

Determinants of Optimal Capital Structure, A Case of Pakistani Companies Listed In Karachi Stock Exchange

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Abstract: In this research leverage is analyze against four independent variables to find the determinants of optimal capital structure, of KSE listed firms is observed for the period 2001-2006. Regression analysis is applied with the assumption that there is no industry or time effect. Four explanatory variables are used, i.e. cost of equity, cost of debt, retained earnings and gross sales to evaluate their result on leverage ratio. However, using fixed effect dummy variable regression, the coefficients for a number of firms were significant. Outcomes endorse the prophecy of trade-off theory in case of cost of debt whereas the cost of equity, and retained earning variables fail to confirm to trade-off theory. Size of firm variable neither confirms to the prediction of trade-off theory nor to asymmetry of information theory. Our results also prove that size of firm is not significant for every sector of economy as it was found insignificant for textile sector. This study discovered that only two variables, Cost of equity and retained earnings was found to be significant, while cost of debt and size of firm were not found considerable. Further study concludes that after controlling for the bias in the data that creditors do not look too much towards the retained earnings of the firm rather they prefer the security of the fixed assets. Finally, the research does not find any evidence that size of firm influence the decision of leverage of the sample firms.

Keywords: Leverage, Optimum, Financing, Regression, Intellectual Capital

Introduction

The relationship between capital structure and firm value has been discussed frequently in the literature by different researcher accordingly, in both theoretical and empirical studies. It has also been discussed that whether the firm has any optimal capital structure that has been adopted by an individual firm, or whether the proportions of debt usage is completely irrelevant to the individual firm value.

A firm can choose a mix of three modes of financing i.e. issuing shares, borrowing from the market and use of retained earnings. The ratio of this mix of funds purely depends on the firm and known as optimal capital structure of the firm. This leads to the different capital structure theories. These theories explain their point of view about optimal capital structure how an optimal capital structure can increase the value of the firm and its impact on the cost of capital of the firm.

Capital structure refers to the mix of debt and equity used by a firm in financing its assets. The capital structure decision is one of the most important decisions made by financial management. The capital structure decision is at the center of many other decisions in the area of corporate finance. These include dividend policy, project financing, issue of long term securities, financing of mergers and so on. One of the many objectives of a corporate financial manager is to ensure the lower cost of capital and thus maximize the wealth of shareholders. Capital structure is one of the effective tools of management to manage the cost of capital. An optimal capital structure is reached at a point where the cost of the capital is minimum.

Pakistan is a developing country with three stock exchanges, the Karachi Stock Exchange (KSE) being the largest one. More than 700 companies are listed on KSE. Like other developing economies, the area of capital structure is relatively unexplored in Pakistan. Limited research work exists on this area, like Booth et al (2001) studied 10 developing countries including Pakistan. However, this study was confined only to top 100 index companies. Second study by Shah and Hijazi (2004) was an improvement on the first one as it included all non-financial firms listed on KSE for the period 1997-2001. However, the second study too was basic in nature in terms of its use of pooled regression model avoiding the fixed effects and random effects models. The purpose of this study is to extend the work of Shah and Hijazi (2004) by extending the sample period i.e 2001-2006 and including more firms in sample as convenient random selection of samples, using relevant models of panel data and using more explanatory variables.

This study will further lead to the dynamics of KSE listed firms. Investor trends towards highly leveraged firms and determination whether the optimum capital structure effects the decision of investor resulting change in the balance sheet of a company.

Objective of the Study

The objective of this study is to check whether the changes in structure of capital has impact on the overall value of the firms, and specifically in leverage ratio of firms listed in Karachi Stock Exchange (KSE).

Literature Review

This section starts with the theory of irrelevancy of capital structure. Following subsections give the overview of theories that suggest that the capital structure affects firm's value. These theoretical research models provide a theoretical base to our intended analysis.

Theory of Irrelevance of Capital Structure

The modern work on capital structure theory began by Modigliani and Miller (1958). The theory proves that the value of the firm is independent from its capital structure. They proof their hypothesis based on different assumptions. These assumptions are not applicable in the real world so as the literature, their work considered best but it cannot be applicable in the practical life. M&M further published the correction for their previous work in 1963 as "A Correction". In that study, they have described that the value of the firm is independent from its capital structure but the interest expenses on the debt create the difference. They further explained that point by sayings that as the interest expenses are tax deductible due to the income tax law prevailing in different countries so the firms working in these countries decreases the tax liability and increases the after tax cash flows. On the other hand, dividend payments are not tax deductible; firms have to pay the tax on all their incomes and this procedure make equity a costly source of financing. Therefore, this differential treatment encourages corporations to use debt in their capital structures. Their work provides the basis for other researchers for further research. As a result different other theories of capital structure developed by other researchers like static trade-off theory, pecking order theory and agency cost theory.

Agency Cost Theory of Capital Structure

Agency theory states that the owners have to bear cost due to the separation of ownership and management in the corporation form of business. The shareholders have to provide incentives to the managers for the efficient working and increased output. The cost, which is paid by owners to managers or agents, is known as agency cost. If the firm takes loans then the managers have to act as the agent of owners as well as to the debt providers. Therefore, agency cost theory of capital structure states that the optimal capital structure is that point where the agency cost of all the interested parties is at the minimum level (Jensen and Meckling, 1976).

The Static Trade-Off Theory

The static trade-off theory states that the value of the leveraged and un-leveraged firm is not same. In the case of debt financing the firm can save the amount of interest payments on the debts from the tax purposes. However, at the same time due to debt finance the cost of financial distress and the agency cost of the debt financing of the firm increases. (Baxter, 1967). This theory further states that the optimal capital structure is that where the tax benefit on the interest payments for the firm, the financial distress and the agency cost of the debt financing balanced with each other (Baxter, 1967 and Altman 1984, 2002). This theory focuses on the three points tax advantage, financial distress costs, and the agency cost. This theory states that the firm save tax on the interest payments of the debt finance. As suggested by MM (1963), that value of the firm only depend on the capital structure due to the fact that interest expenses on the debts are tax deductible but the same is not applicable on the dividend payments.

The second point is financial distress costs. As the firm increases its leverage position the chances of bankruptcy increases as suggested by Jensen and Meckling (1976). Therefore, due to continue inclusion of debt financing the bankruptcy cost is also increases for the firm. As discussed in the agency cost of capital structure that the owners have to pay incentives to their agents (managers) in the corporation form of business. If the corporation also financed by debts then these agents (managers) have to work as the agents of the debt providers so it increases the agency cost of capital structure. Jensen and Meckling (1976) suggest that the optimal capital structure is that point where the tax advantage on interest payments must balanced out with the cost of bankruptcy and agency cost of capital structure.

Pecking Order Theory

Pecking order theory proposed by Myers and Majluf (1984) and states that the firm has to make the hierarchy of the desired funds. They proposed that first of all the firm finance its projects by their own internally generated funds (retained earnings). If the firm needs more funds to match its growth then it should generate funds by issuing debts. Firms utilize new equity for the generation of funds at the last option because it is the most expensive form of financing. Bevan and Danbolt (2002) further work on this idea and prove that the firm, which earns huge profits they have fewer debts due to the use of internally, generated funds.

Signaling Theory

This approach, originally developed by Ross (1977), explains that debt is considered as a way to highlight investor's trust in the company. If a company issues the debt it provides a signal to the markets that the firm is expecting positive cash flows in the future, as the principal and interest payments on debt are a fixed contractual obligation which a firm has to pay out of its cash flows. Thus the higher level of debt shows the manager's confidence in future cash flows. Another impact of the signaling factor, as we have already discussed it in the pecking order theory, is the problem of the under pricing of equity. If firm issues equity instead of debt for financing its new projects, investors will interpret the signal negatively since managers have superior information about the firm than investors, they might issue equity when it is overpriced. Among other explanations about a firm's behavior in choosing its capital structure is the agency theory. Jensen and Meckling (1976) identify the possible conflict between shareholders and a manager's interests because the manager's share is less than 100% in the firm. Furthermore, acting as an agent to shareholders, the manager tries to appropriate wealth from bondholders to shareholders by incurring more debt and investing in risky projects. This is consistent with the work of Myers (1977) who argues that, due to information asymmetries, companies with high gearing would have a tendency to pass up positive NPV (net present value) investment opportunities (under investment problems). Therefore argues that companies with large amounts of investment opportunities (also known as growth options) would tend to have low gearing ratios. A manager having a less than 100% stake in the business may try to use these free cash flows sub-optimally or use it to their own advantage rather than use it to increase the value of the firm. Jensen (1976) suggests that this problem can be somehow controlled by increasing the stake of the manager in the business or by increasing debt in the capital structure, thereby reducing the amount of "free" cash available to managers to engage in their own pursuits (Jensen, 1976, Stultz, 1990). Here the reduction in the cash flow because of debt financing is considered to be a benefit. Stultz (1990) suggests that the agency problem can be solved to some extent if the management stake is increased or the proportion of debt in the capital structure is increased.

Empirical Studies

Many empirical studies have been done on the subject and the researchers try to explain the factors, which have effect on capital structure choices.

Rajan and Zingles (1995) explain that various institutional factors of firm's capital structure in the leading industrial countries and conclude that at an aggregate level firms leverage is mostly similar across the G-7 countries. They ignore the differences due to institutions as were found by the previous researchers.

Booth et al (2001) study the capital structure of developing countries including Pakistan and showed the higher utilization of short term leverage compared to long term debt.

Hijazi and Shah (2005) are the first who studied the determinants of capital structure in Pakistan. They observe that in Pakistan short term debts are higher than the long tem debts. They support their claim by that

the majority of the firms are smaller in size therefore they may not easily approach the capital market. Therefore major source of financing are banks.

Wolfgang and Roger (2003) studies the determinants of the capital structure in Switzerland firms and concludes that leverage of Swiss firms is comparatively low. They confirm the pecking order model and contradict with the trade-off model as more profitable firms use less leverage.

Cai and Zhang (2005) examined the capital structure and stock returns of U.S public firms during 1972-2003 and document significantly negative relation between the leverage changes and the stock returns. This relationship remains significant after controlling for other firms characteristics and cannot be explained by the asset pricing factors. Their study favors the pecking order theory over other capital structure theories and is inconsistent with the trade off theory.

Titman and Tsyplakov (2005) study the determinants of capital structure of Chinese listed firms up to the year 2000 and conclude that leverage in Chinese firms increases with firm size, non-debt tax shields and fixed assets, decreases with profitability and correlates with industries. They prove static trade off model rather than pecking order model.

Saeed, (2005) study the determinants of capital structure of Pakistani listed companies of energy sector and partially support both Static Trade Off theory and Pecking Order theory. His results regarding Agency cost theory were not significant.

Research Methodology

Data

The study is based on the data taken from the State Bank of Pakistan publications “Balance Sheet Analysis of Joint Stock Companies Listed on The Karachi Stock Exchange Volume-IV 2001-2006”. This publication provides useful information on key accounts of the financial statements of all listed firms of KSE. In this research those firms are excluded from analysis for which complete data was not available for the stated period. To avoid outlier in the data that could possibly distort the analysis, all those observations are excluded which had values at least three standard deviation from the average value of all firms. Finally data left with the sample of 155 different firms listed on Karachi Stock Exchange from 2001 to 2006.

Dependent and Independent Variables

After discussing the various theories of capital structure, here is some discussion regarding the dependent variable and its potential determinants. In this research debt to total assets ratio is taken as a proxy for leverage (dependent variable). For potential determinants of leverage, the study revealed for independent variables namely size, cost of debt, cost of equity, and retained earnings.

Measure of Leverage

Previous studies suggest that the level of leverage depends upon the definition of leverage. Several research studies have used both market and book value based measures of leverage (Titman and Wessels 1988, Rajan and Zingales 1995). The former measure divides book value of debt by book value of debt plus market value of equity and the later measure divides the book value of debt by book value of debt plus book value of

equity. Using the book value measure of leverage, this can be justified with the argument that optimal level of leverage is determined by the trade-off between the benefits and costs of debt financing. The main benefit of leverage is the cash savings generated because of the debt-tax shield. This tax shield benefits are not changed by market value of the debt once it is issued (Banerjee, S. et al 2000). This is why market value of debt becomes irrelevant. On the other hand, the primary cost of borrowing is the increased chances of bankruptcy. If a firm falls in financial distress and goes into bankruptcy, then the relevant value of the debt is the book value of debt. Finally, book value measure provides relative ease and accuracy with which it can be calculated.

Another consideration in deciding the appropriate measure of leverage is to take total debt or only long term debt as a percentage of total assets. Though capital structure theories consider long term debt as a proxy for financial leverage, By using the measure of total debt because in Pakistan firms have mostly short-term financing as the average firm size is small which makes access to capital market difficult in terms of cost and technical difficulties (Shah and Hijazi 2004). The main sources of debt in Pakistan have been commercial banks, which do not encourage long term loans, with almost no reliance on market based debt until mid 1994 when government moved to remove most of the constraints among. Which one action was to amend company law to permit corporate entities to raise debt directly from the market in the form of TFCs (Term Finance Certificates). So corporate bond market has limited history and is in the process of development. This explains why firms on average in Pakistan have more short term financing than long term financing. Booth et al (1999) also pointed in their study on determinants of capital structure in developing countries including Pakistan that the use of short term financing is higher than long term financing in developing countries.

Independent Variables

Retained Earnings

Retained earnings refer to the portion of net income, which is retained by the corporation rather than distributed to its owners as dividends. Similarly, if the corporation makes a loss, then that loss is retained and called variously retained losses accumulated losses or accumulated deficit. Retained earnings and losses are cumulative from year to year with losses offsetting earnings.

Retained earnings are reported in the shareholders equity section of the balance sheet. Companies with net accumulated losses may refer to negative shareholders equity as a shareholders' deficit. A complete report of the retained earnings or retained losses is presented in the Statement of retained earnings or Statement of retained losses.

Retained Earnings = Beginning Retained Earnings - Investments - Dividends Paid + Net Income.

H 0: Retained earning does not affect leverage.

H 1: A firm with higher percentage of retained earnings will have higher debt ratio

Size

There are two conflicting viewpoints about the relationship of size to leverage of a firm. First, large firms don't consider the direct bankruptcy costs as an active variable in deciding the level of leverage as these costs

are fixed by constitution and constitute a smaller proportion of the total firm's value. And also, larger firms being more diversified have lesser chances of bankruptcy (Titman and Wessels 1988). Following this, one may expect a positive relationship between size and leverage of a firm. Second, contrary to first view, Rajan and Zingales (1995) argue that there is less asymmetrical information about the larger firms. This reduces the chances of undervaluation of the new equity issue and thus encourages the large firms to use equity financing. This means that there is negative relationship between size and leverage of a firm. Following Rajan and Zingales (1995), we expect a negative relationship between size and leverage of the firm. We measure size (SZ) of the firm by taking the natural log of the sales as this measure smoothens the variation in the figure over the periods of time.

H0: Size has no effect on leverage

H2: There is negative relationship between size and leverage of the firm.

Cost of Equity

In finance, the cost of equity is the minimum rate of return a firm must offer shareholders to compensate for waiting for their returns, and for bearing some risk.

The cost of equity capital for a particular company is the rate of return on investment that is required by the company's ordinary shareholders. The return consists both of dividend and capital gains, e.g. increases in the share price. The returns are expected future returns, not historical returns, and so the returns on equity can be expressed as the anticipated dividends on the shares every year in perpetuity. The cost of equity is then the cost of capital, which will equate the current market price of the share with the discounted value of all future dividends in perpetuity.

$$\text{Cost of Equity} = \frac{\text{Next Year's Dividends and Equity Appreciations per Share}}{\text{Current Market Value of Stock}} + \text{Growth Rate of Dividends}$$

H 0: Equity has no effect on leverage.

H 3: Firms with higher equity will have leverage.

Cost of Debt

Debt is that which is owed, usually referencing assets owed, but the term can cover other obligations. In the case of assets, debt is a means of using future purchasing power in the present before a summation has been earned.

Companies use debt in many ways to leverage the investment made in their assets, "leveraging" the return on their equity. This leverage, the proportion of debt to equity, is considered important in determining the riskiness of an investment, the more debt per equity, the riskier. For both companies and individuals, this increased risk can lead to poor results, as the cost of servicing the debt can grow beyond the ability to pay due to either external events (income loss) or internal difficulties (poor management of resources).

H0: Cost of Debt has no effect on leverage.

H4: Cost of debt does have effect on leverage.

Model Specification

Panel data follows a given sample of firms over time, and thus provides multiple observations on each individual in the sample. Panel data combines the features of time series and cross-section. It provides information on a number of statistical units for a number of years. Panel data for economic research has several advantages over cross-sectional or time-series sets. Panel data usually provides the researcher a large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables; hence improving the efficiency of econometric estimates.

Constant Coefficient Model

This is also known as pooled regression. This is the simplest of all the panel data models. The model disregards the time, space or individual effects. The assumption of the model is that all firms are similar with regard to capital structure and there is no significant time effect on leverage. This method was used by Shah & Hijazi in their research.

$$LG_{it} = \beta_0 + \beta X_{it} + \varepsilon \dots \dots \dots (1)$$

LG = the measure of leverage of a firm i at time t

β_0 = The intercept of the equation

β = The change co-efficient for X_{it} variables

X_{it} = the different independent variables for leverage of a firm i at time t i = the number of the firms i.e. i = 1, 2, 3...N

t = The time period i.e. t = 1, 2, 3...T

Specifically, when we convert the above general least square equation into our specified variables, the equation will be:

$$LG_{it} = \beta_0 + \beta_1(CE_{it}) + \beta_2(SZ_{it}) + \beta_3(CD_{it}) + \beta_4(RE_{it}) + \varepsilon \dots \dots (2)$$

LG = Leverage

CE = Cost of Equity

SZ = Size

CD = Cost of Debt

RE= Retained Earning

The estimated model assumes that the intercept values of all the firms are the same. Therefore, the pooled regression may distort the true picture of the relationships between leverage and the independent variables across firms if the assumptions of the models are not met. Therefore, to capture the firm or random effects, I need to apply some other models of panel data.

Results Interpretation

Using fixed effects model, results for firms related to different industries were statistically significant. Hence only the results of the fixed effect model were mentioned. The regression output for fixed effects dummy variable model shows that industry classification does matter in the determinants of capital structure. The intercept values for all industries except miscellaneous industry are different.

Table 2 Fixed Effect Dummy Variable Regression

| Model Summary (B) | | | | | |
|-------------------|---------|----------|-------------------|----------------------------|---------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .430(a) | .184 | .181 | 762.37016 | 1.964 |

a Predictors: (Constant), Cost of Equity, Cost of Debt, Retained Earnings, Gross Sale

b Dependent Variable: Leverage

*R² = 0.184 shows that independent variables cause 18.4% change in leverage. This is not so high. The R square calculated is 0.184 that is not in accordance with the standard required for the model to be fit.

| ANOVA(b) | | | | | | |
|----------|------------|----------------|-----|--------------|--------|---------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1262201.48679 | 4 | 31555037.170 | 54.292 | .000(a) |
| | Residual | 5579599.35571 | 960 | 581208.266 | | |
| | Total | 6841800.84249 | 964 | | | |

a Predictors: (Constant), Cost of Equity, Cost of Debt, Retained Earnings, Gross Sale

b Dependent Variable: Leverage

The results of table shows that the model is significant, as indicated by the f statistics, the reason for the low R square is that the two variables are insignificant which can be observed by the coefficient table.

The analysis of variance (ANOVA) is also a measure of the fitness of the model, the significance of the model shows that in terms of the ANOVA test the model is fit. The f statistic in the table is greater than the value 54.292 which suggest its significance. Our model is highly fit with the figure 54.292 depicted in the table above.

| Coefficients(a) | | | | | |
|-----------------|-----------------------------|------------|---------------------------|---|-------|
| Model | Unstandardized Coefficients | Std. Error | Standardized Coefficients | t | Sig. |
| | B | Error | Beta | B | Error |
| | | | | | |

| | | | | | | |
|---|-------------------|---------|---------|-------|--------|------|
| 1 | (Constant) | 220.411 | 153.209 | | 1.439 | .151 |
| | Gross Sale | -18.543 | 22.532 | -.028 | -.823 | .411 |
| | Cost of Debt | .119 | .219 | .018 | .542 | .588 |
| | Retained Earnings | -.202 | .076 | -.086 | -2.665 | .008 |
| | Cost of Equity | 6.331 | .432 | .432 | 14.670 | .000 |

a Dependent Variable: Leverage

*The Table shows the magnitude of relationship among independent variable.

The coefficients in the above table shows the extent of the relationship of the independent variables with the dependent variable, as from the coefficients it is clear that two out of the four variables have insignificant relationship, the t statistics shows that cost of equity has strongest impact on leverage with the value of 14.670 and it is also highly significant. In addition to cost of equity retained earning also has high impact on leverage with the t stat value of 2.665, but retained earnings exhibits negative impact on leverage. In addition to these two significant values the gross sale and cost of debt does not have a significant relationship with leverage, and they also have low t statistics.

Conclusion

Using two variants of panel data analysis, to find the determinants of capital structure of KSE listed firms for the year 2001-2006. The effect of four explanatory variables is measured on leverage ratio, which is calculated by dividing the total debt by total assets. Initially some descriptive statistics is presented on selected variables. Pooled regression analysis was applied with the assumption that there were no time effects. By using four explanatory variables to measure their effect on leverage ratio. Two of our variables are significantly related to leverage ratio whereas the remaining two variables are not statistically significant in having relationship with the leverage. The results approve the prediction of trade-off theory in case of retained earning whereas the cost of debt and cost of equity variables fail to confirm to trade-off theory. Size of firm variable neither confirms to the prediction of trade-off theory nor to asymmetry of information theory.

The prediction of trade-off theory is confirmed by our result. Size, measured by gross sale, has a negative coefficient but is insignificant. It means that firms in the sample do not consider their sizes as an active variable in deciding the leverage level. Size gives a comparative advantage of lower asymmetric information. Hence the asymmetry of information problem does not have significant effect on leverage ratios of either large or small firms. Cost of equity variable is significant at 100% level and is positively related to leverage. Agency costs for growing firms are more and hence these firms employ lower level of leverage. Cost of debt is the most insignificant explanatory variable and is positively related to leverage. Results indicate that retained earning variable is highly significant and is negatively related to leverage.

One may conclude, after controlling for the bias in the data that creditors do not look too much towards the retained earnings of the firm rather they prefer the security of the fixed assets. Finally, there is no evidence that size of firm influence the decision of leverage of the sample firms.

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