Volume 19 Issue 11
Originally issued as C3



Global Journal of Management and Business Research: C Finance
Volume 19 Issue 3 Version 1.0 Year 2019
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4588 & Print ISSN: 0975-5853

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Keywords: *capital structure; firm performance; return on equity; return on asset; earning per share.*

GJMBR-C Classification: *JEL Code: F65*



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An Empirical Analysis of Capital Structure and Firm's Financial Performance in a Developing Country

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Abstract- **This paper aims to empirically study the relationship between capital structure and firm's financial performance in a developing country like Bangladesh. The investigation has been conducted through using panel data procedure for a sample of Dhaka stock market enlisted all IT firms during the year of 2013-2017. This research works have been performed through the three performance measures including return on equity, return on asset, and earnings per share as dependent variables, where capital structure is considered as debt ratio (DR), equity ratio (ER), long-term debt ratio (LTDR), short-term debt ratio (STDR) and used as independent variables. However, descriptive statistics, correlation, pooled ordinary least square analysis, fixed effect and Random effect model has been analyzed to find the relationship between capital structure and financial performance.**

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I. Introduction

Capital structure typically consists of debt and equity for a firm, whether, for a big corporation their structure extended to other components such as preferred share and retained earnings *(Van Horne and Wachowicz, 1995).* For the newly starting company, they don't have retained earnings; therefore, retained earning only applicable for the existing firm. The Capital structure can significantly impact on the performance of a company and which determines the distribution of operating cash flows between shareholders and debt holders. If company has higher debt rather than equity that the company doesn't make higher income because for the higher debt company need to pay higher interest which create lower profit, on the contrary for the equity company no need to pay interest but they provide dividend to the shareholder if the company can make a good profit they can pay high dividend. So, a company needs to fix a balance between debt and equity *(Weston and Brigham, 1979)*. Firms internal finance is equity, on the other hand, external finance is debt and majority firm use the combination of debt and equity *(Nassar, S., 2016).*

Modigliani and Miller first talked about the capital structure of a firm they stated that the capital structure is the combination of equity and debt, which the company uses to form their capital structure. First, they find out the impact of capital structure how could that impact on firm value creation later they modified because first time they used some restricted assumption (1963).

Many studies we found that they tried to get the impact of capital structure how does impact on firm performance in Bangladesh perspective *(Amin and Hossain, 2013, Alom K, 2013, Hasan et al., 2014, Amin, S. and Jamil, T., 2015),* no one try to find the relation between capital structure and profitability in IT sector. This research investigates only Dhaka stock market enlisted IT firm's capital structure and their impact on profitability.

The paper is organized as follow; the next chapter we discuss relevant past research theoretically and their empirical evidence based on capital structure, then the following chapter discusses on Method and data collection, and the last chapter covered the discussion on empirical findings and conclusion.

II. Literature Review

Romanian manufacturing companies listed in Bucharest Stock Exchange were analyzed empirically to show the evident of capital structure influence on firm performance, and this study was conducted cross-sectional regressions on capital structure indicators as long and short-term debt, optimal debt and equity ratio with firm's financial indicators as return on assets and return on equity. Result was indicated from the empirical analysis that due to missing data of short-term debt those regression results are insignificant statically but it was visible that the financial performance was higher when manufacturing companies avoid debt rather than equity *(Vătavu, 2015)*. Non-financial registered firms form Karachi Stock Exchange were analyzed to explore the capital structure impact on financial performance, this research used firm performance variables as return on equity, return on asset and return on sales and the capital structure variables are equity ratio, long term

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debt ratio and total debt ratio. After conducted the regression analysis this research showed in the fixed effect model that there is a mixed relationship between firm performance and capital structure are exist. This empirical study illustrates that firm performance as a return on asset has significant and positive impact from capital structure, when firm's performance as a return on equity it showed negative impact form capital structure variables equity and long-term debt but positive impact form capital structure variable debt to asset ratio. Another financial performance as return on sales indicate that debt to asset and equity ratio negatively impact on it but at the same time long term debt impact positively, through this empirical analysis it was evident that the capital structure has impact on firm's financial performance *(Javed, Younas, and Imran, 2014)*. Research on different Chinese firms showed there is a negative impact on financial performance of firm from capital structure *(Huang and Song, 2006)*. There is a negative impact form capital structure were found in firm's financial performance *(King and Santor, 2008)*. Research on Oman firms empirically explore that the capital structure negatively impact on firm performance and which was highly significant (*Rao, Yahyee and Syed, 2007).* Bursa Malaysia Stock exchange listed 237 companies from different sectors in between year 1995 to 2011 were analyzed to investigate the relationship between firm performance and capital structure, this research uses four financial performances and five capital structure measures and also use a control variable, research finally presented a mixed relationship between firm performance and capital structure (*Salim and Yadav, 2012)*. Dhaka Stock Exchange listed non-financial company for the period of 2008 to 2011 was empirically analyzed and estimated the impact of capital structure variables on firm performance and capital structure were recognized in this study by debt, current debt, debt to equity, proprietary of equity ratio and current assets proprietors funds Ratio, and this study showed debt, debt to equity and proprietary of equity have significant negative impact on firm performance as return on asset, return on sales *(Rouf and Abdur, 2015)*. Research by using panel data analysis for fifteen year's data of seven listed cement companies in Bangladesh evident that the significant positive influence on cement firm's performance as return on asset and return on equity were existed through capital structure variable short-term debt to asset ratio *(Amin and Jamil, 2015)*. Study on 40 Dhaka Stock Exchange listed company attempts to evident that capital structure has an effect on profitability and this study used POLS, fixed and random effects model to confirm the effect on profitability and it was also used two control variables to identify those influences on capital structure, and it was proved that firm's size and liquidity have statically negative influence on capital structure *(Anowar, 2016)*. Another empirical study was conducted to support the theory of Modigliani & Miller (MM) though Modigliani & Miller (MM) arguments are still vague, this study was used data from Chittagong Stock Exchange and Dhaka Stock Exchange's listed companies form four most dominants sectors for the robustness of the analysis but this study couldn't empirically support the arguments of MM theory because the empirical findings were showed strong positive correlation between capital structure and firms performance (*Chowdhury and Chowdhury, 2010).* Another empirical study found that there is existent of deficiency of empirical research about capital structure and the performance of banks in Bangladesh and this research attempts to fill this gap by using twenty-two banks of Bangladesh and finally empirical findings evident through the pooled ordinary least square analysis that capital structure inversely affects bank financial performance (*Siddik, Kabiraj and Joghee, 2017).* Study on relation between firm's performance as ROE and Tobin's Q with capital structure that capital structure negatively impacts on firm's financial performance, and this study was supported by Pecking Order Theory *(Hasan, Ahsan and Rahaman, 2014).* Empirical Analysis was conducted on 50 non-financial quoted companies from Nigeria and used Pooled Ordinary Least Squares (OLS) model, Fixed Effect Model (FEM) and Random Effect Model (REM) for empirical findings and this study also found mixed relationship between capital structure and profitability of those companies *(Salawu, 2009)*. A research was conducted to examined the capital structure impact on the firm performance through the Egyptian capital market listed sixty-four firm for the period of 1997–2005 and after analyzing variables this research didn't get any significant impact on the firm performance from capital structure decision as well as the relationship also too weak, and this study used multiple regression analysis to obtain this result *(Ebaid, 2009).* A single measure financial performance as ROA-Return on asset was used to identify the influence from capital structure for Pakistani textile companies and data were used from the period of 2004 to 2009 on 141 firms, this study applied the log-linear regression model, the empirical findings evident that the relationship is exist but the capital structure variable TDTA has negative impact on the performance ROA *(Memon et al., 2012)*. Nonfinancial 174 Swedish companies were analyzed to measure the influence of capital structure variable on the firm performance and this study evidenced that the relationship is visible and the significance level is also strong enough to measure the negative influence *(Gansuwan and Onel, 2012)*. Study of five different variables upon capital structure of listed Romanian constructions sector firms in the Bucharest Stock Exchange was conducted to identify the importance. A

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panel data estimation was developed through using 20 companies and period selected between 2009 to 2011. This study adopted traditional explanatory variable, and these selected variables are profitability, company size, tangibility of assets, liquidity and asset turnover. Method was used for this study were OLS-Ordinary least squire and FE-Fixed effect, simple and multiple linear regressions. For perceive the influence of traditional explanatory variable on the leverage of construction sector of Romania those methods were used. Finally, this study shows that construction sectors capital structure is negatively affected by profitability and liquidity ratios. Tangibility of the firms were negative for the dependent variable leverage as capital structure, solidification the findings of preceding empirical research's which claim that this indicator changes in reverse direction with the debt ratio of companies situated in developing countries. Alternatively, the firm size and its turnover of assets have a positive correlation with leverage. Another explanatory variable of this study was profitability and this explanatory variable has highest impact on the capital structure decisions than any other explanatory variable *(Serghiescu and Vaidean, 2013).* Economic growth may influence by the financial structure and this issue was addressed in a study, where three contending sight of capital structure review in the literature and those are bank, market and financial service-based view. Through applying panel and cross-section methods recent empirical studies observe their importance. This study followed the time-series data and method, along with the Dynamic Mixed Panel approach, fundamentally on developing countries. This research found significant cross-country heterogeneity in the changing aspects of economic growth and capital structure, and the study also conclude that the sample countries pooled data was invalid. Real per-capita output was significantly impacted by the capital structure of firms, which was in sharp difference to some of the findings. Panel estimations, in most cases, do not parallel to country specific estimations, and hence may extend incorrect implications for several countries of the panel. *(Arestis and Luintel, 2004)*. Manufacturing companies from Nigerian Stock Exchange listed was analyzed to investigate the capital structure and firm performance relationship. Five years data were used to conduct the research and the periods were from 2005 to 2009. Multiple regression method was used in this research to analyze the impact, variables used in this research was Profit Margin (PM) and Return on Asset (ROA) as firm performance variable and dependent variable and other independent variables were Long term debts to Total assets (LTDTA), Short-term debts to Total assets (STDTA), and Total debt to Equity (TDE) and these were capital structure indictors. This research found Long term debts to Total assets and Short-term debts to total assets has negative influence on the firm performance as Return on Asset and Profit Margin but the impact was not significant. Total debt to Equity and returns on asset were positively related but negatively with profit margin. Short term debt to total asset and return on assets were significantly related while long term debt to total asset and profit margin were significantly related. They concluded that that capital structure is not a main determinant of firm performance *(Iorpev and kwanum, 2012).*

III. Research Methodology

a) *Data and Variables:* This study was analyzed data from all IT firms listed in Dhaka Stock Exchange and the period of five years (2013 to 2017), and data were collected from the official website of Dhaka stock exchange and the annual financial statement of those IT firms.

Three financial performance indicator and four capital structure variables were selected to identify the capital structure impact on the financial performance. Return on asset (ROA), return on equity (ROE), earning per share (EPS) were chosen as the financial performance indicators, previous literature also studied to select those indicators *(Siddik, Kabirajand Joghee2017., Hasan et al., 2014).* Others function as capital structure variable were debt ratio (DR), equity ratio (ER), long-term debt ratio (LTDR), short-term debt ratio (STDR). Here, previous literature *(Abor, J., 2005, Nassar, S., 2016, Rouf, D. and Abdur, M., 2015,Vătavu, S., 2015)* was analyzed to determine the capital structure variable of this study, total debt out of total asset are considered as debt ratio, short term debt and long-term debt individually out of total asset are respectively considered as short-term debt ratio and long-debt ratio and equity ratio is calculated through total equity to total asset.

b) *Empirical Model:* A primary empirical model (i) was developed to explore the capital structure impact on financial performance of IT sectors of Bangladesh, in this primary model in equation (i), the dependent variable was financial performance of IT firms (ITFP) and the independent variable was capital structure (CS) and there is an error term (€). Where, **α** was the intercept and which was unknown for all IT firms and t is time (t= 2013-2017).

$$ITFP_{c,t} = \alpha + \beta_1 CS_{c,t} + €_{c,t} \ldots\ldots (i)$$

Equation (ii), (iii), (iv) are extension form of primary empirical model (i), since we have considered three different financial performance (ROA), (ROE), (EPS), those were placed as dependent variable for firm c in time t at equation (ii), (iii), (iv) respectively.

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$$ROA_{c,t} = \alpha + \beta_1 CS^{DR}{}_{c,t} + \beta_2 CS^{ER}{}_{c,t} + \beta_3 CS^{LTDR}{}_{c,t} + \beta_4 CS^{STDR}{}_{c,t} + €_{c,t} \ldots\ldots \text{(ii)}$$

$$ROE_{c,t} = \alpha + \beta_1 CS^{DR}{}_{c,t} + \beta_2 CS^{ER}{}_{c,t} + \beta_3 CS^{LTDR}{}_{c,t} + \beta_4 CS^{STDR}{}_{c,t} + €_{c,t} \ldots\ldots \text{(iii)}$$

$$EPS_{c,t} = \alpha + \beta_1 CS^{DR}{}_{c,t} + \beta_2 CS^{ER}{}_{c,t} + \beta_3 CS^{LTDR}{}_{c,t} + \beta_4 CS^{STDR}{}_{c,t} + €_{c,t} \ldots\ldots \text{(iv)}$$

Where β_1, β_2, β_3 and β_4 respectively represent the regression coefficient of capital structure as independent variables of debt ratio (DR), equity ratio (ER), long-term debt ratio (LTDR), short-term debt ratio (STDR) for firm c in time t, and there is error term $€_{c,t}$. Ordinary Least squire- OLS, FE- Fixed effect model and RE- Random effect model are used to test the static model, those models are exploring specifically the impact of variables toward the performance and those models are also assist to explain the different variables discretely.

c) *Descriptive statistics:* Below table1 present the descriptive statistics of the variables, where return on asset in average 0.07 and in case of return on equity is 0.094, earning per share is in average 1.59, Average equity and debt indicate Bangladeshi IT firm's huge investment on asset are from shareholder's equity, and debt were use very less, and it's also appeared IT firms concentrate less on long-term debt in compare to short term debt. Among all variables std. error below 0.02 except earnings per share. And in case of std. deviation earning per share are also highly deviated. Kurtosis of return on asset, equity, debt and short-term debt shows distribution has lighter tails and flatter peak.

Table 1: Descriptive statistics of variables

	ROA	ROE	EPS	ER	DR	LTDR	STDR
Mean	0.0766	0.0941	1.5950	0.8074	0.1926	0.0377	0.1549
Std. Error	0.0047	0.0052	0.1439	0.0220	0.0220	0.0059	0.0210
Std. Deviation	0.026	0.028	0.788	0.120	0.120	0.032	0.115
Kurtosis	-1.047	0.011	0.475	-1.031	-1.031	0.097	-0.858
Skewness	0.172	0.925	1.306	-0.249	0.249	1.005	0.546
Minimum	0.0416	0.0615	0.69	0.5928	0.0181	0.0056	0.0049
Maximum	0.12732	0.1644	3.26	0.9819	0.4072	0.1242	0.3758
Count	30	30	30	30	30	30	30

d) *Correlations:* In table 2 correlation matrix between variable are presented, it's appeared that return on asset and return on equity are highly correlated, good correlation between return on equity and earnings per share are visible, debt ratio and equity ratio are highly and negatively correlated, debt ratio and short-term debt are strongly correlated, strong negative correlation between short term debt and equity also visible. Average relation between return on asset and earnings per share, equity, debt and short-term debt (negative) are exist, weak and negative relation between long-term debt and return on asset also appeared, return on equity and equity are negative and with debt ratio are positive but weak relation exist, earning per share are negative and positively related with all variable but those relation are very weak.

Table 2: Correlation matrix of variables

	ROA	ROE	EPS	ER	DR	LTDR	STDR
ROA	1						
ROE	0.9126	1					
EPS	0.6049	0.7801	1				
ER	0.5634	0.1878	-0.154	1			
DR	-0.5634	-0.1878	0.154	-1	1		
LTDR	-0.1208	0.0509	-0.138	-0.298	0.2982	1	
STDR	-0.5560	-0.2111	0.200	-0.963	0.9632	0.0306	1

IV. Empirical Findings

Table 3 presenting the result of multiple regression between capital structure and financial performance variables, in this table 3 a comparative result analysis model was developed to illustrate the probable impact of capital structure variable toward the financial performance, this model consists through three different test results Ordinary Least Squire-OLS, Fixed effect, Random Effect, this model will be used to identify

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the impact in three phase, first phase capital structure impact on dependent variable as return on asset (ROA), second phase dependent variable as return on equity (ROE), and third phase dependent variable as earning per share EPS).

Table 3: Comparative Result Analysis

		OLS			FE			RE		
ROA Dependent Variable	Variable	β	t	P	β	t	P	β	z	P
	Intercept	0.06	9.31	0.109	.071	8.92	0.034	.068	5.83	0.086
	ER	0.121	3.6086	0.001**	.028	0.68	0.5	.057	1.52	0.128
	DR	-0.12	-3.608	0.001**	-.02	-0.68	0.504	-0.05	-1.5	0.12
	LTDR	-0.09	-0.644	0.52	.32	2.62	0.015	0.27	2.2	0.027
	STDR	-0.12	-3.53	0.0014**	-.06	-1.45	0.161	-0.07	-2.05	0.041
	R-Squared	0.3414			0.0554			0.1132		
	F Test	4.49			3.59			Wald Chi2(4) = 10.10		
	Adj R-sq	0.2655			Hausman Chi2 (4) = 4.32					
					Hausman Prob>Chi2= 0.2291					
		OLS			FE			RE		
ROE Dependent Variable	Variable	β	t	P	β	t	P	β	z	P
	Intercept	0.088	8.7774	0.0280*	0.10	8.01	0.002	0.096	5.61	0.003
	ER	0.0441	1.0120	0.3202	-0.08	-1.62	0.119	-0.047	-0.98	0.328
	DR	-0.04	-1.012	0.3202	0.087	1.62	0.11	0.04	0.98	0.32
	LTDR	0.04	0.2698	0.7893	0.57	3.91	0.001	0.48	3.39	0.001
	STDR	-0.052	-1.1429	0.2627	0.036	0.64	0.528	0.009	0.20	0.84
	R-Squared	0.0728			0.4694			0.4672		
	F Test	0.68			6.19			Wald Chi2(4) = 14.76		
	Adj R-sq	-0.0342			Hausman Chi2 (4) = 6.80					
					Hausman Prob>Chi2= 0.0785					
		OLS			FE			RE		
EPS Dependent Variable	Variable	β	t	P	β	t	P	β	z	P
	Intercept	1.728	5.209	0.005**	1.68	9.87	0.007	1.68	3.73	0.007
	ER	-1.005	-0.822	0.41	-1.21	-1.63	0.117	-1.20	-1.68	0.094
	DR	1.005	0.822	0.417	1.217	1.6	0.11	1.2	1.6	0.09
	LTDR	-3.346	-0.735	0.468	7.51	3.56	0.002	7.12	3.39	0.001
	STDR	1.367	1.078	0.290	0.55	0.7	0.49	0.60	0.79	0.428
	R-Squared	0.0662			0.4064			0.4062		
	F Test	0.61			4.79			Wald Chi2(4) = 13.28		
	Adj R-sq	-0.0415			Hausman Chi2 (4) = 2.47					
					Hausman Prob>Chi2= 0.480					

Note: Significance level 0.05, 0.01** respectively.*

In first phase of the model this study tried to identify the capital structure behavior towards return on asset (ROA), OLS test indicate equity ratio have impact on the return on asset significantly and positively and debt ratio negatively behave on the asset with high significance, In the meantime long term debt were statically insignificance towards the assets but short-term debt was statically significant towards the assets and also have negative impact. Between fixed effect and random effect model Hausman test shows random effect were most appropriate to explain the impact where random effect imply only long term and short term were significantly influence the assets but equity and debt ratio were insignificant. In random effect it was visible that long term debt positively influences asset but short-term debt though negatively but slightly influences

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the asset compare to long term debt. Though Hausman test didn't trigger the fixed effect model but comparative issue of the study it can be said that any variable of this model wasn't statically significant except the long-term debt. OLS model was the most perfect by comparing fixed and random effect model. Little similar coefficient from the equity, debt and short-term debt its visible that equity is more suitable for this sector and less long-term debt coefficient then short-term debt indicate BD IT sector have tend to go for more short-term debt rather than long term debt.

In second phase of the comparative result analysis dependent variable was return on equity (ROE), where this study found that impact of several capital structure variable was exist in all model but the level of significance was very lower or high insignificancy were existing. OLS model shows all variables was totally insignificant towards the return on equity, apparently it appears there is no impact but another two-model fixed and random effect shows a common variable long-term debt were highly significant for equity. Hausman test indicate random effect model is perfect for the explanation so if we consider the random effect model then all variable of this model was highly insignificant except long-term debt and it has significant positive impact on the equity. Biggest coefficient of this variable implies that profitability as return on equity was increased when company goes long term debt.

Subsequently analyzing the third phase, this study found capital structure variable have insignificant impact toward the earning per share (EPS) in case of OLS test but fixed effect and random effect shows there is several influences. Hausman test shows the random effect model was more appropriate for explain the effect of capital structure variable rather than fixed effect model. Random effect shows several variables was significant but long-term debt was highly significant then equity and debt ratio, more specifically equity and debt were near trend significance and contain biggest coefficient both of them and equity had negative influence on the earning per share but at the same time debt had positive influence and if we concentrate on the long-term debt than the model shows very small coefficient with high value significance towards the earning per share.

Overall evaluation of this study found that capital structure has significant and positive or negative impact on return on asset (ROA), return on equity (ROE), earning per share (EPS) as financial performance. Capital structure behaves in different ways in different dependent variables. More specifically IT sector of Bangladesh is growing and newly developed, by nature of this sector and in the perspective of the country most of the IT company have tend to acquire investment from shareholders and owners mutually and very less from debt and most of the debt are from short term basis and this fact also visible in whole comparative result analysis multiple regression model.

V. Research Discussion

This empirical research is supported by packing order theory, Modigliani and Miller Theory and trade off theory. Modigliani and Miller Theorem (1958) proposed that if other factors like tax, interest etc. persist unchanged then capital structure does not have any impact over firm performance. But in current world and in economy this theory is not possible to hold these entire factors are unchanged like tax and interest. So, this theory is not applicable for today's world. Modigliani and Miller (1963) also explained that if other things get involved, then debt over assets ratio would be one that means that all of the financing is due to debt and equity is not used at all. Now, from the empirical result of this study it can be evidently stated that the Modigliani and Miller Theorem (1963) is not applicable on the IT sector of Bangladesh because though other things get involved but primary source or higher percentage of financing of this sector are from equity than the debt.

Miller in 1977 presented Trade-off Theory that stated firms can only get highest revenues if their leverage is at optimum level. It is very problematic to choose optimal leverage level so there are always likelihoods of faults while making the best choice between debt financing and equity financing. Debt over assets has constructive influence over return on assets *(Frank, M.Z. and Goyal, V.K., 2008)*. But *Huang and Song (2006)* conducted study on Chinese firms and found adverse relation between capital structure decision and firm performance. *Ghosh (2007)* came to know that leverage is inversely associated with profitability. *(Raoet al., 2007)* studied Oman companies and stated that capital structure is negatively and significantly connected to company's financial performance. From the study result of IT sector of Bangladesh, empirically it can be stated that the capital structure as debt are negatively related with financial performance as return on asset.

Pecking Order Theory was proposed by Myers and Majluf in 1984, this theory stated that firm first should use the internal financing rather than debt financing such as retained earnings and reserves, than firm should consider the debt financing after this last way of financing can be issuing preferred stock and common stock*(Frank, M.Z. and Goyal, V.K., 2008).* Pecking Order Theory is the best match for the IT sector of Bangladesh and it also visible from the thorough analysis of the capital formation of this sector.

VI. Conclusion

This paper investigated the impact of capital structure on firm's financial performance, and has been

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tried to get the relationship between capital structure and performance of IT firms in the Bangladesh perspective. In order to conduct the experiment Dhaka Stock Exchange enlisted IT Company's selected. In a nutshell, from the research it can say that capital structure has positively significant impact on return on asset (ROA). Moreover, debt and equity ratio uniformly impact on the ROA. So, this paper suggests maximizing shareholder wealth between equity and debt needs to make a perfect combination. On the contrary, other two dependent variable ROE and EPS as financial performance didn't have significant impact from capital structure.

Contribution/Originality: This study is focused on the Information Technology Industry in Bangladesh. Recently the IT industry is very flourishing in the Bangladesh market, but some IT company went for bankruptcy after a few years of their starting. Therefore, this research is conducted to investigate how capital structure impact on Firm's financial performance, moreover, it will contribute to developing and emerging economies finance literature.

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