THE DETERMINANTS OF CAPITAL STRUCTURE IN THE TEXTILE SECTOR OF PAKISTAN

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ABSTRACT

This paper investigates the determinants of corporate capital structure in the Pakistani textile industry after Rajan and Zingales (1995), Shah and Hijazi (2005) and Hijazi and Tariq (2006). Data related to four independent variables (size, growth, profitability and tangibility) and one dependent variable (leverage) for 155 companies of the total 167 companies of the textile sector listed on the Karachi stock exchange over the sample period (1999-2004) was analyzed using regression analysis. The results are consistent with the findings of the previous studies. The findings support the researchers' hypotheses that size and profitability have positive relationship with leverage. Further the findings confirm a positive relationship between tangibility and leverage as expected. However, the findings suggest a negative relationship between growth and leverage contrary to the researchers' hypothesis.

1. INTRODUCTION

Capital structure emerged as an area of great interest to investigators in corporate finance after the path breaking work of Miller and Modigliani (1958, 1963). The importance of capital structure in the creation of value as demonstrated by MM has enticed research covering many dynamics of capital structure. One of this dynamic is the study of the factors that affect the choice made by firm for its mix of capital structure. Many theories (e.g. the static trade off theory, the agency theory, the pecking order theory and the signaling theory) have been developed to provide a framework for understanding this choice of capital mix by a firm; however, the explanations provided so far are inconclusive and thus unsatisfactory.

Myers (1977) was the first to make an attempt to explore the determinants of firm capital structure. Titman and Wessels (1988) explored asset structure, non-debt tax shields, growth, uniqueness, industries classification, size, earnings, volatility and profitability to measure their impact on the choice of capital mix. They found that only uniqueness was highly significant. Harris and Reviv (1991) reported a positive relationship between leverage and non-debt tax shields, size of the firm, tangibility of assets and investment opportunities. They also found that leverage was inversely related to bankruptcy risk, research & development expenditure and firm's uniqueness.

Rajan & Zingales (1995) found a positive relationship of size and tangibility with the choice of capital mix. However, they found that profitability and growth opportunities were negatively correlated with capital struc-ture. Hijazi & Tariq (2006) reported an inverse relationship between size, growth and profitability with leverage while a significantly positive relation was found between tangibility with debt. Bhaduri (2002) reported for the Indian corporate sector that the choice of optimal capital mix can be influenced by growth, cash flow, size, and product and industry characteristics.

Drobetz and Fix (2003) in their investigation of the capital structure for Swiss corporate sector found that more profitable firms use less leverage which confirmed the pecking order theory, however, contradicted the trade-off model. They also found that firms with more investment opportunities use less leverage which is consistent with both the trade-off theory and complex version of the pecking order model. Leverage was also found to be closely related to tangibility of assets and the volatility of a firm's earnings.

Voulgaris, Asteriou and Agiomirgianakis (2004) investigated the determinants of capital structure for the Greek manufacturing firms. They analyzed two different random samples: one for SMEs and the one for LSEs. They found profitability as a major determinant of capital structure for both size groups. Additionally, efficient asset management and asset growth were found significant for the debt structure of large firms. However, efficiency of current assets, size, sales growth and high fixed assets were found to be significant for capital structure choices by small firms.

The remainder of this paper is organized as under; section 2 describes the data and methodology of the paper, section 3 lists and discusses the findings of the study and section 4 concludes the paper.

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2. METHODOLOGY

2.1 Data

The financial data used in the research has been taken from the State Bank of Pakistan's publication titled "Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange (1999-2004)".

2.2 Sample

The study started with all the 167 companies in the textile sector listed on the KSE during the sample period. However, 12 companies were dropped due to inadequate data and thus the researchers were left with 155 companies. Consequently, there were 740 firm-years that offered themselves for data analysis.

2.3 Variables

The researchers have taken firm specific factors i.e. firm's size, growth, profitability and tangibility as the explanatory variables for the choice of capital mix by firms in the textile industry of Pakistan. The same variables were used by Rajan and Zingales (1995), Shah and Hijazi (2005) and Hijazi and Tariq (2006). The description of these variables is given here.

2.3.1 Leverage

It is the percentage of total assets financed through debt. Leverage results in the magnification of gains and losses in earnings[1]. For this research, leverage has been measured as the ratio of total liabilities divided by total assets.

2.3.2 Tangibility

According to Hijazi &Tariq (2006) companies with a higher ratio of tangible assets have an incentive to borrow more because most of the loans are available at a relatively cheaper rate. Thus they expected a positive relationship between tangibility of assets and leverage. This research has defined tangibility as net fixed assets divided by total assets.

2.3.3 Size

The Static Tradeoff Theory suggests a positive relationship between leverage and size.

Rajan & Zingales (1995) included size by taking natural logarithm of sales in their analysis. According to them larger firms tend to be more diversified and fail less often, so size may be an inverse proxy for the probability of bankruptcy. Further, Bevan and Danbolt (2000) argue that large firms are more likely to have credit rating and thus have access to public markets and other non bank financing. The study measures size as sales as a percentage of total assets.

2.3.4 Growth

Rajan and Zingales (1995) took the market-to-book ratio to measure growth opportunities available to the firm. They opined that there is negative relationship between leverage and growth opportunities available to the firm. Bevan and Danbolt (2000) pointed that as growth opportunities have no collateral or liquidation value and as they provide no immediate revenue generation, firms are not in a position to afford to have higher amount of debt in their capital structure.

For this study growth has been defined in terms of percentage change in total assets which is consistent with Hijzi and Tariq (2006).

2.3.5 Profitability

Pecking Order Theory predicts a positive relationship between profitability and leverage. However, the Static Tradeoff Theory proposes a negative relationship between profitability and leverage. Operating profit as a percentage of total assets has been taken to measure profitability.

2.3.6 Hypotheses

The study tests the following hypothesis for the textile sector of Pakistan:

Hypothesis 1: Leverage and size have negative relationship.

Hypothesis 2: Firm with a higher percentage of net fixed assets will have a higher debt ratio i.e. tangibility and leverage are positively related.

Hypothesis 3: Leverage and profitability have negative relationship.

Hypothesis 4: Leverage and growth have positive relationship.

2.4 Regression Model

The following regression model was estimated to measure relationship of independent variables and dependent variables.

DV = þo + þ1 (Tng) + þ2 (Sz) + þ3 (Gwt) + þ4 (Pft) + μ

where

DV = Leverage, Tng = Tangibility of Assets, Sz = Size, Gwt = Growth, Pft = Profitability, $þ$ = the coefficients to be estimated and μ = the error term.

2.5 Multicollinearity

Multicollinearity can be identified by examining the values of R^2 and t-values. When the slope coefficients of the estimated model are statistically equal to

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1. Jones, C.P. (1997). *Investment Analysis and Management.* New York North Carolina State University.

μ

zero; however, there are few significant t test values. This provides a clue regarding the presence of multicollinearity among the variables[2].

We used correlation matrix for the identification of multicollinearity among the independent variables. Pairwise correlation between the variables for this purpose was estimated. A coefficient of correlation in excess of 0.8 is considered to pose serious problems for statistical inference. However, the presence of low correlation coefficients between variables is not sufficient evidence to suggest the absence of multicollinearity. Therefore, we used Eigen-values and Conditional Index, additionally, to detect multicollinearity. This is more sophisticated and reliable method to identify multicollinearity among the variables.

3. Results and Discussions

From the Table 3.2, it can be seen that the highest coefficient is 0.540 which indicates that the multicollinearity problem does not exist among the selected independent variables. This is further verified by Table 3.3, which shows the calculated values for the Conditional Index based on Eigen values.

Table 3.1: Descriptive Statistics

	N	Min	Max	Mean	Std. Dev
Lv	740	0.061	4.791	0.804	0.484
Sz	740	0.000	4.878	1.218	0.670
Gw	740	-0.581	13.905	0.142	0.609
Pf	740	-1.807	4.413	0.074	0.230
Tg	740	0.034	3.996	0.588	0.230

Table 3.4 reveals the value of R-square (R^2=9.8%) indicating that independent variables explain mere 9.8% of variation in dependent variable i.e. Leverage (DV). The value of R^2 is not relevant for pooled data as the R^2 of individual firm over the sample period 1999-2004 is independent of R^2 of other firms. Table 3.5 reports the variance analysis and reveals that model is significant at the one percent level of significant as indicated by the value of F-statistic.

Table 3.2: Correlations

Variables	Sz	Gw	Pf	Tg
Sz	1	0.042	0.54	-0.145
Gw	0.042	1	0.211	-0.285
Pf	0.54	0.211	1	-0.335
Tg	-0.145	-0.285	-0.335	1

Table 3.6 reports the estimated coefficients. Size and Leverage of the firm in the textile industry of Pakistan are negatively correlated (þ1 = -0.063; Table 3.6) and the corresponding *t*-statistic value indicates that the regression coefficient is significant. This supports the first hypothesis that size and leverage of the firm in textile industry of Pakistan have inverse relationship. This relation ship was also observed by Hijazi and Tariq (2006) for cement sector of Pakistan. A possible explanation could be that large firms are in a better position to raise equity capital at comparably lower costs. The amount of equity capital required by large firms is sufficient to warrant economies in the cost of raising equity capital. However, this finding contradicts the findings of Rajan and Zingales (1995) and Shah and Hijazi (2005) who reported a positive relationship between size and leverage.

Table 3.3: Eigen-values & Conditional Index

Dimension	Eigen-value	Conditional Index
1	2.956	1.000
2	0.933	1.779
3	0.860	1.853
4	0.198	3.862
5	0.052	7.534

Table 3.4: Regression Analysis

R	R-Sq	R-Sq(adjusted)
0.313	9.80%	9.30%

Tangibility and leverage are positively correlated (þ3 = 0.49; Table 3.6). This finding confirms the Static Tradeoff Theory, according to which leverage should increase with increase in tangible assets of the firm. It contradicts with the view that increase in tangibility increases operating leverage and hence reduces the motivation of the firm to use debt. Hijazi and Tariq (2006) also found this relationship for the cement sector of Pakistan. We, therefore, accept the second hypothesis that tangibility and leverage are positively related.

Table 4.4: Analysis of Variance

Source	DF	SS	MS	F	P
Regression	4	16.989	4.247	19.980	0.000
Residual Error	735	156.236	0.213		
Total	739	173.226			

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2. Gujarati, D.N. (). *Basic Econometrics,* 4th Edition, International Edition, McGraw-Hill, Singapore.

Table 4.5: Regression Coefficients

Variables	Unstd. Coeff	S.E	Std. Coeff	t-values	p-values
Constant	0.615	0.059		10.350	0.000
Sz	-0.063	0.026	-0.088	-2.430	0.015
Gw	-0.077	0.028	-0.097	-2.770	0.006
Pf	-0.196	0.076	-0.093	-2.590	0.010
Tg	0.496	0.075	0.235	6.630	0.000

Leverage and profitability of the firm in textile industry of Pakistan are negatively correlated ($\beta2$ = -0.196; Table 3.6).It indicates that equity is used as a source of finance by profitable firms in the textile industry of Pakistan. This finding is in accordance with the Pecking Order Theory .The same results were observed by Shah and Hijazi (2005) and Hijazi and Tariq (2006), therefore, we accept the second hypothesis that leverage and profitability are inversely related. For profitable firms in the textile industry of Pakistan it is easier and quick to finance capital needs through internally generated funds rather than obtaining funds externally through issuing rights offering (regulations in Pakistan only allow rights offering to raise equity capital once the firm is listed on KSE) or obtaining loans from commercial banks. Another important factor is that the corporate bond market in Pakistan is not yet developed. This has resulted in limiting the options of debt financing available to firms.

Contrary to the above relationship growth was found to be negatively correlated ($\beta4$ = -0.077; Table 3.6). This reveals that growing firms in the textile industry of Pakistan use more equity to finance new projects rather than debt. Shah and Hijazi (2005) evidenced the same relationship for listed non financial firms of Pakistan. They argued that the negative relationship between leverage and growth in the cement sector of Pakistan was explained by the negligible amount of new investment in that sector. Further they opined that depreciation in the value of fixed assets was responsible for the observed relationship. However, they found a positive relationship in between tangibility and leverage in the same study. As tangible assets are part of the total assets it suggests that their explanation for the observed negative relationship between growth and leverage is inappropriate. Further given their argument that depreciation causes the negative relationship between growth and leverage, a serious doubt arises regarding the going concern concept of corporate firms. One explanation for this finding could be that increased debt puts management of the firm under stress to meet payment of interest and principle i.e. debt service requirements. The management of the firm has thus an incentive not to use debt when growth opportunities are available because growth carries risk. Further debt entails covenants (both positive and negative) which significantly affect the free-dom and speed with which the management of firms can make important business decisions. However, Hijazi and Tariq (2006) found a positive relationship between growth and leverage in the cement industry of Pakistan. It might be because of the different dynamics (Business Risk etc.) of cement and textile industries.

4. CONCLUSION

The researchers analyzed 155 sample firms in the textile sector using pooled regression model to investigate the determinants of capital structure of the firms in the textile sector of Pakistan. Except for growth, the other variables including size, profitability and tangibility exhibited relationship with leverage as expected. The observed negative relationship between profitability and leverage confirms the Pecking Order Theory, however, contradicts the Static Trade off Theory. The observed negative relationship between size and leverage contradicts both the Pecking Order Theory and the Static Trade off Theory. Further the observed positive relationship between tangibility and leverage supports the Static Trade off Theory as opposed to the Pecking Order Theory. Finally the negative relationship between growth and leverage supports both the Pecking Order Theory and the Static Trade off Theory.

REFERENCES

Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange (1999-2004), State Bank of Pakistan.

Bevan, A. and Danbolt, J. (2000). *Capital structure and its determinants in the United Kingdom: A decompositional analysis*, Working paper series, Department of Accounting & Finance, University of Glasgow.

Bhaduri, S.N. (2002). Determinants of the capital structure choice: a study of the Indian corporate sector, *Applied Financial Economics, 12,* 655-665.

Drobetz, W. and Fix, R. (2003, April).*What are the determinants of the capital structure? Some evidence for Switzerland,* Working Paper No. 4/03, WWZ/Department of Finance, University of Basel, Switzerland.

Harris, M. and Raviv, A. (1990). Capital structure and the informational role of debt, *Journal of Finance, 45,* 321-349.

Hijazi, T.S. and Yasir, T. (2006) .Determinants of Capital Structure: A Case for the Pakistani Cement Industry, *The Lahore Journal of Economics,11,* 63-80.

Modigliani, F. and Miller, H. M. (1958). The cost of capital, corporation finance and the theory of investment, *American Economic Review, 48,* 261-297.

Modigliani, F. and Miller, H. M. (1963). Corporate taxes and the cost of capital: a correction, *American Economic Review, 53*, 433-443.

Myers, S.C. (1977). Determinants of corporate borrowing, *Journal of Financial Economics, 5,* 147-175.

Rajan, R. and Zingales, L. (1995). What Do We Know About Capital Structure? Some Evidence from International Data. *Journal of Finance,50,* 1421-1460.

Shah, A. and Hijazi, S. (2005). *The determinants of capital structure in Pakistani listed non-financial firms,* presented at 20th AGM and Conference of Pak Society of Development Economics (January 11, 2005).

Titman, S. and Wessels, R. (1988).The determinants of capital structure choice, *Journal of Finance, 43,* 1-19.

Voulgaris, F., Asteriou. D. and Agiomirgianakis, G. (2004). Size and Determinants of Capital Structure in the Greek Manufacturing Sector, *International Review of Applied Economics, 18,* 247-262.

Shah, A. and Hijazi, S. (2005). *The determinants of capital structure in Pakistani listed non-financial firms,* presented at 20th AGM and Conference of Pak Society of Development Economics (January 11, 2005).

Titman, S. and Wessels, R. (1988).The determinants of capital structure choice, *Journal of Finance, 43,* 1-19.

Voulgaris, F., Asteriou. D. and Agiomirgianakis, G. (2004). Size and Determinants of Capital Structure in the Greek Manufacturing Sector, *International Review of Applied Economics, 18,* 247-262.