A STUDY ON CAPITAL STRUCTURE DETERMINANTS OF INDIAN STEEL COMPANIES

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ABSTRACT

This paper studies the determinants of capital structure choice of Indian steel companies. The main objective of the firm is to explore the most important factors which influence most the choice of capital structure of the steel companies in India. The study is basically empirical in nature. In the present paper 37 Indian steel companies listed under National Stock Market and Bombay Stock Market constitute the sample of study. Correlation and regression analysis are used to explore the relationship between dependent variable leverage and other independent variables like tangibility, size, non-debt tax shield, growth opportunity, profitability and business risk. It is found that tangibility, non-debt tax shield, size and growth opportunity have significant effect of the leverage of the capital structure of the companies. The other two variables, profitability and business risk have insignificant effect on the capital structure of the companies.

KEYWORDS: Indian Steel Companies, Capital Structure Decision, Capital Structure of Indian Steel Companies, Study on Capital Structure Determinants

INTRODUCTION

The capital structure decision of a corporation is a controversial issue at present. There must be a balanced proportion of debt and equity in the capital structure. Over the past several decades, theories on a company’s capital structure decision have evolved in many directions. Capital structure is a mix of long-term debt (including bonds and loans), equity (common and preferred stock) and hybrid securities (such as convertible debt and preferred shares). In other words, it refers to the percentage of capital at work in a business by type. But it is difficult to predict the financial structure of a firm on the basis of its nationality. Economic and business cycles are prime determinants of the firm’s future course of action. Firms can gain access to the markets and loans premiums on their debt and equity issues if the projections and business confidence levels are high. The global economy is in a fragile state. Firms need to be careful with the costs they add to their portfolios with the loans they undertake. Capital structures would depend on the interaction of demand side variables given by the trade-off and the pecking order theory and the supply side variables of investors’ taste and limited financial intermediation. Therefore, it can be said that the financing decision of a firm would be governed by both demand and supply side factors. The optimal debt-equity mix is explained by a number of capital structure theories. Corporations’ funds their operations by raising capital from a variety of distinct sources. The mix between the various sources is generally referred to as the firm’s capital structure. The empirical capital literature explores the cross sectional studies and indicate that observed debt ratios are relatively close to the firm’s actual targets. The main purpose of the study is to understand the determinants of Indian steel industry.

REVIEW OF LITERATURE

According to the study of Titman and Wessel (1988) and Harris and Raviv (1991) the selection of explanatory
variables in the analysis of cross-sectional variation in capital structure is a very crucial task for the researchers. At present time Booth et al (2001) provided the first empirical study to test the explanatory power of capital structure models in developing countries. Wald (1999) examined characteristics of firms that were not similarly correlated with leverage across countries. He demonstrated that institutional differences could contribute to differences in capital structure. The theoretical considerations and prior empirical evidence with regard to each of the independent variables are discussed as under:

Tangibility

Firms with higher tangible assets are expected to have higher leverage. Firms can borrow money from the market or third parties against collateral security and collateral value may be a major determinant of the level of debt finance available to companies (Scott, 1977; Williamson, 1988; Harris & Raviv, 1990; Wald, 1999). Sometimes lenders face certain uncertainties due to conflict between shareholders and debt holders (Jensen and Mekling, 1976). Empirically, Titman and Wessels (1988), Rajan and Zingales (1995) shows a significant positive relationship between gearing and fixed assets ratio. According to the study of Harris and Raviv (1990) tangibility is one of the important explanatory variables in determination of capital structure in developed and developing countries. They find that non-debt portion of liabilities does not need collateral security. But tangibility is expected to affect the long-term debt or total debt ratio rather than total liabilities ratio. Marsh (1982) and Walsh and Ryan (1997) find significant positive relationship between tangibility and leverage. Bennet and Donnelly (1993) find positive relationship between gearing and collateral value for total and short-term debt, but not for long-term debt. Chittenden et al (1996) and Bevan and Danbolt (2002) find a relationship between tangibility and gearing depending on the measure of debt applied. According to their studies, tangibility is positively related with long term debt element but negatively with short-term debt. In the present study tangibility can be calculated with the help of the following formula:

\[
\text{Tangibility} = \frac{\text{Fixed Assets}}{\text{Total Assets}}
\]

Non-Debt Tax Shield

Tax has an immense relationship with the capital structure of a firm. According to the study of De Angelo and Masulis (1980) tax deduction which is not associated with debt portion of capital structure can act as replacement of interest payment. A firm has high non-debt tax shield is expected to possess low amount of debt content in its capital structure. It helps to reduce the business risk in long-term. Firm may use depreciation as non-debt tax shield to reduce the corporate tax burden. Thus, it can be said that it shares a negative relationship with the leverage because it reduces the potential tax benefit. In contrast, Scott (1977) and Moore (1986) find in their study that a firm should possess a considerable amount of collateral security to secure the debt from the market. Actually secured debt is less risky compared to the unsecured debt. Therefore theoretically non-debt tax shield shares positive relation with the leverage. Bowden, Daley and Huber (1982) conducted a study of cross-industry differences in financial leverage and found that non-debt tax shield has a significant relation with capital structure at the industry level. But the empirical study shows some mixed result for this relationship. Bradley et al (1984), Campbell and Jerzemowska (2001) shows positive relation between non-debt tax shield and leverage. Chaplinsky and Niehaus (1993), Wald (1999), Gajdka (2002) find that non-debt tax shield has a negative relation with leverage of the capital structure.

In the present study non-debt tax shield can be calculated with the help of the following formula:
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Jensen (1986) and Williamson (1988) define debt as a discipline device to measure that manager pay out profits rather than build enterprise. According to the study by Ross (1977) and Leland and Pyle (1977) choice of capital structure provides the signal to the market and internal investors. If the debt portion of the firm is large then it signals good performance of the firm’s and management’s confidence. If that argument is true then the firm can expect a positive relation between leverage and profitability. But a profitable firm always prefers to finance its projects using their internal finance rather than external. This implies that profitable firms will have less amount of debt in their capital structure [Myres and Majluf (1984)]. Thus, a negative relation is expected on the basis of the above study. Titman and Wessels (1988) found that profitability is one of the major determinants of the US firms and projected a negative relationship between leverage and profitability. Kester (1986), Friend and Lang (1988), Rajan and Zingales (1995) and Wald (1999) also find negative relation between leverage and profitability while conducting the study on the capital structure of the companies in developed and developing countries. In contrast, Long and Maltiz (1985) finds positive relation between these two variables but the result is not statistically significant. In the present study profitability is measured as the ratio of earnings before interest and tax (EBIT) divided by total assets. The following formula is used to calculate profitability:

$$\text{Profitability} = \frac{\text{Earnings before Interest and Tax (EBIT)}}{\text{Total Assets}}$$

Size

A number of studies have suggested that leverage ratios may be related to the firm size. According to the study of Marsh (1982) large firms are able to take the advantages of economies of scale in issuing long term debt because of its bargaining power. The most important argument is that informational asymmetries are less severe for larger firms than for smaller firms to attract long term debt. Therefore, large firms prefer to have long term debt in their capital structure. Large firms are more diversified, thus, less exposed to the risk of bankruptcy. The size of firm is considered positively related to the leverage (Agrawal and Nagarajan, 1990). There are certain other studies conducted by Fama and Jensen (1983), Bennett and Donnelly (1993), Rajan and Zingales (1995) and Barclay and Smith (1996) that find a positive relation between leverage and size. Bevan and Danbolt (2002) find that size of the firm is negatively related with the short term debt but share positive relation with long term debt. In contrast, Kester (1986), Titman and Wessels (1988) find negative relation among size and leverage. In the present study size of the firm is measured by taking natural logarithm of the sales because this measure smoothens the variation in the figure over a period of time. In other words,

$$\text{Size} = \log (\text{Sales})$$

Business Risk

Business risk refers to the risk associated with the future operation of the firm. According to the study of Burgman (1996), leverage shares inverse relation with business risk because of increase in bankruptcy risks. Several measures of volatility are used in different studies, such as standard deviation of the return on scale (Booth et.al, 2001), standard deviation of the first difference in operating cash flow scaled by total assets [Bradley et al. (1984), Chaplinsky and Niehaus (1993), Wald (1999)] or standard deviation of the percentage change in operating income (Titman, 1988). All these studies show that business risk is negatively correlated with leverage. Firms are experiencing a greater risk of financial distress
while it possesses greater proportion of debt in their capital structure. The static trade-off theory implies that firms should balance tax advantages to be gained from debt with cost of financial distress, earning volatility and bankruptcy costs (Hillier et. al, 2011). In the present study business risk is measured with standard deviation of earnings before interest and tax (EBIT) by mean of EBIT.

\[
\text{Business Risk} = \frac{\text{Standard Deviation of EBIT}}{\text{Mean of EBIT}}
\]

**Growth Opportunities**

The expected relation between growth and leverage is ambiguous. Several studies suggest that firms with higher growth can expect to have lower amount of leverage in their capital structure. According to Baskin (1989), trade-off theory would suggest a negative sign for this variable because higher growth is associated with greater bankruptcy risk. This implies that a positive sign is more consistent with pecking order theory. As per the study of Jensen and Meckling (1976), Smith & Warner (1979) and Green (1984) when the firm issues convertible debt the agency costs will be reduced. This suggests that there may be positive relation between convertible debt ratios and growth opportunities. It should be noted that growth opportunities are capital assets that add value to a firm but cannot be collateralized and do not generate current taxable income. Thus, on the basis of this argument it can suggest that there is a negative relation between debt and growth opportunity. According to Myres (1977), high-growth firms may hold more real options for future investment than low-growth firms. If high-growth firms need extra equity financing to exercise the options in future, a firm with outstanding debt may forgo this opportunity because such an investment effectively transfers wealth from stockholders to debt holders. So firms with high growth opportunity may not issue debt in the first place and leverage is expected to be negatively related with growth opportunity. In the present study the percentage changes in the total assets are taken to determine the growth opportunity.

\[
\text{Growth Opportunity} = \frac{\text{Percentage Change in Total Assets}}{\text{Assets Total in Change Percentage}}
\]

**OBJECTIVES**

The main objective of the paper is to study the influence of various determinants of capital structure on leverage of Indian steel companies. The details of the objectives are given below:

- To study the relationship between different individual factors like tangibility, non-debt tax shield, profitability, size, business risk and growth opportunity with leverage.
- To examine the impact of tangibility on leverage of capital structure of sample steel companies.
- To examine the impact of non-debt tax shield on leverage of capital structure of sample steel companies.
- To examine the impact of profitability on leverage of capital structure of sample steel companies.
- To examine the impact of size on leverage of capital structure of sample steel companies.
- To examine the impact of business risk on leverage of capital structure of sample steel companies.
- To examine the impact of growth opportunity on leverage of capital structure of sample steel companies.
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DATA AND SOURCE OF DATA

The present study is predominantly empirical in nature and based on secondary data. Data are collected from National Stock Exchange, Bombay Stock Exchange, moneycontrol.com, and annual reports of the concerned companies. The study was conducted on the producers of steel in India and 37 companies from this segment are selected for a period of 10 years since 2003 to 2012.

METHODOLOGY

- Pearson Correlation coefficient is used to find out the relationship between leverage and individual variables. The variables used in the study are quantitative variables.
- Regression analysis is used as a method to find out which of the independent variables (tangibility, non-debt tax shield, profitability, size, business risk and growth opportunity) affecting the dependent variable leverage of capital structure were significant with respect to predicting the most influential capital structure determinants. Regression analysis is conducted to reveal the linear relationship between leverage and other independent variables of the company. The variables (ratios) are retained in the regression model on the basis of high t value (|t|>2) and low p-value (p<0.05).

Formulation of Hypothesis

Keeping in view the objective of the study the following hypotheses are formulated:

- $H_0$: There is not significant positive relation between leverage and tangibility.
- $H_1$: There is significant positive relation between leverage and tangibility.
- $H_0$: There is not significant positive relation between leverage and non-debt tax shield.
- $H_1$: There is significant positive relation between leverage and non-debt tax shield.
- $H_0$: There is not significant negative relation between leverage and profitability.
- $H_1$: There is significant negative relation between leverage and profitability.
- $H_0$: There is not significant negative relation between leverage and size.
- $H_1$: There is significant negative relation between leverage and size.
- $H_0$: There is not significant negative relation between leverage and business risk.
- $H_1$: There is significant negative relation between leverage and business risk.
- $H_0$: There is not significant positive relation between leverage and growth opportunity.
- $H_1$: There is significant positive relation between leverage and growth opportunity.

ANALYSIS OF DATA

In the present study SPSS 17.0 is used to conduct the correlation and regression analysis.

Table 1 shows the correlation among the different variable in the study. The variable leverage shares a significant positive correlation with tangibility ($r=0.715$, sig=0.020) growth opportunity ($r=0.656$, sig= 0.039) and non-debt tax shield ($r=0.628$, sig=0.50) but has a significant negative relation with the size of the firm ($r=-0.831$, sig=.003). The other two variables profitability and business risk share negative relation with the variable leverage but the relation is not statistically significant.

Hypothesis Testing

- $H_0$: There is not significant positive relation between leverage and tangibility.
- $H_1$: There is significant positive relation between leverage and tangibility.
In this case both the variables leverage and tangibility are continuous variables. At the significant level of 0.05, we found that |t|-value > 2 (t-value 2.893) and p-value=.020 (Table 2) which is less than 0.05. Hence, we can reject the null hypothesis and accept that there is significant positive relation between leverage and tangibility in the selected sample companies.

- H$_0$: There is not significant positive relation between leverage and non debt tax shield.
- H$_1$: There is significant positive relation between leverage and non debt tax shield.

In this case both the variables leverage and non-debt tax shield are continuous variables. At the significance level of 0.05, we found that |t|-value > 2 (t-value 2.280) and p-value=.050 (Table 3). Hence, we can reject the null hypothesis and accept that there is significant positive relation between non-debt tax shield and leverage in the selected sample companies.

- H$_0$: There is no significant negative relation between leverage and profitability.
- H$_1$: There is significant negative relation between leverage and profitability.

In this case both the variables leverage and profitability are continuous variables. At the significance level of 0.05, we found that |t|-value < 2 (t-value -0.940) and p-value=.375 (Table 4). Hence, we can accept the null hypothesis in this case on the basis of significance level because p-value exceeds the significance level of 0.05. Therefore, it can be said that there is no significant negative relation between profitability and leverage in the selected sample companies.

- H$_0$: There is no significant negative relation between leverage and size.
- H$_1$: There is significant negative relation between leverage and size.

In this case both the variables leverage and size are continuous variables. At the significant level of 0.05, we found that |t|-value > 2 (t-value -4.224) and p-value=.003 (Table 5). Hence, we can reject the null hypothesis and accept that there is significant negative relation between size of the firm and leverage in the selected sample companies.

- H$_0$: There is no significant negative relation between leverage and business risk.
- H$_1$: There is significant negative relation between leverage and business risk.

In this case both the variables leverage and profitability are continuous variables. At the significance level of 0.05, we found that |t|-value < 2 (t-value -.575) and p-value=.581 (Table 6). Hence, we can accept the null hypothesis in this case on the basis of significance level because p-value exceeds the significance level of 0.05. Therefore, it can be said that there is no significant negative relation between business risk and leverage in the selected sample companies of the present study.

- H$_0$: There is no significant positive relation between leverage and growth opportunity.
- H$_1$: There is significant positive relation between leverage and growth opportunity.

In this case both the variables leverage and growth opportunities are continuous variables. At the significant level of 0.05, we found that |t|-value > 2 (t-value 2.462) and p-value=.039 (Table 7) which is less than 0.05. Hence, we can reject the null hypothesis and accept that there is significant positive relation between leverage and growth opportunity in the selected sample companies.
CONCLUSIONS

The primary objective of the paper is to study the relationship between the independent variables (tangibility, size, business risk, growth opportunity, profitability and non-debt tax shield) and dependent variable (leverage). In the present study, 37 Indian steel companies were considered as sample to analyze the determinants of capital structure by applying regression analysis. For this purpose, independent variables were considered to measure the effect on the leverage (dependent variable) position of the company. With the help of regression analysis it is found that tangibility, non-debt tax shield and growth opportunity have positive relation with leverage. In contrast, size shares significant negative relation with leverage. Profitability and business risk also have negative relation with leverage but the result is not statistically significant. Thus, it can be said that tangibility, non-debt tax shield and size of the firm are the determinants of the capital structure of the Indian steel companies. Therefore, it can be said that Indian steel companies with lower level of tangible assets are more subject to information asymmetry problems among the stakeholders, and consequently, more willing to use debt to finance their activities. In contrast, it is found that profitability and business risk have no effect on capital structure decision for Indian steel companies.

REFERENCES


A Study on Capital Structure Determinants of Indian Steel Companies


APPENDICES

Table 1: Correlation between Leverage and Other Individual Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Leverage</th>
<th>Tangibility</th>
<th>NDT</th>
<th>Profitability</th>
<th>Business Risk</th>
<th>Size</th>
<th>Growth</th>
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</thead>
<tbody>
<tr>
<td>Leverage</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.715*</td>
<td>.628</td>
<td>-.316</td>
<td>-.199</td>
<td>-.831**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.020</td>
<td>.052</td>
<td>.375</td>
<td>.581</td>
<td>.003</td>
<td>.039</td>
</tr>
<tr>
<td>Tangibility</td>
<td>Pearson Correlation</td>
<td>.715*</td>
<td>1</td>
<td>.959**</td>
<td>-.278</td>
<td>-.172</td>
<td>-.854**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.020</td>
<td>.000</td>
<td>.437</td>
<td>.634</td>
<td>.002</td>
<td>.730</td>
</tr>
<tr>
<td>NDT</td>
<td>Pearson Correlation</td>
<td>.628*</td>
<td>.959**</td>
<td>1</td>
<td>-.233</td>
<td>-.311</td>
<td>-.837**</td>
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<td>Sig. (2-tailed)</td>
<td>.050</td>
<td>.000</td>
<td>.518</td>
<td>.382</td>
<td>.003</td>
<td>.975</td>
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<tr>
<td>Profitability</td>
<td>Pearson Correlation</td>
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<td>1</td>
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<td>Sig. (2-tailed)</td>
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<td>.518</td>
<td>.065</td>
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<td>-.172</td>
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<td>.382</td>
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<td>-.854**</td>
<td>-.837**</td>
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<td>Sig. (2-tailed)</td>
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<td>.002</td>
<td>.003</td>
<td>.341</td>
<td>.461</td>
<td>.339</td>
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<td>Growth Opportunity</td>
<td>Pearson Correlation</td>
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<td>.079</td>
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*, Correlation is significant at the 0.05 level (2-tailed).
**, Correlation is significant at the 0.01 level (2-tailed).

Table 2: Regression Analysis of Leverage and Tangibility

<table>
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<th>Adjusted R Square</th>
<th>Beta</th>
<th>t-Value</th>
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<tr>
<td>Tangibility</td>
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ANOVA Table

<table>
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<td>Total</td>
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a. Predictors: (Constant), Tangibility
b. Dependent Variable: leverage
**Table 3: Regression Analysis of Non-Debt Tax Shield and Leverage**

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<tr>
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<td>Non-Debt Tax Shield</td>
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**ANOVA Table**

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a. Predictors: (Constant), NDT
b. Dependent Variable: leverage

**Table 4: Regression Analysis of Profitability and Leverage**

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<tr>
<th>Variable</th>
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<td>-0.940</td>
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a. Predictors: (Constant), Profitability
b. Dependent Variable: leverage

**Table 5: Regression Analysis of Size and Leverage**

<table>
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<tr>
<th>Variable</th>
<th>R</th>
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<tr>
<td>Size</td>
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<td>.690</td>
<td>.652</td>
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**ANOVA Table**

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</table>

a. Predictors: (Constant), Size
b. Dependent Variable: leverage

**Table 6: Regression Analysis of Business Risk and Leverage**

<table>
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<tr>
<th>Variable</th>
<th>R</th>
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<th>Adjusted R Square</th>
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<td>-0.080</td>
<td>-0.199</td>
<td>-0.575</td>
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</tr>
</tbody>
</table>

**ANOVA Table**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>0.001</td>
<td>1</td>
<td>0.001</td>
<td>0.331</td>
<td>0.581</td>
</tr>
<tr>
<td>Residual</td>
<td>0.033</td>
<td>8</td>
<td>0.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td><strong>0.034</strong></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Business Risk
b. Dependent Variable: leverage

**Table 7: Regression Analysis of Growth Opportunity and Leverage**

<table>
<thead>
<tr>
<th>Variable</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Beta</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>0.656</td>
<td>0.431</td>
<td>0.360</td>
<td>0.656</td>
<td>2.462</td>
</tr>
</tbody>
</table>

**ANOVA Table**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>0.015</td>
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<td>0.015</td>
<td>6.059</td>
<td>.039</td>
</tr>
<tr>
<td>Residual</td>
<td>0.019</td>
<td>8</td>
<td>0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td><strong>0.034</strong></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Growth
b. Dependent Variable: leverage

Impact Factor (JCC): 4.9926

Index Copernicus Value (ICV): 3.0