



GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: C
FINANCE

Volume 16 Issue 4 Version 1.0 Year 2016

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals Inc. (USA)

Online ISSN: 2249-4588 & Print ISSN: 0975-5853

Determinants of Capital Structure: An Empirical Evidence from United States

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Keywords: total debt ratio (TDR), long-term debt ratio (LTDR), short-term debt ratio (STDR), profitability (PROF), size (size), growth (growth), tangibility (tang), cost of financial distress (EVOL), non-debt tax effects (NDTS).

GJMBR - C Classification : JEL Code : F65



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I. INTRODUCTION

a) Introduction

The financial structure is said to be the relative proportion of funds from various sources used in a business. The part of the financial structure which refers to the proportion of different long-term financing sources is termed as Capital structure. It deals with making a proper array of the various sources of the funds in the relative proportion and magnitude. The capital structure of a company is made up of debt and equity securities that comprise a firm's financing of its assets. It is the permanent source of financing for a firm which is represented by long-term debt, preferred stock and net worth. Thus, it shows the capital arrangement which excludes short-term borrowings. Furthermore, it represents the degree of permanency as it excludes short-term sources of financing.

The question arises: What should be the appropriate proportion between owned and debt capital? It depends on the financial policy of individual firms. The debt capital may be nil in a company while it may be greater than owned capital in another company. The proportion between the two, usually expressed in terms of a ratio which represents the capital structure of a company.

In this modern era, the capital structure choice is one of the most important decisions made by financial managers. The choice of capital structure is at the center of many other decisions in the area of corporate finance. One of the major objectives of a corporate financial manager is to ensure a low cost of capital and thus maximization of shareholders' wealth. Hence, capital structure is one of the effective tool to manage the cost of capital. A minimal cost of capital is the indications of an optimal capital structure. However, what are the key potential determinants of such optimal capital structure choice? This question has been answered in this paper for the US firms listed on the New York Stock Exchange (S&P 500 index).

b) Objectives of the study

The objective of the study is to empirically investigate the determinants of capital structure (i.e. to identify the factors to be considered prior making financing decisions) of US companies using firm specific panel data. The sample in the study comprises of 15 firms that are listed on New York Stock Exchange (S&P 500 index).

The impact of independent variables on the dependent variables of the study would be better investigated by breaking the objectives across various models. Considering the three dependent variables (short term debt, long term debt and total debt) and all the 6 independent variables (profitability, size, growth, tangibility, cost of financial distress and tax shield effects), the objective of the study has been divided into three models as under:

Model 1: American companies and total debt: To investigate the impact of independent¹ variables while raising total debt.

Model 2: American companies and long term debt: To investigate the impact of independent variables while raising long term debt.

Model 3: American companies and short term debt: To investigate the impact of independent variables while raising short term debt.

c) Significance of the study

Assessing the factors that determines the capital structure choice will advantage the concerned

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¹ Independent Variables: The independent variables of the study are Profitability, Size, Growth, Tangibility, EVOL and NDTS

parties to innovate actions which fortifies their competitive position in the industry. This study, apart from being a step for the researcher's educational career, has the following significance:

Firstly, it will have immense importance to external investors in making well-informed decisions by considering the financing patterns of the service sector in United States.

Secondly, even though there are plenty of studies on the area of capital structure, this study can contribute to the literature as a reference point by providing the picture of firm-level factors that determine capital structure choice of United States.

II. LITERATURE REVIEW

a) *Literature Review*

The debate on determining an optimal capital structure and firms' value can be traced back to Modigliani and Miller (1958) who constructed a mathematical model to attempt to provide a basis for making finance decisions. Their research was based on the assumption of no taxes (either personal or corporate). In their research they concluded that the firms' value is self-determining of capital structure and that the total market value of an unlevered firm is equal to that of a levered firm. In their subsequent research Modigliani and Miller (1963) they considered no tax assumption to be unrealistic and took tax into consideration. They concluded that a levered firm has a higher market value than an unlevered firm because of tax shield on debt, and that this extra value was equal to the present value of the tax shield. Later Modigliani and Miller (1977) modified their research of 1963 by incorporating the effect of personal taxes in their study. Personal taxes were classified into two categories which are tax on income from holdings shares and tax on income from debt securities. In their research they analyzed certain special cases where the gain from leverage resulted zero, allowing the original (1958) result. Thus the results signify the existence of an optimal capital structure at the macro level and not at the micro level.

In their paper Myers and Majluf (1984) developed a model under the assumption that the management have more knowledge of the business than the investors. The model suggests that to undertake the valuable investment opportunity, a firm should rely on the internal sources of funds rather than the external source of finance. Once the internal source of finance is exhausted, the firm should go to the bond markets for the external capital alternative to financing by equity due to the asymmetry of information.

i. *Determinants of Capital structure in Developed Countries*

Titman and Wessels (1988) analyzed the explanatory power of recent theories of optimal capital

structure. The study analyzed the measure of short-term debt, long-term debt and convertible debt as dependent variables. The attributes suggested by different capital structure theories which may affect the firm's debt to equity choice such as asset structure, non-debt tax shields, growth, uniqueness, industry classification, size, earnings volatility, and profitability has been used as explanatory variables of the study. It is found that level of leverage increased with non-debt tax shields, fixed assets, size of the firm, and growth opportunities; and decreased with profitability, research and development expenditures, advertising expenditures, uniqueness of the product, and volatility.

Rajan and Zingales (1995) applied the capital structure models which are derived from a U.S. setting to firms in the G-7 countries (namely United States, Japan, Germany, France, Italy, United Kingdom and Canada). The study analyzed the financing decisions of public firms in the major of the industrialized countries. The study analysis is concentrated on the period from 1987 to 1991. The study examined the correlation of the leverage with tangibility, market to book ratio, size and profitability. From the results, it is found that the variables that were found to have a correlation with leverage in the United States were also correlated with firms' leverage in G-7 countries.

ii. *Determinants of Capital structure in Developing Countries*

The assessment for the portability of capital structure theory across countries with distinct institutional structure Booth et al. (2001) provided the first empirical study to test the capital structure models in developing countries. The financial structures of firms' from 10 developing countries (namely India, Pakistan, Thailand, Malaysia, Turkey, Zimbabwe, Mexico, Brazil, Jordan and Korea) has been used for the study. For comparison, the study also included the G-7 economies (United States, Germany, Canada, Italy, France, Japan, and United Kingdom) which are reported in Rajan and Zingales (1995). The study provided that the variables which affects the capital choice decisions in developing countries were same as they were in developed countries. However, the persistent difference across the countries were due to the country specific factors.

Chen (2004) used the firm level panel data to explore the determinants of the capital structure of Chinese listed companies. The study interpreted that neither trade-off model nor the pecking order has convincing explanation for the capital choice of the Chinese firms. Chinese firms follow "new pecking order" – retained profits, equity finance and long term debt finance; therefore the study concluded that Chinese firms have substantial lower amount of long term debt and prefer short term finance.

Acaravci (2015) investigated the determinants of capital structure for the firms listed on Istanbul Stock

Exchange in Turkey. The results interpreted that growth opportunities have effect on leverage which supports the trade-off theory; size, profitability and tangibility have effect on leverage and supports pecking order theory. The paper concluded that the five potential determinants of capital structure for Turkish manufacturing firms are growth opportunities, size, profitability, tangibility and non-debt tax shields.

b) Hypothesis of the Study

Based on above literature review, the researcher formulates the following hypothesis.

Model 1:

H_0 : There is no significant impact of Independent Variables² on Total Debt.

H_1 : There is significant impact of Independent Variables on Total Debt.

Model 2:

H_0 : There is no significant impact of Independent Variables on Long Term Debt.

H_1 : There is significant impact of Independent Variables on Long Term Debt.

Model 3:

H_0 : There is no significant impact of Independent Variables on Short Term Debt.

H_1 : There is significant impact of Independent Variables on Short Term Debt.

The hypothesis for each of the three models has been described in Table 1, Table 2 and Table 3.

III. RESEARCH METHODOLOGY

a) Sample Set

The current study on “Determinants of Capital Structure, An Empirical Evidence from US” comprises a sample data collected from the New York Stock Exchange (NYSE) and the targeted Index of the study is Standard and Poor’s 500 (S&P 500). The panel data of the study is collected on the annual basis over a time period of 5 years (i.e. 2010 – 2014) from the Financial Statements (namely Income Statement and Balance Sheet) of the firms. The sample set of the study consists of 15 firms from the “Information Technology” sector which are listed on S&P 500.

b) Theoretical Framework

The study consists of following set of nine variables to explore the determinants of the capital structure. The study consists of three dependent variables which are followed from the dependent variables of an existing literature (Handoo& Sharma, 2014) [173]; while the six independent variables are followed from the independent variables of existing literatures of (Chen, 2004) [1344]; (Handoo& Sharma, 2014) [173]. In the study, E-views 8 has been employed to test the hypothesis.

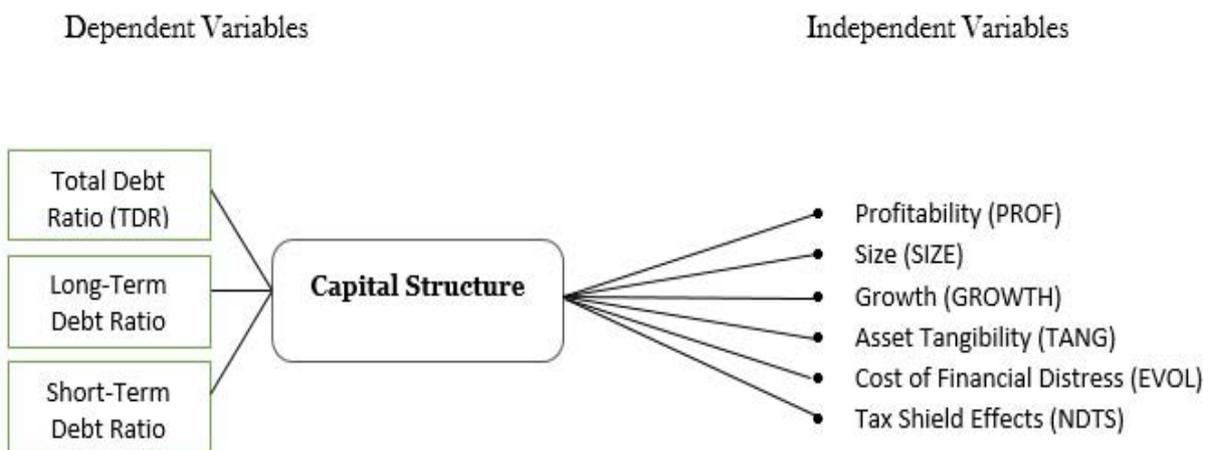


Figure 1 : Show the Theoretical Framework of the Study

² Independent Variables : The independent variables of the this study i.e. PROF, SIZE, GROWTH, TANG, EVOL, NDTS

i. *Dependent variables*

Total debt ratio (TDR): The total debt ratio is a financial ratio which is expressed as percentage of a company's assets that are provided in comparison to debt. It is calculated by dividing total debt to total assets.

Long term debt ratio (LTDR): The long term debt ratio indicates the portion of a company's total assets which are financed from long term debt. This value differs from industry to industry and company to company. Long term debt ratio is computed by dividing long term debt to total assets.

Short term debt ratio (STDR): The short term debt is the current liabilities of a company shown on the balance sheet. This account is comprised of debts or repayments which are incurred by a company that is due in one year. The short term debt ratio is the calculated by dividing debt payables which are due within one year to total assets. Thus the ratio shows the capacity of a firm whether it is able to fulfill its immediate financial obligations or not.

ii. *Independent variables*

Profitability (PROF): Profitability is the primary goal of firms that is realized when the total amount of revenues attained from a business activity exceeds the expenditure, costs, and taxes. Operating profit rate of return (earnings before interest, taxes and depreciation and amortization (EBITDA) to total assets) is used as a measure of profitability. (Chen, 2004) [1344]

Size (SIZE): Firms with larger size are more diversified and have stable cash flows; as a result the large size firms have a smaller probability of defaults than the smaller size firms. Thus, the cost of financial distress risk

is reflected to be lower in the larger size firms. The study uses the measure of a firm's size by the taking natural logarithm of its total assets. (Handoo & Sharma, 2014) [173]

Growth (GROWTH): Those firms which possess growth opportunities have a comparatively higher capacity for expansions of project, development of new products, and acquisitions than the firm which do not possess growth opportunities. The growth factor is measured by the percentage change of sales. (Chen, 2004) [1344]

Assets tangibility (TANG): All those tangible assets which possess some degree of debt capacity are referred to as asset tangibility. Tangible assets comprise of land and building, plant and machinery and equipment. In this study, the formula used to measure the value of assets tangibility of the firms is the ratio of net fixed assets to total assets. (Handoo & Sharma, 2014) [173]

Cost of Financial distress (EVOL): Financial distress refers to the condition where a company has difficulties in the fulfillment of its financial obligations. The firms' cost of financial distress increases with revenues that are sensitive to economic declines, higher fixed costs or illiquid assets. Earning volatility is the absolute value of percentage change in an operating income which is used as a measure for cost of financial distress in the study. (Chen, 2004) [1344]

Tax Shield effects (NDTS): Non-debt tax shields—ratio of depreciation & amortization to total assets (as depreciation & amortization is the most significant element among non-debt tax shield). (Chen, 2004) [1344]

Table 4 : Measurement of variables

Variables	Measurement
Dependent variables	
Total Debt Ratio (TDR)	Ratio of book value of total debt to total assets
Long-term Debt Ratio (LTDR)	Ratio of book value of long term debt to total assets
Short-term Debt Ratio (STDR)	Ratio of book value of short term debt to total assets
Independent variables	
Profitability (PROF)	Ratio of earnings before interest, tax and depreciation and amortization (EBITDA) to total assets
Size (SIZE)	Logarithm of total assets
Growth opportunities (GROWTH)	Sales growth
Asset Tangibility (TANG)	Tangibility - ratio of tangible assets (the sum of fixed assets) to total assets
Cost of financial distress (EVOL)	Earning volatility - absolute value of percentage change in operating income
Tax shields effects (NDTS)	Non-debt tax shields—ratio of depreciation and amortization to total assets (due to depreciation is the most significant element among non-debt tax shield)

c) *Regression Models*

Regression analysis is statistical process to estimate the relationship among variables. In the current

study, multiple regression analysis is employed to examine the relationship between the firm capital structure and the explanatory variables.

$$TDR = \beta_0 + \beta_1 PROF + \beta_2 SIZE + \beta_3 GROWTH + \beta_4 TANG + \beta_5 EVOL + \beta_6 NDTs + \epsilon \tag{1}$$

$$LTDR = \beta_0 + \beta_1 PROF + \beta_2 SIZE + \beta_3 GROWTH + \beta_4 TANG + \beta_5 EVOL + \beta_6 NDTs + \epsilon \tag{2}$$

$$STDR = \beta_0 + \beta_1 PROF + \beta_2 SIZE + \beta_3 GROWTH + \beta_4 TANG + \beta_5 EVOL + \beta_6 NDTs + \epsilon \tag{3}$$

Where

β_0 = Coefficient of intercept (constant)

$\beta_1 - \beta_6$ = Coefficient of Slope

TDR = Total Debt Ratio

LTDR = Long Term Debt Ratio

STDR = Short Term Debt Ratio

PROF = Profitability

SIZE = Size

GROWTH = Growth

TANG = Asset Tangibility

EVOL = Earning Volatility (Cost of Financial Distress)

NDTS = Non-debt Tax Shield Effects

ϵ = an error term.

IV. RESULTS AND DISCUSSIONS

a) *Descriptive Statistics*

The descriptive analysis of variables for the sample in terms of mean, median, maximum, minimum, standard deviation, skewness and kurtosis is made to see the variation in data for Information and Technology Sector of United States.

Table 5 : Shows the descriptive statistics

	TDR	LTDR	STDR	PROF	SIZE	GROWTH	TANG	EVOL	NDTS
Mean	0.545288	0.279536	0.265761	0.188009	9.661988	0.031955	0.514285	0.250741	0.061583
Median	0.474876	0.278315	0.262703	0.192027	9.447702	0.000000	0.540077	0.117700	0.038991
Maximum	1.409745	0.692349	0.891415	0.637474	12.07951	0.481800	0.843463	3.567700	0.428931
Minimum	0.099443	0.017989	0.073095	-0.080687	6.889591	-0.574600	0.108838	0.000000	0.009796
Std. Dev.	0.277655	0.160186	0.150812	0.116095	1.446829	0.134637	0.147015	0.461458	0.086430
Skewness	0.471981	0.263356	1.423220	0.960411	0.089573	-0.636223	-0.407903	5.245774	3.387273
Kurtosis	2.872259	2.460432	6.389096	5.466206	1.893202	9.047132	2.825432	37.01894	13.37170
Jarque-Bera	2.835567	1.776746	61.21310	30.53666	3.928423	119.3342	2.175046	3960.503	479.5834
Probability	0.242250	0.411324	0.000000	0.000000	0.140266	0.000000	0.337050	0.000000	0.000000
Sum	40.89662	20.96520	19.93207	14.10066	724.6491	2.396600	38.57137	18.80560	4.618715
Sum Sq. Dev.	5.704847	1.898814	1.683073	0.997367	154.9051	1.341406	1.599390	15.75782	0.552791
Observation	75	75	75	75	75	75	75	75	75

The above table shows that the highest mean value of size 9.66 while the non-debt tax shield effects (NDTS) has 0.061583 which is the lowest value. The size has highest value of standard deviation which is 1.446829 whereas the non-debt tax shield effects has the lowest value of standard deviation of 0.086430. The earning volatility (EVOL) has the highest value of kurtosis of 37.01894 while size has the lowest value of kurtosis of 1.893202.

b) *Correlation Analysis*

Correlation means the relationship between two variables. The correlation shows two things, first it shows the direction between two variables and secondly it shows the strength of associations between two variables. The below table shows the values of correlation among the variable

Table 6 : Shows the correlation analysis

	TDR	LTDR	STDR	PROF	SIZE	GROWTH	TANG	EVOL	NDTS
TDR	1.000000								
LTDR	0.899505	1.000000							
STDR	0.885735	0.593913	1.000000						
PROF	0.118504	0.009029	0.208640	1.000000					
SIZE	0.031437	0.114076	-0.063373	-0.227565	1.000000				
GROWTH	-0.038453	-0.116147	0.052642	0.471752	-0.269473	1.000000			
TANG	-0.441636	-0.296840	-0.497857	-0.279015	0.300555	-0.104628	1.000000		
EVOL	-0.001658	0.024529	-0.029101	0.284043	-0.161491	0.324673	0.008432	1.000000	
NDTS	0.142156	0.081362	0.175277	0.707812	-0.215951	0.341420	-0.102734	0.539787	1.000000

The above table shows that the highest positive correlation is observed between total debt ratio and long term debt ratio, the correlation value of total debt ratio and long term debt ratio is 0.899505, which means that 89.95% positive correlation is present between TDR and LTDR. PROF, SIZE and NDTS are positively correlated with Total Debt Ratio, whereas GRWOTH, TANG and EVOL is negatively correlated with total debt ratio. PROF, SIZE, EVOL and NDTS are positively correlated with Long-Term debt ratio, while GROWTH and TANG are negatively correlated. PROF, GRWOTH and NDTS are positively correlated with Short-Term debt ratio, while SIZE, TANG and EVOL are negatively correlated.

TDR, LTDR and STDR are positively correlated with each other. PRFO has a positive correlation with GROWTH, EVOL and NDTS while negatively correlated with SIZE and TANG. SIZE is positively correlated with TANG and negatively correlated with GROWTH, EVOL and NDTS. GROWTH has a positive correlation with EVOL and NDTS and a negative correlation with TANG. TANG is positively correlated with EVOL and negatively correlated with NDTS. There exists a positive correlation between EVOL and NDTS.

c) Regression Analysis

Panel regression comprises of three effects namely Common Effect, Fixed Effect and Random Effect. Selection of an appropriate effect for the panel data has been based on Likelihood Ratio and Hausman Test for each individual model of the study.

i. Model 1: American companies and Total Debt

From the results of Likelihood Ratio (Cross section F with P-value of 0.000) and Hausman Test (Cross-section random with P-value of 0.0012) shows that Fixed Effect is the best describe for the Model 1 of the study. Table 7 shows the results of the Fixed Effect.

The coefficient value of profitability is -0.074981, which means that 7.4981 percent negative variation of total debt ratio has been explained by the variation of profitability. The t-statistics of profitability is -0.432300 with a p- value of > 0.05 which shows that profitability has insignificant negative impact on total

debt ratio. If one unit increases in profitability than total debt ratio will decrease at 0.075 units.

The coefficient value of size is -0.033182, which means that 3.3182 percent negative variation of total debt ratio has been explained by the variation of size. The t-statistics of size is -0.825058 with a p- value of > 0.05 which shows that profitability has insignificant negative impact on total debt ratio. If one unit increases in size than total debt ratio will decrease at 0.033 units.

The coefficient value of growth is -0.019022, which means that -1.9022 percent negative variation of total debt ratio has been explained by the variation of growth. The t-statistics of growth is -0.202886 with a p- value of > 0.05 which shows that growth has insignificant negative impact on total debt ratio. If one unit increases in growth than total debt ratio will decrease at 0.019 units.

The coefficient value of tangibility is 0.981641, which means that 98.1641 percent positive variation of total debt ratio has been explained by the variation of tangibility. The t-statistics of tangibility is 5.063598 with a p- value of < 0.05 which shows that tangibility has significant positive impact on total debt ratio. If one unit increases in tangibility than total debt ratio will increase at 0.98 units.

The coefficient value of earning volatility is 0.019357, which means that 1.9357 percent positive variation of total debt ratio has been explained by the variation of earning volatility. The t-statistics of earning volatility is 0.733784 with a p- value of > 0.05 which shows that earning volatility has insignificant positive impact on total debt ratio. If one unit increases in earning volatility than total debt ratio will increase at 0.019 units.

The coefficient value of non-debt tax shield effects is -0.603116, which means that 60.3116 percent negative variation of total debt ratio has been explained by the variation of non-debt tax shield effects. The t-statistics of non-debt tax shield effects is -0.981545 with a p- value of > 0.05 which shows that non-debt tax shield effects has insignificant negative impact on total

debt ratio. If one unit increases in non-debt tax shield effects than total debt ratio will decrease at 0.603 units.

All 15 firms have a common coefficient of 0.408046. The value of R-squared is 0.951567 which represents that 95.16% variation of total debt ratio has been explained by the variation of 6 independent variables which are profitability, size, growth, tangibility, cost of financial distress and non-debt tax shield effects.

The value of AdjR² is 0.933629, which shows that if the researcher incorporates more relevant variables than it will adjust R² at the rate of 93.36 percent. The p-value of F-statistic is 0.0000 (i.e. significant value) which shows that the model is best fitted for the study.

ii. *Model 2: American companies and Long Term Debt*

From the results of Likelihood Ratio (Cross section F with Prob. of 0.000) and Hausman Test (Cross-section random with Prob. of 0.0316) shows that Fixed Effect is the best describe for the Model 2 of the study. Table 8 shows the results of Fixed Effect.

The coefficient value of profitability is -0.286385, which means that 28.6385 percent negative variation of long term debt ratio has been explained by the variation of profitability. The t-statistics of profitability is -1.873054 with a p- value of > 0.05 which shows that profitability has insignificant negative impact on long term debt ratio. If one unit increases in profitability than long term debt ratio will decrease at 0.286 units.

The coefficient value of size is -0.025834, which means that 2.5834 percent negative variation of long term debt ratio has been explained by the variation of size. The t-statistics of size is -0.728679 with a p- value of > 0.05 which shows that profitability has insignificant negative impact on long term debt ratio. If one unit increases in size than long term debt ratio will decrease at 0.026 units.

The coefficient value of growth is 0.017394, which means that 1.7394 percent positive variation of long term debt ratio has been explained by the variation of growth. The t-statistics of growth is 0.210459 with a p- value of > 0.05 which shows that growth has insignificant positive impact on long term debt ratio. If one unit increases in growth than long term debt ratio will increase at 0.017 units.

The coefficient value of tangibility is 0.424778, which means that 42.4778percent positive variation of long term debt ratio has been explained by the variation of tangibility. The t-statistics of tangibility is 2.485611 with a p- value of < 0.05 which shows that tangibility has significant positive impact on long term debt ratio. If one unit increases in tangibility than long term debt ratio will increase at 0.425 units.

The coefficient value of earning volatility is 0.043109, which means that 4.3109 percent positive variation of long term debt ratio has been explained by the variation of earning volatility. The t-statistics of

earning volatility is 1.853769 with a p- value of > 0.05 which shows that earning volatility has insignificant positive impact on long term debt ratio. If one unit increases in earning volatility than long term debt ratio will increase at 0.043 units.

The coefficient value of non-debt tax shield effects is -0.841257, which means that 84.1257percent negative variation of long term debt ratio has been explained by the variation of non-debt tax shield effects. The t-statistics of non-debt tax shield effects is -1.553113 with a p- value of > 0.05 which shows that non-debt tax shield effects has insignificant negative impact on long term debt ratio. If one unit increases in non-debt tax shield effects than long term debt ratio will decrease at 0.841 units.

All 15 firms have a common coefficient of 0.404974. The value of R-squared is 0.886924 which represents that 88.69% variation of long term debt ratio has been explained by the variation of 6 independent variables which are profitability, size, growth, tangibility, cost of financial distress and non-debt tax shield effects. The value of AdjR² is 0.845044, which shows that if the researcher incorporates more relevant variables than it will adjust R² at the rate of 84.50percent. The p-value of F-statistic is 0.0000 (i.e. significant value) which shows that the model is best fitted for the study.

iii. *Model 3: American companies and Short Term Debt*

From the results of Likelihood Ratio (Cross section F with Prob. of 0.000) and Hausman Test (Cross-section random with Prob. of 0.0009) displayed below shows that Fixed Effect is the best describe for the Model 3 of the study. Table 9 shows the results of Fixed Effects.

The coefficient value of profitability is 0.211674, which means that 21.1674 percent positive variation of short term debt ratio has been explained by the variation of profitability. The t-statistics of profitability is 1.177483 with a p- value of > 0.05 which shows that profitability has insignificant positive impact on short term debt ratio. If one unit increases in profitability than short term debt ratio will increase at 0.212 units.

The coefficient value of size is -0.007320, which means that -0.7320 percent negative variation of short term debt ratio has been explained by the variation of size. The t-statistics of size is -0.175595 with a p- value of > 0.05 which shows that profitability has insignificant negative impact on short term debt ratio. If one unit increases in size than short term debt ratio will decrease at 0.007 units.

The coefficient value of growth is -0.036421, which means that 3.6421 percent negative variation of short term debt ratio has been explained by the variation of growth. The t-statistics of growth is -0.374798 with a p-value of > 0.05 which shows that growth has insignificant negative impact on short term debt ratio. If

one unit increases in growth than short term debt ratio will decrease at 0.036 units.

The coefficient value of tangibility is 0.556963, which means that 55.6963 percent positive variation of short term debt ratio has been explained by the variation of tangibility. The t-statistics of tangibility is 2.771940 with a p-value of < 0.05 which shows that tangibility has significant positive impact on short term debt ratio. If one unit increases in tangibility than short term debt ratio will increase at 0.557 units.

The coefficient value of earning volatility is -0.023757, which means that 2.3757 percent negative variation of short term debt ratio has been explained by the variation of earning volatility. The t-statistics of earning volatility is -0.868873 with a p-value of > 0.05 which shows that earning volatility has insignificant negative impact on short term debt ratio. If one unit increases in earning volatility than short term debt ratio will decrease at 0.024 units.

The coefficient value of non-debt tax shield effects is 0.238048, which means that 23.8048 percent positive variation of short term debt ratio has been explained by the variation of non-debt tax shield effects. The t-statistics of non-debt tax shield effects is 0.373788 with a p-value of > 0.05 which shows that non-debt tax shield effects has insignificant positive impact on short term debt ratio. If one unit increases in non-debt tax shield effects than short term debt ratio will increase at 0.238 units.

All 15 firms have a common coefficient of 0.002709. The value of R-squared is 0.823650 which represents that 82.37% variation of short term debt ratio has been explained by the variation of 6 independent variables which are profitability, size, growth, tangibility, cost of financial distress and non-debt tax shield effects. The value of $AdjR^2$ is 0.758335, which shows that if the researcher incorporates more relevant variables than it will adjust R^2 at the rate of 75.83 percent. The p-value of F-statistic is 0.0000 (i.e. significant value) which shows that the model is best fitted for the study.

d) Summary of Hypothesis testing

Based on above results, the following hypothesis are accepted or rejected.

Model 1

$H_{1\ 11}$: There is significant impact of profitability on total debt ratio [Rejected].

$H_{1\ 12}$: There is significant impact of size on total debt ratio [Rejected].

$H_{1\ 13}$: There is significant impact of growth on total debt ratio [Rejected].

$H_{1\ 14}$: There is significant impact of tangibility on total debt ratio [Accepted].

$H_{1\ 15}$: There is significant impact of cost of financial distress on total debt ratio [Rejected].

$H_{1\ 16}$: There is significant impact of non-debt tax shield effects on total debt ratio [Rejected].

Model 2

$H_{1\ 21}$: There is significant impact of profitability on long term debt ratio [Rejected].

$H_{1\ 22}$: There is significant impact of size on long term debt ratio [Rejected].

$H_{1\ 23}$: There is significant impact of growth on long term debt ratio [Rejected].

$H_{1\ 24}$: There is significant impact of tangibility on long term debt ratio [Accepted].

$H_{1\ 25}$: There is significant impact of cost of financial distress on long term debt ratio [Rejected].

$H_{1\ 26}$: There is significant impact of non-debt tax shield effects on long term debt ratio [Rejected].

Model 3

$H_{1\ 31}$: There is significant impact of profitability on short term debt ratio [Rejected].

$H_{1\ 32}$: There is significant impact of size on short term debt ratio [Rejected].

$H_{1\ 33}$: There is significant impact of growth on short term debt ratio [Rejected].

$H_{1\ 34}$: There is significant impact of tangibility on short term debt ratio [Accepted].

$H_{1\ 35}$: There is significant impact of cost of financial distress on short term debt ratio [Rejected].

$H_{1\ 36}$: There is significant impact of non-debt tax shield effects on short term debt ratio [Rejected].

V. CONCLUSION AND RECOMMENDATION

a) Conclusion

The results of the study provides a better understanding the financial behavior of US IT firms during the period of 2010 to 2014. The relationship between total debt, long-term debt and short-term debt and 6 independent variables that represents profitability, size, growth, asset tangibility, cost of financial distress (EVOL) and non-debt tax shield effects was tested to identify the variable which explained the capital structure of US firm more appropriately. Results show that among all the 6 independent variables, TANG has a positive significant impact on the total debt ratio, long term debt ratio and short term debt ratio; and overall the other independent variables have insignificant impact on the total debt ratio, long term debt ratio and short term debt ratio.

The study concludes that profitability, size, growth, tangibility, cost of financial distress and non-debt tax shield effects are the determinants of capital structure in the IT sector of S&P 500 index. Among all the independent variables of the study, Tangibility best describe the capital structure of the IT firms listed on the New York Stock Exchange "S&P 500 index". The results reveal that firms with higher tangibility prefers higher debt capital structure in their total capital structure.

b) *Recommendations*

The researcher has conducted the research on the determinants of capital structure evidence from United States, S&P 500 index over the time period of 5 years from 2010 to 2014 by using six independent and three dependent variables. If anyone else wants to conduct the research on the same topic then the researcher must incorporate:

- The researcher must incorporate more independent variables
- The period of the study should be more than 10 years for better results
- The researcher must collect the data more the 30 companies for better results

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APPENDICES

Table 1: Hypothesis of Model 1

Null Hypothesis	Alternative Hypothesis
H _{0 11} : There is no significant impact of profitability on total debt ratio	H _{1 11} : There is significant impact of profitability on total debt ratio
H _{0 12} : There is no significant impact of size on total debt ratio	H _{1 12} : There is significant impact of size on total debt ratio
H _{0 13} : There is no significant impact of growth on total debt ratio	H _{1 13} : There is significant impact of growth on total debt ratio
H _{0 14} : There is no significant impact of tangibility on total debt ratio	H _{1 14} : There is significant impact of tangibility on total debt ratio
H _{0 15} : There is no significant impact of cost of financial distress (EVOL) on total debt ratio	H _{1 15} : There is significant impact of cost of financial distress (EVOL) on total debt ratio
H _{0 16} : There is no significant impact of non-debt tax shield effects on total debt ratio	H _{1 16} : There is significant impact of non-debt tax shield effects on total debt ratio

Table 2 : Hypothesis of Model 2

Null Hypothesis	Alternative Hypothesis
H _{0 21} : There is no significant impact of profitability on long term debt ratio	H _{1 21} : There is significant impact of profitability on long term debt ratio
H _{0 22} : There is no significant impact of size on long term debt ratio	H _{1 22} : There is significant impact of size on long term debt ratio
H _{0 23} : There is no significant impact of growth on long term debt ratio	H _{1 23} : There is significant impact of growth on long term debt ratio
H _{0 24} : There is no significant impact of tangibility on long term debt ratio	H _{1 24} : There is significant impact of tangibility on long term debt ratio
H _{0 25} : There is no significant impact of cost of financial distress (EVOL) on long term debt ratio	H _{1 25} : There is significant impact of cost of financial distress (EVOL) on long term debt ratio
H _{0 26} : There is no significant impact of non-debt tax shield effects on long term debt ratio	H _{1 26} : There is significant impact of non-debt tax shield effects on long term debt ratio

Table 3 : Hypothesis of Model 3

Null Hypothesis	Alternative Hypothesis
$H_{0\ 31}$: There is no significant impact of profitability on short term debt ratio	$H_{1\ 31}$: There is significant impact of profitability on short term debt ratio
$H_{0\ 32}$: There is no significant impact of size on short term debt ratio	$H_{1\ 32}$: There is significant impact of size on short term debt ratio
$H_{0\ 33}$: There is no significant impact of growth on short term debt ratio	$H_{1\ 33}$: There is significant impact of growth on short term debt ratio
$H_{0\ 34}$: There is no significant impact of tangibility on short term debt ratio	$H_{1\ 34}$: There is significant impact of tangibility on short term debt ratio
$H_{0\ 35}$: There is no significant impact of cost of financial distress (EVOL) on short term debt ratio	$H_{1\ 35}$: There is significant impact of cost of financial distress (EVOL) on short term debt ratio
$H_{0\ 36}$: There is no significant impact of non-debt tax shield effects on short term debt ratio	$H_{1\ 36}$: There is significant impact of non-debt tax shield effects on short term debt ratio

Table 7 : Results of Model 1

Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	22.050356	6	0.0012

Table 7 : Shows the Fixed Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.408046	0.364793	1.118567	0.2683
PROF_?	-0.074981	0.173446	-0.432300	0.6672
SIZE_?	-0.033182	0.040218	-0.825058	0.4130
GROWTH_?	-0.019022	0.093756	-0.202886	0.8400
TANG_?	0.981641	0.193862	5.063598	0.0000
EVOL_?	0.019357	0.026380	0.733784	0.4663
NDS_?	-0.603116	0.614456	-0.981545	0.3307
Fixed Effects (Cross)				
HPQ—C	0.200057			
IBM—C	0.285971			
INTC—C	-0.228586			
JNPR—C	-0.402159			
MSFT—C	0.196246			
MSI—C	0.228653			
NFLX—C	0.458770			

SNDK—C	-0.294766
SWKS—C	-0.516712
TDC—C	-0.122305
TXN—C	-0.188142
VRSN—C	0.719104
WU—C	0.367077
XRX—C	-0.135516
YHOO—C	-0.567690

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.951567	Mean dependent var	0.545288
Adjusted R-squared	0.933629	S.D. dependent var	0.277655
S.E. of regression	0.071531	Akaike info criterion	-2.205876
Sum squared resid	0.276301	Schwarz criterion	-1.556980
Log likelihood	103.7204	Hannan-Quinn criter.	-1.946779
F-statistic	53.04754	Durbin-Watson stat	1.499312
Prob(F-statistic)	0.000000		

Table 8 : Results of Model 2

Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.830122	6	0.0316

Table 8 : Shows the Fixed Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.404974	0.321575	1.259346	0.2133
PROF_?	-0.286385	0.152897	-1.873054	0.0665
SIZE_?	-0.025834	0.035453	-0.728679	0.4693
GROWTH_?	0.017394	0.082649	0.210459	0.8341
TANG_?	0.424778	0.170895	2.485611	0.0161
EVOL_?	0.043109	0.023255	1.853769	0.0692
NDTS_?	-0.841257	0.541658	-1.553113	0.1262
Fixed Effects (Cross)				
HPQ--C	0.035571			
IBM--C	0.232207			
INTC--C	-0.044696			
JNPR--C	-0.270205			
MSFT--C	0.058486			
MSI--C	0.117316			
NFLX--C	0.388062			
SNDK--C	-0.155211			
SWKS--C	-0.336764			

TDC--C	-0.158570
TXN--C	-0.037462
VRSN--C	0.318127
WU--C	0.130060
XRX--C	0.006470
YHOO--C	-0.283389

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.886924	Mean dependent var	0.279536
Adjusted R-squared	0.845044	S.D. dependent var	0.160186
S.E. of regression	0.063056	Akaike info criterion	-2.458079
Sum squared resid	0.214710	Schwarz criterion	-1.809182
Log likelihood	113.1780	Hannan-Quinn criter.	-2.198982
F-statistic	21.17780	Durbin-Watson stat	1.930042
Prob(F-statistic)	0.000000		

Table 9 : Results of Model 3

Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	22.773018	6	0.0009

Table 9 : Shows the result of Fixed Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002709	0.378091	0.007166	0.9943
PROF_?	0.211674	0.179768	1.177483	0.2442
SIZE_?	-0.007320	0.041684	-0.175595	0.8613
GROWTH_?	-0.036421	0.097174	-0.374798	0.7093
TANG_?	0.556963	0.200929	2.771940	0.0076
EVOL_?	-0.023757	0.027342	-0.868873	0.3888
NDTS_?	0.238048	0.636853	0.373788	0.7100
Fixed Effects (Cross)				
HPQ—C	0.164442			
IBM—C	0.053680			
INTC—C	-0.183980			
JNPR—C	-0.131948			
MSFT—C	0.137700			
MSI—C	0.111373			

NFLX--C	0.070705
SNDK--C	-0.139516
SWKS--C	-0.179847
TDC—C	0.036301
TXN--C	-0.150715
VRSN--C	0.401132
WU--C	0.237011
XRX--C	-0.142005
YHOO--C	-0.284334

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.823650	Mean dependent var	0.265761
Adjusted R-squared	0.758335	S.D. dependent var	0.150812
S.E. of regression	0.074138	Akaike info criterion	-2.134272
Sum squared resid	0.296811	Schwarz criterion	-1.485375
Log likelihood	101.0352	Hannan-Quinn criter.	-1.875174
F-statistic	12.61043	Durbin-Watson stat	1.145728
Prob(F-statistic)	0.000000		

