE_{i,t} + \beta_5LIQ_{i,t} + \beta_6GROWTH_{i,t} + \beta_7TAN_{i,t} + \epsilon_{it} \quad \text{-- (OLS)} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1STD_{i,t} + \beta_2LTD_{i,t} + \beta_3AGE_{i,t} + \beta_4SIZE_{i,t} + \beta_5LIQ_{i,t} + \beta_6GROWTH_{i,t} + \beta_7TAN_{i,t} + (\epsilon_{it} + \mu_{it}) \quad \text{-- (REM)} \quad (2)$$

$$EPS_{it} = \beta_0 + \beta_1STD_{i,t} + \beta_2LTD_{i,t} + \beta_3AGE_{i,t} + \beta_4SIZE_{i,t} + \beta_5LIQ_{i,t} + \beta_6GROWTH_{i,t} + \beta_7TAN_{i,t} + \epsilon_{it} \quad \text{-- (FEM)} \quad (3)$$

Where,

ROA<sub>it</sub> = Return on assets of firm i at time t  
 ROE<sub>it</sub> = Return on equity of firm i at time t

EPS <sub>it</sub>	= Earnings per share of firm i at time t
STD <sub>it</sub>	= Short term debt ratio of firm i at time t
LTD <sub>it</sub>	= Long term debt ratio of firm i at time t
AGE <sub>it</sub>	= Age of firm i at time t
SIZE <sub>it</sub>	= Size of firm i at time t
LIQ <sub>it</sub>	= Liquidity of firm i at time t
GROWTH <sub>it</sub>	= Sales growth of firm i at time t
TAN <sub>it</sub>	= Tangibility of firm i at time t
$\beta_0$	= Common y-intercept
$\beta_1$ - $\beta_7$	= Coefficients of the respective explanatory variables
$\epsilon_{it}$	= Residual error term of firm i in the year t

## Method

The current study runs pooled OLS, REM, and FEM estimate to test the panel data obtained from the annual reports of the food and allied companies listed in the DSE. The OLS estimate assumes no significant time and firm effects; the model parameters remain constant across all firms over the entire period. However, it is widespread to experience firm specific-effects in panel data estimates. Under this situation, applying the FEM or REM provides an effective result over the OLS estimate. FEM assumes that the individual effects are random and the variables are correlated, while the REM assumes that the explanatory variables are uncorrelated. However, the main challenge in panel data estimation is to select the appropriate model. To choose among the OLS, FEM, and REM estimate, we first run the Breusch-Pagan test for the equation. The result of the Breusch-Pagan test for ROA, ROE, and EPS are presented in Table 4, which proposes that the OLS estimation is appropriate for the ROA model whereas, for ROE and EPS models, the OLS estimate is inappropriate.

Further, the current study conducted the Hausman (1978) test to select whether to run the FEM or REM for the panel of ROE and EPS. The Hausman test assumes the null hypothesis that there is no correlation between the individual effects and the regressors, and hence REM should be used and vice versa. The results of the Hausman test are presented in the corresponding table for the ROE and EPS, i.e., in Table 4. However, the Hausman test reveals that applying REM is appropriate for ROE, whereas FEM is appropriate over the REM in case of EPS.

## EMPIRICAL RESULTS AND DISCUSSION

### Descriptive Statistics

Table 2 presents the descriptive statistics of the data used in the analysis, which provides the mean, median, maximum, minimum, standard deviations, skewness, and kurtosis. The summary statistics show that all the profitability measures have a positive mean value having the highest standard deviation of EPS (37.78) which means the earning per share of the listed food and allied companies highly fluctuate in Bangladesh. One important and interesting observation produced from the descriptive statistics is Bangladeshi food and allied companies' less usage of long-term debt. For example, table 2 shows a maximum value of LTD ratio is 0.298 and a minimum value of 0.00 which means some companies do not go for any long-term debt financing. On the other hand, the descriptive statistics also demonstrate that Bangladesh's food and allied companies are more likely to short-term debt financing as the table shows a maximum STD value of 0.975 and a minimum value of 0.024 with a mean value of 0.370. However, for the profitability measure, the mean value of ROA, ROE, and EPS is 0.066, 0.531, and 16.113, with a standard deviation of 0.067, 1.487, and 37.777 respectively, showing high fluctuation in EPS.

Table 2. Descriptive Statistics

	ROA	ROE	EPS	STD	LTD	AGE	SIZE	LIQ	GROWTH	TAN
<b>Mean</b>	0.066	0.531	16.113	0.370	0.058	28.556	9.292	0.105	0.249	0.410
<b>Median</b>	0.038	0.114	1.810	0.345	0.038	35.000	9.189	0.083	0.097	0.411
<b>Maximum</b>	0.214	7.861	166.870	0.975	0.298	48.000	10.774	0.317	4.312	0.702
<b>Minimum</b>	-0.015	-0.023	-2.320	0.024	0.000	3.000	8.117	0.003	-2.521	0.047
<b>Std. Dev.</b>	0.067	1.487	37.777	0.259	0.064	13.281	0.681	0.086	0.991	0.187
<b>Skewness</b>	1.102	4.251	2.875	0.787	1.892	-0.453	0.413	0.769	2.211	-0.119
<b>Kurtosis</b>	2.750	19.923	10.070	3.000	6.617	1.918	2.946	2.666	11.530	1.911
<b>Jarque-Bera</b>	9.22	672.47	155.70	4.64	51.36	3.74	1.28	4.65	173.13	2.33
<b>Probability</b>	0.010	0.000	0.000	0.098	0.000	0.155	0.527	0.098	0.000	0.312
<b>Observations</b>	45	45	45	45	45	45	45	45	45	45

### Multicollinearity Test

The study tested the multicollinearity among the variables used with two different measures (variance inflation factor and correlation matrix). The empirical evidence suggests that a value less than 10 in the variance inflation factor (VIF) is acceptable (Kennedy, 1985; Hossain, 2021). The extant literature also suggests that a correlation coefficient less than 0.9

does not show any multicollinearity among the variables (Dohoo, Ducrot, Fourichon, Donald, & Hurnik, 1997; Hossain, 2021). Table 3 presents the correlation matrix and the result of variance inflation factor (VIF), which shows that there is no multicollinearity among the variables since both the VIF and correlation matrix result satisfy the acceptable threshold suggested by (Marquardt, 1980; Kennedy, 1985; Lin, 2008; Said, Omar, & Abdullah, 2013; Hossain, 2021).

Table 3. Correlation Matrix

	STD	LTD	AGE	SIZE	LIQ	GROWTH	TAN	VIF
STD	1							5.12
LTD	-0.086	1						1.46
AGE	0.556	-0.117	1					2.87
SIZE	0.037	0.401	0.374	1				1.79
LIQ	-0.319	-0.123	0.013	0.137	1			1.25
GROWTH	-0.092	0.146	0.198	0.355	0.074	1		1.24
TAN	-0.884	0.237	-0.671	0.012	0.261	0.118	1	7.28

### Empirical Result and Discussion

The results of the study presented in Table 4 show a strong association between the short term debt and firm profitability in respect to ROA and ROE which concur the findings of similar studies (Abdullah & Tursoy, 2021; Mardones & Cuneo, 2020), whereas no significant but a negative relationship is found between the long term debt and firm profitability. More clearly, the study's empirical findings show a significant negative relationship between short-term debt and the firms' ROA. On the other hand, the study's findings reveal a strong positive connection between short-term debt financing and ROE of the food industry in Bangladesh. Further, the study results show that firm size can significantly enhance the firms' return on assets which means larger firms are more capable of, and therefore, utilizing their assets more profitably. The results also posit that sales growths of the companies are meaningfully associated with the firms' profitability in terms of ROA and ROE. However, firm liquidity has a negative impact on the earnings per share. More particularly, firms with higher liquidity reduce the companies' earnings per share. Again, it is evident that the food industry is less capable of employing its tangible assets profitably; therefore, the empirical result shows a negative association between asset tangibility and ROA.

Table 4. Estimate Result for Firm Performance of Food and Allied Companies

Variables	Dependent variables								
	ROA (OLS)			ROE (REM)			EPS (FEM)		
	Coef.	T	P > t	Coef.	T	P > t	Coef.	T	P > t
STD	-0.118	-2.481	0.018**	4.581	2.647	0.012**	160.418	1.490	0.147
LTD	-0.088	-0.857	0.397	-4.398	-1.171	0.249	32.886	0.465	0.646
AGE	0.001	1.145	0.260	0.010	0.387	0.701	-2.517	-1.177	0.249
FSZ	0.066	6.137	0.000***	0.131	0.337	0.738	61.201	1.582	0.125
LIQ	0.092	1.289	0.205	-1.626	-0.628	0.534	-64.676	-2.085	0.046**
GROWTH	0.015	2.506	0.017**	0.505	2.266	0.029**	3.976	1.545	0.133
TAN	-0.135	-1.714	0.095*	4.467	1.563	0.127	-37.923	-0.483	0.633
_cons	-0.476	-4.933	0.000	-4.194	-1.195	0.240	-520.649	-1.544	0.133
R-squared	0.7563			0.3314			0.9218		
Adj R-squared	0.7102			0.2048			0.8814		
F-Statistic	16.41 (p-value = 0.0000)			2.62 (p-value = 0.0266)			22.80 (p-value = 0.0000)		
Breusch-Pagan test	Chi <sup>2</sup> 0.26 (Prob> Chi <sup>2</sup> = 0.611)			Chi <sup>2</sup> 68.78 (Prob>Chi <sup>2</sup> = 0.000)			Chi <sup>2</sup> 21.70 (Prob> Chi <sup>2</sup> = 0.000)		
Hausman test				Chi square statistic = 8.188, p value = 0.316			Chi square statistic = 15.705, p value = 0.028		

Note: \*, \*\*, and \*\*\* represents the level of significance at 10%, 5%, and 1% respectively.

Source: Authors' estimation using EViews 10

To summarize, the current study attempts to examine the effects of firm capital structure on profitability in terms of ROA, ROE, and EPS. The study's empirical findings show that only short-term debt has significant effects on the ROA and ROE. More clearly, the study produces a negative relationship between short term debt and ROA complying previous results (Sheikh & Wang, 2012; Gill et al., 2011; Hasan et al., 2014), and contrary to this, a strong positive linkage between short term debt and ROE has also been produced. A logical explanation of this finding might be that the food industry is



less capable of employing its assets profitably. Moreover, the listed food and allied companies use more short-term debt, which directs that the debts are used more in meeting up working capital needs of the firms. As a result, the investors (lenders) have less influence on monitoring the effective utilization of companies' long-term assets. However, the empirical result exhibits that short-term debt has a significant positive impact on the ROE which complies with the previous empirical findings (Abdullah & Tursoy, 2021; Gill et al., 2011). The logical explanation of this positive association might be the benefits resulting from the tax shield and the low issue or processing cost of debt financing. It should be mentioned that leverage does not have any significant impact on the earnings per share of the food industry. Finally, the study's empirical findings reveal that short-term leverage has notable positive effects on firm profitability in terms of ROE and negative impact on ROA. Again, though the long-term leverage does not significantly impact firm profitability, it is negatively associated with the firm's performance regarding the ROA and ROE.

### RESEARCH IMPLICATION AND CONCLUSION

The current study provides empirical evidence on the impact of capital structure choices on the profitability of food and allied companies from an agro-based emerging economy perspective. More particularly, this study sheds light on the leverage practices and their effects on the profitability from a bank finance-dominated economy perspective which would guide the finance managers to set the optimum leverage design to develop firm profitability and reduce the agency cost. The study would also help develop the understanding of managers and other stakeholders of the companies on the debt-equity-profitability relationship, thus resulting in the best selection of financing sources. To the academicians, this study provides grounding for further studies addressing the relationship between leverage and financial performance of food and allied companies from an agriculture-dominated developing country perspective like Bangladesh.

The current study is aimed to examine the effects of capital structure (leverage) on the profitability of food and allied companies listed in the DSE to contribute to the extant literature in many ways. For example, to the best of our knowledge, this is the first-ever empirical study that is aimed to examine the capital structure and firm performance relationship of Bangladeshi food and allied companies with the most recent dataset, covering a time frame of 2015 to 2019. Therefore, this study provides evidence on the contemporary financing practices of the food and allied companies in Bangladesh and its impact on their financial performance while most of the studies are either on manufacturing industries, or on banking industry. In addition to this, since the current study is focused on the food industry which establishes a bridge between the agriculture and industry as the key input of food industry come from the agricultural output, this study would help develop the perfect mix of debt and equity financing for a robust development of food industry and the agricultural output as whole. More clearly, sound food and allied industry would help boost agricultural production, resulting in food security, more employment creation, enhanced national production, and thus, would ensure the country's sustainable economic growth. Therefore, studying the relationship between the food and allied industry's capital structure and financial performance from an agricultural country setting is important.

In short, considering the immense significance of the food industry to the nation's economy, the current study provides empirical evidence showing a strong positive relationship between short term leverage and firm profitability which would help decide the best mix of debt and equity financing to enhance firm profitability by reducing the cost of capital. However, further study could be initiated with a large dataset covering more firm-year to draw a comparative picture on the debt-profitability relationship of food and allied companies.

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