The Determinants of Capital Structure: A Case from Sugar Industry of Pakistan

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Abstract

The purpose of this research is to find out the capital structure of listed firms in the sugar industry of Pakistan. The study finds that a particular industry’s capital structure exhibits unique attributes, which are usually not visible in the combined analysis of many sectors. The study took 5 firms in the sugar sector, listed at the Karachi Stock Exchange for the period 2008-2012 and analyzed the data by using multiple linear regressions. These are four independent variables i.e. firm size (measured by natural log of sales), tangibility of assets, net income and %change in assets. The results, except for firm size and growth were found highly significant. The regression model is found to be significant. Only growth and size of firms were found insignificant and have positive relationship with leverage. So, capital structure of firms in sugar industry mainly depends upon their sizes and growth opportunities.

Keywords: Capital Structure, Sugar industry, Karachi Stock Exchange, Pakistan

1. Introduction

Capital structure refers to the mix of debt and equity used as a result of 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, buyouts and so on. The firm can choose a mix of financing options to finance its assets so that its overall value can be maximized and this is known as the capital structure of the firm. Capital structure contributes a lot in determining the overall market value of the firm. Firms use different mix of financing options to finance their assets and most of the times it is based on the nature of the industry and the operations.

This study will focus on firms of the Sugar industry of Pakistan and the purpose is twofold. One is to see whether the determinants identified (Afzal and Hussain, 2011) provide an explanation for the choice of capital structure of firms in the Pakistan’s sugar industry. Second, I will attempt to see whether Sugar industry of Pakistan exhibits unique attributes that are not apparent in the combined analysis on non-financial firms of Pakistan made by (Hijazi, S. T., & Tariq, 2006) who analyzed 445 firms listed in Karachi Stock Exchange.

There has been a growing interest worldwide in identifying the factors influencing Capital Structure decisions of financial and non-financial sectors. The primary objective of the firm is to maximize the shareholders wealth by selecting an appropriate mix of the sources of finance for a firm including retained earnings, proceeds from the issue of ordinary shares, preference shares and debt. Banks, Individuals and financial institutions including investment, leasing and insurance firms provide debt capital. The borrowing firms may avail the tax shield by using debt financing if they have operating profits but it increases the risk of bankruptcy. Bankruptcy costs include direct and indirect costs; the former consists of liquidation cost which is higher for a small firm and lesser for a large size firm. Indirect costs are the result of changes in policies of firm regarding long term investments i.e. reduction in the staff of research and development department, reducing training and development budgets of employees, and advertisement expenses which further increases the losses due to poor quality of goods and services resulting in low sales revenue of the firms. (Afzal and Hussain, 2011)

The factors which influence the firm’s capital structure are business risk, tax position, profitability, managerial conservatism and growth opportunity. Assuming a perfect capital market which includes no transaction or bankruptcy costs, perfect information, companies and individuals can borrow at the same interest rate, and no taxes, value of company is not affected by financing decisions. (Chen and Jean, 2003)

Therefore, the potential benefits of leverage diminish due to bankruptcy cost and highly levered firms are considered to be highly risky by lenders and investors. If the borrowing firm has low credit rating, the borrowing will not be cost effective.

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for the firm. Equity financing includes issuance of common stock and cost of equity is higher than the cost of debt financing due to floatation cost and shareholders demand for higher dividend for the risk of volatility of earnings. Asymmetric information causes underinvestment issues for small firms. Large firms have less asymmetric information as compare to small firms which encourage the large firms to issue equity for fund raising. (Afzal and Hussain, 2011)

The determinants of capital structure in the Indian corporate sector in the period 2003-2007, a period of unprecedented growth of Indian economy. They found that financing with internal funds, as suggested by the Pecking-Order theory, has emerged as a major feature of corporate capital structure. However, they also found evidence supporting the Tradeoff theory and Agency Cost theory in the influences of some of the other determinants. (Datta D and Agarwal, 2009)

Capital structure in SMEs is recognized as the backbone for every economy, they continue to suffer from the problem of lack of availability of finance. They found that capital structure was highly related with the type of firm, age of firm, growth of firm, degree of competition, the level of capital investment, and by owner’s qualification. They highlighted that a majority of SMEs still rely on their own funds and comparatively less on borrowed funds. (Dogra B and Gupta S, 2009)

One of the most important theories about optimal capital structure is pecking order theory. This theory based on this fact that financing must reduce information asymmetries and agency problems (Abor, 2007). Thus, it could increase owner’s assurance and it is in accordance with stewardship approach and accountability of managers to owners and investors. On the other hand, determining optimal capital structure is a basic and important issue which will be affected by different variables. For example, controllable variable by firms and accounting variables which arose from the main activities in organizations have an important effect on investors and creditors decisions about firm’s financing. These factors also have an effective impact on capital structure which maximize the firm value and minimize cost of financing. (Raul, 2009)

The remainder of this paper is divided into four main sections. Section 2 presents the theoretical basis for the analysis presented in paper. Section 3 then provides a detailed description of the methodology, operational definitions of the variables and model used. Section 4 then details the results of this analysis, comparing the results with the past findings. Finally, section 5 summarizes and concludes.

The objective of our study is to identify the determinants of capital structure in sugar industry of Pakistan. We have used four variables: Size of the firm, Tangibility of assets, % change in assets and net income. Following are the key research questions:

- What is the company’s capital structure?
- What are the nature of relationship between debt and equity?
- Whether capital structure effect on the company’s financial performance?
- To what extent capital structure effect on the company’s financial performance?
- What are the major determinants that impact the capital structure?
- What are the variables which have major effect on the leverage of the firm?

2. Literature Review

For a number of years, there has been a sizeable research in relating capital structure. In addition, many factors have been used to determine the capital structure. The following section discusses the determinants of capital structure; namely, growth opportunity, profitability, firm size, asset structure. (Modiglian and Miller, 1958) was written first paper on capital structure. They conceptually proved that the value of firm in not dependent upon the capital structure decision given that certain conditions are met. Because of the unrealistic assumptions in MM irrelevance theory, research on capital structure gave birth to other theories. The tradeoff theory says that a firm’s adjustment toward an optimal leverage is influenced by three factors namely taxes, costs of financial distress and agency costs. Firstly (Hijazi, S. T., & Tariq, 2006) have used the second approach Secondly, the capital structure of firms in developing countries like Pakistan primarily based on the short-term debt as compared to the long term debts. Leverage refers to the percentage of assets financed by debt. Previous research studies have used different measures of leverage. (Myers, 2001) Proposes Pecking order hierarchies the financing as fellow: Preference of internal finance rather than external finance, Dividends are sticky. It means do not cut dividends to finance capital expenditures, First issue safety
securities like debt before issuance of new equity. This theory also addresses the asymmetric information regarding the firm’s potential earnings. Managers are well informed than the market investors. 

(Awan and Amin, 2014) The pecking order theory emphasis on the uses of internal funds generated from operations of firm. Because of internal funds are relatively low costs than debts while Debts are relatively low costs than issuing of new securities. Cash flow theory underlines the assumption that managers act in their own interest rather than shareholders’ interests. (Myers, 2001) Explained that cash flow theory discussed the agency problems and their relating costs because of the conflicts in interests between the shareholders and the management.

(Boateng, 2004) When leverages differ from target capital structure, firms tend to move their capital structure towards the target capital structure, whereas the speeds of adjustment are considered to be questionable. Furthermore, capital structure decision-making is even more complicated when it is examined in an international context, particularly in developing countries where markets are characterized by controls and institutional constraints

(Fama and French, 2002) High leverage prompts high costs of financial distress. As a result, the market discounts the shares of firms in financial distress at a higher rate hence leading to the negative relationship between leverage and growth opportunities. In the extant literature growth opportunities are measured differently, depending to a great extent on data availability. (Nguyen and Ramachandran, 2006) There are conflicting theoretical predictions on the influence of profitability on the leverage of the firms. The trade-off theory predicts that profitable firms would more likely be able to benefit from greater tax advantages of debt which might induce them to be more levered with low risk of financial distress.

(Afzal and Hussain, 2011) The determinants of capital structure for firms in Pakistan revealed that firms with high profitability used retained earnings, followed by debt financing and equity financing was considered as a last resort. Thus, the evidence supports pecking order theory. (Singhania and Seth, 2010) Found a negative correlation between the debt ratio of the companies and their growth, the liquidity and the interest coverage ratio, and a positive correlation between the debt ratio and size of the company (Khan, 2010) studied capital structure in the Indian paint industry. She found that profitability, tangibility, growth and business risk were significant determinants in the choice of capital structure, while size and tax rate were weak determinants. She found a positive relationship between leverage and tangibility of assets and size, and a negative relationship between leverage and profitability.

(Akbarpour, M., & Aghabeygzadeh, 2011) The aim of determining financial structure is to distinguish structure of financial fund in order to maximize shareholders' wealth. We can consider financial structure as an effective factor on shareholders wealth. The more bonds a firm issues, the higher will be its breakeven point and leverage. Otherwise, the profit per share will decline; therefore, financial managers measure different impacts of different financial structures on shareholders' wealth.

( Basu and rajeev, 2013) Found that institutional factors matter in financing decisions of corporations, and that capital market regulation in India have had an adverse impact on the use of public debt and a favorable impact on the use of equity capital. They also found that firm specific factors are more capable of explaining trade-off theory rather than explaining the information asymmetry in the public domain, so that firms can mobilize resources from private sources more readily than from the market, as private lenders have superior firm-specific information.

(Panda, 2013) Studied the determinants of capital structure in the Indian steel industry. They observed that the industry is highly debt-driven, with an average debt portion of about 68%. They found that profitability had a significant positive impact on the debt ratio of steel companies, while growth and risk had a significant negative impact on the debt ratio of steel companies. Thus, they suggested that the Trade-Off theory held for capital structure decisions in the Indian steel industry.

(San and Heng, 2011) Critically investigates the relation between corporate performance and capital structure by using the data from construction sector of Malaysia. They disclose that EPS and debt to capital have negative link between them in large and small firms, while return on capital and debt to equity market value, EPS and long-term debt to capital have positive link particularly for large firms. In medium size firms, there is a positive relation between OM and LDCE (Long term debt to common equity). The volume of debt in capital structure of firms in Jordan has negative and remarkable effect on the performance of companies, when performance is evaluated both in accounting based (ROA) and market based measures.

(Khan, 2013) Inspect the capital structure, financial performance and their effect on stock returns. After analyzing the data from 69 listed textile firms of Pakistan, they reveals that leverage, ROE, EPS, and Cash flow ratio have positive effect on the return of firm’s stock. Capital structure of a textile firms in Pakistan is positively linked with the wealth of stockholders (Stock price) and performance of organizations (ROA, ROE and EPS).

(Raheman, Zulfiqar and Mustafa, 2007) Scrutinize the link between capital structure and profitability. The data from the 94 non-financial firms for a phase of 6 years (1999-2004) was put in use. They employ the regression and correlation

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analysis and made known that equity and firm’s size has positive, while leverage (Debt) has negative effect on the profitability of organizations. (Umar, 2012) Examine the impact that capital structure has on financial performance on the data of 100 top firms in Pakistan for 4 years (2006-2009). The outcome displayed that capital structure inversely affect the profitability whereas positive link was revealed between ROE and Long term debt to total asset.

3. Design Research and Methodology

This research project is based on the data, which is published by State Bank of Pakistan as “Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange Volume-II 1996-2001” and “Balance Sheet Analysis of Joint Stock Companies Listed at the Karachi Stock Exchange (1999-2004)” published by state bank of Pakistan statistics department source of the data is www.sbp.org.pk As this study has focused on the Sugar Sector, the firms (which are listed on the Karachi Stock Exchange) in the Sugar sector (whose published data was available) were selected. Then after screening the firms with incomplete data, we were left with only 5 firms. This section comprises of two sub sections. Section 3.1 explains data and 3.2 describe the research methodology.

3.1. Data

This study utilized the secondary data which is collect form Karachi stock exchange. We focused on secondary time series data of 5 years duration period is 2008-2012. Multiple regression line analysis is used to find the relationship between the variables. Leverage is treated as a dependent variable. While independent variables as net income, firm size, tangibility of assets and change in assets.

Population & Sampling

The population of the study is listed sugar companies of Pakistan. Convenience sampling technique has been used to identify and select the 5 sugar companies for which data were available for the period of study.

Variable:

After discussing the various theories of capital structure, now we discuss the potential dependent and independent variables for our study. We take the debt to total assets ratios as a proxy for leverage (dependent variable). For independent variables, we take only four main independent variables namely, tangibility, profitability, growth and size of the firm.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
</tr>
<tr>
<td>Leverage</td>
<td>Debt/ total assets</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
</tr>
<tr>
<td>Tangibility of assets</td>
<td>Tangible Assets/T. Assets</td>
</tr>
<tr>
<td>Firm Size</td>
<td>Natural Log of sales</td>
</tr>
<tr>
<td>Growth</td>
<td>% change in assets</td>
</tr>
<tr>
<td>Net income to Assets</td>
<td>EBIT/T. Assets</td>
</tr>
</tbody>
</table>

Source of Data: Karachi stock exchange

Leverage can be defined as the degree to which a company uses fixed-income securities, such as debt and preferred equity. Leverage use borrowed capital (an investment), expecting the profits made to be greater than the interest payable. Profitability is defined as the earnings before interest and taxes to total assets. It shows how profitable a firm is in sugar industry of Pakistan. Profitability is calculated as: Profitability = EBIT/Total Assets

The size of the firm can be calculated either by log of sale or by log of assets. In this research project measured the firm’s size by log of total assets. So the firm’s size is calculated as: Size = Log of total assets
Tangibility of assets is defined as tangible assets to total assets. This shows that how much fixed tangible assets a firm has in sugar sector of Pakistan. High tangibility of fixed assets provides a firm with more ability of taking long term loan. So the tangibility of fixed assets can be calculated as: \( \text{Tangibility} = \frac{\text{Tangible Assets}}{\text{Total Assets}} \)

There are two ways to measure growth either by change in total sales or by change in total assets. In this research project growth measured change in total assets as proxy for measuring growth in sugar sector of Pakistan. It is calculated as: \( \text{Growth} = \frac{\text{Change in total assets}}{\text{Total assets}} \)

### Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>St. dv</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangible Asset</td>
<td>25</td>
<td>93.35</td>
<td>12.55</td>
<td>70.65</td>
<td>116.51</td>
</tr>
<tr>
<td>Natural log</td>
<td>25</td>
<td>8.7</td>
<td>11.51</td>
<td>6</td>
<td>64</td>
</tr>
<tr>
<td>Change in asset</td>
<td>25</td>
<td>25.35</td>
<td>35.19</td>
<td>-23.17</td>
<td>91.47</td>
</tr>
<tr>
<td>EBIT asset</td>
<td>25</td>
<td>12.42</td>
<td>7.2</td>
<td>-1.27</td>
<td>27.72</td>
</tr>
<tr>
<td>Debt Asset</td>
<td>25</td>
<td>70.34</td>
<td>7.6</td>
<td>53.03</td>
<td>85.24</td>
</tr>
</tbody>
</table>

Notes: This table represents the summary statistics, obs is observation, mean represents central tendency of data, sd is the standard deviation, min is the minimum and the max is the maximum is the particular set of data.

Data source: Karachi stock exchange

Table 2 represents the summary statistics of all variables the model. Coefficients that abridges given in sequence set, which can either be a demonstration of the entire population or a sample. Measures of central tendency enclose the mean, median and mode; on the other hand measures of variability also include the standard deviation, the minimum and maximum variables these are depended and independent variables. Mean is the basic statistical average of a position of two or additional numbers. We can calculate the Mean by using Arithmetic mean and Geometric mean. Standard deviation is used to discover the distribution in a data set. Standard deviation is the square root of variance.

### 3.2. Research Methodologies

To test or check the impact of independent variables or dependent variable multiple linear regression model are used. This section is further divided into two sub section. Where section 3.2.1 explains research hypotheses and sub section 3.2.2 represents empirical model.

#### 3.2.1. Research Hypotheses

The hypotheses of our study are:

- H1: There is negative relationship between firm of size and leverage.
- H2: There is negative relationship between tangibility of assets and leverage.
- H3: There is positive relationship between EBIT in assets and leverage.
- H4: There is positive relationship between %change in assets and leverage.

#### 3.2.2. Empirical model

\[ L_G = \beta_0 + \beta_1 (T) + \beta_2 (SZ) + \beta_3 (%AST) + \beta_4 (NI) + \varepsilon \]

Where,

- \( L_G \) = Leverage
- \( T \) = Tangibility (EBIT) of assets
- \( SZ \) = Size
- \( %AST \) = %Change in Assets
- \( NI \) = Net Income

Data source: Karachi stock exchange
SZ = Firm Size measure by Log of sales
% = change in Assets
DA = debt assets
ε = the error term
β₀ = intercept
β₁, β₂, β₃, β₄, β₅ is the coefficient parameters

4. Research Analysis

This section explains the results and analysis of our study. Initial of all data is tested correlation is associated of two variables or one variable are other variables. To test the impact of explanatory variable on dependent variables multiple linear regression form are used correlation.

Correlation among explanatory variables result

<table>
<thead>
<tr>
<th>Variables</th>
<th>Natural log</th>
<th>Change in asset</th>
<th>EBIT assets</th>
<th>Debt asset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural log</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in asset</td>
<td>-0.075</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBIT assets</td>
<td>0.147</td>
<td>-0.2323</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Debt asset</td>
<td>-0.2086</td>
<td>0.4437</td>
<td>-0.45</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: natural log is the size of the firm and % change in assets earnings before interest rate assets and Debt assets. Data Source. Karachi stock exchange

Explanation of correlation:

However, the table explains some interesting facts about the correlation among these independent variables. Correlation is used to determine how two random variables are associated. As standard deviation is always optimistic, the symbol of the correlation among two variables should be the same as that of the covariance among the two variables. If the correlation is optimistic, that variables are optimistic correlated. If it is pessimistic than they are the pessimistic correlated. Furthermore, it can be proved that the correlation is always among +1 and -1.

IMPACT OF INDEPENDENT VARIABLE ON DEPENDENT VARIABLE BY UTILIZING MULTIPUL LINEAR REGRESSION
Explanation of regression result:

Table 4 demonstrate the regression analysis used to find the relationship among Firm size, Tangibility of assets, Net income, %change in assets and leverage respectively. One asterisk shows statistical significance at 1%, two asterisks at 5% level, and three asterisks at 10% level. R² explicate how much independent variable explains the dependent variable, while adjusted R² tells about the model fit. Intercept depicts that there are other factors that impact our dependent variable other than variables used in our study. The result shows that firm size has insignificant negative relationship with firm size, which means that an increase in firm size by one will reduce the leverage by 6.8%. Tangibility of assets also has insignificant negative relationship with leverage. This means that an increase in tangibility of assets by one will reduce the leverage by 11.59%. Net Income has significant positive relationship with leverage at 1% significant level. This means that an increase by one in net income the leverage will increase by 67.89%. The %change in assets also has significant positive relationship with return on equity at 10% significant level, which means an increase by one in size will increase leverage by 14.08%.

5. Conclusion

The purpose of this research study is to determine the determinants of capital structure in sugar sector in Pakistan. For this purpose 5 firms from sugar sector of Pakistan selected as study sample and data is collected for the period of 2008-2012. In this study leverage used as dependent variable while firm size, tangibility of assets, net income % change in assets used as independent variables. First of all data is tested for correlation in order to check the association between explanatory variables. The results show that there is normal correlation between independent variables. The result shows that firm size has insignificant negative relationship with firm size and Tangibility of assets also has insignificant negative relationship but net income and growth has positive relationships with leverage.
Bibliography


