Testing of Pecking Order Theory in the context of SMEs in India

Prof. Anirban Ghatak, Asst. Professor, Christ University Institute of Management, Bangalore, India

ABSTRACT

This study is related to the relevance of Pecking Order Theory, one of the explanations concerning the formation of capital structure, in terms of manufacturing and service SMEs. For the present study, data on manufacturing and service SMEs was accessed from the Prowess database between the years 2006 – 2011. The study tests the hypotheses based on Pecking Order Theory by examining the influences of a number of firm capital structure determinants on SMEs’ debt equity ratio. Results from regression model tested on panel data support a number of the propositions derived from Pecking Order Theory. The findings were consistent with that of the Pecking Order Theory.

Key Words: debt and equity, Pecking Order Theory, Capital Structure

Introduction:

SMEs have been playing a critical role in both the developed and the developing economies. They have identified the unique power of innovation and served as incubators for new technologies and practices. The contribution of SMEs has been remarkable in the industrial development of India. SMEs contribute about 40 per cent of India’s domestic production, almost 50 per cent of total exports and 45 per cent of industrial employment; they are also the largest direct and indirect employer (41 million). SME finance in the country is largely seen as a part of the regulated lending through a network of state-created institutions. While it is an achievement on the part of the banking sector and shows the credit-absorption capacity of SMEs, there is a definite and visible gap in its support to the sector. This gap is generally filled by the unorganized banking sector and local money lenders. Although this type of funding is readily available, it comes with the downside of high maintenance costs. Despite the significant contribution to the general perception on the various intricacies of corporate capital structure, research undertaken so far did not provide a sound basis for establishing, in a decisive fashion, the empirical validity of the different theoretical models. In the above background, the present study aims to test the hypotheses based on Pecking Order Theory by examining the most important factors that influence the capital structure decisions of SMEs in India.

Reviews of Literature:

Zoppa and McMahon (1994) conducted a research titled “Pecking order theory and the financial structure of manufacturing SMEs from Australia’s business longitudinal survey” to study the relationship between Pecking Order Theory and the financial structure of 871 manufacturing SMEs in Australia. The results were found to be consistent with what predicted by pecking order theory. The researcher also found that enterprise growth may not be an important influence upon the financial structure of the manufacturing SMEs.

Frank and Goyal (2002) in the research paper titled “Trade-Off and Pecking Order Theories of Debt” studied the implications of both the theories. The trade-off theory focuses on taxes and bankruptcy costs. Whereas pecking order theory focussed that cash on hand actually issue debt. The importance of bankruptcy and collateral was discussed in the paper. A further problem is that currently there is little research that examines capital structures within a general equilibrium context.

Swinnen, Voordeckers and Vandemaele (2003) did the research titled “Capital structure in SMEs: pecking order versus static trade-off, Bounded rationality and the behavioral principle”. The study was carried out to determine whether behavioral principle can better explain the financing behavior of SMEs better than the two traditional theories namely trade off and pecking order theory. The sample size was 899 firms and financial data were collected over a period of 10 yrs from 1993-2002. The regression analysis was used to analyse the results and that were found consistent as predicted by the pecking order theory that the firms decide on debt financing depending on their internal sources of finance. Descriptive analysis showed that behavioral principle outperformed the traditional trade off theory. The study did not considered the economic conditions of the nations where these firms operate and also the business cycle and the stage in which these firms are.

Medeiros and Daher (2004) did a study on “Testing the Pecking Order Theory of Capital Structure in Brazilian Firms” to investigate whether the pecking order theory provided empirical evidences of the capital structure of the 132 firms. The methodology adopted in this empirical study involves cross-section regressions and the testing of hypotheses stemming from the underlying theory in its strong and weak forms. Paper has revealed b coefficients relatively closer to one, seemingly indicating that Brazilian firms are closer to the theory’s strong form than their American firms. The preferences for debt and equity supported the pecking order theory predictions.

Galpin, (2004) in his research work titled “Can the Pecking Order Explain the Costs of Raising Capital?” focussed on information theories of capital market
transaction costs. The author showed that the explanatory power of the pecking order appears to fade through time. The findings were inconsistent with the pecking order theory. The hypothesis was tested based on the econometric model. The data of the firms listed on NYSE, AMEX, and NASDAQ were taken. It was found through the study that the pecking order’s main prediction, that managers prefer debt capital to equity capital is not robust to period. Also firms with high ex ante information asymmetry have high debt and equity transaction costs, but information asymmetry does not seem to push firms toward more of a pecking order. This is inconsistent with the pecking order prediction that information asymmetry drives the value of debt relative to equity, but does not rule out a very important role for asymmetric information in capital structure.

Ramlall, I., (2007) conducted a study titled “Determinants of Capital Structure Among Non-Quoted Mauritian Firms Under Specificity of Leverage: Looking for a Modified Pecking Order Theory”. The data was collected from 450 firms for the period 2005-06 and regression analysis was used to test the hypothesis. Results show that profitability, non-debt tax shield and growth do not explain leverage needs. The results were consistent with pecking order theory. Size and age were found to be negatively correlated and tangibility was found to be positively correlated.

Bell and Vos (2007) conducted a study on capital structure of SMEs titled “SME Capital Structure: The Dominance of Demand Factors”. The objective being the contentment hypothesis that contents the reason SMEs exhibit pecking order behavior is the aversion to loss of control to outside financiers and the preference for financial freedom. The sample includes 3455 firms from Germany, Greece, Ireland, Portugal, South Korea, Spain and Vietnam. The study has shown SMEs exhibit pecking order behavior, consistent with previous studies on small firm capital structure. The findings in this paper suggest that debt carries disutility for SME managers. Profitability is negatively related to leverage and the use of external debt.

Li-Ju Jung and Shun-Yu (2009) did a research titled “How the Pecking-Order Theory Explain Capital Structure” to find what characters of the capital structure are important for a firm to obtain better operational performance. The sample consisted of 305 Taiwan electronic companies and block regression is used as an analytical tool for data analysis. The research concludes that assets structure is not correlated with capital structure, perhaps because it affects long-term debt. The dividend policy is not correlated with capital structure, size of firms is the moderator of the path between tax rate and capital structure. The tax rate affects positively leverage.

Ali, Huson and Hisham (2009) did the research work on theories of capital structure titled “Revisiting Capital Structure Theory: A Test of Pecking Order and Static Order Trade-off Model from Malaysian Capital Market”. The sample consisted of 102 Malaysian firms that are listed and the data were analysed using regression analysis. The pecking order theory was found to be well explained in Malaysian firms despite having low predicting power. The expanded pecking order model provides more vibrant explanation for debt issuance with higher predictive power. The firm’s size showed some evidence where as NDTs, size, asset structure, and growth provide no evidence of static trade-off hypothesis in Malaysian capital market.

Research Methodology:

Statement of the problem

Although many studies have been conducted on the capital structure, still there is a gap of satisfactory, comprehensive and positive explanation for firms’ capital structure observed behaviour. Most of the research on capital structure has focused on public, nonfinancial corporations with access to U.S. or other international capital markets. The study on the determinants of capital structure of SME’S in the developing countries like India has been overlooked and therefore a study on testing the hypotheses based on Pecking Order Theory by examining the most important factors that influence the capital structure decisions of SMEs in India is an important research area that needs to be explored.

Objectives of the study

The present study has been undertaken with the following objectives:

i. To find out the main determinants of capital structure of SME’s.
ii. To determine the implication of pecking order theory of capital structure in SMEs.
iii. To builds a model to find out the level of leverage in SME’S.
iv. To explore the link between theory and practice of capital structure.

Variables of the study

Dependent variable

The dependent variable in the study is the debt equity ratio.

Independent variable

Independent variables used in the study are profitability, growth, collateral, size, liquidity, non debt tax shield, age and effective tax rate.

Hypotheses

Hypothesis 1: A negative relationship will exist between profitability and debt equity ratio.
Hypothesis 2: A positive relationship will exist between growth and debt equity ratio.
Hypothesis 3: A positive relationship will exist between collateral and debt equity ratio.
Hypothesis 4: A positive relationship will exist between size and debt equity ratio.
Hypothesis 5: A negative relationship will exist between liquidity and debt equity ratio.
Hypothesis 6: A negative relationship will exist between NDTs and debt equity ratio.
Hypothesis 7: A negative relationship will exist between age and debt equity ratio.
Hypothesis 8: A positive relationship will exist between effective tax rate and debt equity ratio.

Sampling procedure
For data analysis the SME’S data were chosen from the CMIE Prowess database. Totally 1573 SMEs for a period of 5 years (2007 – 2011) are chosen for the current study.

Data Analysis:

Regression Analysis
The regression analysis is the process of constructing a mathematical model or function that can be used to predict or determine one variable by another variable. In the regression model the variable is to be predicted is called a dependent variable and the variables upon which the dependent variables are depending is called independent variable.

Interpretation:

Insert Table 1: Descriptive Statistics
Insert Table 2: Correlation Matrix

Regression Analysis

Insert Table 3: Model Summary

Interpretation:

R - R is the square root of R-Squared and is the correlation between the observed and predicted values of dependent variable. Here the R value is .950 which means there is a high correlation between the observed and the predicted value of the dependent variable.

R Square – This represents the proportion of variance in the dependent variable which can be explained by the independent variables. This is an overall measurement of the strength of the association and does not reflect the extent to which any particular independent variable is associated with the dependent variable. The value of R square is 0.902 which shows a high strength of association between dependent and independent variables.

Adjusted R Square – This is an adjustment o the R Square that penalizes the addition of extraneous predictors to the model. The value of Adjusted R Square is 0.901 which indicates that if there is an addition of extraneous predictor to the model it will not add significant predictability to the dependent variable.

Std. error of the Estimate – This is also referred as the root mean square error and it represents the standard deviation of the error term and the square root of the mean square for the residual in the ANOVA table.

Insert Table 4: ANOVA Table

Interpretation:

F test is used to test whether the model is statistically significant. We look to the p-value of the F-test to see if the overall model is significant. With a p-value of zero to three decimal places, the model is statistically significant. The null hypothesis is that the population means of the treated variables are equal. Here the p value is less than the significance level of 5 per cent. So the null hypothesis is rejected. Not all means are equal. It implies that there is a significant difference between all the independent variables.

Insert Table 5: Coefficients

Interpretation:

The first variable (constant) represents the constant, also referred as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of debt equity ratio when all other variables are 0.

From the table coefficients, the B value tells us about the relationship of each variable with the independent variable, i.e. debt equity ratio.

Profitability: The coefficient for profitability is -.052. So for every unit increase in profitability, a 0.052 unit decrease in debt equity is predicted, holding all other variables constant.

Growth: The coefficient for growth is .002. So for every unit increase in growth, .002 increase in debt equity is predicted, holding all other variables constant.

Collateral: The coefficient for collateral is .309. So for every unit increase in collateral, a 0.309 unit increase in debt equity is predicted, holding all other variables constant.

The relationship in the case of other variables also follows the same pattern.

The t and Sig. are the t-statistics and their associated 2-tailed p-values used in testing whether a given coefficient is significantly different from zero or not. If the t test associated with the B value is significant then that predictor is making significant contribution to the model. Using an alpha of 0.05 for the manufacturing SMEs we may explain these variables as follows:

1. The coefficient for profitability (. -0.52) is significantly different from 0 because its p-value is 0.000, which is smaller than 0.05.
2. The coefficient for growth (.002) is significantly different from 0 because its p-value is 0.474, which is smaller than 0.05.
3. The coefficient for collateral is (.309) is significantly different from 0 because its p-value is 0.014, which is smaller than 0.05

The relationship in the case of other variables also follows the same pattern.

So the regression equation can be written as:

Debt equity = .656 - .052 Profitability + .002 Growth + .309 Collateral + 0.001 Size - .007 Liquidity - .162 Age - .047 NDTs - .018 Effective tax rate

Hypothesis Testing:

Hypothesis 1: A negative relationship will exist between profitability and debt equity ratio.
H₀: Negative relationship between profitability and debt equity ratio
H₁: Positive relationship between profitability and debt equity ratio
Result: Negative relationship between debt equity and profitability has been obtained.
Thus, H₀ accepted.

Hypothesis 2: A positive relationship will exist between growth and debt equity ratio
H₀: Positive relationship between growth and debt equity ratio
H₁: Negative relationship between growth and debt equity ratio
Result: Positive relationship between debt equity and growth has been obtained.
Thus, H₀ accepted.

Hypothesis 3: A positive relationship will exist between collateral and debt equity ratio.
H₀: Negative relationship between collateral and debt equity ratio
H₁: Positive relationship between collateral and debt equity ratio
Result: Positive relationship between debt equity and collateral has been obtained.
Thus, H₀ is accepted.

Hypothesis 4: A positive relationship will exist between size and debt equity ratio.
H₀: Positive relationship between size and debt equity ratio
H₁: Negative relationship between size and debt equity ratio
Result: Positive relationship between debt equity and size has been obtained.
Thus, H₀ is accepted.

Hypothesis 5: A negative relationship will exist between liquidity and debt equity ratio.
H₀: Negative relationship between liquidity and debt equity ratio
H₁: Positive relationship between liquidity and debt equity ratio
Result: Negative relationship between debt equity and liquidity has been obtained.
Thus, H₀ is accepted.

Hypothesis 6: A negative relationship will exist between non debt tax shield and debt equity ratio.
H₀: Negative relationship between non debt tax shield and debt equity ratio
H₁: Positive relationship between non debt tax shield and debt equity ratio
Result: Negative relationship between debt equity and non debt tax shield has been obtained.
Thus, H₀ is accepted.

Hypothesis 7: A positive relationship will exist between effective tax rate and debt equity ratio.
H₀: Positive relationship between effective tax rate and debt equity ratio
H₁: Negative relationship between effective tax rate and debt equity ratio
Result: Negative relationship between debt equity and effective tax rate has been obtained.
Thus, H₀ is rejected.

Findings:

- Profitability is found to have a negative relationship with debt-equity ratio. The results indicated that with every unit increase in debt equity ratio, there is a decrease in profitability by 0.052 units.
- Growth is found to have a positive relationship with debt-equity ratio. The results indicated that with every unit increase in debt equity ratio, there is a decrease in profitability by 0.002 units.
- Collateral and debt equity ratio were found to be positively related and thus consistent with pecking order theory. The correlation coefficient was found to be 0.309.
- Size and debt equity ratio relationship is found consistent with the pecking order theory, showing a positive relationship. The model reflected that with every unit increase in debt equity ratio, there is an increase in the size by 0.001 units.
- Liquidity and debt-equity ratio was found consistent with the pecking order theory, showing a negative relationship. The model implies the result that with every unit increase in the debt equity ratio, there is a decrease in the liquidity by 0.007 units.
- Age and debt equity ratio showed a negative correlation with a coefficient of 0.162, which implies that with every unit increase in debt equity ratio; there is an increase in the asset structure by 0.162 units.
- Non debt tax shield is found to have a negative relationship with debt equity ratio. The results indicated that with every unit increase in debt equity ratio, there is a increase in non debt tax shield by 0.047 units.
- Effective tax rate and debt equity ratio showed a negative correlation with a coefficient of 0.018, which implies that with every unit increase in debt equity ratio; there is an increase in the effective tax by 0.018 units.

Conclusion:

The study is with the aim of contributing to the search of factors determining the SMEs’ capital structure. The study tests the hypothesis based on Pecking Order Theory by examining the influences of a number of firm capital structure determinants on SME debt equity ratio. Results from regression model tested on panel data support a number of the propositions derived from Pecking Order Theory. The findings were found consistent with that of the Pecking Order Theory. The overall results show that the debt equity ratio is positively related to size and collateral, which indicates the importance of the size and provision of fixed assets secure long-term debt finance. Moreover, the liquidity, profitability, age, NDTs and effective tax rate of firms are negatively related with use of debt equity. It was
also found that growth do not significantly contribute to the capital structure determination in case of SMEs. These findings support the proposition that the use of internal financial sources increases as the firm gets older.

References:

Annexure

Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Statistic</th>
<th>D/E Ratio</th>
<th>Profitability</th>
<th>Growth</th>
<th>Collateral</th>
<th>Size</th>
<th>Liquidity</th>
<th>Age</th>
<th>NDTS</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of observations</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
<td>1573</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.01</td>
<td>-2376.352</td>
<td>-0.317</td>
<td>0.001</td>
<td>0.18</td>
<td>-81.923</td>
<td>-1.255</td>
<td>-38,625</td>
<td>-47,455</td>
</tr>
<tr>
<td>Maximum</td>
<td>124,822</td>
<td>43,068</td>
<td>437,537</td>
<td>0.989</td>
<td>14427,942</td>
<td>324,194</td>
<td>0.373</td>
<td>23,143</td>
<td>12,972</td>
</tr>
<tr>
<td>1st Quartile</td>
<td>0.392</td>
<td>0.006</td>
<td>0.038</td>
<td>0.175</td>
<td>6.472</td>
<td>1.79</td>
<td>0.001</td>
<td>0.07</td>
<td>0.033</td>
</tr>
<tr>
<td>Median</td>
<td>0.577</td>
<td>0.032</td>
<td>0.122</td>
<td>0.311</td>
<td>13.26</td>
<td>2.783</td>
<td>0.01</td>
<td>0.229</td>
<td>0.144</td>
</tr>
<tr>
<td>3rd Quartile</td>
<td>0.739</td>
<td>0.09</td>
<td>0.251</td>
<td>0.474</td>
<td>23.374</td>
<td>4.886</td>
<td>0.029</td>
<td>0.499</td>
<td>0.26</td>
</tr>
<tr>
<td>Mean</td>
<td>0.795</td>
<td>-1,667</td>
<td>3.054</td>
<td>0.341</td>
<td>42.13</td>
<td>5.147</td>
<td>0.011</td>
<td>0.3</td>
<td>0.108</td>
</tr>
<tr>
<td>Standard deviation (n=1)</td>
<td>3.304</td>
<td>60.071</td>
<td>110.202</td>
<td>0.212</td>
<td>415.209</td>
<td>12,962</td>
<td>0.073</td>
<td>1.948</td>
<td>1.322</td>
</tr>
</tbody>
</table>

Source: Secondary Data

Table 2: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>D/E Ratio</th>
<th>Profitability</th>
<th>Growth</th>
<th>Collateral</th>
<th>Size</th>
<th>Liquidity</th>
<th>Age</th>
<th>NDTS</th>
<th>Effective tax rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>D/E Ratio</td>
<td>1.000</td>
<td>-.949</td>
<td>.003</td>
<td>.327</td>
<td>.003</td>
<td>-.042</td>
<td>-.004</td>
<td>-.033</td>
<td>-.009</td>
</tr>
<tr>
<td>Profitability</td>
<td>-.949</td>
<td>1.000</td>
<td>.001</td>
<td>.030</td>
<td>.003</td>
<td>.014</td>
<td>.002</td>
<td>.006</td>
<td>.002</td>
</tr>
<tr>
<td>Growth</td>
<td>.003</td>
<td>.001</td>
<td>1.000</td>
<td>.010</td>
<td>.012</td>
<td>-.008</td>
<td>.000</td>
<td>-.102</td>
<td>-.001</td>
</tr>
<tr>
<td>Collateral</td>
<td>.327</td>
<td>.030</td>
<td>.010</td>
<td>1.000</td>
<td>.077</td>
<td>-.103</td>
<td>.061</td>
<td>.043</td>
<td>-.037</td>
</tr>
<tr>
<td>Size</td>
<td>.003</td>
<td>.003</td>
<td>.012</td>
<td>.077</td>
<td>1.000</td>
<td>-.012</td>
<td>-.014</td>
<td>.013</td>
<td>-.001</td>
</tr>
<tr>
<td>Liquidity</td>
<td>-.042</td>
<td>.014</td>
<td>-.008</td>
<td>-.103</td>
<td>-.012</td>
<td>1.000</td>
<td>-.024</td>
<td>.042</td>
<td>-.019</td>
</tr>
<tr>
<td>Age</td>
<td>-.004</td>
<td>.002</td>
<td>.000</td>
<td>.061</td>
<td>-.014</td>
<td>-.024</td>
<td>1.000</td>
<td>.011</td>
<td>.002</td>
</tr>
<tr>
<td>NDTS</td>
<td>-.033</td>
<td>.006</td>
<td>-.102</td>
<td>.043</td>
<td>.013</td>
<td>.042</td>
<td>.011</td>
<td>1.000</td>
<td>-.025</td>
</tr>
<tr>
<td>Effective tax rate</td>
<td>-.009</td>
<td>.002</td>
<td>-.001</td>
<td>-.037</td>
<td>-.001</td>
<td>-.019</td>
<td>.002</td>
<td>-.025</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Source: Secondary Data

Table 3: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.950a</td>
<td>0.902</td>
<td>0.901</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Source: Secondary Data

Table 4: ANOVA Table

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>15477.149</td>
<td>8</td>
<td>1934.644</td>
<td>1793.27</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>1687.295</td>
<td>1564</td>
<td>1.079</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17164.444</td>
<td>1572</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Secondary Data
### Table 5: Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Un standardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.656</td>
<td>.052</td>
<td>12.602</td>
</tr>
<tr>
<td></td>
<td>Profitability</td>
<td>-.052</td>
<td>.000</td>
<td>-119.574</td>
</tr>
<tr>
<td></td>
<td>Growth</td>
<td>.002</td>
<td>.000</td>
<td>-.715</td>
</tr>
<tr>
<td></td>
<td>Collateral</td>
<td>.309</td>
<td>.125</td>
<td>2.467</td>
</tr>
<tr>
<td></td>
<td>Size</td>
<td>.001</td>
<td>.000</td>
<td>-.236</td>
</tr>
<tr>
<td></td>
<td>Liquidity</td>
<td>-.007</td>
<td>.002</td>
<td>-.3.303</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>-.162</td>
<td>.359</td>
<td>-.450</td>
</tr>
<tr>
<td></td>
<td>Non debt tax shield</td>
<td>-.047</td>
<td>.014</td>
<td>-.3.455</td>
</tr>
<tr>
<td></td>
<td>Effective tax rate</td>
<td>-.018</td>
<td>.020</td>
<td>-.894</td>
</tr>
</tbody>
</table>

**Source:** Secondary Data

***