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Degree of Indebtedness and Short Term Solvency - A Study on Manufacturing Companies of Bangladesh

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Abstract

Financial leverage refers to the extent to which a firm relies on debt. The main objective of the study was to measure the degree of indebtedness as well as effect of corporate borrowings on short-term solvency of DSE-listed manufacturing companies in Bangladesh over a 20-year period (1998-2017). The study was based on secondary data. Stratified and Quota Sampling techniques were applied for the selection of sample items of MNCs and domestic companies respectively. Seven companies from each of MNC and domestic company category were selected as sample from six industrial sectors. It is seen that MNCs' mean short-term solvency is significantly higher and mean degree of indebtedness is significantly lower than that of domestic companies. All three DFL measures exert negative impact on domestic companies' coverage ratios and on interest coverage ratio of MNCs. In case of domestic companies, only DFL (FS) has significant influence on TIE ratio. In case of MNCs, all measures of degree of indebtedness has significant influence on short-term solvency.

Keywords: Financial leverage, Indebtedness, Coverage, Repayment

1. Introduction

Financial leverage is a process that involves borrowing resources that are paired with existing assets and utilized to bring about a desired outcome to a financial deal. Debt is a contract that pays out fixed schedules of interests and principal in exchange of investors' cash. It involves bank loans, bonds or leases. Debt can be from private or public sources with the modalities of the contract being private or public. Debt holders do not obtain direct control on the investment decisions. But, debt is a senior claim relative to equity which makes the latter a riskier security. Degree of indebtedness is measured by degree of financial leverage (hereafter DFL) which is concerned with the relationship between operating profits and shareholders' earnings. If a company is financed exclusively with common stock, a specific percentage change in operating profit will be insensitive to shareholders' earnings. If a company is financed with debt or is 'leveraged,' however, its shareholder earnings will become more sensitive to changes in operating profit. Nevertheless, financial leveraging makes companies equally susceptible to greater decreases in stockholder earnings if operating profits drop. Leverage is very scientific tool in the hand of finance manager.

1.1 Statement of the Problem

In the agency theory, debt has a two-fold role. First, it mitigates the problem related to the separation of control and ownership as it constitutes an alternative financing source that do not involve new (outside) shareholders. Second, debt financing introduces another conflict of interest between shareholders and debt holders that is emphasized when leverage becomes important. This conflict also generates costs that reduce the firm total market value. Moreover, borrowings create financial burden as debt is to be repaid within stipulated time and the maturity of debt is specified in the contract. It can range from short-term to long-term. On one hand, a shorter maturity allows to negotiate a new contract more quickly. The interest rate can be adjusted at shorter time intervals to correspond to the risk level of the investment throughout its lifetime. On the other hand, longer maturities may respond to a need for stability in the financing costs.

Value of company maximizes at optimum capital structure. To gain advantages of tax shield and higher earnings per share many companies raise too much debt capital which is detrimental to their good performance and survival. Excessive use of debt capital leads to financial distress and excessive use of equity capital leads to poor financial performance and low company value. According to Stewart (1997), it is the contractual obligation to repay debt, the fact that they have borrowed money and pre-committed to paying it back that forces companies to pay out cash, to sell unrelated businesses or to take other value increasing steps they might otherwise be reluctant to take. Another benefit is that having more debt and less equity makes it easier to concentrate the equity in the hands of insiders so that they have stronger incentives to create value that come with significant equity ownership. The main benefit of increased debt is the increased benefit from the interest expense as it reduces taxable income. But it does not make sense to maximize debt load. With an increased debt load the following occurs: interest expense rises and cash flow needs to cover the interest expense also rise due to increased investment. Debt issuers become nervous that the company

will not be able to cover its financial responsibilities with respect to the debt they are issuing. Stockholders become also nervous.

2. Theoretical Framework & Literature Review

Pandey (2014) defines DFL as the % change in EPS due to a given % change in EBIT. Gitman (2007) states that the numerical measure of a firm's financial leverage is called degree of financial leverage. Sinha (2013) describes two different measures of DFL:

(i) (Financing Business Load / Financing Business Effort) i.e. {|% Δ DFV| / |% Δ IFV|}, is a measure of the degree of the "financing leverage effect" and may be connoted as the "elasticity coefficient measure" of DFL or

(ii) Relative proportion of Average Fixed Financing Cost Bearing Capital (AFFCBC) within the "average capital structure" or relative proportion of Fixed Financing Cost Before Tax (FFCBT) or Fixed Financing Cost After Tax (FFCAT) within the "financing cost structure" is a measure of the degree of the cause of the financing leverage effect and may be connoted as the "structural measure" of DFL.

2.1 Measures of Degree of Financial Leverage (DFL)

There are three measurements of Degree of Financial Leverage a) Capital Structure measure b) Financing Cost Structure measure and c) General measure. Detailed calculation of DFL is shown below:

(a) Capital Structure Measure: This is a measure of the cause of the "financing leverage effect" and representing the "relative proportion of AFFCBC within the "average capital structure" and given by:

$$\text{DFL(CS)} = \frac{\text{Amount of Average Fixed Financing Cost Bearing Capital}}{\text{Amount of fixed and Variable Financing Cost Bearing Capital}}$$

DFL (CS) = [AFFCBC/(AFFCBC+AE)] Since, AFFCBC ≥ 0 and AE >0,0≤ DFL_{CS}< 1

(b) Financing Cost Structural Measure: It represent the "relative proportion of FFCBT (or FFCAT) within the financing cost structure", given by:

$$\text{DFL(FS)} = \frac{\text{Amount of Fixed Financing Cost After tax}}{\text{Amount of Total Financing Cost After tax}}$$

DFL (FS) = {(1 – t) FFCBT / {(1 – t) FFCBT + EDAT}

(c) General measure: DFL can also be measured as follows:

DFL = EBIT / [EBIT- I- PD/ (1-t)]

Here, PD = Preferred Dividend, I = Interest expense, t= tax rate

Coverage ratios measure the ability of a company to cover its debt obligations through its earnings. These ratios are useful in accessing a company's short term solvency and therefore, in evaluating the quality of a company's bond and other debt obligations. Two types of

coverage ratios are used in the study; (i) Times Interest Earned (TIE) or interest coverage ratio and (ii) Fixed-Charge Coverage Ratio (FCCR). According to CFA Institute (2010), interest coverage ratio measures the number of times a company's EBIT could cover its interest payments. A higher ratio indicates greater solvency which means that the company can repay its debt (bank borrowings, bonds, debentures) with ease and in a timely fashion from its operating income. Fixed-charge coverage ratio relates fixed financial charges or obligations, to the cash flow generated by the company. It measures the number of times a company's earnings (before interest, depreciation, taxes, and lease payments) can cover the company's interest expenses, lease rentals, and preferred dividend payment. Like TIE ratio, higher FCCR indicates that a company is more solvent and offer greater assurance in meeting all fixed financial charges within due time.

2.2 Measures of Short-Term Solvency (Coverage Ratios)

a. TIE ratio: EBDIT/ Interest expenses

b. Fixed charge coverage ratio (FCCR):

$$\frac{\text{EBDIT} + \text{Lease rentals}}{\text{Interest} + \text{Lease rentals} + \frac{\text{Preferred div.+Loan repayment}}{1-\text{Tax rate}}}$$

Harelimana (2017) in his study analyzed the effect of debt financing on firm performance. He has drawn a comparison between I&M Bank and Bank of Kigali within a period of six years from 2010. The study found a strong positive relationship between debt level and profitability for both I&M bank and Bank of Kigali. The debt levels are not influenced by the variation on both sustainable growth rate and internal growth rate. Mazzoleni and Giacosa (2017) in their research verified the impact of a series of company's variables on the debts degree in small and medium sized companies. They found that the impact of a series of variables on the indebtedness is not a simple cause effect relationship; this relationship unites them, and creates a circuit of concatenation between variables, which influences on the company's indebtedness. According to ECB Monthly Bulletin (2012) since the second half of 2009 the debt ratios of non-financial corporations have gradually declined from the high levels of indebtedness accumulated previously. The gradual decline in debt ratios reflects both demand and supply-side factors affecting credit to the corporate sector. Firms in most of the largest euro area countries started to deleverage gradually in mid-2009 although firm size played an important role. According to survey evidence, on balance, a higher percentage of large firms indicated a decline in their debt-to-assets ratios from 2009 to 2011 than SMEs.

Kalemli-Özcan et al. (2017) in their study quantify the role of financial factors that have contributed to sluggish investment in Europe in the aftermath of the 2008–2009 crises. The study was conducted in 8 European countries over time, and over 2 million observations were obtained. Study found that the decline in investment in the aftermath of the crisis can be linked to higher leverage, increased debt service, and having a relationship with a weak bank. Finding also indicated that firms that have borrowed more long term are less affected by bank weakness as they do not need to rollover loans. Akhtar et al. (2016) in their paper investigated the relationship between leverage and firm's value, in Pakistani context. Secondary data was obtained for this purpose from KSE and financial statements of 100

companies for 6 years. Regression analysis was carried out and study found that increase in leverage is positively related to the value of a firm. Pytkowska (2011) had conducted a research on the level of indebtedness and repayment performance of individual borrowers in Kyrgyzstan. The analysis was conducted on a sample of 2,603 active borrowers – private persons. Credit records of active and past loans were analyzed. The results of the study showed that the amount of debt per borrower in Kyrgyzstan is considerable in relation to the average income of citizens as it exceeded by more than 3 times the annual GNI per capita. Although the amount of debt per borrower is relatively high the repayment performance remains very good. Pytkowska and Spannuth in their study assessed whether there is a problem of over indebtedness among microcredit clients in Azerbaijan. The analysis was based on a sample of 1,100 microcredit borrowers of eight microcredit providers. The participating institutions stated that the incidence of over-indebtedness and cross-indebtedness is thought to be much higher than the survey results suggest.

Circiumaru (2011) carried a study regarding the limits and the terms of using the degree of financial leverage when evaluating the financial risk. The result showed that the coverage ratio of financial expenses is correlated with the safety margin. The indicators of financial risk's assessment based on the dynamic between two consecutive years have a reduced capacity to evaluate the financial risk. Tsuji (2013) in his study examined the linkages between corporate solvency and capital structure of the electric appliances industry firms, which are listed on the Tokyo Stock Exchange. In this study, he clarified that in the Japanese electric appliances industry, the linkages between corporate solvency and debt ratio are generally negative. Further, he also revealed that about 50% to 60% of the ratio of total debt to total asset could be explained by corporate solvency variables. Norges Bank (2016) conducted a research to evaluate debt-servicing ability of Norwegian non-financial companies. They found that the debt-servicing capacity of Norwegian non-financial companies has declined somewhat and is currently lower than the average for the past 14 years. Recently, the oil service sector in particular has experienced a marked decline in debt-servicing capacity and its debt-servicing capacity is now at a very low level compared with the historical average.

2.3 Objective of the Study

The broad objective of the study was to analyze effect of indebtedness on short term solvency of manufacturing firms. Specific objectives are:

a. To determine the significance of difference in mean TIE & FCCR between MNCs and domestic companies.

b. To determine the significance of difference in mean Degree of Financial Leverage (DFL) between MNCs and domestic companies.

c. To identify the change of coverage ratios due to change of DFL of MNCs and domestic companies and make a comparison between them.

2.4 Hypotheses of the Study

The following three hypotheses have been developed:

a. H_0-1: There is no significant difference in short term solvency between MNCs and domestic companies.

b. H_0-2: There is no significant difference in Degree of Financial Leverage (DFL) between MNCs and domestic companies.

c. H_0-3: Degree of indebtedness has significant impact on short term solvency of manufacturing companies

3. Materials and Methods

Type of Research: Type of research is explanatory or causal. An attempt was made to identify cause and effect relationship between degree of indebtedness and short-term solvency. Nature of research is empirical and research approach is quantitative.

Population: Population one consists of all MNCs listed on DSE which continue operation during the study period. Eight MNCs are found in 6 industrial sectors. Population two consists of all DSE listed domestic companies of the same 6 industrial sectors and which continue operations during the study period. Population size is 45.

Types of Data: Secondary data was used. The research method employed basically involved quantitative analysis of secondary data. Nature of data is both time series and cross sectional.

Sources of Data: Journals, Company documents, Annual reports of sample firms, Reports of Securities and Exchange Commission and Dhaka Stock Exchange (DSE) and Websites of sample firms and DSE. Study period is from year 1998 to 2017.

Sampling Technique: Stratified Sampling technique was applied for the selection of sample items of population one. Each of the two populations has been divided into several sub-populations or strata according to industry sector or type of industry. Samples are taken from each stratum of each population. For the sake of comparison with the MNCs, it is necessary to select only those domestic companies that are performing well and on a consistent basis. So, Quota Sampling method was applied in selecting sample firms of population two.

Sample Size & Sample Items: The sample in this study consists of 14 companies (7 from each population) listed in Dhaka Stock Exchange (DSE) . Two companies are selected from Pharmaceuticals & Chemicals industry and one company is selected from Engineering, Food & Allied, Tannery, Cement and Fuel & Power industry in each category. Name of the domestic companies are: Aftab Automobiles Ltd., Agricultural Marketing Company Ltd., Beximco Pharmaceuticals Ltd., Square Pharmaceuticals Ltd., Apex Footwear Ltd., Confidence Cement Ltd., and Padma Oil Company Ltd. Name of the MNCs are: Singer Bangladesh Ltd., British American Tobacco Bangladesh Company Ltd., GlaxoSmithKline Bangladesh Ltd., Reckitt Benckiser (Bangladesh) Ltd., Bata Shoe Company Ltd., Heidelberg Cement Bangladesh Ltd., and Linde Bangladesh Ltd.

Techniques of Data Analysis: Mean is used to determine yearly average and grand average. T-test has been applied to test the hypotheses. Simple linear regression has been used to measure the sensitivity of dependent variable for change of independent variable as well as significance of independent variable. Collected data has been processed by MS Excel, SPSS (version 20) and Gretl software. Presentation of data is done in two forms; text and tabular.

Model Specification: The following simple linear regression model has been specified:

$$CR_{it} = \beta_0 + \beta_1.DFL(CS)_{it} + \beta_2.DFL(FS)_{it} + \beta_3.DFL(Gen.)_{it} + \varepsilon_{it}$$

Here, CR_{it} = Coverage ratio of firm i at year t (TIE and FCCR)

DFL_{it} = Degree of financial leverage of firm i at year t

β_0 = Constant, ε_{it} = Random error term

β_1, β_2, β_3= Coefficient of $DFL(CS)_{it}$,$DFL(FS)_{it}$ and $DFL(Gen.)_{it}$ respectively

Based on the above model, separate models have been developed for each solvency ratio (TIE and FCCR) as well as for each category of firm (Domestic companies and MNCs).

The four models are as follows:

$$TIE_{it}\,(Local) = \beta_0 + \beta_1.DFL(CS)_{it} + \beta_2.DFL(FS)_{it} + \beta_3.DFL(Gen.)_{it} + \varepsilon_{it} \quad (1)$$

$$FCCR_{it}\,(Local) = \beta_0 + \beta_1.DFL(CS)_{it} + \beta_2.DFL(FS)_{it} + \beta_3.DFL(Gen.)_{it} + \varepsilon_{it} \quad (2)$$

$$TIE_{it}\,(MNC) = \beta_0 + \beta_1.DFL(CS)_{it} + \beta_2.DFL(FS)_{it} + \beta_3.DFL(Gen.)_{it} + \varepsilon_{it} \quad (3)$$

$$FCCR_{it}\,(MNC) = \beta_0 + \beta_1.DFL(CS)_{it} + \beta_2.DFL(FS)_{it} + \beta_3.DFL(Gen.)_{it} + \varepsilon_{it} \quad (4)$$

4. Results and Discussions

4.1 Comparison of Coverage Ratios

From Table 1 it is seen that both TIE ratio and FCCR of MNCs were much higher than that of domestic companies in every year.

Table 1. Average TIE ratio and FCCR

Year	Domestic Companies		MNCs	
	TIE	FCCR	TIE	FCCR
1998	10.46	2.90	32.83	28.98
1999	6.72	2.90	40.69	7.20
2000	8.66	2.94	56.12	48.49
2001	6.89	3.23	27.23	18.21
2002	4.54	1.98	38.94	28.28
2003	3.98	2.06	523.06	522.13

2004	4.06	2.26	16.08	12.56
2005	8.11	5.16	24.78	95.49
2006	5.01	1.44	50.64	15.25
2007	4.51	2.27	84.11	42.67
2008	3.73	2.58	156.64	95.96
2009	9.01	3.62	357.92	123.14
2010	12.51	7.81	465.64	283.44
2011	10.75	8.99	580.65	486.84
2012	8.21	6.44	168.18	136.83
2013	10.16	7.45	205.38	121.27
2014	12.91	6.50	1064.14	462.69
2015	44.64	5.88	1112.85	730.29
2016	6.13	5.33	1050.82	1027.36
2017	6.23	2.53	760.04	1057.44
G. Mean	9.36	4.22	340.84	263.18

Note: Data compiled by the researcher

Source: Derived from table no. A2 to A8

4.1.1 Measuring Significance of Difference in Short-Term Solvency (TIE & FCCR)

Table 2. T-test for testing hypothesis one (H_0-1)

Ratio	**Coverage ratios of Domestic Companies**			**Coverage ratios of MNCs**			**t statistic with p value**	**Decision about H_0-1**
	S.D	S.E. of mean	95% C.I. of mean	S.D	S.E. of mean	95% C.I. of mean		
TIE	8.772	1.9616	5.25532 -13.4667	383.7	85.818	161.21 - 520.45	-3.861(0.00)	Rejected
FCCR	2.272	0.5081	3.14986 -5.27714	336.8	75.329	109.559 -424.893	-3.491(0.00)	Rejected

Note: Figure in parenthesis indicate probability

Source: Authors' calculation through Gretl

From the above table it is seen that null hypothesis (H_0-1) is rejected in both cases which means that domestic companies' short term solvency significantly differs from that of MNCs.

4.2 Comparison of Yearly Average DFL Between Domestic Companies and MNCs

There are three measurements of Degree of Financial Leverage (DFL)-a) Capital Structure measure b) Financing Cost Structure measure and c) General measure. In this section comparison of yearly average of DFL between domestic companies and MNCs is shown in a comprehensive way by incorporating all three measures of DFL. Average of yearly DFL of seven companies of each category is determined to reach at average DFL in each year. From Table 2 it is observed that DFLs of domestic companies were higher than that of MNCs in all three measures of DFL in all the years.

Table 3. Comparison of average DFL

Year	**Domestic Co.**			**MNCs**		
	DFL(CS)	DFL(FS)	DFL(General)	DFL(CS)	DFL(FS)	DFL(General)
1998	0.17	0.46	4.19	0.06	0.14	1.10
1999	0.16	0.53	2.02	0.06	0.16	1.13
2000	0.13	0.55	2.21	0.04	0.09	1.05
2001	0.15	0.56	2.38	0.03	0.09	1.06
2002	0.16	0.60	2.48	0.02	0.09	1.08
2003	0.16	0.65	2.13	0.03	0.18	0.89
2004	0.19	0.70	1.76	0.04	0.18	0.90
2005	0.19	0.72	2.12	0.05	0.20	1.25
2006	0.14	0.65	1.96	0.04	0.28	1.11
2007	0.11	0.62	2.02	0.03	0.19	1.17
2008	0.09	0.70	1.63	0.03	0.21	1.12
2009	0.09	0.78	1.61	0.02	0.06	1.04
2010	0.09	0.67	1.58	0.01	0.01	1.00
2011	0.08	0.57	1.58	0.01	0.01	1.01
2012	0.08	0.57	1.63	0.01	0.03	1.02
2013	0.08	0.65	1.59	0.00	0.02	1.02

2014	0.07	0.46	1.63	0.00	0.01	1.02
2015	0.10	0.45	1.94	0.01	0.01	1.02
2016	0.25	0.69	3.12	0.05	0.12	1.12
2017	0.15	0.64	2.12	0.04	0.16	1.06
G.Mean	**0.13**	**0.61**	**2.09**	**0.03**	**0.12**	**1.06**

Source: Derived from Table A1, A6 & A7

4.2.1 Measuring Significance of Difference in Degree of Financial Leverage (DFL)

Table 4. T-test for testing hypothesis two (H_0-2)

Ratio	**Coverage ratios of Domestic Companies**			**Coverage ratios of MNCs**			**t statistic with p value**	**Decision about H_0-1**
	S.D	S.E. of mean	95% C.I. of mean	S.D	S.E. of mean	95% C.I. of mean		
DFL (CS)	0.048	0.010	0.10949-0.154502	0.018	0.004	0.02029-0.0377095	8.934(0.00)	Rejected
DFL (FS)	0.091	0.020	0.56813-0.65386	0.081	0.0183	0.07368-0.15031	18.16 (0.00)	Rejected
DFL (Gen.)	0.629	0.140	1.7906 -2.3794	0.083	0.0186	1.01945 -1.09755	7.234(0.00)	Rejected

Note: Figure in parenthesis indicate probability

Source: Authors' calculation through Gretl

From the above table it is seen that null hypothesis (H_0-2) is rejected in all three cases of DFL which means that domestic companies' degree of indebtedness significantly differs from that of MNCs.

4.3 Impact of DFL on Coverage Ratios

Ordinary Least Square method has been used to measure the impact of different measures of DFL on TIE and FCCR. Year-wise data was used in the analysis. Average DFL of each year is determined by taking the arithmetic mean of all seven companies' DFL. TIE ratio and FCCR of each year is also determined by using the data of all seven companies.

4.3.1 Impact of DFL on Short-Term Solvency of Domestic Companies

Table 5 depicts the impact of DFL on short term solvency measured by coverage ratios of domestic companies through multiple linear regressions. From coefficient table it is seen that all three DFL measures exert negative impact on TIE ratio. Only DFL (FS) has significant

influence on TIE ratio. If degree of indebtedness increases by 1 or 100% in financing cost structure measure then TIE would decline by 52.42 times. In terms of capital structure and general measure the decline of TIE would be 11.54 and 2.69 times respectively.

Table 5. Model 1-Dependent variable: TIE_Local

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	Decision (H_0-3)
Constant	48.5398	17.6406	2.7516	0.01419**	
DFL_CS	-11.5471	58.9053	-0.1960	0.84706	Rejected
DFL_FS	-52.4273	24.736	-2.1195	0.05004*	Accepted
DFL_General	-2.69616	4.61698	-0.5840	0.56739	Rejected

Note: **Significant at 5%; *Significant at 10%

Source: Authors' own computation done on Gretl

From Table 6 it is seen that all three DFL measures exert negative impact on FCCR ratio but no DFL measure has significant influence and H_0-3 is rejected. If degree of indebtedness increases by 1 or 100% in financing cost structure measure then FCCR would decline by 3.22 times. In terms of capital structure and general measure the decline of FCCR would be 15.51 and 0.56 times respectively.

Table 6. Model 2-Dependent variable: FCCR_Local

	Coefficient	Std. Error	t-ratio	p-value	Decision (H_0-3)
Constant	9.41434	4.84943	1.9413	0.07004*	
DFL_CS	-15.5186	16.1932	-0.9583	0.35215	Rejected
DFL_FS	-3.2244	6.79997	-0.4742	0.64178	Rejected
DFL_General	-0.56704	1.26922	-0.4468	0.66103	Rejected

Note: *Significant at 10%

Source: Authors' own computation done on Gretl

From Table 7 it is seen that all three DFL measures exert negative impact on TIE ratio of MNCs but no DFL measure has significant influence. If DFL increases by 1 or 100% in financing cost structure measure then TIE would decline by 17.65 times. In terms of capital structure and general measure the decline of TIE would be 98.83 and 40.86 times respectively

Table 7. Model 3-Dependent variable: TIE_MNC

	Coefficient	Std. Error	t-ratio	p-value	Decision (H_0-3)
Constant	999.698	1159	0.8625	0.40113	
DFL_CS	-98.8314	698.529	-0.1415	0.88925	Rejected
DFL_FS	-17.65	15.3301	-1.1513	0.26651	Rejected
DFL_General	-40.8616	115.036	-0.3552	0.72707	Rejected

Source: Authors' own computation done on Gretl

From Table 8 it is seen that DFL (FS) and DFL (general) measures exert negative impact on FCCR ratio of MNCs but no DFL measure has significant influence thus rejecting H_0-3. If degree of indebtedness increases by 1 or 100% in financing cost structure measure then FCCR would decline by 117.82 times. In terms of capital structure and general measure the decline of FCCR would be 319.03 and 57.58 times respectively.

Table 8. Model 4-Dependent variable: FCCR_MNC

	Coefficient	Std. Error	t-ratio	p-value	Decision (H_0-3)
Constant	916.248	1103.22	0.8305	0.41846	
DFL_CS	319.037	664.906	0.4798	0.63785	Rejected
DFL_FS	-117.82	145.922	-0.8074	0.43127	Rejected
DFL_General	-57.5894	109.499	-0.5259	0.60615	Rejected

Source: Authors' own computation done on Gretl

4.4 Fitness of the Models

Several tests have been performed to judge fitness of the models. Multicollinearity problem is judged by VIF values and none of the model has this problem as VIF values of all independent variables are less than 10. There is no heteroscedasticity problem also as p value of both White's test and Breusch-Pagan test is more than 0.05. Residuals of all the models are normally distributed as p value of Chi-square statistic of all the models are more than 0.05. Moreover, there is no serial correlation as Durbin-Watson statistic of all the models are near 2.

Table 9. Model diagnostics

Tests	Model 1	Model 2	Model 3	Model 4
Multicollinearity by VIF values	DFL(CS): 2.410 DFL(FS): 1.542 DFL(Gen.) :2.53	DFL(CS): 2.410 DFL(FS): 1.542 DFL(Gen.) 2.534	DFL(CS): 2.316 DFL(FS): 2.158 DFL(Gen.): 1.26	DFL(CS): 2.316 DFL(FS): 2.158 DFL(Gen.): 1.26
Heteroscedasticity	White's test: 11.8106 (0.22) Breusch-Pagan test: 18.45(0.35)	White's test: 13.917 (0.125) Breusch-Pagan test: 1.474(0.68)	White's test: 9.4962 (0.392) Breusch-Pagan test: 2.1421(0.54)	White's test: 9.3715 (0.403) Breusch-Pagan test: 4.3963(0.22)
Normality	Chi-square(2) = 21.5276(0.211)	Chi-square(2) = 4.88904 (0.086)	Chi-square(2) = 7.26012 (0.096)	Chi-square(2) = 12.0473(0.38)
Autocorrelation by Durbin-Watson	1.90	1.809648	1.747702	1.829241
F(3, 16)	23.74533(0.00)	1.512113(0.249)	1.396251(0.28)	0.389430(0.762)
R-squared	0.308066	0.220893	0.207480	0.368049
Akaike criterion	143.2314	91.57781	297.0851	295.1118

Source: Authors' own computation done on Gretl

5. Conclusion

Degree of indebtedness can create financial distress. From discussion of results it is evident that domestic companies' degree of indebtedness is significantly higher than that of MNCs. Corporate solvency depends on fulfillment of fixed financial obligations in due time by the firms. Domestic companies' ability to fulfill fixed financial obligation is significantly lower than MNCs, which is revealed through analysis of two coverage ratios. Margin of safety for MNC's creditors are much higher than that of domestic firms. MNCs can use more debt financing to take advantage of financial leverage. Moreover, due to high debt servicing capability, MNCs cost of financing would be lower than domestic firms. Further researches can be done on activity of assets and long term solvency of manufacturing as well as service oriented firms.

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Appendices

Table A1. FFCBC, VFCBC, FFCBT and EDAT of companies

	Domestic companies (in million Tk.)				**MNCs(in million Tk.)**			
Year	**AFFCBC**	**AVFCBC**	**FFCAT**	**EDAT**	**AFFCBC**	**AVFCBC**	**FFCAT**	**EDAT**
1998	133.14	878.09	30.62	40.85	44.46	633.62	19.44	116.62
1999	101.26	971.54	40.93	48.54	53.52	682.57	21.09	88.64
2000	70.42	1079.02	51.16	47.21	43.97	759.47	14.51	132.30
2001	133.24	1204.57	55.31	52.36	39.05	856.54	12.45	143.72
2002	175.88	1335.90	60.01	51.34	22.70	951.40	11.35	166.88
2003	256.92	1454.06	61.83	44.25	61.18	1041.60	46.57	160.03
2004	348.78	1583.26	72.36	47.82	91.18	1090.18	34.17	173.80
2005	340.02	1877.94	84.48	51.19	74.92	1086.70	35.23	124.80
2006	322.85	2279.38	87.24	79.87	55.33	1152.94	39.16	76.00
2007	346.19	2568.13	106.22	79.41	35.93	1317.56	26.72	122.69
2008	362.06	2938.60	125.86	66.13	36.95	1586.09	25.41	185.15

2009	659.58	3495.79	140.57	80.61	37.74	1923.39	17.75	368.53
2010	724.90	4533.48	183.41	91.22	29.97	2406.60	2.55	466.05
2011	467.30	5739.27	169.79	124.21	25.29	2704.85	14.77	809.31
2012	450.38	6590.46	206.29	153.34	24.60	2898.57	25.46	629.35
2013	421.91	7454.36	184.96	180.44	22.31	3414.29	13.63	668.08
2014	413.41	8362.02	186.85	337.11	21.31	3803.16	23.84	1283.55
2015	452.25	9425.65	171.59	451.27	33.39	4113.28	17.32	1183.98
2016	460.25	9515.20	174.28	459.81	34.45	4203.22	16.20	1061.80
2017	464.93	9561.41	176.47	462.36	38.74	4287.29	18.30	1110.65

Source: Compiled from Annual Reports of Sample Firms (1998-2017)

Table A2. EBDIT of domestic companies (In million Tk.)

Year	**AAL**	**AFL**	**AMCL**	**BPL**	**CCL**	**POC**	**SPL**
1998	42.07	71.98	42.80	578.81	114.24	207.12	435.92
1999	43.27	74.95	95.13	604.63	86.50	236.05	545.60
2000	38.13	85.51	99.11	679.73	163.48	245.65	621.10
2001	52.21	82.85	116.43	699.82	209.24	289.25	795.60
2002	66.25	84.53	124.44	621.24	90.38	220.17	1047.92
2003	103.01	91.24	148.37	504.90	65.76	207.79	1359.26
2004	87.47	137.53	161.96	572.72	31.54	219.04	1549.76
2005	106.64	165.71	161.73	834.97	74.35	235.39	1923.42
2006	116.44	194.65	151.95	937.93	115.06	312.44	1968.90

2007	106.30	412.52	158.10	811.80	133.34	370.28	2481.51
2008	154.91	512.77	162.15	1110.96	33.16	471.48	2767.00
2009	431.13	636.84	174.69	1443.04	255.19	743.78	3560.96
2010	683.60	695.84	199.77	2304.10	362.11	1009.03	3862.09
2011	934.67	891.58	224.43	2732.34	343.08	1332.02	4552.07
2012	465.81	995.08	257.00	3130.75	550.84	2341.85	5430.72
2013	458.98	968.82	261.47	3278.25	677.80	3122.90	5962.43
2014	480.80	975.23	240.35	3562.36	537.32	3037.07	6737.11
2015	472.75	942.52	258.22	3758.83	1074.58	2813.54	8992.74
2016	469.73	945.67	260.49	3642.14	927.21	2956.05	7448.25
2017	475.15	951.22	231.53	3509.73	842.62	2738.03	7261.21

Source: Compiled from Annual Reports of Firms (1998-2017) Note: EBDIT = EBIT + Depreciation

Table A3. EBDIT of MNCs (In million Tk.)

Year	**BSC**	**BATB**	**GSK**	**HCL**	**LBD**	**RBB**	**SBD**
1998	209.26	1069.54	163.06	239.08	218.68	51.56	229.76
1999	265.82	685.00	131.50	318.49	271.00	62.91	159.22
2000	341.57	950.64	106.97	620.48	330.49	98.30	172.52
2001	382.87	1392.21	120.00	330.52	359.31	73.42	193.21
2002	430.46	1368.89	134.66	114.06	392.80	-10.23	194.29
2003	469.86	1406.56	137.38	216.81	376.64	56.90	191.54
2004	302.38	1340.76	244.26	312.26	328.58	73.40	128.42

2005	347.47	932.14	119.65	477.33	357.63	114.38	122.44
2006	430.48	1207.53	41.21	896.18	475.97	176.10	275.61
2007	522.91	1718.48	130.75	1095.95	486.57	240.25	332.07
2008	654.34	2674.83	261.94	1152.04	594.19	283.06	424.34
2009	667.37	3186.03	491.27	1681.15	909.90	309.51	655.10
2010	787.69	4608.55	607.27	1850.64	1037.42	235.95	2318.29
2011	879.73	5689.52	536.49	1327.99	1078.37	253.09	582.31
2012	1045.34	7313.51	502.93	2042.68	815.27	250.75	786.91
2013	1226.86	9825.34	827.54	2274.74	1161.98	258.54	620.36
2014	1103.52	11791.96	1305.28	1911.71	1016.85	340.38	622.50
2015	1324.59	13563.25	1260.12	2178.33	1044.05	448.01	648.13
2016	1235.50	10584.50	1248.42	1861.92	1151.00	348.93	618.40
2017	1290.61	8022.01	1349.74	1766.55	1156.82	442.93	633.71

Source: Compiled from Annual Reports of Sample Firms (1998-2017) Note: EBDIT = EBIT + Depreciation

Table A4. Repayment of leases and loans by domestic companies (in million Tk.)

Year	AAL	AFL	AMCL	BPL	CCL	POC	SPL
1998	8.67	11.50	16.38	94.56	49.31	1.20	27.92
1999	0.00	34.00	31.21	0.00	9.36	0.00	330.04
2000	12.20	7.89	33.08	0.00	16.73	0.00	173.16
2001	0.00	12.77	36.96	0.00	17.83	0.00	136.96
2002	0.00	13.48	154.09	0.00	23.34	0.00	521.60

2003	0.54	14.28	180.89	192.79	93.18	0.00	136.96
2004	0.00	5.29	18.71	0.00	5.48	0.00	182.19
2005	0.00	28.75	0.00	180.51	27.80	525.00	39.57
2006	32.19	18.39	2.32	619.14	132.53	425.00	323.92
2007	0.00	29.76	42.38	395.23	36.38	0.00	334.46
2008	0.00	5.50	50.88	209.11	10.90	0.00	237.05
2009	0.00	0.00	1.96	55.87	124.45	0.00	1440.75
2010	496.00	0.00	8.04	22.78	0.00	0.00	1140.42
2011	0.00	0.00	14.30	12.08	0.00	0.00	475.31
2012	0.00	0.00	75.47	235.25	0.00	0.00	1178.78
2013	0.00	137.39	77.57	228.03	0.00	0.00	1421.07
2014	135.03	0.00	42.87	340.76	11.68	0.00	1526.48
2015	0.00	377.33	53.09	0.00	63.89	4405.88	303.34
2016	0.00	128.09	33.12	8.01	5.75	0.00	275.23
2017	69.53	50.70	4.04	3.94	32.10	2.54	64.24

Source: Compiled from Annual Reports of Sample Firms (1998-2017)

Table A5. Repayment of leases and loans by MNCs (in million Tk.)

Year	BSC	BATB	GSK	HCL	LBD	RBB	SBD
1998	0.00	150.63	0.00	0.00	24.35	0.00	114.75
1999	10.00	150.13	0.00	0.00	15.49	42.27	28.70
2000	0.00	150.47	0.00	0.00	186.70	0.18	38.52

2001	0.00	350.30	0.00	0.00	164.06	0.00	0.00
2002	0.00	173.33	0.00	0.00	175.90	9.14	69.79
2003	0.25	0.37	0.00	76.98	0.00	0.00	0.00
2004	1.29	293.84	0.00	287.16	1.64	0.00	0.00
2005	107.60	0.00	0.14	111.41	59.35	0.00	0.00
2006	2.22	72.13	2.68	881.23	33.99	0.00	0.00
2007	1.79	805.10	1.48	53.07	1.23	0.00	0.00
2008	0.23	0.00	3.31	50.23	0.65	0.00	0.00
2009	0.00	0.00	1.16	823.49	2.23	0.00	1001.41
2010	0.00	0.00	1.30	0.00	0.00	0.00	311.37
2011	0.00	17.09	4.22	0.00	0.00	0.00	0.00
2012	0.00	17.03	6.89	0.00	0.00	0.00	0.00
2013	0.00	10.34	7.74	48.86	0.00	0.00	468.65
2014	0.00	7.54	11.09	0.00	0.00	0.00	0.00
2015	4.18	3147.61	9.91	0.00	0.00	0.00	199.66
2016	66.17	0.00	5.42	0.00	0.00	0.00	28.72
2017	0.00	12.51	4.23	0.00	0.00	0.00	20.16

Source: Compiled from Annual Reports of Sample Firms (1998-2017)

Table A6. Interest expenses of domestic companies (in million Tk.)

Year	**AAL**	**AFL**	**AMCL**	**BPL**	**CCL**	**POC**	**SPL**
1998	16.93	47.32	5.02	101.83	6.56	66.22	12.81

1999	16.47	44.59	29.65	118.96	4.22	70.54	51.47
2000	18.81	56.62	34.94	159.94	4.48	74.15	60.82
2001	20.87	58.21	45.05	179.52	11.70	78.68	48.98
2002	25.81	60.27	51.34	170.99	18.04	76.32	75.70
2003	27.79	59.53	65.32	156.60	18.58	77.71	124.49
2004	30.76	70.45	74.56	172.05	24.92	85.08	108.67
2005	34.99	80.96	76.64	221.95	21.21	87.66	106.45
2006	35.91	104.94	79.70	253.32	17.34	85.72	139.86
2007	42.54	176.39	86.83	254.74	19.62	83.59	236.85
2008	49.16	254.51	89.89	249.65	25.61	85.36	351.87
2009	75.06	333.52	98.02	289.43	8.39	80.03	397.14
2010	30.51	276.62	106.34	508.43	10.82	89.09	308.86
2011	40.87	422.06	112.80	567.65	23.24	112.82	268.85
2012	55.85	501.85	134.78	645.41	80.08	111.74	433.58
2013	76.98	469.12	142.74	609.02	93.93	106.54	325.28
2014	118.66	543.87	122.29	702.78	48.22	114.53	169.18
2015	172.60	564.60	116.65	386.24	117.72	112.97	34.31
2016	153.41	530.22	118.73	429.93	96.60	109.71	183.44
2017	164.20	542.09	132.73	493.69	104.15	112.71	173.36

Source: Compiled from Annual Reports of Sample Firms (1998-2017)

Table A7. Interest expenses of MNCs (in million Tk.)

Year	BSC	BATB	GSK	HCL	LBD	RBB	SBD
1998	1.46	131.53	0.00	18.62	22.29	5.96	16.38
1999	1.39	131.91	0.00	18.62	30.36	5.99	13.85
2000	1.81	71.14	0.00	18.62	25.67	1.38	10.09
2001	5.57	28.05	0.00	18.62	40.07	1.37	15.21
2002	2.78	27.68	0.00	18.62	22.14	2.14	17.67
2003	5.58	115.34	0.00	145.25	12.73	0.02	9.23
2004	10.48	122.54	0.00	124.49	15.20	0.00	7.93
2005	11.65	133.05	1.56	145.50	13.27	0.00	24.20
2006	2.59	160.50	3.83	108.40	4.39	0.00	96.37
2007	2.89	45.57	4.58	64.04	2.03	0.00	142.22
2008	5.04	3.09	8.43	79.30	0.98	0.00	154.75
2009	3.92	3.62	0.83	20.73	0.97	0.00	126.76
2010	3.76	4.73	0.82	8.27	1.39	0.00	5.61
2011	21.21	142.47	3.76	0.30	6.32	0.00	9.08
2012	4.44	184.44	5.15	3.98	8.63	0.00	69.60
2013	6.05	88.80	4.27	8.56	2.97	0.00	43.44
2014	4.95	187.50	3.09	0.21	1.29	0.00	71.73
2015	4.31	142.56	3.31	1.94	0.10	0.00	66.15
2016	4.11	168.47	4.03	2.26	1.61	0.00	52.77
2017	5.93	151.10	4.25	1.86	4.61	0.00	44.28

Source: Compiled from Annual Reports of Sample Firms (1998-2017)

Table A8. Lease rental of companies (in million Tk.)

Year	RBB	AAL	AMCL	BPL	CCL	SPL
1998	0.00	0.00	0.92	0.00	0.16	7.20
1999	0.00	0.00	5.64	27.54	0.00	6.20
2000	0.00	0.00	14.35	43.84	0.00	4.71
2001	0.00	0.00	19.22	56.86	0.00	2.43
2002	0.00	0.00	16.44	60.24	0.00	1.02
2003	0.00	0.82	16.45	77.51	0.00	1.13
2004	0.00	1.34	10.25	74.36	0.00	2.84
2005	0.00	1.52	2.91	0.00	0.00	3.28
2006	0.00	1.48	0.00	0.00	0.00	3.70
2007	0.00	1.80	0.00	0.00	0.00	3.00
2008	0.00	1.20	0.00	0.00	0.00	0.31
2009	0.00	1.73	0.00	0.00	0.00	0.50
2010	0.00	0.00	0.00	0.00	0.00	0.97
2011	10.95	0.00	0.00	0.00	0.00	1.06
2012	12.18	0.00	0.00	0.00	0.00	1.16
2013	12.18	0.00	0.00	0.00	0.00	1.36
2014	32.79	0.00	0.00	0.00	0.00	1.37
2015	21.31	0.00	0.00	0.00	0.00	1.37
2016	18.30	0.00	0.00	0.00	0.00	1.52
2017	23.41	0.00	0.00	0.00	0.00	1.65

Source: Compiled from Annual Reports of Sample Firms (1998-2017)