



## **CORPORATE CAPITAL STRUCTURE AND ITS IMPACT ON FIRM PROFITABILITY: EVIDENCE FROM MANUFACTURING FIRMS**

**Venkati Ponnala. CFA (icfai)**  
Assistant Professor Finance  
CoBE, Addis Ababa University, India.

### **ABSTRACT**

*The capital structure of a firm is very important since it is related to the ability of the firm to meet the needs of its stakeholders. The aim of this paper is to provide large sample evidence on capital structure and its impact on profitability using a new database of large tax payer manufacturing firms in Ethiopia. The study employs a panel data regression analysis. The dataset comprises twenty four manufacturing firms covering a five-year period (120 cross-sectional and time variant observations) firm level accounting data. Within what is referred to as capital structure the researcher is able to establish relationship between capital structure variables and profitability. Most sample firms concentrate their borrowing in only one of these debt types especially short term debt finances and this debt specialization persists overtime. It is also clear from the study that short-term debt to total liability, long-term debt capitalization ratio and interest coverage ratio showed positive and significant impact on profitability. Other constituted variables i.e. debt ratio and debt to equity ratio found to be insignificant regarding their impact on profitability of sample firms.*

### **Background of the Study**

The concept capital structure generally described as the combination of debt and equity that make the total capital of firms. For its capital to be well structured and effectively utilized, a business firm must be able to devise various ways for selecting the best components of its capital which would be used in the company's operation to raise its productivity and or achieve

performance (Uremandu, 2012). However, not all business firms use a standardized capital structure hence they differ in their financial decisions under various terms and conditions (Uremandu, 2012). For the most part, a firm can choose any capital structure that it wants. If management so desired, a firm could issue some bonds and use the proceeds to buy back some stock, thereby increasing the debt-equity ratio. Alternatively, it could issue stock and use the money to pay off some debt, thereby reducing the debt-equity ratio (Allen, 2011).

After the pioneer seminar work of M&M (Miller&Modigliani, 1958) which explains the value of the firm is independent to its financial structure under certain key assumptions; several researchers have come up with theories and empirical studies to solve the puzzle regarding the impact of capital structure decision on firm performance and its determinants. The successful selection and use of capital is one of the vital elements of the firms' financial strategy. Empirical studies undertaken were also inconclusive and inconsistent with respect to country, industry, size of the firm and also type of corporate debt utilized. Most studies such as: (Niresh, 2012) and (Mohammad et al, 2012) found negative relationship between profitability and leverage. One other hand (Kim Abildgren, 2014) indicated that the overall capital structure has no significant impact on profitability or productivity, neither at an industry level nor at a firm level. The argument capital structure is incomplete without a detailed examination of all forms of corporate debt; was also reinforced by (Bevan, 2002). Empirical finding inefficiencies added to longing personal interest of the researcher on the subject was a motive to research further and contribute in filling the gap observed. Hence, the main objective of this paper is to assess the relationship between capital structure and firm profitability. Specifically, to determine whether the ability of a firm to finance its assets through debt or equity or both; is an important consideration in the profitability of firm.

The specific objectives include;

1. To determine the relationship between capital structure variables and profitability on subject companies
2. To ascertain the effect of using short term and long term debt options on performance of subject companies
3. To determine the effect of debt to equity combination on performance of sample firms

## **Research Question**

As presented in chapter one, the broad objective of the thesis is to assess the relationship between capital structure and firm profitability. To achieve this objective the following research questions are developed in this chapter.

1. What is the relationship between capital structure variables and profitability of subject companies?
2. What is the effect of using short-term and long-term debt options on profitability of subject companies?
3. What is the effect of debt to equity combination on financial performance of sample firms?

## **Review of Related Literature**

The capital structure of a firm is very important since it is related to the ability of the firm to meet the needs of its stakeholders. The Board of Directors or the financial manager of a company should always strive to develop a capital structure that would lie beneficial to the equity shareholders in particular and to the other groups such as employees, customers, creditors and society in general (Pandey, 2010).

The main issue of debate in finance revolves around the optimal capital structure. There are two schools of thought in this regard. One school pleads for optimal capital structure and other does against it. Former school argues that judicious mixture of debt and equity capital can minimize the overall cost of capital and maximize the value of the firm. Hence, this school considers capital structure decision as relevant. Latter school of thought led by Modigliani and Miller contends that financing decision does not affect the value of the firm.

On the other hand, the capital structure literature is abundant also with attempts to explore the consequences of market imperfections caused by uncertainty or asymmetric information.

The Modigliani-Miller theorem on the irrelevancy of financial structure implicitly assumes that the market possesses full information about the activities of firms. If managers possess inside information, however, then the choice of a managerial incentive schedule and of financial structure signals information to the market, and in competitive equilibrium the inferences drawn from the signals will be validated (Ross, 1977).

Signaling theory conceptualized with asymmetric information, equity issues are rationally interpreted on average as bad news; since managers are motivated to make issues when the stock is overpriced. Ross's (1977) model suggests that the value of firms will rise with leverage, since increasing leverage increases the market's perception of value. This is a major reason why equity issues are comparatively rare among large established corporations. Other things being equal, the high-quality firms hold more inside equity than the low-quality firms with the same debt level and issue less debt than the low-quality firms with the same inside equity position (Cheong, 1999).

The trade-off theory predicts that profitable firms should be more highly levered to offset corporate taxes (Ross, 1977). (Fama and French, 2002) and others on the other hand, found profits and leverage to be negatively correlated. (Myers, 1984), suggested that management follows a preference ordering when it comes to financing. His work also proposes that the costs of issuing risky debt or equity overwhelm the forces that determine optimal leverage in the trade-off model; the result is the pecking order. He also argued that the trade-off theory fails to predict the wide degree of cross-sectional and time variation of observed debt ratios. The pecking order theory is mainly a behavioral explanation of why certain companies finance the way they do. It is consistent with some rationale arguments, such as asymmetric information and signaling discussed above, as well as with flotation costs. Moreover, it is consistent with the observation that the most profitable companies within an industry tend to have the least amount of leverage.

The pecking order theory explains why the bulk of external financing comes from debt; why more profitable firms borrow less: not because their target debt ratio is low.

The order followed is as follows:-

- Firms prefer internal finance
- If external finance is required; firms issued the safest security first.

They start with debt, then possible hybrid securities such as convertible bonds then perhaps equity as a last resort. Pecking Order Theory suits large firms with high profit and which has enough internal funds in the form of retained earnings and depreciation. These firms follow a stringent dividend policy and a target dividend payout ratio. Thus, this theory states that highly profitable firms prefer internal funds and when external funds are required the firm will borrow, rather than issuing equity. The pecking order theory predicts that high-growth firms, typically with large financing needs, will end up with high debt ratios because of a manager's reluctance

to issue equity. (Fama and French 2002) posits though, high-growth firms consistently use less debt in their capital structure. Firms that choose to fund with equity today will leave less expensive sources of funding for future needs. If they choose debt funding now, then they will tend to have only more expensive funding available in the future. This reasoning made (Cornell, 1987) to hypothesize that, firms with higher levels of net organizational capital should be predominantly equity financed and hold relatively large cash balances.

Another theory developed in this regard is free cash flow theory. This theory is framed for matured firms that are prone to over invest. It says that high debt levels will increase value, despite the threat of financial distress, when a firm's operating cash flow significantly exceeds its profitable investment opportunities (Myers, 2001). Thus, the profit earning capacity increases the value of the firm despite the threat of financial distress. Firms with a positive free cash flow use this cash flow to lower their debt ratio. Firms with a negative free cash flow increase their debt ratio to respond to the lack of internal funds. The percentage adjustment is smaller for firms with relatively more debt than for firms with relatively low debt.

### **Empirical Framework**

As discussed above major international studies of capital structure dates back to 1958's Modigliani and Miller paper. They stated that in a simplified world that it did not matter whether a firm financed investments through debt or equity, famously known as the Irrelevancy Theorem. (Modigliani and Miller, 1963) then went on to point out that if companies can deduct debt interest before arriving at taxable profits hence concluding that a firm should finance full with debt. Since then there have been vast amounts of empirical studies on this topic; expressing different and conflicting views as to what really determines optimal capital structure and its impact on firm performance. Accordingly, the subsequent sections deal with these studies at international and regional/national level.

The most prominent paper in the literature of capital structure is (Rajan and Zingales, 1995) entitled, "What do we know about Capital structure? Some evidence from international data." The paper investigated the determinants of capital structure choice by analyzing the financing decisions of public firms in the major industrialized countries. At an aggregate level, firm leverage found to be similar across G-7 countries. The authors look at the institutional differences across the seven countries and identify the main determinants of capital structure. Furthermore they did find that firms in the UK had lower level of debt than in the other six

countries. They argue that although common firm-specific factors significantly influence the capital structure of firms across countries, several country-specific factors also play an important role. They also found that profitability was negatively correlated with firm leverage, i.e. the more profitable a firm was, and the less leverage they would have.

Other studies comparing firms from developing and developed countries found similar results regarding the importance of country specific factors. For instance, (Maksimovic.V., 1999) and (Joseph P.H. Fan, 2012) compare leverage of firms developed and developing countries. They found institutional environment factors between countries describe the differences in the capital structure, specifically the long-term debt to total assets. Developed countries firms have more long-term debt and a greater amount of their total debt is held as long-term debt and that large firms have more long-term debt as a proportion of total assets and debt. They believe that cross-country variations in leverage can be described by difference in the legal systems and financial institutions, as well as firm industry and macroeconomic factors, such as the rate of inflation and the economy's growth rate. (Harry Huizinga, 2007) by incorporating international taxation factors, posits corporate debt policy indeed not only reflects domestic corporate tax rates but also differences in international tax systems since multinational firms have an incentive to shift debt to high-tax countries.

To achieve target profit it is agreeable that companies must empower all of its resources optimally. The problem rise when the resource is insufficient; and companies decide to obtain debt with consideration of profitability and risk of bankruptcy. (Mohammad et al, 2012) seeks to extend, Abore's (2005), and Gill, et al., (2011) findings regarding the effect of capital structure on profitability by examining the effect of capital structure on profitability of the industrial companies listed on Amman Stock Exchange during a six-year period (2004-2009). Applying correlations and multiple regression analysis, the results reveal significantly negative relation between debt and profitability. Related studies such as (Winston Pontoh, 2013), (Koech, 2013), (Singh, 2013) and (Opoku et al, 2014) reaffirmed this result. The former study used debt equity and debt asset ratio as indicators for capital structure, where growth, size, tangibility and degree of operating leverage as its determinant on 247 companies in period 2009 to 2011. For profitability, they used return on asset and return on equity. With path analysis, this research found that size negative significant to DAR, DOL negative significant to DER, DAR negative significant to ROA, and DER negative significant to ROE. (Uremandu, 2012), conducting

research on data sourced from the financial statements of 10 selected firms in Nigeria. The research also affirmed negative and significant influence of value of long-term debt, ratios of long-term debt to total liability, and ratios of short-term debt to total liability and equity capital to total liability, on returns; and positive and significant effects of domestic liquidity rate, ratios of long-term debt to equity capital and value of short-term debt, on profitability. Even when a company decides to settle for the choice of debt capital in its capital structure, disparity still exists in the choice of the type of debt to use in financing the firms operations. So their paper suggests maturity of the debt is also a consideration to be properly made before choosing a corporate capital structure to adopt.

In addition,(Singh, 2013)analyzed how far capital structure affect the profitability of corporate firms in India. The study tried to establish the hypothesized relationship as to how far the capital structure affect the business revenue of firms and what the interrelationship is between capital structure and Profitability. This study is carried out after categorizing the selected firms into three categories based on two attributes, viz. business revenue and asset size. The study proved that there has been a strong one-to-one relationship between Capital Structure variables and Profitability variables, Return on Assets (ROA) and Return on Capital Employed (ROCE). The Capital Structure found to have significant influence on Profitability, and increase in use of debt fund in Capital Structure tend to minimize the net profit of the Manufacturing firms listed in Bombay Stock Exchange in India.

On the other hand, (Babatunde Yusuf et al, 2014) investigated the relationship between capital structure and profitability of conglomerate, consumer goods, and financial services firms on quoted firms in Nigeria stock exchange. The study established a significant relationship in almost all firms between return on equity and debt to equity which justifies highly geared firms are more profitable. Moreover, they posit the nature of the industry also determines the effect of capital structure on profitability. In the financial firms, there is a negative significant relationship between return on equity and debt to assets ratio. In the conglomerate firms, there is also a negative relationship between return on assets (ROA) and debt to equity ratio however not significant. This explains that highly geared firms have significant relationship with return on equity while insignificant with return on assets. The study recommended that firms that want to maximize shareholders wealth should increase their leverage while firms that ensure

stakeholders performance should increase their assets; which is consistent with (Graham, 2000) who posits more profitable firms should rely on external funds like debt to finance their investments because of tax shields advantage which they stand to derive from interest repayment.

Another empirical research result which fall neither on the above wings is (Kim Abildgren, 2014). The study took a closer look at the links between corporate capital structure and productivity, profitability and access to finance based on Danish industry-level and firm-level accounting data from the period 2000-2011. The results indicated that the capital structure has no significant impact on the firms' profitability or productivity. However, the capital structure found to be important in relation to the range of financing options available to the firm and its funding and refinancing risks.

The impact of capital structure on profitability of various Ethiopian industries is still under-explored area in literature of financing decision and manufacturing industry is not an exception. Though, there are few studies conducted on determinants of capital structure; such as (Amanuel, 2011), (Mohammed, 2005), and (Woldemichael, 2010); they fail to show us the possible inverse relationship i.e. not only how profitability affect capital structure but also the impact of capital structure on profitability.

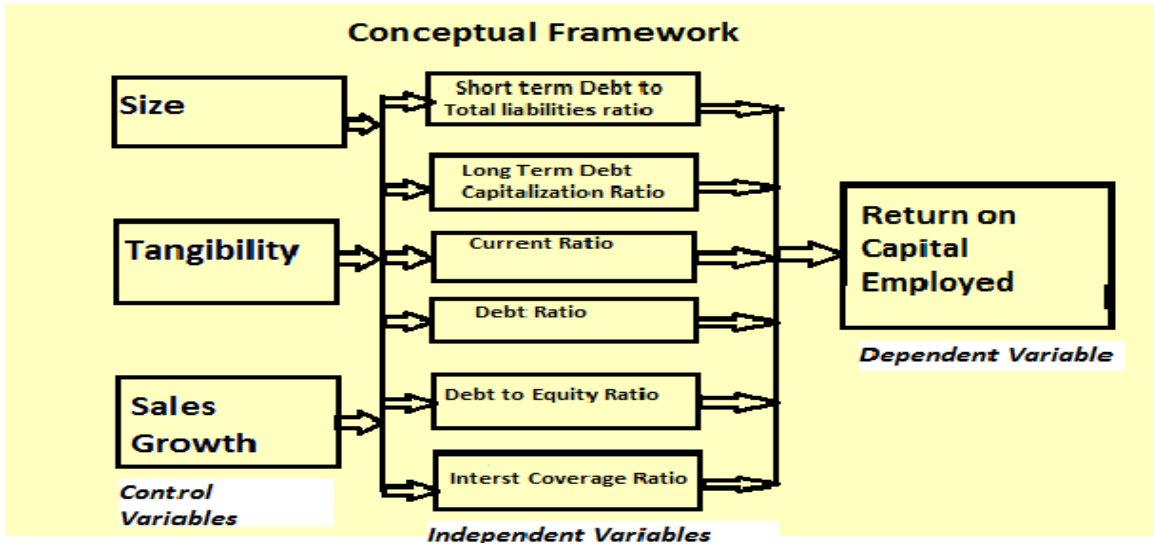
The conceptual literature review has detailed several theories that explain capital structure and the relation to the value of the firm and consequently a number of theories can be used to predict the possible effects of capital structure changes on performance. Overall, the debate over capital structure is unlikely to be resolved in terms of predominance of one of the those theories prevailing over the other, if anything because there are a larger amount of elements that have to be factored into the equation than those that appear in the theories outlined above: whilst it is important for a capital structure to minimize the weighted average cost of capital, such considerations have to be balanced against considerations of flexibility, for instance, that are even more important in today's operating environment. In this sense, the existence of multiple theories on capital structure, as opposed to one, may in fact be beneficial. The empirical literature section cited the various relevant empirical studies done on capital structure changes, the outcomes of the studies and finally an explanation of the outcome.

In spite of the continuing theoretical debate on capital structure, there is relatively little empirical evidence on how companies actually select between financing instruments at a given point of time in order to attain optimum profitability. This is mainly due to considerable inter-industry



differences caused by unique nature of each industry's business and the intra-firm variations attributed to the business and financial risk of individual firms. Which implies specific empirical research (like this one) is paramount importance in order to answer the question how the capital structure influences performance in manufacturing industry in Ethiopia; especially since there are only few previous researches based on scope and methodology.

### Conceptual Framework



(Source: Authors own design, 2015)

### Research Design and Methodology

#### Research Design

There are three alternative strategies of inquiry: qualitative, quantitative and mixed approaches. (Cresswell, 2009), explains these different approaches in terms of their typical philosophical assumptions as well as techniques used in data collection, analysis and interpretation. It then recommends the use of mixed strategy of inquiry is advisable so as to increase the overall strength of the study since it offsets the deficiencies by either of qualitative or quantitative Research designs. Accordingly, the research method used in this study is off quantitative nature. Ordinary least square (OLS) regression analysis is used to generate a model to analyze the impact of capital structure variables on profitability. In order to reach out its very objective the study used cross sectional and longitudinal panel research design employing secondary

quantitative data. By combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test, by employing information on the dynamic behavior of a large number of entities at the same time. The additional variation introduced by combining the data in this way can also help to mitigate problems of multicollinearity that may arise if time series are modeled individually. Third, structuring the model in an appropriate way, we can remove the impact of certain forms of omitted variables bias in regression results (Brooks, 2008).

### **Target Population**

The Ethiopian Standard Industrial Classification (ESIC) set forth sectoral definition of industries (see ESIC, 2010). Accordingly, the total population of the research encompasses large tax payers manufacturing share companies of Ethiopia. The Ethiopian Revenues & Customs Authority (ERCA) has revised the entry point into the large taxpayer category to start from companies who have an annual sales turnover greater than 27 million Birr. The new revision had been effective as of August 7, 2013. In which it has an increase from the previous 15 million Birr annual sales cut-off point between medium and large taxpayers. When the new revision is implemented number of large taxpayers increased from 870 to 1,002. In addition, According to Ethiopian revenue and customs Authority (ERCA) large tax payers office(LTO), from 1002 large tax payers organizations in Ethiopia, construction companies are 112, Financial institutions are 38, wholesale and other traders are 649 and Manufacturing companies encompasses 203 in number as of 31 March 2015. (Unpublished data taken from ERCA, 2015). This study will focus only on share companies manufacturing firms in which it excludes Private limited companies even though they are large tax payers. Therefore, large tax payers manufacturing share companies as of 31 March 2015 were 34. We can deduce then, the total number of population eligible and used for the study has been 34 large tax payers manufacturing share companies found in Ethiopia. The sample has been drawn from the population registered in ERCA.

### **Data Sources and Instruments**

The study makes use of secondary data. All the data was collected by review of annual financial reports of selected companies, Ethiopian revenue and Customs Authority and National Bank of Ethiopia. Basing the sample selection on a comprehensive list of potential respondents who have an equal chance of selection is vital to increasing the representativeness of the samples.

Accordingly, after stratifying the population based on business type and turnover the study selected a total sample of twenty seven companies from all sectors using random sampling techniques from each stratum. As part of data cleaning and in order to have a balanced sample the researcher excluded three companies with missing observations or possible data errors.

### **Measurement of Variables**

The capital structure was measured using the indebtedness ratio and firm performance measurements based on models developed on previous studies such as (Uremandu, 2012) (Mohammad et al, 2012) and (Pratheepkanth, 2011) with few modifications on variables. In this model the paper shall establish if proportion of short-term debt and long-term debt profile will have significant influence on corporate profits on manufacturing industry in Ethiopia.

### **Leverage**

The leverage indicators which will be used in this study are Interest coverage ratio (ICR), Debt ratio (DR), debt to equity ratio (DE), Long term debt to capitalization ratio (LDCR), short term debt to total liability (SDTL), and long-term debt to total liability (LDTL).

The interest coverage ratio is used to determine how easily a company can pay interest on outstanding debt. It is calculated by dividing a company's earnings before interest and taxes (EBIT) by the company's interest expenses for the same period.

$$ICR = \frac{EBIT}{Interest\ Expenses}$$

*Hypothesis 1: There is positive and significant relationship between Interest coverage ratio and profitability.*

Whereas, Debt ratio calculated by dividing total liabilities (i.e. long-term and short-term liabilities) by total assets.

$$DR = \frac{Total\ Debt}{Total\ Assets}$$

*Hypothesis 2: There is negative and significant relationship between Debt ratio and profitability.*

Debt-to-equity ratio (D/E) also known as gearing ratio; which frequently used to gauge the extent to which a company is taking on debts as a means of leveraging is our third independent variable.

The ratio is computed by dividing a company's total liabilities by its stockholders' equity and represented in the following way;

$$DE = \frac{\text{Total Liabilities}}{\text{Share holders Equity}}$$

*Hypothesis 3: There is negative and significant relationship between Debt-to-equity ratio and profitability.*

Long term debt to capitalization ratio, is the other ratio that is used in the study. The acceptable level of capitalization ratios for a company depends on the industry in which it operates. But generally as reviewed in literatures above, high capitalization ratios imply increase in return on equity because of the tax shield of debt; a higher proportion of debt also increases the risk of bankruptcy for a company.

The ratio is computed as:

$$LDCR = \frac{\text{Long term Debt}}{\text{Long term debt +share holders equity}}$$

*Hypothesis 4: There is positive and significant relationship between long term debt capitalization ratio and profitability*

Furthermore, the interrelation between the liquidity and profitability in subject companies is considered. The two leverage and liquidity indicators used in this regard are Short term debt to Total liability (SDTL).

The ratios and respective hypothesis are as follows:

$$SDTL = \frac{\text{Total short term liability}}{\text{Total Liability}}$$

*Hypothesis 5: There is negative and significant relationship between short term debt to total liability and profitability.*

### **Control variables**

The model has also included other firm level explanatory control variables to enhance the validity of the model. These include, Size (SZ), Sales growth rate (SG) and Tangibility (TN) represented as;

Size (SZ) = Natural log of (TA)

Sales growth rate (SG) =  $\frac{\text{Current year sale} - \text{Previous year sale}}{\text{Previous year sale}}$

Tangibility =  $\frac{\text{Fixed Assets}}{\text{Total Assets}}$

## Profitability

Profitability is considered as Return on Capital Employed (ROCE). Capital employed is defined as total assets or total equity of shareholders minus short term debt liabilities. Therefore, it is similar to the return on equity, or ROE ratio, except it additionally includes debt liabilities. Hence adding strength to the ratio; since in ROE, disproportionate amount of debt in a company's capital structure would translate into a smaller equity base. Thus, a small amount of net income could still produce a high ROE off a modest equity base.

The model can be mathematically expressed as follows;

Profit = f (capital structure) (1)

ROCE =  $\beta_0 + \sum_{i=t}^n \beta X_{it} + \varepsilon$  (2)

Where:

ROCE = the measure of profitability which is return on capital employed;

$\beta_0$  = the regression constant (i.e. intercept of equation);

$\beta_i$  = the change coefficient for  $\chi_{it}$  variables;

$\chi_{it}$  = the different independent variables for profitability of the corporate firms  $i$  and  $t$  ;

$t$  = is the time period for the series;

$\varepsilon$  = the random error term which captures other explanatory variables;

The general least square equation (2) above will be restated with the specified variables as below;

ROCE = f (ICR, DR, DE, LDCCR, SDTL, SZ, SG, TN) (3)

Where:

ROCE = Return on capital employed;

ICR = Interest coverage ratio;

DR = Debt ratio;

DE = Debt to Equity ratio;

LDCR= Long term debt capitalization ratio

SDTL = Short term debt to total liability ratio;

SZ = Size;

SG = Sales growth rate;

TN = Tangibility;

The final equation to be estimated from equation 3 is:

$$ROCE = \beta_0 + \beta_1 ICR - \beta_2 DR - \beta_3 DE - \beta_4 LDCR - \beta_5 SDTL + \beta_6 TN + \beta_7 SZ + \beta_8 SG + \varepsilon \text{----- (4)}$$

## **Model Estimation and Interpretation of Results**

### **Econometric analysis**

In order to answer our research questions, it is to be recalled that the paper constructed econometric model in the previous chapter. We also know theoretically, an econometric model should pass pre and post estimation tests or diagnostic tests. In the way to make sure the model is valid, consistent and reliable the researcher applied the following tests.

### **Stationary test**

In panel data analysis unit root test is the basic test in order to select estimation method. As a result of this, the researcher firstly subjected the data and variables to a unit root test. This is so necessary in order to ascertain from the onset, the nature of data we are dealing with and secondly, to know whether or not the result and invariably the findings can hold in the long run. Specifically, the LLC unit root test was conducted for this purpose via E-views. Given the test results, it indicates most of the variables except (assets tangibility) are stationary at level and significant at 1 %. And also assets tangibility is found to be stationary at first difference. This therefore indicates that, whatever outcome we get from the hypotheses testing, the findings can hold in a long-run perspective.

### **Distributional and Specification Tests**

#### ***Tests for Normality***

Before applying statistical methods that assume normality such as least square regression, it is necessary to perform a test on residuals for normality. We hypothesize that the data follows a normal distribution, and only reject this hypothesis if we have strong evidence to the contrary i.e.

if the test is significant, the distribution is non-normal. To achieve normality the researcher used log transformation on the dependent variable-return on capital employed (ROCE) and also added one dummy variable for 12<sup>th</sup> observation which was outlier. Since the proxy is for profits; it will have negative values which consequently bring about more missing values. So we used common technique for handling negative values by rebasing values which have negative values. First the researcher arranged the series with negative values in ascending order from smallest to largest. The smallest value, which is the largest absolute negative value, was then added in all series members, which created a series of positive integers.

There are three ways of testing normality in e-views: Skewness and Kurtosis, Jarque-Bera test. According to the reported summary statistics in, the residuals happen to have slightly positively skewed and leptokurtic; though, it passed the test so we fail to reject our null hypothesis which presumes normality (cf., annex 2.A.).

### ***Multi-collinearity Test***

Another implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would be said to be *orthogonal* to one another. If the explanatory variables were orthogonal to one another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change. Though in real scenarios some level collinearity is expected, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as *multicollinearity*. Furthermore, (Brooks, 2008) confers two classes of multicollinearity: perfect multicollinearity and near multi-collinearity.

*Perfect multicollinearity* occurs when there is an exact relationship between two or more variables. In this case; it is not possible to estimate all of the coefficients in the model. Perfect multicollinearity will usually be observed only when the same explanatory variable is inadvertently used twice in a regression. whereas, *Near multicollinearity* is much more likely to occur in practice, and would arise when there was a non-negligible, but not perfect, relationship between two or more of the explanatory variables.

To check for the presence of multicollinearity in the model, we have used the correlation matrix presented in the annex 2.B. The result of the test implies that there is the no problem of multi-

collinearity in the model being the highest correlation coefficient 0.76 or 76% between SDTL and LDCR.

### ***Hausman Specification Test***

Under this section we carry out some diagnostic tests to examine which estimation technique fits the model and the data well (Fixed effect or random effect). The Hausman test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results.

**Table 1: The Hausman Specification Test**

Correlated Random Effects - Hausman Test

Equation: EQ01LOGROCE

Test cross-section random effects

Chi-Sq.			
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.819514	8	0.5562

Table1 shows the Hausman specification test that is used to choose between the fixed effect and random effects model. The test result suggests that random effect is the appropriate methodology.

### **Regression Model**

*Table 2: Regression Model*

variables	Un standardized Coefficients		Exponential values	t	Sig.	95% confidence interval	
	B	Std. Error	B <sup>e</sup>			Lower bound	Upper bound
Cons.	0.226186	0.132903	1.253809	1.701885	0.0918		
SDTL	0.301297	0.097601	1.351611	3.087019	0.0026	0.81	0.90
TN	-0.28929	0.080398	0.748799	-3.59816	0.0005	0.20	0.33
SG	0.014021	0.013631	1.01412	1.028651	0.3061	0.11	0.37



LDCR	0.319735	0.134602	1.376763	2.375411	0.0194	0.06	0.14
ICR	0.000236	7.08E-05	1.000236	3.338085	0.0012	87.82	170.54
DE	-0.0007	0.002171	0.999298	-0.32318	0.7472	-0.41	2.31
DR	-0.05209	0.039988	0.949247	-1.30253	0.1956	0.37	0.49
Size	0.004483	0.01505	1.004493	0.297858	0.7664	7.63	8.19
R-square	Adjusted R square		Std. error of the estimate		P(f-stat)		
0.435594	0.386277		0.093595		0.000000		

(Source: author's computation of the E view result)

Table 2 above presents the regression output on return on capital employed regression model. Exponential values less than one reflect negative relationship whereas values greater than one denote positive relationships. According to the findings depicted in the table the intercept is 1.25, while the coefficients for short-term debt to total liabilities ratio will be 1.35, long-term debt capitalization ratio 1.37, interest coverage ratio 1.0002, debt-equity ratio 0.99, and debt ratio 0.95.

The value of R is 0.44; which means the model explains 44% of the variation in dependent variable. This indicates the data contain an inherently higher amount of unexplained variability other than explanatory variables included in our model; such as perhaps macro-economic variables, industry characteristics, management style etc. Even though R-squared seems low, low P values still indicate a real relationship between the significant predictors and the dependent variable which makes further interpretations and hypothesis tests valid.

$$\begin{aligned} \text{LOG(ROCE)}_t = & 0.22618 + 0.00024 \cdot \text{ICR}_t - 0.00071 \cdot \text{DE}_t - 0.05209 \cdot \text{DR}_t + 0.00448 \cdot \text{SZ}_t \\ & (-0.1329) \quad (7.08E-05) \quad (0.00217) \quad (0.03999) \quad (0.01505) \\ & -0.28928 \cdot \text{TN}_t + 0.30129 \cdot \text{SDTL}_t + 0.31973 \cdot \text{LDCR}_t + 0.01402 \cdot \text{SG}_t + \varepsilon_t \\ & (0.08039) \quad (0.09760) \quad (0.13460) \quad (0.01363) \end{aligned}$$

For assessing magnitude, the easiest way is to determine the change from these values as percentage change in ROCE i.e.  $\% \Delta \text{ROCE} = (\text{Exponentiated coefficient value} - 1) \cdot 100$ ; which we will use in the following discussions.

As shown in table 2 above the data analysis is presented in two forms i.e. in p values and confidence intervals. Whereas, the p-value allows assessment of whether or not the findings are 'significantly different' or 'not significantly different' from some reference value (which in our

case is this is value reflecting ‘no effect’ or “zero effect”); confidence intervals provide different information from that arising from hypothesis tests i.e. a range about the observed effect size. This range is constructed in such a way that we know how likely it is to capture the true but unknown effect size. So this means that 95% of the time the confidence intervals should contain the true mean of the variable of interest. This corresponds to our hypothesis testing with p-values, with a cut-off for p of less than 0.05

### **Return on Capital Employed with Interest Coverage Ratio**

According to our regression model an increase in Interest coverage ratio leads to 1.000236 or 0.02% positive change on ROCE. The test statistics from our regression model Interest coverage ratio has positive influence on profits (0.02%) at 5% significant level keeping other variables held the same. This is absolutely normal, if reverse will be strange mainly due to the characteristics of the variable. Therefore, we will reject our null hypothesis which presumes no relationship and accept our alternative hypothesis.

### **Return on Capital Employed with Debt Ratio**

The other independent variable from our model is debt ratio which we hypothesized negative impact on profitability of manufacturing firms. Though the test result indicated this variable has 0.95% negative influence, the t-stat is not significant even at 10%. Since, no statistically significant linear dependence was detected we fail to reject the null hypothesis.

### **Return on Capital Employed with Debt to Equity Ratio**

This ratio is mostly used as risk indicator just like our other independent variable long term debt capitalization ratio; showing risk factor per stock holders equity. It is also used interchangeably with debt ratio when the purpose is to evaluate how the firm finances its projects as well as operations. Based on previous literatures, this ratio was predicted to have positive impact on our performance proxy return on capital employed. Though the sign of the coefficient is as predicted, the test result is insignificant. We can therefore perhaps infer debt to equity proportion is not significant factor on firms profitability based on sample taken from manufacturing firms in Ethiopia. Consequently, we fail to get sound evidence to reject null hypothesis or accept the alternative.

### **Return on Capital Employed with Long-Term Debt Capitalization Ratio**

According to the multivariate regression results long term debt capitalization ratio has significant positive relationship with profits. This ratio showing the financial leverage of firms' is highly related to risk level of companies being compared to other companies' in the same industry. This relationship aligns with the fourth hypothesis which predicted positive relationship. The test statistics found to be significant at 5% indicating 37.6% positive effect on profits per one unit change. This can be explained by ample and convincing ground for firms to take long-term debt options than what they currently do.

### Hypothesis decision and discussion of results

Table 3: Hypothesis Analysis summary

Hypothesis	Statement of Hypothesis	Decision
H1	There is positive and significant relationship between Interest coverage ratio and profitability.	Accepted
H2	There is negative and significant relationship between Debt ratio and profitability.	Rejected
H3	There is negative and significant relationship between Debt-to-equity ratio and profitability.	Rejected
H4	There is positive and significant relationship between long term debt capitalization ratio and profitability.	Accepted
H5	There is negative and significant relationship between short term debt to total liability and profitability	Rejected

(Source: Based on Authors analysis of table 2 above)

### Conclusions

Profit is primary factor to be achieved by businesses. To achieve this profit, companies must utilize all of its resources optimally. The problem arises when the resource is insufficient and companies decide to obtain debt with consideration of profitability and risk of bankruptcy. The study has examined the relationship between capital structure and profitability of large tax payer manufacturing firms in Ethiopia in period 2010-2014. The main objective was to provide empirical evidence on the financing behavior of these firms and perhaps its impact on their financial performance or profitability. Accordingly, the study established significant and positive relationship between (short-term liabilities to total liabilities ratio, long-term debt capitalization

ratio and interest coverage ratio) and profitability. The study has failed to gauge significant relationship between the other leverage indicators debt to equity ratio, and debt ratio. The research was based on financial statements of large manufacturing firms that demonstrate what can be done even with the limitations of currently available data. There is clearly enormous scope for more research that can build an understanding of how the capital is structured, how it connects with the profitability and what elements of capital structure make a difference.

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