

The Determinants of Capital Structure: Analysis of Non Financial Firms Listed in Karachi Stock Exchange in Pakistan

Jasir Ilyas*

Introduction

The capital structure of a company is a particular combination of debt, equity and other sources of finance that it uses to fund its long-term asset. The key division in capital structure is between debt and equity. The proportion of debt funding is measured by gearing or leverages. There are different factors that affect a firm's capital structure, and a firm should attempt to determine what its optimal, or best, mix of financing. But determining the exact optimal capital structure is not a science, so after analyzing a number of factors, a firm establishes a target capital structure which it believes is optimal. Capital structure policy also involves a trade-off between risk and return. Using more debt raises the risks in the firm's earnings stream, but a higher proportion of debt generally leads to a higher expected rate of return and the higher risk associated with greater debt tends to lower the stock's price. At the same time, however, the higher expected rate of return makes the stock more attractive to investors, which, in turn, ultimately increases the stock's price. Therefore, the optimal capital structure is the one that strikes a balance between risk and return to achieve our ultimate goal of maximizing the stock prices.

Capital structure is basically permanent long term financing of a firm including long term, common stock and preferred stocks and retain earning. Although there has been plenty of research focusing on the

* Jasir Ilyas, Lecturer, Qurtuba University of Science and IT, D.I.Khan, Pakistan

primary determinants of capital structure, there is still disagreement regarding which factors significantly affect a firm's capital structure. This study supplements the work of Attaullah Shah and Tahir Hijazi¹ on determinants of capital structure by using the latest data, increased numbers of variables and with sector wise analysis. This study attempts to analyze determinants of capital structure in a systemic manner and provides practical and applicable guideline for any one who wants to have insight of the topic. Research introduces the main determinants of capital structure and their influencing factors. In general, it covers each and every aspect of the subject but specifically it is related to capital structure of non financial firms listed in Karachi stock exchange and their financing decision making. It explores a variety of factors that influence the determinants of capital structure and manipulate the financial decision taken by the manager as well the success or the failure to these decisions.

Literature Review

The main result of MM's² irrelevance theorem stated that, under certain conditions, the value of the firm is independent of its capital structure. They argued that a firm's investment policy has an important effect on firm's value, whereas the financing decision is secondary. The theorem was based on the following (explicit and implicit) assumptions; the firm's manager is selfless, always acting in investors' interests (no agency costs); information about the firm is symmetrically distributed between managers and investors; debt is risk-free. MM also ignored the effects of corporate taxes.

Jensen and Meckling (1976)³ were the pioneers of agency cost modeling in relation to the capital structure. They considered a manager who gains utility from both the wealth he derives from the firm, and the

private benefits he gains. JM assumed a direct trade-off between firm value and managerial private benefits. *Damadoran* (2001)⁴ argue that firms should determine the optimal structure by trading off the costs and benefits of debt. However, in reality, firms may use one of the following methods; a) choosing debt and equity according to their life cycle. b) Benchmarking against other firms in their industry. c) Strong preference for a type of financing (pecking order theory). *Levy* (1998)⁵ and *Opler* (1997)⁶ have attempted to develop a formula for determining the optimal capital structure. Both methods form a type of sensitivity analysis, whereby the value effects of different factors of debt and equity financing are considered.

In 1984 *Mayer and Mijlf*⁷ suggested a pecking order for firm financing decisions based on the idea that information asymmetries exist between managers and investor. This theory states that managers like to use internally generated cash to fund new projects. If this cash is not available they want to issue in order of riskiness: from safe to risky. Thus straight debt would be issued before preferred equity, which is before common equity. *Ross* (1977)⁸ considers the signaling role of debt issuance. In his model, managerial quality is private information. A low ability manager will not be able to repay a high level of debt, and will therefore face bankruptcy. A high ability manager will be able to repay a high level of debt. In effect, the high ability manager is using a high debt level to demonstrate his confidence in firm prospects to the market.

Research Methodology

This research study is based on the data taken from the State Bank of Pakistan publication “Balance Sheet Analysis of Joint Stock Companies Listed on The Karachi Stock Exchange Volume-II 2000-2005.”⁹ The research initially included all 443 non financial firms listed in Karachi

Stock Exchange. Financial sector firms were excluded on the basis of the fact that their nature of capital structure of financial firms is different as compared to non financial firms. But among these 443 firms 79 firms were excluded for the reason that they did not qualify on our criteria or due to incomplete data. Finally this study takes 364 non financial firms in consideration to analysing the determinants of capital structure. Time period of the data is from 2000 to 2005.

Hypotheses: Total eight variables have been used in this study. The only dependent variable of the study is leverage and independent variables were hypothesized as follow:

H1: A firm with higher profitability's is expected to have lower debt ratio.

H2: A firm with large size will have higher debt ratio.

H3: A firm with higher percentage of fixed assets will have higher debt ratio.

H4: A firm with higher growth is expected to have higher debt ratio.

H5: A firm with higher non-debt tax shields is expected to have lower debt ratio.

H5: A firm with higher taxes will have higher debt ratio

H6: A firm with higher degree of financial leverage is expected to have lower debt ratio.

To estimate panel data model this research used two alternatives regression methods i.e. ordinary least square regression method and weighted least square method. The advantage of using panel data over cross-sectional or time series data lies in the fact that it usually gives a large number of observations, which increases the degrees of freedom and hence improving the efficiency of the econometric estimates. Furthermore, the most important advantage of using the panel data

approach was that it accounted for the unobserved heterogeneity among the cross-sectional firms over time in the form of unobserved firm-specific effects. The variables involved of the model in linear equation form were put as follows:

$$D/E = \alpha + \beta_1 (ROI) + \beta_2 (SZ) + \beta_3 (TANG) + \beta_4 (G) + \beta_5 (NDTS) + \beta_6 (TX) + \beta_7 (DFL) + \varepsilon_i$$

Where as

D/E = measure of Leverage

ROI = Profitability's

SZ = Size

TG = Tangibility of assets

G = Growth Opportunities

NDTS = Non debt tax shield

TX = Taxes

DFL = Degree of leverage

ε = the error term

Research Analysis & Findings

In all firm's analysis, study includes all the non financial firms listed in Karachi Stock Exchanges which comprises of 364 firms in total. During the course of analysis once the data was entered in SPSS two alternative methods of panel data regression were performed i.e. ordinary least square method and weighted least square method. Ordinary least square regression and weighted least squared regression on data of the study give following results:

Table: 1.1 Regression Analysis Outputs

SECTOR	R-SQUARE		ADJUSTED R-SQUARE		STANDARD ERROR		F-STATISTIC	
	OLS	WLS	OLS	WLS	OLS	WLS	OLS	WLS
All firms	0.245	0.996	0.242	0.996	0.871	1.060	100.6	77259
Cement	0.396	0.925	0.351	0.920	0.808	1.004	8.811	167.53
Chemicals	0.455	0.999	0.434	0.999	0.754	1.200	21.26	74162
Engineering	0.411	0.994	0.391	0.994	0.782	1.007	21.31	5467.8
Fuel & energy	0.340	0.914	0.304	0.909	0.837	1.130	8.802	180.21
Jute	0.630	0.991	0.460	0.986	0.745	3.320	3.890	244.47
Miscellaneous	0.358	0.999	0.338	0.999	0.815	1.050	18.01	86228
Others textile	0.233	0.999	0.163	0.999	0.920	1.370	3.304	41092
Paper & board	0.531	0.953	0.460	0.946	0.742	1.240	7.438	133.06
Sugar	0.494	0.991	0.476	0.991	0.725	1.275	27.31	3174.7
Textile	0.177	0.537	0.171	0.534	0.911	0.827	25.99	140.18
Tobacco	0.781	0.996	0.685	0.994	0.572	1.840	8.161	569.27
Transp. & comm.	0.803	0.999	0.754	0.999	0.503	2.230	16.30	65807
Vanaspati & allied	0.755	0.992	0.693	0.990	0.561	1.031	12.30	498.16

When weighted least square regression method was applied on data of the study results were some what ambiguous but this research study reports those outputs as it is. Before conducting weighted least square regression, study explains the need of weighted least square regression that is this method is used because the standard error of the data was no constant which is necessary condition for the linear regression.

Overall Overview of the Findings

Analysis of all firms shows that total 24% variation in dependent variable i.e. leverage or debt to equity is related to the values of all seven independent variables of the study as evidenced in R-square value. In other words 24 % variation in leverage decision of the firm is explained by profitability, size, tangibility, growth, non debt tax shield, taxes and degree of financial leverage position of the firm. Rest of the

76% variation is because of extraneous factors. Over all significance of the model or goodness of fitness of the model is relatively low mainly because of the lack of availability of data. The validity of the model increases in weighted least square regression method. In weighted least square regression 99% variation in dependent variable is explained by independent variables of the model.

Slope (beta) of *Profitability* is less than zero suggesting to reject null hypothesis of the study i.e. there is positive relationship between profitability and leverage of the firm and asking to accept the hypothesis that with increase profitability of the firm, the leverage or debt to equity of the firm reduces. With one unit increase in profitability, there is 0.44 unit's reduction in debt to equity of the firm. This hypothesis is also supported with 99% confidence level. Slope of *Size* of the firms also suggest accepting the null hypothesis and rejecting the hypothesis that with increase in size of the firm, the leverage of the firm also increases but this test is not statistically significant. But in weighted least square (WLS) this test is significant statistically. One reason for this conflict is huge variance in this variable, as ordinary least square (OLS) does not consider the weightage of variance, so the same problem was resolved in the WLS.

About *Tangibility* of the firm, slope or beta suggest rejecting null hypothesis that is there is negative relationship between tangibility and firms leverage and accepting the hypothesis that they are positively correlated. In both regression techniques this test is significant. *Growth* of the firm is negatively related to debt to equity ratio in ordinary least square regression and is positively related to debt to equity ratio in weighted least square regression. But statistically both of techniques of regression are not significant.

According to OLS method *Non Debt Tax Shield* is positively related to leverage of the firm so accepting the null hypothesis. But it is not significant statistically. In case of WLS method our null hypothesis is rejected so that to accept the hypothesis that there is negative relation between non debts tax shield and leverage of the firm. This test is significant statistically. Both regression techniques suggest to reject the null hypothesis and to accept the hypothesis that with increases in *Taxes*, debt ration of the firm also increases. But this hypothesis is only significant in WLS regression technique.

About the *Degree Of Financial Leverage* as determinant of capital structure, both methods of regressions suggest to reject null hypothesis and accept that with increased degree of financial leverage the debt capacity of the firm decreases but statistically it is only significant in case of WLS regression method. Over all the most important variable of all the independent variables on the basis of both regression techniques is profitability of the firm which has lowest value in all standardized coefficients in the model.

Sector Wise Findings

Cement Sector: This research study took 17 Cement firms out 22 firms listed in Karachi Stock Exchange under consideration as 5 firms failed to qualify the criteria of the study i.e. complete data availability. In cement sector independent variables of the study explain almost 40% variation in the dependent variable leverage of the firm. Where as 60% variation is due to other factors which lie in error terms also know as extraneous factors but validity of the model is very low in general. But in WLS regression the relationship between the dependent and independent variables is even stronger with 92% R-square.

Profitability as in case of all firms, here as well shows negative relationship with the debt of the firm forcing to reject null hypothesis and to accept the fact that with the increase in profitability of the firm, lesser tends to be financed with debt. This fact is tested as significant in both regression techniques. On basis of both regression techniques, slope of the *Size* variables suggests to accept the null hypothesis of the study i.e. with the increase in firm's size, the debt financing of the decreases. But this hypothesis is only statistically significant in case of the WLS.

Growth is positively related to debt to equity ratio of the firm in case of OLS regression but WLS regression favors the hypothesis that growth of the is negatively related to leverage decision of the firms. None of these two regression techniques proved to be significant statistically.

Degree of Financial Leverage as in all firm's analysis here again in this sector proved to be negatively related to debt taking decision of the firm but this hypothesis proved to be significant statistically in both OLS and WLS regression techniques. In cement sector as well *Profitability* proved to be most influencing in the study's model among all other independent variables as depicted in standardized coefficients of the model.

Chemical Sector: Among 34 firms in chemical sector, 31 firms were taken in this research study. In terms of explaining variation in leverage of the firm by independent variables of this study, the chemical sector's R-square (67%) is quite strong thus showing the strength of the model. Result of chemical sector is more valid as compared to cement sector. As before results in WLS are stronger, here 99% variation in dependent variable leverage is caused by the variation in independent variables in the model of the study.

Profitability as expected is negatively related to the leverage decision of the firm resulting in rejection of null hypothesis of the study which states that with increase in profitability of the firm, debt financing also increases. This negative relation ship between the leverage and profitability of the firm is significant in both regression techniques of the study. *Size* as unlikely in cement sector, here in this sector found to be positively related to leverage of the firm. But this relationship is statistically significant only in case of WLS.

As in all firms finding here as well *Tangibility* is found to be positively related to the financing decision of the firm. Leverage capacity of the firm increases with the increase in tangibility of the firm. So study rejects the null hypothesis of the study and accepts the hypothesis in favor of positive relation between the dependent and independent variables.

Engineering Sector: Total 41 engineering firms are listed in Karachi Stock Exchange. This research study includes 37 firms out of these 41 firms. Independent variables of the study in engineering sector explain 41% variation in dependent variable and rest of the variation is due to extraneous factors. However the validity of the model is relatively low. But in WLS the validity of the model increases as 99% variation in leverage decision is due to the variation in independent variables

Profitability as independent variable in both regression methods found to be inversely related to debt to equity ration of the firm. Thus rejecting the null hypothesis and accepting the hypothesis of the study that when firm's profits increase, the firm tends less towards the debt financing. As usual this hypothesis is significant in both regression techniques of the study. Regarding the *Size* of the firm both regression methods suggest to reject the null and accept the hypothesis that with

increase in size of the firm, the debt financing also increases. But none of the regression method proved to be significant about the relationship between size and leverage of the firm.

For *Tangibility* as independent variable, both regression methods suggest to accept the hypothesis that with increases in tangibility of the firm, the debt financing also increases as firm can utilize its assets to secure debt financing. This positive relation is statistically significant in WLS regression method. *Growth* of the firm is positively related to the leverage of the firm in both regression methods suggesting to reject the null hypothesis of the study. But only WLS proved to be significant for this positive relationship between the growth and debt to equity of the firm.

In engineering sector both regression methods suggests accepting the hypothesis of the study that with the increase in *Non Debt Tax Shield* the firm less tends towards the debt financing. WLS give a statistical significance proof for this positive relation between the non debt tax shield and leverage of the firm. As before here as well *Taxes* is found to be positively related to debt financing due to tax deductibility of interest, resulting in rejection of null hypothesis which states inverse relation between the two variables. But it is significant only in WLS regression.

Fuel and Energy Sector: This research study analysis's 21 firms out 28 firms in fuel and energy sector listed in Karachi Stock Exchange. OLS Analysis of this sector shows that the independent variable explain 34% of variation in the dependent variable but overall validity of the model is quite low as depicted in F-statistics. But this validity increases in WLS where independent variables cause 91% variation in leverage of the firm. Both regression techniques used in the study suggests rejecting the null

hypothesis and accepting hypothesis of the study which states that with increase in *Profitability* of the firm, debt financing of the firm reduces. This inverse relationship is statistically significant in both regression techniques. In regard of *Size* as the independent variable, the regression techniques show that there is positive relationship between the size of the firm and leverage of the firm. Thus null hypothesis of the study is rejected and hypothesis which states that there is positive relationship between the size and debt financing of the firm. Statistically this hypothesis is significant for both regression methods.

On the basis of OLS and WLS, the study accepts the hypothesis as expected that states that the debt financing of the firm increases with increase in tangibility of the firm. But this hypothesis is only statistically significant in WLS. In context of *Growth* as independent variable as a determinant of capital structure, analysis shows that growth of the firm is positively related to debt financing.

The analysis of *Degree of Financial Leverage* as an independent variable shows negative relationship between the debt financing of the firm and degree of financial leverage. Both analysis's techniques used in the study suggest that profitability has more influence on leverage decisions of the firm as compared to any other determinant of the capital structure.

Jute Sector: Jute sector has total 6 firms listed in KSE but two firms lacked complete data availability. Therefore four firms are considered in this research study. In Jute Sector the independent variables of the study explains 63% variation in the leverage of the firm but overall model strength is weak. But in WLS regression the validity of the model increases as 99% of variation in the leverage of the firm is explained by independent variable of the study and only 1% are explained by

extraneous factors. In Jute sector as well the analysis suggest to reject the null hypothesis and accept the hypothesis which states that the debt financing of the firm decreases with the increase in the *Profitability* of the firm. This hypothesis is significant only in WLS. On the basis of the two regression techniques the study accepts the null hypothesis of the study which states that with the increase in the *Size* of the firm, debt financing decreases, but this hypothesis fails to be significant statistically in both regression techniques.

Surprisingly in jute sector the analysis suggests that with the increase in the *Tangibility* of the firm, the debt financing reduces. Analysis of the jute sector shows that the *Growth* of the firm is negatively related to the leverage of the firm. As a result we accept null hypothesis of the study which states positive relationship between leverage and growth of the firm.

Regarding the analysis of *Non Debt Text Shield*, the study accepts the hypothesis which states that the debt to equity ratio reduces with the increase in non debt text shield. Unexpectedly in this sector *Taxes* found to be in negative relation with the debt financing of the firm. Thus the study accept the null hypothesis which states that the higher the *Taxes* the lower will be the debt ratio of the firm. This hypothesis is only significant in WLS.

Cotton Textile Sector: In this research study involves 142 cotton textiles firms out of 161 firms in the sector. 19 firms are excluded due to incomplete data or firms with zero sales. Cotton textile sector is one of the important and largest sectors of Pakistan's economy. OLS analysis of this sector shows that 17% variation in the leverage of the firm is explained or related to the variation in the independent variable used in the study. Relatively the strength of the model is good. However, in

WLS analysis, R square is 53%, showing that when there is 1 unit variation in dependent variable, 53% variation is due to independent variables used in the study. Validity of model in WLS analysis is more than the OLS analysis.

Firm's *Profitability* in cotton textile sector is found to be negatively related to firm's leverage, thus rejecting the null hypothesis and accepting the alternative statement of the study which states that higher the firm's profitability, lower is the debt ratio of the firm. On the basis of the both regression techniques the study accepts the null hypothesis of the study which states that with increase in the *Size* of the firm, debt ratio of the firm also increases. This hypothesis regarding the variable is significant in both the regression techniques.

Tangibility as an independent variable in this sector is significant in both regression techniques. The study rejects the null hypothesis to accept the alternative hypothesis stating that tangibility is positively related to the firm's leverage. The study found that with the increase in the *Growth* of the firm, the debt financing of the firm in this sector reduces. Thus the null hypothesis of the study is accepted whereas it is significant in both the regression techniques used in the study.

Non Debt Tax Shield as an independent variable in this model is negatively related to the leverage of the firm as found in analysis of this sector. The null hypothesis of the study is rejected to accept the alternative statement. It is insignificant in OLS analysis. According to the regression techniques used in the study, *Tax Rate* of the firm is positively related to the debt financing of the firm which is stated in the alternative hypothesis of the study against the null hypothesis. However, this variable is insignificant in OLS regression technique.

Regarding *Degree of Financial Leverage*, the OLS analysis shows that it is negatively related to the firm's leverage but in WLS analysis the study found that the degree of financial leverage is positively related to the firm's debt financing. But it was found to be insignificant in this analysis technique. According to the standardized coefficient of the model in this sector, profits plays more important role in firm's leverage decisions as compared to other determinants of the capital structure.

Other Textile Sector: This sector includes all those textile firms which are other than cotton textile firms. In total 21 firms are in this sector but this research study includes 14 firms in its study due to complete data availability. On the basis of OLS analysis of other sector, study found that the variation in firm's leverage is 23% explained by independent variables of the study. However, it was found that the validity of the model is low. In WLS analysis, 99% variation in firm's leverage is due to variation in independent variables of the model. However, the findings of WLS are relatively strong. As expected, *Profitability* of the firm came out to be negatively related to the leverage of the firm. Therefore, the study rejects the null hypothesis and accepts the hypothesis which states that with the increase in firm's profitability the debt of the firm decreases. This hypothesis was statistically significant in both regression analyses. On the basis of OLS, the study accepts the null hypothesis which states that with the increase in the *Size* of the firm, the debt to equity ratio decreases but in WLS analysis the size of the firm is positively related to the firm's leverage. Thus the null hypothesis of the study is rejected. The both tests were insignificant for this variable.

Tangibility of the firm in both regression analysis of other textile sector is found to be negatively related to the leverage of the firm. Thus

the study accepts the null hypothesis of the study. But it is statistically significant only in WLS analysis. The two regression analysis shows that the *Growth* of the firm increases the debt financing of the firm also increases. Thus confirming the positive relation between growth and debt to equity ratio of the firm but this hypothesis is insignificant in OLS analysis. *Non Debt Tax Shield* as expected came out to be negatively related to the firm's debt ratio as the slope of NTDS is negative. Thus it confirms the negative relation of NTDS to debt to equity ratio of the firm resulting in the rejection of the null hypothesis of the study. However, it is significant only in WLS. In context of *Tax Rates* the analysis suggests to accept the null hypothesis of the study which states that the debt financing decreases with the increase in tax rates. However, the tax rate variable in this sector is only significant in the WLS analysis.

Paper and Board Sector: In paper and board sector out of 12 firms 9 firms are used to conduct this study to determine determinants of capital structure. In paper and board sector according to the OLS analysis 23% of total variation in the firm's leverage is linearly related to the values of the independent variables used in the model of the study and the rest of 47% is because of the extraneous factors. But the overall validity of the model is a bit low. The result of WLS analysis shows that 95% variation of the dependent variable is related to independent variables of the study and its validity is more than the OLS analysis.

As usual in this sector as well, the slope of the *Profitability* of the firm as an independent variable suggests accepting the hypothesis that states with an increase in the profitability of the firm, the firm's debt ratio reduces. This variable as an independent variable is significant in both regression analyses. In this sector the analysis shows that the *Size* of the firm is positively related to the debt ratio of the firm, therefore, null

hypothesis is rejected. Size as an independent variable, in this sector is significant for both the regression analysis.

Growth of the firm is positively related to the firm leverage in both the analysis as depicted in the slope of the variable. Hence the study accepts the hypothesis that states with an increase in the growth opportunities of a firm the debt requirement of the firm also increases. This growth variable is significant only in WLS analysis. According to the previous studies the debt financing of the firm increases with an increase of the assets structure of the firm. The analysis of this sector proves that *Tangibility* is positively related to the leverage of the firm. Thus the study rejects the null hypothesis about this variable which states that debt financing decreases with increase in the tangibility of the firm. However, the tangibility as independent variable failed to be significant in any of regression techniques used in the study.

On the basis of the slope of the *Non Debt Tax Shield* as an independent variable, the study accepts the null hypothesis which states that with an increase in non debt tax shield the debt financing of the firm also increases. This variable is found to be significant statistically in both the regression analysis. About the *Tax Rates*, the study accepts the null hypothesis which states that with increase in tax rate, debt ratio of the firm decreases. Tax rate variable is proved to be statistically significant in both the regression analysis of this sector.

About the *Degree of Financial Leverage*, the study accepts the null hypothesis which states that the debt ratio increases with the increase in the degree of financial leverage. In paper and board sector this variable is insignificant in both regression analysis techniques. In OLS analysis the tax rate has lowest value, among all independent variables, of standardized coefficients showing its importance among all

independent variables used in this study. However according to WLS analysis, profitability is found to be most important independent variable in this study, in deciding the leverage decision of the firm for this sector.

Sugar Sector: Sugar industry includes total 35 firms. In this study 34 firms are taken to study determinants of capital structure. In sugar sector of Karachi Stock Exchange, the relationship between independent and the dependent variable is strong on the basis of OLS analysis which shows 49% variation in the leverage of the firm is due to the variation in independent variables used in the study. F statistic or the validity is also a healthy one. In WLS analysis it was found that the relationship is as usual came out to be even stronger as compare to OLS analysis, where 99% of the variation in leverage of the firm was explained by the independent variables of the study. Overall validity of WLS analysis is also very strong.

Profitability as an independent variable is significant in both the regression techniques used in the study. The study accepts the expected hypothesis which states that with increase in profitability of the firm, firm's debt to equity ratio reduces. Regarding the *Size* of the firm as individual variable, the study again rejects the null hypothesis and accepts the alternative hypothesis which states that with the increase in the firm's size, the debt financing of the firm also increases, for the reason that more and more finance is required to the firm. However, it is found that this variable is insignificant in both the regression techniques used in the study. The slope of independent variable namely *Tangibility* accepts the alternative hypothesis which states that the debt financing of a firm increases with the increase in assets structure of the firm. This variable proves to be significant statistically in both regression techniques used in this study. The study accepts the hypothesis regarding

the *Growth* variable of a firm which states that with increase in the growth opportunity of a firm, the debt ratio or the leverage of the firm also increases. However, it was found that growth variable was significant only in WLS regression analysis.

Non Debt Tax Shield as an independent variable in this model is positively related to the leverage of the firm as found in analysis of this sector. The null hypothesis of the study is accepted against the alternative statement. It is insignificant in OLS analysis. In OLS analysis the study rejects the null hypothesis and accepts the alternative statement which states that with increase in the *Tax Rate* the debt ratio of the firm also increases, thus confirming the positive relationship between them. However, this variable is insignificant statistically. In WLS regression analysis the study found taxes negatively related to debt financing of a firm that is with increase in the tax rates the firm reduces its debt financing. The statement is significant statistically in this WLS analysis. This study also accepts the hypothesis which states that the debt ratio of the firm is negatively related to the *Degree of Financial Leverage* as depicted in the slope of the variable degree of financial leverage. This dependent variable is insignificant only in OLS regression. For this sector again, firm's profitability is the most influential variable in determining the capital structure of the firm.

Tobacco Sector: There are four firms in this sector and this research study includes all of them. As the number of firms in this sector is very low, analysis of this sector shows that 78% of dependent variable variation is related to the values of independent variable but the F statistics shows that the overall validity of the model is low. On the other hand, according to the WLS analysis 99% variation in the dependent variable is explained by the values of the independent variables used in

the study. The validity of WLS regression technique was more than the validity of OLS regression technique.

Profitability of the firm in OLS analysis is insignificant variable, and is negatively related to the firm's leverage. But in WLS analysis profitability with same negative relationship to the firm's leverage is statistically significant in the model. *Size* of the firm in this sector is a significant variable according to the both regression techniques, showing negative relationship with the firm's debt ratio. Thus the study accepts the null hypothesis of the study which states that with the increase in the size of the firm the debt financing decreases. The study accepts the hypothesis which states that with the increase in the *Tangibility* of the firm, debt to equity ratio also increases, as found in slope of the tangibility in both analysis techniques. This variable is found to be significant in both the analysis techniques. In OLS analysis the study found that the negative relationship between the *Growth* of the firm and the firm's leverage in this sector but in WLS analysis the study found that there is a positive relationship between the two, thus accepting the hypothesis that with increase in the growth opportunity of the firm, the debt ratio of the firm also increases. The study found that the growth as independent variable is not significant in any of the regression techniques.

For *Non Debt Tax Shield* as an independent variable the study rejects the null hypothesis as the study found that the slope of NDTS variable is directing towards the negative relationship of NDTS and firm's leverage. However, both the tests were significant for the growth variable. The study rejects the null hypothesis regarding the *Tax Rate* and accepts the alternative statement of the study which states that with an

increase in the tax rate the firm's debt also increases. However, only WLS technique proves to be significant for tax rate variable.

In WLS regression, slope of *DFL* suggest the study to reject the null hypothesis due to the negative relationship between the DFL and debt to equity ratio of the firm. But in case of WLS regression the study accepts the null hypothesis which states that DFL is positively related to firm's leverage. None of the regression techniques is found to be significant for DFL as independent variable. According to OLS analysis, Non Debt Tax Shield is most important determinant of capital structure in this sector but in WLS analysis, size of the firm is consider being main determinant of capital structure.

Transport and Communication Sector: Out of the 15 firm, 9 firms were excluded due to incomplete data availability and 6 firms were selected for this research study. The OLS analysis of this sector suggests that 80% of the firm leverage is related to the independent variables used in the study with relatively healthy validity of the model. In WLS analysis 99% of dependent variable variation is explained by the independent variables of the study. Here the validity of the model is very strong. Regarding the *Profitability* of the firm as an individual variable, OLS analysis shows negative relationship between the firm's profitability and the firm's debt financing. Thus study accepts the alternative hypothesis of the study. In WLS analysis profitability is found to be positively related to firm's leverage, thus the study accepts the null hypothesis. However, it was found that in none of the regression techniques, this variable is significant statistically. Regarding the *Size* of the firm, both the regression techniques suggest the acceptance of alternative hypothesis which states the positive relationship of the firm's

size and firm's leverage. The size variable used in both techniques was statistically significant.

As similar to the size of the firm, *Tangibility* of the firm as independent variable is positively related to the firm's leverage. Thus, suggesting the acceptance of the alternative hypothesis of the study. It was significant in both the regression techniques. The slope of the *Growth* variable in both regression techniques suggested the acceptance of alternative hypothesis which states that growth is positively related to the firm's leverage. Similar to the tangibility and size, growth variable is also found to be significant statistically in both the techniques. In context of NDTs the study accepts the null hypothesis of the study which states that higher the *Non Debt Tax Shield* higher is the debt financing of the firm. This variable was also significant in both the regression techniques. *Taxes* of the firm are found to be negatively related to the firm's leverage in this sector. Thus the study accepts the null hypothesis which states that higher the tax rate, higher is the debt financing of the firm. Similar to other variables, taxes variable is also significant in both the regression techniques. The study also found that *Degree of Financial Leverage* is positively related to the debt financing of the firm in both regression techniques, suggesting the acceptance of the null hypothesis of the study. But this variable was significant only in WLS regression. In transport and communication sector, main determinant of capital structure among all independent variables is tax rates.

Vanaspati and Allied Industries Sector: In vanaspati and allied industries, two firms were excluded from the study due to zero sales and rests of the six firms were included in this research study. According to the OLS analysis the study finds that 75% of the dependent variable is due to the values of the independent variables. But in WLS regression

this percentage raised to 99% which means that 99% of variation in firm's leverage is caused by the values of independent variables. Similar to the above findings the validity of WLS regression is more than the validity of OLS regression.

Analysis of this sector shows that firm's *Profitability* is negatively related to the firm's leverage. Increase in the profitability of the firm results in decrease of the debt financing. Therefore the study rejects the null hypothesis and accepts the alternative hypothesis of the study. *Size* of the firm in both of the regression techniques in the sector proves to be significant. It was found that size is positively related to the firm's leverage as stated in alternative hypothesis of the study. Therefore, the study rejects the null hypothesis to accept the alternative statement.

The slope of the *Tangibility* in the model suggest the rejection of null hypothesis and the acceptance of alternative hypothesis which states that with increase in asset structure of the firm higher is firm's debt financing. But it is found that this variable is only significant only in WLS regression technique. Regarding the *Growth* variable in OLS regression analysis the study finds that growth is negatively related to the firms leverage suggesting the acceptance of null hypothesis. But in WLS analysis the study finds there is a positive relationship between the growth and leverage of the firm, suggesting the acceptance of alternative hypothesis which states that higher the growth of the firm, higher is the debt ratio of the firm. Growth variable is insignificant in both of the regression techniques.

The study accepts the null hypothesis regarding NDTS which states that higher the *Non Debt Tax Shield* of the firm greater is the debt financing of the firm. This positive relationship between the NDTS and the firm's leverage is found to be significant statistically in both the

regression techniques. The study accepts the alternative hypothesis against the null hypothesis regarding the *Tax Rate* variable, as the study finds that there is a positive relationship between the tax rate and firm's debt ratio. Tax variable is found to be significant statistically in this sector.

The variable *Degree of Financial Leverage* is found to be insignificant in both regression techniques, showing negative relationship with the firm's leverage. Therefore, the study rejects the null hypothesis against the hypothesis that states that higher the degree of financial leverage higher is the debt financing of the firm. Main determinant of the capital structure in this sector is profitability of the firm as depicted in the standardized coefficient of the model.

Miscellaneous Sector: Total 53 firms in Karachi Stock exchange are categorized as miscellaneous sector by state Bank of Pakistan out of which 39 firms are consider in this study. In miscellaneous sector the independent variables are related to the dependent variable about 35% whereas F-statistic or validity of the model is relatively low. However, this validity increases in WLS analysis where 99% of variation in the dependent variable is related to variation in independent variables. In this sector, analysis suggests to accept the hypothesis of the study which states that the debt financing of the firm decreases with the increase in *Profitability* of the firm. This hypothesis is statistically significant in both regression analyses. The analysis regarding the *Size* as an independent variable shows positive relationship with debt financing of the firm. Thus the null hypothesis of the study is rejected and hypothesis which states that the debt financing increases with the increase in the size of the firm is accepted. This hypothesis is significant in both regression methods.

Tangibility of the firm is found to be negatively related to the leverage of the firm in this sector analysis, which suggests the acceptance of the null hypothesis which states that with the increase in the assets of the firm debt financing also increases. According to the analysis of this sector the null hypothesis of the study is rejected and the hypothesis which states that the *Growth* of the firm has positive relationship with the debt financing of the firm. This positive relationship is statistically significant in WLS regression.

The *Non Debt Tax Shield* is positively related to the debt financing according to the analysis of the study for this sector. Thus the null hypothesis of the study is accepted which states that the debt ratio of the firm increases with the increase in NDTs. The slope of the *Taxes* in the analysis proves that with increase in the tax rates the debt financing of the firm also increases. Thus the null hypothesis is rejected and the hypothesis which states that with increase in tax rates firm's debt ratio also increases. This hypothesis is significant only in WLS regression.

In OLS analysis, the null hypothesis is accepted which states that with increase in *Degree Of Financial Leverage* debt financing also increases but in WLS this hypothesis is rejected and the hypothesis which states that the degree of financial leverages causes decrease in debt financing of the firm. Both hypotheses were insignificant statistically. On the basis of OLS analysis the profitability of the firm has more influence in debt ratio decision of the firm but according to WLS analysis tangibility of the firm play important role than profitability of the firm in deciding the debt ratio of the firm.

Conclusion

The study finds that determining the exact optimal or best capital structure is not a science, so after analyzing a number of factors, a firm

establishes a target capital structure it believes is optimal, which is then used as a guide for raising funds in the future. In Pakistan as well there are different factors that affect a firm's capital structure decision.

The finding of the report shows that in Pakistani firms most of the firm tends toward the equity or internal financing instead of the debt. In Pakistan debt or long term financing is not considered as prior to equity financing because the bond market in this country is not yet so developed. Main source of external financing available to the Pakistani firms is commercial bank operating all around the country. These commercial banks encourage short term and secured loans only. Larger firm can easily get loans from commercials as banks likes to advance loan to those firm which are financially sound and can absorb more shock. Where as most of Pakistani firms are of medium size. Therefore firms are less tempted toward the long term loan to finance their future investments. Another possible reason why Pakistani firms try to avoid debt financing is that these firms want to avoid the legal obligations and scrutiny procedures related to the debt financing. Often many firms listed in Karachi Stock Exchange try's to escape the discipline of capital market for example they don't pay dividend for years and do not experience significant decline in stock prices. Such shares are not traded and new issues are never announced. Other reason for non debt financing trend of Pakistani, but not yet proven, is that religious teaching regarding the interest or Reba forbids interest bearing loan transactions. This is main reason for slow development of bond market in Pakistan.

This study finds that with increase in profitability of Pakistani firms, they less tend toward debt financing, thus confirming the finding of picking theory by *Mayer and Mijluf (1984)*²⁸. One possible reason for this negative relationship between profitability and leverage of the firm is

that most of the Pakistani firms try to retain its earning for future requirements as they prefer to pick internal financing over the out financing. However the study finds that with the passage of the Pakistani firms are and will realize the importance of the debt financing in increase the value of the firm and ultimately the wealth of the share holders.

End Notes:

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