

Determinants of Capital Structure Choices for Listed Manufacturing Companies in Bangladesh

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Abstract:

The study attempts to investigate the firm specific determinants to explore capital structure choices by using panel data model for 63 DSE listed manufacturing companies during 2008 to 2012. The FGLS panel data analysis reveals that determinants assumed under pecking order theory have dominating influence on leverage in Bangladesh and short term debt is preferred to long term debt as a source of financing. The implication of this study under transitional economic and infrastructural outset profitable firm should finance its project through internally generated funds without changing present situation rather availing greater debt capacity as well as without changing its control scenario. If there is lack of available internal funds (retained earnings), firm's manager should be prudent enough to decide right choices for financing at that time without inclining to any specific one (only debt or only new stock).

Keywords: Capital Structure, Pecking order theory, FGLS.

1. Introduction:

The theories of capital structure having great deal of explanatory power in corporate finance behavior and practices are frequently focused topic for research to define different anomalies in corporate governance as well as performance of the firm. The choices of financing decision considered many factors contributed to financial growth and distress could produce substantial impact on achieving corporate goals and objectives. Most of the researches related to capital structure are under the developed world outset (Rajan and Zingales, 1995; Wald, 1999; Akhtar, 2005; Akhtar and Oliver, 2009; Kester, 1986; Kremp *et al*, 1999; Ozkan, 2001; Frank and Goyal, 2007) leaving only a little literature in the context of developing and underdeveloped institutional and infrastructural background. Therefore, the continuous debate in search of fitted theories never been explored under an emerging economical and infrastructural context.

The unique set of institutional and infrastructural outset and high yielding future prospect of Bangladesh made it more concentrated in capital market and focused on capital structure decision to derive more firm level benefit out of it. Can firm level capital structure determinants gear up the choices for capital structure decision in Bangladesh? Only a few literature (Lima, 2009; Sayeed, 2011; Hossain and Ali, 2012; Siddiqui, 2012) analyzed the effect of firm level determinants in capital structure choices in companies of Bangladesh couldn't align the findings to define existing capital structure practices with the prevalent theories. Thus, there is a broad research gap exists in the literature in Bangladesh as well as in the world. Especially from the time of world economic meltdown at 2008 and its corresponding recovery period for world economy as well as domestic stock market upsurge from 2009 then crash in December 2010 and following recovery period in Bangladesh meant a lot for firm level policy makers in listed companies to deal with corporate challenges for raising funds invoke to derive strategic capital structure formation. The study seeks to identify the major determinants as well as the practical theories reflecting the capital structure choices for listed companies in Bangladesh under of a highly susceptible socioeconomic situation.

FGLS regressions have been used to analysis yearly data from 2008 to 2012 from 63 companies listed in Dhaka Stock Exchange (DSE). A number of firm specific variables used for analysis and a systematic panel data methodology used to define the major contributory factors in explaining capital structure choices ideally differentiate itself in terms of mechanism as well as in terms of explanation to recognize the capital structure practices in Bangladesh.

The rest of the paper has been organized as follows; the section two reviews the capital structure debacles that study the capital structure theories, Objectives have been developed in section three. Section four provides data collection procedure and research methodology in brief. Results will be discussed in section five and section six draws the conclusion.

2. Capital Structure Debacle

The path breaking article by Modigliani and Miller (MM) in 1958 identified irrelevancy of capital structure decision to firm value under a set of assumption of perfect world with zero transaction and bankruptcy cost, risk free debt, no tax situation, homogeneity of riskiness among companies etc. They showed that the benefit from debt financing –financing at a low rate will be offset by the increase in cost of equity derived from high financial risk perceived by the shareholders and individual project risk has no relation to the sources of fund it uses. Therefore,

market value of a company and cost of capital are independent to the extent of debt in the capital structure. The strength of this theory notified the presence of arbitragers able to substitute personal leverage or homemade leverage for corporate leverage aligning any change in the market value of the company irrespective to its capital structure decision. Another explanation (1963) they made after incorporating the effect of tax in the model is that value of the firm would be maximized if it uses 100% debt in its capital structure since interest payments are tax deductible. In 1977 Miller new version of irrelevance theory reveals that capital structure decision of a firm has no effect in real world of corporate and personal tax.

After that a wide array of research conducted and developed trade off theory, signaling theory, agency theory and pecking order theory confirming the effect of capital structure decision on the value of the firm. According to trade off theory developed by Scott (1977), firms seek to have an optimum debt–equity ratio where marginal rise in tax benefit equals to the marginal increase of agency and bankruptcy cost generated from an extra use of leverage.

Another popular theory developed by Jensen and Meckling in 1976, Signaling theory, suggest optimal capital structure can be found by minimizing agency cost arising from conflict of interest among managers, owners and debt holders. They suggest two ways to align managers’ interest with the interest of owners and debt-holders. First one is to increase ownership participation by managers so that any decision made by managers would then equally affect both managers and owners. Second one is to increase the use of debt financing to minimize consumption in the perk. Jensen (1986) enlarges the explanation of agency problem by free-cash theory where managers’ tendency to pursue projects having low growth or ill prospect as bundle of fund are available to managers. This tendency can be controlled by increased dividend payment and increased use of debt or both. Hence an increased ownership by management or more debt in capital structure can reduce the amount of free cash available to managers.

The role of asymmetric information in determining optimal capital structure explained in signaling theory by Ross (1977) and Pecking order theory by Myers and Majluf (1984). Ross (1977) explained how debt financing raises investors’ confidence reflected in a rise in share price. The underlined reason is that higher debt in capital structure carries a signal of high future cash-flows and firm commitment towards its contractual obligation as managers know better than investors about its future prospect and ability to pay interest and principal in due time. Therefore more debt introduced in capital structure signals not only higher profitability but also higher quality of the firm resulting in a positive relation of debt ratio to the value of the firm.

The last but not the least rather highly recommended one is Pecking order theory (POT) put forwarded by Myers and Majluf (1984) suggest it is not wise to seek target capital structure rather use internal financing and issue safest low cost security as first priority. The essence for relevancy of this theory is the difficulties of raising required fund at a reasonable cost at right time and debt financing is less costly than common stock financing. The use of debt in capital structure signals positive impression to the investors’ sentiment due to the presence of information asymmetry between managers and investors. Hence it is wise to have fund ahead of time and a reserve borrowing capacity. That is retained earnings is preferred over debt and equity since there is no floatation, transaction or maintaining balance –a 100% financing for retained earnings financing. Thereby, profitable firms generate funds internally, raise greater debt capacity and create financial slack.

3. Objective of the issue

The overall objective is to identify the level of existence of capital structure theories in Bangladesh. The specific objectives are

- i. To identify firm specific factors effect on leverage decision at what direction and at what magnitude.
- ii. To identify theories best fit for explaining capital structure choice in Bangladesh.

4. Research Methodology

4.1 Sources of Data:

The study is based on secondary data. The data have been collected from yearly financial statements (Balance sheet, Profit and Loss statement, Cash-flow statement) of selected listed companies over 2008 to 2012. The study period starts from 2008 along world economic meltdown and over the study period highly vulnerable socioeconomic situation prevails in the country such as departure of Interim government and fresh start of Democratic system , stock market upturn, then crash and recovery. The main source of data is the Dhaka Stock Exchange library, Company website and Bangladesh bank database. The overall data have been classified to align the objective of the study into two broad categories; one is the firm specific factors acting as independent variable and another is dependent variable.

4.2 Sample size:

The final sample consists of 63 out of 166 listed companies in Dhaka stock exchange (DSE) other than financial

institution from 2008 to 2012. The study excluded bank, insurance, finance companies from the sample for its unique nature of business and operation. This sample of 63 DSE listed companies classified under four sectors (Pharmaceuticals and Chemicals, Textile, Engineering, and others).

Table 01: Sample

Name of the Industry	Total listed companies	Sample included companies
Pharmaceuticals and chemicals	27	14
Textile	34	20
Engineering	25	20
Others(remaining)	80	9
Total	166	63

(www.dsebd.org)

4.3 Measure of variables

The variables used in this theory largely pursued the existing literature in accordance of research objective. The dependent variables are total leverage and long term leverage and independent variable includes profitability, tangibility, liquidity ratio, size, growth opportunity, debt service coverage, earning volatility, tax, tax shield effect, age. This paper is highly concentrated on accounting information rather on market information like firm's market share, management quality, and firm's reputation because of prevailing market inefficiency to depict real scenario of the listed companies. Their measures are listed in appendices A1.

4.4 Summery Statistics and Correlation Matrix of variables :

The summary statistics of dependent and independent variables, including mean, standard deviation, minimum and maximum, and a correlation matrix, are reported in Tables A2 and A3 in the Appendices. It can be seen that most cross-correlation terms for the independent variables are fairly small other than liquidity and growth opportunity. Therefore a test of multicollinearity run and found (table A3) none of the variable have VIF greater than 5 implying less cause of concern for multicollinearity problem (Gujarati 2003).

4.5 Model Specification:

Feasible generalized least square (FGLS) regression used to analyze the panel data for the likelihood of presence of hetroskedasticity in variance of error term and autocorrelation among the panels. The first order auto regressive model has been employed in FGLS by STATA 12 for this multivariable regression analysis.

The basic model for analysis is

$$y_{it} = \alpha_0 + \beta x_{it} + \mu \quad i = 1, \dots, 63 \text{ and } t = 5$$

Where 'i' and 't' represents cross section and time dimension respectively in panel data. Now the model for estimation as per the dependent and independent variable s are given below

$$tl_{it} = \alpha_0 + \beta_1 pft_{it} + \beta_2 tan_{it} + \beta_3 liq_{it} + \beta_4 lnsiz_{it} + \beta_5 growth_{it} + \beta_6 dsc_{it} + \beta_7 evol_{it} + \beta_8 tax_{it} + \beta_9 tse_{it} + \beta_{10} age_{it} + \mu_{it} \dots \dots \dots (1)$$

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Here, tl and l represent total leverage and long term leverage respectively as dependant variable, and pft for profitability, tan for tangibility, liq for liquidity, lnsiz for size of the firm, growth for growth opportunity, dsc for debt service ratio, evol for earnings volatility, tax for tax rate, tse for tax shield effect and age for age of the firm as independent variable in equation 1 and 2.

Multidimensional tests were employed to identify and verify the level and degree of consistency, accuracy and robustness of the models used. Relevant econometric literatures (Gujrati, 2003; Baltagi, 1995; Pesaran, 2003 & 2004; Im *et al*, 2003; Hsiao, 2003; Drukker, 2003; Wooldridge, 2006; Baum, 2006; Colin and Trivedi, 2005) have been pursued to reach sufficient estimator for panel data analysis. The study set to identify appropriate model by testing fixed effect vs. random effect models for panel data analysis through the Hausman's specification test. In all cases (equation 1, 2), the null hypothesis of random effect model preference over fixed effect model cannot be rejected. The test result for eq. 1 is chi2 (10) = **16.19** and P = **0.0943**, for eq. 2 is chi2 (10) = **18.91** and P = **0.0414**. Now special diagnostic tests were employed. Since data set contains both cross section and time dimension, Firstly cross sectional dependence test used. The pesaran test for cross section independence result for eq. 1 is 3.821 having p value of 0.001 and for eq. 2 is 3.223 having p value of 0.001. And then group wise heteroskedasticity test run through modified Wald test where for eq. 1 chi2 (63) = 6.7e+06, p=0.000; for eq. 2 chi2 (63) = 1.8e+06, p=0.000 and finally serial correlation in panel data have been identified by Wooldridge test. The test result for eq. 1 is F (1, 62) =9479, F= 0.003; for eq.2 F (1, 62) =5.59, F=0.021. So these results indicate the presence of group wise heteroskedasticity and first order auto-correlation except cross-section

dependence. To deal with these problems the study used FGLS estimator which assume these entire problem and a common coefficient of AR (1) for all panel. Last but not the least should come first for analysis, panel unit root test, fisher type, pesaran and Im-pesaran-shin unit root test for all variables found the required level of panel stationary, so they are used in levels instead of their first difference. Therefore results found were not spurious (Gujrati, 2003).

5. Results and Discussion

5.1 Regression Results

The regression results identified that the coefficients of profitability, tangibility, liquidity, size, growth opportunity, earnings volatility, tax, age have significant impact on total leverage (table -3). Where, the coefficients of profitability, tax shield effect have been found significant effect on long term leverage (table-4).

Results of both FGLS models show that profitability has highly significant negative impact on leverage. In both cases null hypothesis cannot be accepted at 1% significance level. The coefficient of profitability for total leverage model is -0.207 which implies that 1 percent increase in net income to total sales causes the total leverage-total debt to total asset to decrease by 0.207 percent. As same as the coefficient value of -0.19 for profitability in long term leverage model depicts any 1 percent increase brings 0.19 percent decrease for regressand. This empirical result of inverse relation between profitability and leverage is consistent with the findings of Titman and Trueman (1988), Rajan and Zingalas (1995), Antoniou *et al* (2002), Chen (2003), Akhtar (2005), Huang and Song (2006), Tariq *et al* (2006), Sayilgan *et al* (2006), Frank and Goyal (2009), Sheikh and Wang (2010), Hussain and Ali (2012). However this result contradicts the earlier findings of Sayeed (2011), Siddiqui (2012) in Bangladesh.

Table -03: FGLS Regression Results (Dependent variable: Total leverage)

tl	Coef.	Std. Err.	z	P > z	[95% Conf. Interval]	
pft	-.2073	.0971	-2.13	0.033	-.3977	-.0169
tan	-.0815	.0304	-2.68	0.007	-.1411	-.0219
liq	-.0280	.0048	-5.88	0.000	-.0373	-.0187
lnsiz	-.0890	.0070	-12.64	0.000	-.1028	-.0723
growth	.0315	.0064	4.91	0.000	.0189	.0440
dsc	-.0005	.0004	-1.26	0.209	-.0015	.0003
evol	-.0096	.0058	-1.67	0.094	.0209	.0017
tax	-.0194	.0086	-2.26	0.024	-.0363	-.0025
tse	.0323	.1565	0.21	0.836	.02743	.3390
age	-.0017	.0010	-1.81	0.070	-.0036	.0001
Constant	2.0337	.0973	20.90	0.000	1.8430	2.2245
Number of obs = 315 Number of Groups = 63 Time period = 5 Wald chi2 (10) = 380.3 Prob > chi2 = .0000						

The results also identify a significant negative impact of tangibility on total leverage at a significance level of 1 percent and insignificant positive impact on long term leverage. The significant negative relation to leverage supported by the prior empirical evidence of Gaud *et al* (2005), Sayilgan *et al* (2006), Sheikh and Wang (2010), Hussain and Ali (2012), Siddiqui (2012). But significant positive relation found by Lima (2009) and Sayeed (2011) in Bangladesh cannot be pronounced by this study.

Like profitability, negative relation between liquidity and leverage and firm size and leverage were pronounced by both models where only total leverage model produces statistically significant relationship (1% significance level). This result for liquidity is pertinent to findings of Ozkan (2001), Antoniou *et al* (2002), Siddiqui (2012), Oolderink (2013) and size is consistent with the findings of Titman and Wessels (1988), Chen (2003), Mazur (2007). But the result of size contrast positive relation found by Rajan and Zingalas (1995), Akhtar (2005), Sayeed (2007), Frank and Goyal (2009).

Table -04: FGLS Regression Results (Dependent variable: Long Term Leverage)

ltl	Coef.	Std. Err.	z	P > z	[95% Conf.Interval]	
pft	-.0969	.0338	-2.87	0.004	-.1631	-.0307
tan	.0129	.0101	1.27	0.205	-.0070	.0328
liq	-.0004	.0009	-0.44	0.663	-.0023	.0015
lnsiz	-.0075	.0046	-1.61	0.107	-.0166	.0016
growth	-.0002	.0019	-0.11	0.911	-.0039	.0035
dsc	-.0001	.0002	-0.54	0.590	-.0004	.0003
evol	.0010	.0017	0.61	0.540	-.0022	.0043
tax	.0034	.0039	0.89	0.375	-.0041	.0111
tse	.8187	.0841	9.73	0.000	.6581	.9836
age	-.0003	.0004	-0.83	0.406	-.0012	.0005
Constant	.1745	.0675	2.59	0.010	.0422	.3067
Number of obs = 315 Number of Groups = 63 Time period = 5 Wald chi2 (10) = 118.35 Prob > chi2 = .0000						

Again total leverage model found significant positive relation between growth opportunity to leverage but long term leverage model cannot substantiate any significant relation leaving a positive direction only. Therefore, the empirical evidence of inverse relation between growth and leverage found by Titman and Wessels (1988), Wald (1999), Chen (2003), Akhtar and Oliver (2009), Lima (2009), Siddiqui (2012) were strongly pronounced by the study.

None of the model found any significant negative relation between debt service ratio and leverage like the result found by Siddiqui (2012) in Bangladesh.

The research result suggest marginal acceptance of negative relation of earning volatility and total leverage (at 10% level of significance). This evidence is the same line of Wald (1991), Booth *et al* (2001), Akhtar and Oliver (2009). Whereas positive relation found between earning volatility and long term leverage didn't bring any statistically significant result.

The result also suggest that tax rate have negative relation to leverage at 5% significance level(table-03) which support the theoretical explanation of Kremp *et al* (1999).

Another important result is that tax shield effect has positive impact on leverage (table 03, 04) at 1 percent significance level. This result follows the prior empirical evidence of Bradley *et al* (1994), Graham (2006), Al shabiri (2010), Hussain and Ali (2012).

The final important variable age has negative impact on the leverage (table-03) at 10 percent significance level.

5.2 Discussion

5.2.1 Descriptive statistics: Total leverage and Long-term leverage

The results of descriptive statistics for leverage ratios identified that the total leverage ratio is 66% and long term leverage ratio is 14%. This result clearly postulates the preference of short term debt as sources of fund rather than long term debt by most of the listed companies in Bangladesh. Therefore substantial portion of total leverage has been constituted by short term leverage in Bangladesh.

The reason behind this result is due to inherent defect in political, economical, legal and corporate governance practice in Bangladesh. Political-legal-economical framework didn't show concrete and consistency for resource based sustainable development in practice over the years leaving an incomplete institutional structure and defective governance and ownership system and practice. Again, no bond market been established; no surveillance system yet to be developed, system within a system supporting bureaucratism and red-tapism drive away controlling power from statutory body. These entire phenomenons force the scenario complex for searching, availing and proper deployment of fund. So, most of the companies use short term sources of fund and banks are playing vital role for allocating funds to the deficit users. Easy monitoring and controlling and timely inflow of short term loanable fund made the companies more encouraged in using short term financing. Again low default risk and less agency cost support the use of short term debt than long term debt as a source of fund. This dominating feature of short run debt over long term debt on total leverage unlike well developed countries might open a new window for capital structure thoughts for less or under developed countries.

5.2.2 Explanation in search of consistent theory of capital structure in Bangladesh

Profitability: According to pecking theory firm prefer internal sources of financing to external sources of financing. As a result more profitable firms tend to have less debt in capital structure. Since primarily projects are finances

through retained earnings and if further fund required only then it's financed through external sources of financing. Whereas tradeoff theory suggests the benefit from debt financing increases with the increase in profitability. Profitable firm can avail more tax benefit from debt financing. Again signaling theory predicts that profitable firm send positive signal to lender and have more tolerance over the debt level. It is further argued by agency theory where firm like to use more debt to minimize free cash-flow available to manager. Therefore, tradeoff, signaling and agency theory contrast pecking order theory in defining negative relationship between profitability and leverage.

The negative relationship found between profitability and debt in DSE listed firms initially supported by pecking order theory. However this may be due to avoid misuse of fund and to reduce underinvestment problem. Though pecking order suggest to use debt after retained earnings as a sources of fund but here listed companies use debt and equity simultaneously after retained earnings depending on cost benefit in consideration. No bond market in Bangladesh, corporate governance problem, significant tax shield effect prevails in Bangladesh. They altogether suggest that firms prefer debt as long as to derive tax benefit out of it but nonexistence of bond market encourages firms to use equity due to marketability of share at any time.

Table 05: Summary of Results pertaining to different capital Structure theories

Variable	Different capital structure theories identifying relationship of different variable to leverage				Relationship obtained	
	Pecking order	Trade off	Signaling	Agency theory	Total Leverage	Long-term leverage
Profitability	-	+	+	+	-	-
Tangibility	+	+		±	-	
Liquidity	-				-	
Size	-	+	+		-	
Growth Opportunity	+	-	+	-	+	
Debt Service Coverage		+				
Earning Volatility		-			-	
Tax Rate		+			-	
Tax Shield Effect		+		+		+
Age	-				-	

Tangibility: It is highly evident that firms with greater tangible asset can borrow funds at low cost result in higher level of leverage. Lenders especially in case of long term debt requires tangible asset to secure position as suggested by agency theory. Where, trade off model predicts that firms having high level of tangible asset suggesting less possibility of bankruptcy use more leverage to earn more benefit from debt financing. Pecking order theory also suggest to use less costly debt financing over equity financing as soon as retained earnings exhausted to finance new projects and more tangible assets in asset structure makes thing easy to have more debt at time with relatively low cost.

In case of listed companies in Bangladesh, it is found that short term debt preference over long term and in most of the cases short term debt require less tangible collateral than long term leverage. For short term debt other things like personal guarantee, profitability, future prospect works as security for debt. Again as a measure to minimize agency problem, firms with less collateralizable assets (fixed asset) use more leverage (Grossman and Hart, 1982). Therefore inverse relationship between tangibility and leverage could be rationalized by the condition of institutional structure and corporate governance in Bangladesh.

Liquidity: A variable highly represent the pecking order theory by substituting debt is liquid asset as sources of fund. Liquid asset represent the internal sources of fund and have negative relation to leverage sounds preference of internal source of capital ahead of external source in Bangladesh.

Size: The relationship between firm size and leverage is ambiguous. According to trade off theory larger firm are more diversified and have less possibility for bankruptcy. These things gear the reduction in transaction cost for debt issuance. Therefore larger firm have tendency to use more debt in capital structure. It is also argued in signaling theory that larger firm has positive signaling effect to the lenders result in lower cost of debt than the cost of debt for smaller firm. But signaling theory argues against by considering the absorption of positive signal in capital market that firms prefer equity financing than debt financing to take advantage of low transaction cost and zero binding feature. Furthermore, pecking order theory assumes less informational asymmetry between managers and shareholders produced by large firms. As a result, large firms having the advantage over smaller firm to provide sensitive information to the investors prefer equity financing.

Though inverse relationship found in Bangladesh supported by pecking order theory, this cannot be explained fully by POT. Larger firm have greater ability to raise short term fund internally result in lower level of short term debt in capital structure. No significant relation cannot be found for long term leverage, because firm

tend to use debt or equity depending on its unique firm specific benefit produced by each alternative.

Growth Opportunity: Pecking order theory and signaling theory predicts positive relationship between growth opportunity and debt. The higher the growth opportunity the more the demand for funds and debt is more preferable to equity for financing explained in POT. Where, signaling model identifies higher growth as positive signal to investor result in a rise in share price and firm value. This higher firm valuation reduces the cost for introducing debt financing as less valuable companies are more likely to fall into bankruptcy (Ross, 1977).

Trade off theory predicts that growth opportunity and leverage has negative relationship. Growth opportunities remains in the form of intangible asset cannot be collateralized for debt. So firms with high growth opportunities are likely to borrow less than firms with less growth opportunity. Again agency theory argues on firms' likelihood to expropriate wealth from debt holder (Myers, 1977; Jensen, 1986), that is, firm can use funds less optimally and expropriate wealth from debt holders to shareholder because of asset substitution effect. Therefore prevailing conflict between debt holder and equity holder establish negative impact of growth opportunity in leverage.

The result obtained by analysis pertaining to pecking order theory and signaling theory to constitute a positive impact of growth opportunity on leverage in Bangladesh. Firms use short term debt over long term to mitigate agency problem (Myers, 1977). Growing firms more likely to have agency problem substitute short term financing over long term financing and producing a positive relation between growth and leverage.

Earnings volatility, tax rate, tax shield effect are the factors exclusively define in trade off theory of capital structure. Where earning volatility, tax shield effect found significant as the way it is to be in trade off theory in Bangladesh. Higher variability in earnings indicates higher probability of bankruptcy result in a decrease in total leverage. Again, Higher the ability to generate tax shield effect pronounce greater possibility to use debt as a sources of fund since tax benefit preferred by listed companies in Bangladesh. However tax rate found inverse relation to debt contrasting the prediction under trade off theory. The result found in tax rate due to the fact that higher tax rate may increase cost of fund and absorbs the internal fund by paying more tax to the Govt. As a result demand for external fund and total leverage decreases.

In accordance to pecking order theory, as the age of the firm increases, firm's strength to carry out its business by own fund increases. Therefore the inverse relation found between age and total leverage is pertinent to the pecking order theory.

6. Conclusion:

The study intends to identify the effect of firm specific factors on capital structure decision for a sample of 63 DSE listed companies using FGLS regression method to define the consistent capital structure choice for listed companies in Bangladesh. The research result found the dominance of pecking order theory (POT) over other theories-especially trade off theory in explaining capital structure choices. Though it is evident that companies has inclination to reap tax benefit, companies use debt only if it can generate more benefit than equity financing because of sensitivity of debt market to the riskiness (earning volatility) of fund seeking firms and corporate tax rate. Whereas assumption of pecking order theory found true by the significant relation of profitability, liquidity, firm size, growth opportunities, age to leverage decision. And presence of agency problem and signaling theory observed by the study. Finally though pecking order theory dominates other theory in Bangladesh, POT hierarchy (first retained earnings, then debt and finally equity) is not explicitly followed here. Firms prefer short term debt to long term debt unlike developed countries. If fund required firms use internal sources of financing first and then external sources. Choice between debt and equity as an external source of financing, firms prefer debt over equity only when it can guarantee more benefit relative to cost than net benefit of equity financing, otherwise not.

The real time implication is that under transitional economic and infrastructural outset profitable firm should finance its project through internally generated funds without changing present situation rather availing greater debt capacity as well as unaffected control scenario. If there is lack of available retain earnings, firm's manager should be prudent enough to decide right choices for financing at that time without inclining to any single one (only debt or only new stock).

The ground work study set on establishing firm level determinants of capital structure can open the window for far broader research especially in defining dynamic model on time based cost-benefit analysis for debt and equity mix so that firm can identify more convenient capital structure at right time to maximize the value of the firm.

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Appendices

A1. Measure of variables

Variable	Measurement	Prior empirical use
<i>Dependent variable</i>		
1. Total leverage (tl)	Ratio of book value of total debt to total asset	Rajan & Zinglas (1995), Chen (2003), Siddiqui (2012)
2. Long term Leverage (ltl)	Ratio of book value of Long Term debt to total asset	Rajan & Zinglas (1995), Chen (2003), Siddiqui (2012)
<i>Explanatory variable</i>		
Profitability (pft)	Ratio of net income to total sales	Akhtar (2005), Mazur (2007)
Tangibility (tan)	Ratio of fixed asset to total Asset	Akhtar (2005), Shah & Khan (2007), Hossain & Ali (2012)
Liquidity ratio (liq)	Ratio of current asst to current liabilities	Jong et al(2008), Siddiqui(2012)
Size (lnsiz)	Natural logarithm of total asset	Chen (2003), Akhtar (2005)
Growth opportunity (growth)	Percentage change in book value of total asset	Siddiqui (2012)
Debt service coverage (dsc)	Ratio of EBIT to financial Expenses	Keoun, et al (1986), Siddiqui (2012)
Earning volatility (evol)	Absolute value of first differences of percentage change of operating income	Chen (2003)
Tax (tax)	Ratio of tax to EBIT	
Tax shield effect (tse)	Ratio of total depreciation to total asset	Ozkan (2001), Chen (2003)
Age (age)	Total no. of years from inception	Siddiqui (2012)

A2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
tl	315	0.664181	0.707867	0.000471	9.22587
ltl	315	0.143564	0.226528	0	2.009604
stl	315	0.530622	0.647416	0.000283	9.214342
pft	315	0.060307	0.121786	-0.60869	1.005269
tan	315	0.49261	0.622605	0.006742	10.48084
liq	315	2.49672	9.120775	-13.7443	143.254
insiz	315	14.09188	1.45709	9.830541	17.12209
growth	315	0.645981	6.315108	-0.97862	111
dsc	315	8.314404	22.04987	-21.6705	142.8412
evol	315	1.039084	2.757106	0	38.24555
tax	315	0.417091	2.669399	-6.29828	44.82843
tse	315	0.039363	0.114558	0	1.605261
age	315	24.79365	12.088	0	54

A3. Correlation matrix

	pft	tan	liq	insiz	growth	dsc	evol	tax	tse	age
pft	1									
tan	-0.0163	1								
liq	-0.0357	-0.1263	1							
insiz	0.2632	-0.1326	0.2223	1						
growth	-0.0148	-0.0531	0.8662	0.1082	1					
dsc	0.1787	-0.1169	-0.0075	0.0878	0.0047	1				
evol	-0.0224	-0.0108	-0.0035	-0.1157	0.0008	-0.0071	1			
tax	-0.008	0.0191	-0.0009	-0.0168	0.0385	-0.0127	-0.02	1		
tse	-0.0082	0.0284	-0.0501	-0.2014	-0.032	-0.0381	-0.0073	0.0011	1	
age	0.0405	-0.0307	-0.104	-0.0501	-0.0714	0.2093	-0.0573	0.1547	0.0756	1

A4. Multicollinearity Results

Variable	VIF	1/VIF
liq	4.48	0.223103
growth	4.23	0.236323
insiz	1.26	0.791736
pft	1.12	0.888976
dsc	1.1	0.909287
age	1.1	0.909574
tan	1.05	0.948961
tse	1.05	0.950292
tax	1.03	0.967699
evol	1.02	0.980274
Mean VIF	1.75	

A5. Sample Listed Companies

Serial	Companies
1	ACI Formulation
2	ACI Limited
3	Ambee Pharmaceuticals
4	Beximco Pharmaceuticals
5	Beximco Synthetics
6	Glaxo Smithkline
7	IBN SINA Pharmaceutical
8	Keya Cosmetics
9	Kohinoor Chemicals
10	Libra Infusions
11	Marica Bangladesh
12	Pharma Aids Limited
13	Renata Limited
14	Square Pharmaceuticals
15	Al-Haj Textile
16	Alltex Industries Ltd.
17	Anlimayam Deying Ltd
18	Apex Spinning & Knitting mills Ltd
19	CMC Kamal
20	Delta Sippners Ltd
21	Desh Garments
22	Dulamia cotton
23	H.R Textile
24	Maksons Spinning Mills Ltd
25	Metro Spinning
26	Mithun Knitting
27	Safko Spinnings
28	Saiham Cotton Mills Ltd
29	Square Textile
30	Stylecraft Ltd
31	Tallu Spinning
32	Prime Textile
33	Rahim Textile
34	sonargoan Textiles
35	Aftab Automobiles
36	Anwar Galvanizing
37	Atlas BD
38	Aziz Pipes
39	BD.Autocars
40	BD Lamps
41	BD.Thi aluminium
42	BSRM LTD.
43	Eastern Cables
44	Golden Son LTD.
45	Kay and Que
46	Monno Jut Stafflers
47	Navana CNG LTD.
48	National polymer
49	National Tubes
50	Quasem Drycells
51	Rangpur Foundry
52	Renwick Jajneswar LTD.
53	S.Alam Cold Rolled LTD.
54	Singer Bangladesh

55	Apex Adelchi Footwear Ltd.
56	Bata Shoe Ltd
57	Aramit cement Ltd
58	Heidelberg cement(BD) Ltd
59	Lafarge Surma cement(BD) Ltd
60	M.I. Cement Factory Ltd
61	FU-WANG Ceramic Ltd
62	RAK Ceramics(BD) Ltd
63	Shinepukur Ceramics Ltd