AN ANALYSIS OF CAPITAL STRUCTURE DETERMINANTS USING THE EXAMPLE OF PAKISTAN'S CEMENT SECTOR COMPANIES LISTED ON THE KARACHI STOCK EXCHANGE

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INTRODUCTION

A company's capital structure is a particular combination of debt, equity and other sources of finance it uses to fund its short- and long-term financing needs. However, the key division in capital structure is between debt and equity. The proportion of debt funding is measured by leverage. There are different factors that affect a firm's capital structure, and a firm should attempt to determine the optimal mix for its financing. While determining the optimal capital structure, a firm will analyse a number of factors to establish the capital structure which it believes is optimal. 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. At the same time, that higher expected rate 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 the ultimate goal of maximising the stock price.

SIGNIFICANCE OF THE STUDY

This research study would be a useful tool for company managers in the cement industry to decide the optimal capital structure for their firm by considering the variables which have a significant impact on decisions regarding their capital structure. It could also help policymakers formulate cash flow policy. The study would also enable credit institutions to consider important variables before sanctioning loans to firms in Pakistan's cement sector. Finally, the study's findings provide data for further research work.

RESEARCH QUESTIONS

Following are the research questions for this study.
1. What determinants of the capital structure are relevant to the leverage in Pakistan's cement sector?
2. What is the relationship between leverage and the determinants of capital structure in Pakistan's cement sector?
3. Which determinants of the capital structure have a significant relationship that could be suggested for different sectors of Pakistan's economy?

LITERATURE REVIEW

In recent years several authors have proposed to identify and explain many potential attributes that influence financial decisions in selecting the right debt-to-equity variations across a firm's capital structure. The link between a firm's capital structure and the factors that influence a firm's debt-equity mix took on added importance as a result of the ground-breaking debate pioneered by Modigliani and Miller [1958] on the irrelevance theorem, which states that the firm's value has no relevance in its choice of capital structure.

According to Modigliani and Miller [1958], the rate of return required by shareholders increases linearly as the debt-to-equity ratio is increased. The enormous criticism received after the publication of MMI (Modigliani and Miller theory I) gave rise in 1963 to MMII (Modigliani and Miller theory II), a framework which includes tax, a component absent in the former. Miller's [1977] discovery of the effect of personal and corporate tax on the firm's value and two other theories: Jensen and Meckling's agency cost theory [1976] and Myers's pecking order theory [1984] dominates the literature on capital structure.

The publication of Capital Structure, a correction by Modigliani and Miller [1963], demonstrated the tax advantages of debt financing when tax was introduced into the equation. The publication also concluded that the market value of a leveraged firm is greater than the market value of the unleveraged firm by a tax shield due to tax.

The tax relation allowed firms the tax advantage of debt financing by deducting interest payments on debt from taxable income. MM I encourages firms to maximise the possible amount of debt they can hold in their capital structure. Debt is valuable within this framework primarily because interest payments are tax deductible. For instance, when money is borrowed, interest expenses are deducted before arriving at the taxable income. This will automatically reduce the firm's taxes, a luxury equity does not provide. Dividends are not deducted before arriving at the taxable income, hence they do not provide similar deductions for cash flow from equity, making debt a more attractive financing vehicle than equity. MM II suggested that a point of optimum leverage exists when firms should issue 100% debt.

Donaldson's pecking order theory [1961] goes against the idea of companies having a unique combination of debt and equity to minimise their cost of capital. The theory states that firms have a well-defined order of financing preference available to it. "Firms prefer retained earnings as their main source of funds for investment. Next in order of preference is debt and lastly equity financing" [Myers 1984]. This implies that a firm's first preference is to use internal finance or retained earnings rather than external sources

of finance. If internal finance proves insufficient, bank borrowing and corporate bonds are the preferred source of external finance. Once both options have been exhausted, then the final and least preferred source of financing is issuing new equity; least preferred because of the transactions costs associated with it.

According to Myers [2001], if external funds are required for capital investment, firms will issue the safest security first. That means debt before equity as debt has the prior claim on assets and earnings; equity is the residual claim. Investors in debt are less exposed to errors in valuing the firm. In contrast, if internally generated cash flows exceed investment, the surplus is used to cover debt rather than repurchasing and retiring equity. This is attributable to information asymmetry, as Shyam-Sundler and Myers have confirmed [1999]. As the demand for external financing increases, the firm will work down the pecking order, from safe to riskier debt, perhaps to convertible securities or preferred stock and finally to equity as a last resort [Irvine 2000].

"The static tradeoff theory of capital structure is determined by the tradeoff of the value of tax benefit against the cost of debt. This theory states that the optimal capital structure is determined by balancing the corporate tax shield associated with debt financing against the probability of financial distress. This theory contends that firms will borrow up to the point where the marginal value of tax shields on additional debt is offset by the increase in the present value of possible costs of bankruptcy and also to the agency cost when a firm's credit worthiness is in doubt".

Myers [2001] predicts that firms with different types of assets will have different bankruptcy, agency costs and optimal debt ratios. In addition, those with varied amounts of alternative tax shields will have different levels of optimal debt ratios. Any increase in debt beyond this optimal point reduces the firm's value as the perception of investors of the increased cost of bankruptcy outweighs the tax benefits of debt.

The static theory provides a testable prediction that the analysis of the costs of financial distress should not be taken lightly, especially for those firms with valuable intangible assets and with growth opportunities. It should be observed that mature firms with mostly tangible assets borrow more than growth firms that rely heavily on research and development or advertising [Booth et al. 2001]. This demonstrates an inverse correlation between intangible assets and gearing.

While there is less than total agreement on the precise costs and benefits of leverage and the role it plays in influencing a firm's capital structure decisions, Myers [2001] observes that there is a general consensus among financial economists that supports partial versions of the trade-off theory. Recent studies have examined debt-equity responses to the effect of taxes.

RESEARCH METHODS

The cement sector of Pakistan's economy was selected for this study because of its significant contribution to the country's GDP per annum. The sector accounts for almost 0.04% of the entire manufacturing sector, which is 25% of Pakistan's Economy [Economic Survey of Pakistan 2014] so this sector could be a good proxy for the manufacturing sector. The financial statements used were profit and loss accounts, balance sheets, and financial ratios.

The dependent variable of the study was leverage and the independent variables were profitability, size, growth, financial cost and asset tangibility. The following hypotheses were formulated for the research:

H1: Profitability is positively correlated with leverage.
H0: Profitability is negatively correlated with leverage.

H2: Size is positively correlated with leverage.
H0: Size is negatively correlated with leverage.

H3: Growth is positively correlated with leverage.
H0: Growth is negatively correlated with leverage.

H4: Financing is positively correlated with leverage.
H0: Financing is negatively correlated with leverage.

H5: Assets tangibility is positively correlated with leverage.
H0: Assets tangibility is negatively correlated with leverage.

To analyse the data collected, different statistical tools were used, including descriptive analysis, correlation, and regression. SPSS and Microsoft Excel were used for analysis.

The linear equation used is:
$$D/E = \alpha + \beta1.P + \beta2.S + \beta3.G + \beta4.FC + \beta5.TA + \varepsilon i$$
where:
D/E = debt/equity
P   = profitability
S   = size
G   = growth
FC   = financial cost
TA   = tangibility of assets
E   = the error term

The data were first described using descriptive analysis. To test the hypothesis, additional statistical tools were then applied to see whether there is a relationship between the dependent and independent variables. Pearson correlation was used to measure the degree of association between different variables in the study. Regression analysis was then applied to measure the causal relationship between dependent and independent variables.

DESCRIPTIVE ANALYSIS RESULTS DISCUSSION

There are 21 firms operating in Pakistan's cement industry and listed on the Karachi Stock Exchange. The following are the results and discussion of an analysis of those companies. The debt-to-equity column in each table presents figures in Pakistani currency (the Pakistani rupee) and all the figures are in millions. The results of descriptive analysis

show that the mean to the dependent variable debt/equity is 319.75 (Table 1). The dependent variable's maximum value is 17,561 while the minimum value is 0. This means that the mean value is extracted by incorporating all the maximum and minimum values. The standard deviation of the dependent variable is 1,593, a higher value of standard deviation. There are a total of 105 observations in this sector.

The first independent variable, financial cost, has a mean value of 4.80 with a standard deviation of 1.85, which means that it can deviate that much from its mean value. The maximum value of financial cost is 9.60 and the minimum value is –0.35; there are 105 total observations.

The second variable, growth, has a mean value of 0.19 with a standard deviation of 1.13. The maximum value in this variable is 7.16 and the minimum value is –1 and there are a total of 105 observations. Profitability as an independent variable has a mean of 0.045, with a standard deviation of 0.12, which means that it can deviate 0.12% from the mean value. The maximum value in this variable is 0.43 and the minimum value is –0.24 and there are a total of 105 observations. The fourth variable is size, which has a mean value of 8.83 with a standard deviation of 1.20. The maximum value in size is 12 and the minimum value in the series is 6 while the total number of observations is 105. Tangibility is the last variable. It has a mean value of 0.72 with a standard deviation of 0.16. The maximum value for this variable is 0.98 and the minimum value is 0.00. Here too there were 105 total observations.

TABLE 1. Descriptive statistics

Specification	Debt/Equity	Financial cost	Growth	Profit	Size	Tangibility
Mean	319.7575	4.8099	0.1944	0.0450	8.8374	0.7220
Median	134.35	4.8819	0.1518	0.0190	8.6856	0.7568
Maximum	17 561.1	9.6023	7.1630	0.4382	12.5453	0.9844
Minimum	0	–0.3566	–1	–0.2477	6.0806	0
SD	1 593.605	1.8543	1.1302	0.1247	1.2648	0.1695
Observations	105	105	105	105	105	105

Source: results of SPSS analysis, financial data sourced from the State Bank of Pakistan balance sheet analysis 2009–2014 [http://www.sbp.org.pk/departments/stats/bsa.pdf, accessed: 23.03.2014].

CORRELATION ANALYSIS RESULTS DISCUSSION

The results of correlation analysis show that out of five independent variables, two are positively correlated and three negatively with the dependent variable (Table 2). Financial cost is positively correlated with debt/equity, with a coefficient value of 67.50907 (Table 3). This relationship is insignificant with a t-value of 0.507909 and a p-value of 0.6125. This result shows that as costs increase, so too does the debt level. This conclusion is in line with MM II theory [1984], which suggests that higher financial costs and debt levels will provide a benefit in the form of a tax shield to any firm.

Growth as an independent variable is negatively correlated with the dependent variable, having a coefficient value of –133.7509. This relationship is significant as proved

by the statistical values: the t-value is –0.921555 and the p-value is 0.0587, meaning that as the firms grow they prefer to finance their needs with internal sources. It also means that when firms grow they enjoy higher earnings, and firms like to use internal financing to save their financial cost.

With a coefficient value of –1,770.703, profitability is negatively correlated with the firm's debt, meaning that as a firm becomes more profitable, it tends, according to pecking order theory, to be financed less with debt [Myers 1984]. The relationship is significant with a t-value of –1.357115 and a p-value of 0.0174. As many other studies have shown, as firms earn more and more profit, their reliance on internal financing increases. Firms use their profit to make investments and take care of other financial needs.

With a coefficient statistic value of –193.9601, size is also negatively correlated with a firm's leverage. The relationship between size and debt ratio is significant, as evidenced by a t-value of –1.074652 and a p-value 0.02848. According to pecking order theory [Myers 1984], as a firm's size increases, debt financing decreases and it uses the internal funds available to meet its financial needs. The larger cement firms rely on their internal profits and retain funds because they have considerable internal funds which can be used for profitable projects without any restrictions or legal obligations [Myers 1984].

With a coefficient value of 635.1859, a t-value of 0.673885 and p-value of 0.05017, tangibility was found to be positively correlated with company leverage. This means that the more tangible assets a firm has, the more borrowing it can do from the external market. The relationship is also a positive one because financial institutions prefer lending to firms which have more tangible assets for collateral. So, in the cement sector, the value of tangible assets determines how much a firm can borrow on the market.

TABLE 2. Correlation analysis

Variable	Debt/Equity	Financial cost	Growth	Profitably	Size	Tangibility
DEBT_EQUITY	1.0000	0.0478	–0.1029	–0.1714	–0.0674	0.0662
FINANCIAL COST	0.0478	1.0000	–0.3214	–0.2780	0.7195	0.1620
GROWTH	–0.1029	–0.3214	1.0000	0.0161	–0.0473	0.1796
PROFITABILITY	–0.1714	–0.2780	0.0161	1.0000	–0.0664	–0.2899
SIZE	–0.0674	0.7195	–0.0473	–0.0664	1.0000	0.2422
TANGIBILITY	0.0662	0.1620	0.1796	–0.2899	0.2422	1.0000

Source: results of SPSS analysis, financial data sourced from the State Bank of Pakistan balance sheet analysis 2009–2014 [http://www.sbp.org.pk/departments/stats/bsa.pdf, accessed: 23.03.2014].

REGRESSION ANALYSIS RESULTS DISCUSSION

In Pakistan's cement sector, 52% of the variation in the dependent variable can be attributed to the independent variables used in the study. The remaining 48% of the variation is due to other external factors – extraneous factors, as they are also known – which lie in the model's error term.

TABLE 3. Regression analysis

Variable	Coefficient	Standard error	Probability
C	1 356.273	1 228.314	0.0218
FINANCIAL_COST	67.50907	132.9156	0.6125
GROWTH	−133.7509	145.1361	0.0587
PROFITABILITY	−1 770.703	1 304.755	0.0174
SIZE	−193.9601	180.4865	0.02848
TANGIBILITY	635.1859	942.5732	0.05017
R-squared	0.5212	319.7575	
S.E. of regression	1 585.179	17.62349	
Sum squared resid	2.8608	17.76286	
Log likelihood	−1 051.409	17.68009	
Prob(F-statistic)	0.002887	−	

Source: results of SPSS analysis, financial data sourced from the State Bank of Pakistan balance sheet analysis 2009–2014 [http://www.sbp.org.pk/departments/stats/bsa.pdf, accessed: 23.03.2014].

CONCLUSIONS

The three variables (growth, profitability and size) are negatively correlated with leverage. This means that if a company adds more debt to its capital structure, its growth and profitability will fall because most of the funds will go towards paying down interest against the debt. The results of the present study show that tangibility and leverage are positively correlated in the cement sector of Pakistan economy.

These findings are similar to the trade-off theory, which states that the debt level in a firm's capital structure increases with the amount of tangible assets available on its balance sheet. This highlights the role of fixed assets as collateral in obtaining long-term debt. Financial costs are positively correlated with leverage, which is quite obvious as the firm will incorporate more debt as its costs rise.

The results of the research done for this paper support the conclusion that the determinants of capital structure do indeed make decisions relevant in Pakistan's cement sector. This study is not applicable to the services sector of Pakistan's economy, for banks and the like.

A future study could be based on other sectors of the Pakistani economy, while other developing economies could also be used to make a comparative study. Researchers could use the market leverage as a dependent variable, much as this study uses book leverage as a dependent variable. Future studies could also use a different number of explanatory variables.

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Summary. This paper examines the capital structure determinants of Pakistan's cement
sector. The sample is based on 21 cement sector companies listed on the national stock
exchange of Pakistan, the Karachi Stock Exchange (KSE). Debt/equity was taken as the
dependent variable while independent variables were sales growth, profitability, financial
cost, company size and tangibility. The overall results showed that financial cost and tan-
gibility have positive relationship with the dependent variable. The three other variables
growth, profitability and size are negatively correlated with leverage.

Key words: capital structure determinants, cement sector, KSE Pakistan

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