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The Determinants of Capital Structure: Evidence from Pakistani Manufacturing Companies

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ABSTRACT

Financing decisions are one of the most vital decisions for companies. This research study is an attempt to examine the effect of business risk on debt ratio of the companies of different size like small, medium and large firms. This study also identifies the factors which are important in choosing optimum capital structure. A panel data set of 400 manufacturing firms of Pakistan for the period of 2001 to 2014 was selected to fulfil the objectives of the study. Ordinary Least Square (OLS), fixed effect and random effect estimation methods are used in the study for analysis. The results shows that profitability, cash ratio, and age have negative impact on debt ratio while tangibility, firm size, Tobin's q and business risk has positive impact. Managers of the companies should dedicate their time and energies to those variables that have significant direct link between determinants of capital structure and debt ratio with the intention of minimizing the weighted average cost of capital which in turn will maximizes the wealth of shareholders.

Key words: Business risk, Capital structure, Firm size, Panel data, JEL Classification: C23, G32

INTRODUCTION

In corporate finance, decision of optimal structure of capital, is a controversial issue. The capital structure is a way the company finances its operations by using different sources of funds. Mainly, these are two sources, the one is debt and the other is equity. Debt is obtained through issuance of bonds or long-term notes, while equity is divided into three main sources such as retained earnings, common stock and preferred stock.

The rate of interest on the loan amount and the schedule of repayment are settled in the agreement between the creditor and the debtor. If the debtor does not fulfil the creditors' requirements mentioned under the agreement, it may affect the credibility of the debtor which in turn can make it problematic to get funds in the future and can also lead to financial let-down. Even if a company is not making enough profits and is not in a position to repay its debt payments it still had a responsibility to repay the amount on time (Shah and Hijazi, 2004).

Equity financing refers to the resources generated through the sale of shares. The key advantage of equity financing is that it does not require the repayment of funds. However, it does not mean that there is no problem to use equity solely for business.

The shareholders buy shares with the consideration that they would own a small portion in the business. The company at that moment is bound to investors and must produce stable earnings in order to sustain the stock value and pay dividends. The company have to pay the cost of obtaining these sources which is called the cost of capital.

In simple words, the cost of acquiring funds is weighted average of both types of financing cost either it is taken in the form of debt or in equity. The cost of equity refers to the risk that equity investors perceive in their investment and the cost of debt includes the risk of default that creditors see from the same investment (Damodaran 2016).

AIMS OF THE RESEARCH

- To observe empirically which factors affect the debt ratio of Pakistani manufacturing companies
- To examine how business risk affects the debt ratio of Pakistani manufacturing companies
- To examine how business risk affects the debt ratio of small, medium and large firms

LITERATURE REVIEW

A review of literature is considered as the research pillar and linked to the topic of the research and the suitable research policy. It is crucial for scholars to have a solid edge of information in mind before starting the research journey. Beside this, a concrete background shows the consistency of the theories that have been chosen. This chapter deliberates on the capital structure's determinants, assessment of empirical studies, and a comprehensive over view of such type of research in Pakistan**.** The capital structure is all about the mixture of debt and equity. The decision on the capital structure poses many challenges for companies. One of the most strategic decisions being faced by the companies is to examine an applicable mix of equity and debt (Modugu, 2013).

Boodhoo (2009) investigated the literature on the capital structure and provided the observed facts that there is some association between the structure of capital and the structure of the ownership of the firm. The economists and researchers have not yet reached to any conclusion regarding the decision of optimal capital structure (debt/equity ratio) which would allow companies to maximize their performance while handling the agency problem.

Samuel et al. (2012) reveals that in a developing economy such as Ghana, share capital as a part of the capital structure is associated to the worth of a company, and debt capital is also considered as the main determinant of a company's value. In the light of the results discussed in their study, corporate financial managers are directed to use more debt than equity capital in managing their operations; meanwhile, it affects more the value of the company. Their study tries to find the evidence on the impact of capital on the value of a company. The study used the data of all 34 companies registered in the Ghana Stock Exchange (GSE) for the year ended in December 31, 2010. The Ordinary Least Squares (OLS) regression method is used to perform the analysis.

Isaac (2014) indicates that the choice of capital structure positively and significantly affect the fair value of a company. As a result, the decision of optimal capital structure of a company is reasonable by the fact that it has a significant-positive impact on the market value of the company. The study recommends that the listed companies in Nigeria could be encouraged to maximize their market values in deciding their choice of capital structure and those companies should try to adjust their capital structure through a suitable combination of debt and equity. The optimal capital structure is the only combination which maximizes the market values of companies.

Ani and Amri (2015) studied that the capital structure (leverage) determinants in three sub-sectors of Omani Industrial Enterprises (construction, chemical and products) registered in the stock market of Muscat for the period 2008-2012. The findings of the study indicated that in the industrial sector as a whole; risk and tangibility have positive relationship with leverage. In addition, the growth rate and profitability have negative relationship with leverage, although these had no association with size of the firm. Regression analysis showed that three variables namely size, tangibility and risk had statistically significant effects on leverage.

Akeem et al. (2014) examined the impact of the capital structure on the company's performance through a case study of industrial firms in Nigeria from 2003 to 2012 in order to provide an acute assessment of the necessity and significance of the capital structure. Based on their findings, the measures of capital structure and total debt divided by total equity are inversely related to the company's performance. They suggested that the companies should employ more equity as compared to debt to finance their corporate activities. The debt should be used in a ratio that can improve the value of a company.

Ahmed et al. (2016) investigated the influence of firm level factors on the capital structure in Pakistan's life insurance corporations. In order to do this investigation, they took debt as a dependent variable, whereas, the profitability, size, growth, age, risk, asset tangibility and liquidity have been decided as independent variables. The findings of the OLS regression indicated that size, profitability, danger, liquidity and age are significant determining factors of the capital structure of life insurance organizations.

Kausar et al. (2014) empirically examined the impact of capital structure decision on the financial performance of Pakistani firms indexed on the Pakistan stock exchange (PSE). This research used the multiple regression panel regression as analysis techniques which have been applied to 197 companies inside the country's market quoted at the Pakistan stock

exchange (PSE). These companies are selected to estimate the effects of the capital structure in the business for the period from 2004 to 2011. The companies listed in Pakistan's PSE rely heavily on equity and short-term debt, however, debts involved the robust clause`s that have an impact on the performance of the company. The study reveals a remarkable fact that Pakistani companies are mostly financed by equity capital or mix of equity and short-term financing.

Gaud et al. (2005) used a model of over 5,000 EU (European) corporations to report the drivers of capital structure policies in Europe. Monitoring dynamic styles and countrywide environments, they revealed how these guidelines cannot be decreased to an easy version of equilibrium or hierarchy. Both the company governance and market momentum influence the structure of capital. The European organizations are restricted to a higher leverage barrier, however, not to a lesser one. The internal financing, when obtainable, have preference over external financing, but the firms restrict forthcoming excess of slack as it found to be a possible cause of clash.

Agarwal and Mohtadi (2004) studied the role of financial market improvement in deciding the type of financing for corporations operating in the emerging economies through a dynamic panel technique with a cumulative data at the enterprise level. On one hand, the outcomes of their study recommended that the enlargement of the stock market favours the financing of companies on debt financing while the development of the banking sector favours the financing of debt on capital financing, as might be expected. On the other hand, unexpectedly, equity markets had stronger effects in the short-run than in the long run. The consequences of the dynamic panel model indicated that if both the components of the financial sector are developed concurrently, the long term debt-to-equity ratio, while increasing, will meet to a constant value.

Harc and Sarlija (2012) resulted from their studies that the liquidness of the company, which is shown in the permanent potential to pay financial dues, has an influence on the capital structure of the organisation. The higher the liquidity of the company leads to reduction in leverage and the lower liquidity increase the leverage. It is crucial to highlight the significance and role of cash in liquidity. The cash or the cash equivalent, that is used to pay the dues, appears to be the important indicator of liquidity for Croatian firms. In comparison to other current assets (stocks, bills receivable etc.), cash is a limited resource. So, the managers must be conscious about the significance of liquid asset management.

Baum et al. (2016) showed that risk plays a vital role in the estimation of the firm's capital structure adjustment. The adjustment process is disproportionate and depends on the type of risk, its degree, the current firm's level of debt and its financial situation. They revealed that the companies with financial surplus and leverage beyond the target adjust their leverage more quickly when the specific risk of the firm is lower and when the macroeconomic risk is higher. Business with financial and leverage funds under the target adjust their capital structure more rapidly when both type of risks are lower. Their research recommended that models without risk factors get influenced outcomes.

Cook and Tang (2010) used the two dynamic models of partial adjustment of capital structure to evaluate the numerous macroeconomic elements on the speed of capital structure's adjustment. They found a strong proof consistent with a prediction of the theory of Hack barth et al. (2006) in which the firms have a tendency to adjust their leverage in the direction of objectives more quickly in good macroeconomic conditions. They also found support for the pecking order and market timing theories. Their results are strong to the size of the company, deviations from the target, definitions of leverage, and possible boundary matters.

Psillaki and Daskalakis (2009) studied that either determining factors of capital structure are specific to state in which the companies are operating or specific to the companies itself. They conducted their research on the SME's operating in four different countries. Their study reveals that factors specific to the firms explain the differences in capital structure choices.

Ozkan (2001) suggested that companies had a long-term leverage ratio which regulate to the exceptionally rapid target rate, indicating that the costs of being far away from their targeted ratios and adjustment expenses are equally significant for the enterprise. Their findings prove that liquidity, profitability and growth opportunities had a negative impact on the capital structure of the companies. Their outcomes are also regular with the expectation of the theory that there is counter relationship in

non-debt tax shields and borrowing ratio of the companies. Eventually, there is no considerable support for a positive impact derived from the size of companies.

Huang and Ritter (2009) examined the time series patterns of the external financial choices and indicated that the publicly traded corporations finance has larger share in their financing shortfall with the outside capital when the cost of capital is lower.

The past values of the cost of capital have continuing effects on the capital structures due to their impact at the past financing selections of the companies. It additionally brings a new econometric approach to address biases in the evaluations of the adjustment speed in the direction of leverage in the corporations to modify the targeted leverage at a reasonable velocity, afterwards monitoring for the conventional determinants of capital structure and stuck effects of the firm.

Alnajjar (2015) analysed that managers do not take risk while choosing their policy of financing when there is instability in profits. Therefore, the chance of bankruptcy can be prevented.

The profitability is positively correlated with the formation of policy of financing which shows that the managers of commercial organizations use higher amount of debt when there is consistency in sales volume and increased earnings so that they can reveal in the benefits of fiscal shield. The executives of the industrial sector incorporate debt according to the size of the organisation. As the size of the company gets larger, they employ extra debt in their capital structure. The evaluation confirms that managers within the business zone are very thoughtful about the risk element. They provide enormous significance to sales growth, profitability, business risk and size, whilst including and increasing the portion of leverage in their capital structure.

Chen, Harford and Kamara (2016) indicated that operating leverage overflows financial leverage and at the same time increases the profitability. Therefore, operating leverage generates the inverse relationship between profitability and financial leverage that appears to be inconsistent with the trade-off theory, but is commonly observed in the data. They found empirically that by eliminating the effect of operating leverage on profitability, the negative association between profitability and financial leverage decreases by around 70%, confirming the channel. They demonstrated the effect of operating leverage on financial leverage decisions of companies during the financial crisis.

Methodology And Data

The sample for this research study is taken from 400 manufacturing companies listed in the Pakistan Stock Exchange (PSE) throughout the time period of this study. These companies cover major segments of the country for example textile, sugar, automobile, pharmaceuticals, paper & board, Engineering, Chemicals, Power generation & distribution, Oil & Gas, Leather, Cement, Food & Personal care, and Fertilizer etc. These segments play a vital role in the performance of Pakistan's economy. The time period of sample is from 2001 to 2014. Therefore, this study used panel data analysis as to study the behaviours of these companies across each other over a long period of time. The data regarding the companies quoted on the PSE is reliable because the listed companies are required to submit their annual reports to Security and Exchange commission of Pakistan (SECP) with full disclosure of all matters and these reports are also examined by the external auditors of the company. This is a satisfactory point regarding reliability of data about listed companies.

Techniques of Data Analysis

Panel data is defined as having the properties of both types of data cross-sectional and times series. The combination of two types of data cross-sectional and time series is called panel data. The method of data analysis used in this research work is the Descriptive, Correlation and Regression Technique. The random and fixed effects models are also used in the study.

Empirical Model

In the following model, dependent variable is denoted by debt ratio, and the independent variables are the determinants of capital structure. The independent variables are profitability, cash ratio, tangibility, Tobin Q, log TA, age and business risk. Same model used by Akbar et al. (2009), Hijazi & Shah (2004) and Alnajjar (2015).

$$DR_{it} = \beta_0 + \beta_1 PRO_{it} + \beta_2 CR_{it} + \beta_3 TQ_{it} + \beta_4 TANG_{it} + \beta_5 LTA_{it} + \beta_6 Age_{it} + \beta_7 BSR_{it} + \mu_{it}$$

Where;

DR = Debt ratio

β_0=Constant coefficient

$\beta_1 - \beta_7$= Regression coefficients for measuring independent variables

PRO = Profitability

CR = Cash Ratio

TQ = Tobin's q

TANG= Tangibility

LTA = Log of total assets

Age = Age of the company

BSR = Business risk.

μ_{it} = Error term

Definition of Variables, Measurements and Hypothesis Development

The purpose of this study is to examine the determinants of capital structure and how these affect the capital structure in Pakistani manufacturing companies during the period 2001 - 2014. Therefore, the variables are divided into two categories, which are independent and dependent variables. By keeping in view the research question and objective, it is decided that debt ratio is dependent variable; profitability, cash ratio, tangibility, Tobin's q, log TA and business risk are independent variables.

Dependent Variable

Debt ratio

The earlier measure divides the book value of debt through book value of debt plus market price of equity and the book value is measured by dividing the book value of debt to book value of debt plus book price of equity. The book value measure of leverage is used in this study. This is defensible with the logic that certain level of debt is decided by means of the trade-off between the advantages and prices of debt financing. The main advantage of debt is the savings in the form of tax shield due to interest expense. These tax advantages are not modified by market value of the debt after it issued to the market. That is why market value of debt does not remain relevant.

The leverage ratio would be calculated as;

$$DR_{it} = \frac{TL_{it}}{TA_{it}}$$

Where;

TL= total liabilities

TA = total assets

Independent variables

The following variables are considered as independent variables in this study.

Portability

is the function of earnings before interest, taxes and depreciation (EBITD) to total assets. According to the hypothesis of the pecking order theory companies have a tendency to firstly use internal funds and then go for external financing. Myers and Majluf, (1984) stated that more profitable companies will have a smaller amount of debt. Therefore, inverse relationship between profitability and leverage is expected.

The profitability is calculated as

$$PRO_{it} = \frac{NPBT_{it} + FExp_{it} + Dep_{it}}{TA_{it}}$$

Where;

NPBT = Net Profit before Tax

FExp = fixed expenditure

Dep = depreciation

TA = total assets

H1: Firms with higher profitability have lower leverage.

Cash Ratio is the ratio of cash available to the firm divided by its total assets. Cash ratio is calculated as

$$\boldsymbol{CR_{it} = \frac{Cash_{it}}{TA_{it}}}$$

Opler, et al. (1999) showed that money must not be taken as a bad debt; so they recognized cash as a key determinant of the structure of capital. Empirically, the negative effect of the operational performance variables at the perceived level of debt is not always a wonder, as it is for one of the most documented regularities in capital structure studies. A general clarification comes from pecking order concept, where financing with internal resources is cheap as it avoids underinvestment costs (Myers and Majluf, 1984)

H2: There is inverse relationship between cash and leverage ratio.

Tobin's Q

In this study Tobin's q is taken as market value of equity +total liabilities / total assets

$$TQ = Mv\ of\ equit + Total\ liabilities/Total\ assets$$

Where TQ denotes the Tobin's Q

Tangible Assets

it is measured as independent variable and calculated by dividing the total fixed assets to total assets. The same measure is used by Weill (2007) and Margrates and Psillaki (2010) for tangible assets. In most of the empirical research ratio of fixed assets to overall assets has been used for measuring the tangibility of a firm's assets. Tangible assets are deliberated as security and assurance for financiers while the company required capital from outsiders... tangibility is defined as total fixed assets to total assets of the company. Hence, Assets' tangibility is predicted to have a positive impact on a firm's performance.

$$TANG_{it} = \frac{TFA_{it}}{TA_{it}}$$

Where;

TFA=total fixed assets

TA=total assets

H3: A firm with higher tangibility of assets will have higher leverage.

Log TA

is the proxy used for firm size in this study. The same proxy of firm size is used by Kausar, et al. (2014). In the number of previous studies, firm size is represented by the log of total assets. The total assets include the net fixed assets, intangible assets, investments, current assets, and other assets.

Titman and Wessels (1988), stated that both log of total assets and log of total sales are used as proxy for firm's size and one can choose anyone of them as there is a high correlation between these two (about 0.98), and therefore, choosing any of them does not make a considerable difference. It is considered as important determinant in determining the capital structure of firm.

H4: Greater the size of the company will be higher than the leverage ratio

Age

(log of number of years since the company is incorporated). This measure is used by Abu-Tapanjeh and Muritala, (2012) and Kausar, et al. (2014). In equation form, we can write it as

$$\boldsymbol{Age_{it} = Log\ of\ age + 1}$$

H5: There is positive relationship between age of the firm and its leverage.

Business Risk

Kim and Sorensen (1986) explained in their research study that, corporations with high operational risk use a lesser quantity of debt in their mix of debt because of greater financial risk. Consequently, the companies operating in a tremendously unstable environment ought to lessen their use of debt in order to lessen enterprise risk, which in turn will lessen their threat of bankruptcy. Andersen (2005) suggested that company's risk and bankruptcy threat are contrariwise related to the usage of debt.

H6: Capital structure of firms is affected by the business risk

Estimation Methods

The question of researchers about the selection of method as which one is most appropriate fixed effect model or random effect model is very tricky to explain. Judge et al. (1980) provided some recommendations that are linked to the framework of the data, and their surroundings next to the correlation between the error term and independent variables. If the error term and regressors are not correlated, the random effects model may be suitable, however, if correlation exists, then the fixed effects models are unbiased and more suitable. Which method is more appropriate can be examined by applying the Hausman specification test. Though, the econometricians, in general, looks like to be unified that the random effects model is more suitable to be used if the individual is randomly drawn from a large set of population. The null hypothesis is that error term in random effects is not interrelated with regressions and that the model is properly specified. The null hypothesis described that the individual special effects are not correlated with the other variables of the model. In simple words, the notion behind the Hausman test is that if the error term is not correlated with regressors then there is no dissimilarity between the usage of any method (fixed or random).

Ho: u_i not correlated with x_{it}

H1: u_i correlate with x_{it}

Under the null hypothesis (H_0), the random effects would be steady and efficient (i.e., H0 is true), but according to the alternative hypothesis (H_1), the random effects would be varying.

The fixed effect model is stable if the null hypothesis is true or not, it means that if the hausman test is significant, then the alternative hypothesis would be accepted that there is a correlation between the individual effects and x_{it}. Three models ordinary least square (OLS) model, fixed effect model and random effect model are used in the study.

OLS MODEL

In statistics, ordinary least squares or linear least squares is a technique for estimating the unidentified factors in a linear regression model, with the aim of reducing the sum of the squares of the variances between the values of the variable being predicted in the specified dataset and these variables are predicted by a linear function of explanatory variables. The OLS estimators had the following properties:

- Linear
- Unbiased
- Efficient: it has the minimum variance
- Consistent

Fixed Effect Model

In statistics, the fixed effects model is a statistical model that signifies the perceived numbers in terms of explanatory variables which are treated as if the quantities were not random. If fixed effects model is used, then the time independent impacts are imposed for each individual that are possibly correlated with the independent variables. It is assumed in the fixed effect model that the individual particular **effect** is associated with the independent variables used in the model equation.

The researcher should practise fixed-effects model whenever he is only concerned with examining the effects of variables that differ over time. The fixed effect model discovers the relationship between dependent and independent variables within an object such as country, company and person etc. Each object has its own specific characteristics that may or may not affect the independent variables like, an opinion can be changed from men to women or stock prices of the companies may be affected by the practices of the company.

The fixed effect model works under the assumption that the analyst has a need to control that variable which may affect or bias the outcome variables or the predictor. This is the justification behind the assumption, the individual's error term and independent variables are associated with each other. The fixed effect model eliminates the effect of time-invariant characteristics so one can evaluate the net influence of the predictors on the outcome variable.

One more key assumption of the fixed effect model is that those time-invariant characteristics should not be interrelated with other individual characteristics and are unique to the individual. Each object is changed so the object's error term should not be interconnected with others. The fixed effect model is not suitable if the error terms are correlated, hence, the outcome will not be correct.

Random effect model

In econometrics, the random effect model likewise is called variance components model, which is a kind of sequential linear model. It is assumed in this model that the data being examined is taken from a hierarchy of diverse populations whose differences are related to that hierarchy.

In econometrics, these models are used by the researchers who used panel data for analysis when it is assumed that there are no fixed effects. The **assumption** of random effect model is that individual particular **effects** are not associated with the independent variables used. The logic behind using of random effects model is that, it is different from the fixed effects model in a way that it assumes deviation across individuals is random and not correlated with the independent variables incorporated in the model.

EMPIRICAL RESULTS

This chapter of the study includes the analysis and interpretation of data used in the study. There are two main parts of this section - the first portion covers the descriptive analysis; the second part includes inferential analysis. The Ordinary Least Square (OLS), fixed and random effects estimation methods are used in the study.

The data which is used in the study is secondary data collected from the website of Pakistan Stock Exchange and the annual reports presented by those particular companies included in the sample. The data was collected for these variables: debt ratio, profitability, cash ratio, Tobin's Q, tangibility, logTA, age, and business risk. An exercise was carried out in this

respect while using debt ratio as dependent and profitability, cash ratio, Tobin's Q, tangibility, log TA, age and business risk as independent variables.

Interpretation and Analysis of Data

Descriptive Statistics

This portion shows the descriptive analysis of this research study. The descriptive statistics describe the smallest (minimum) value, extreme (maximum) value, mean and standard deviation of each variable.

Table 1. *Descriptive Analysis*

Variables	obs.	Mean	St.Dev	Minimum	Maximum
Debt ratio	4714	0.577	0.214	0	0.999
Profitability	4703	0.126	0.173	-3.111	5.625
Cash ratio	4713	0.044	0.086	-0.000	1
Tobin's Q	4689	1.169	1.827	0.087	51.25
Tangibility	4711	0.798	0.403	0	7.184
Log TA	4715	14.42	1.680	7.090	20.02
Age	4697	4.292	0.581	1	6.030
B-risk	3641	0.761	0.812	0	6.524

In this table, the debt ratio has the lowest value 0 and maximum value 0.99 having average value of 0.57 and a standard deviation value 0.21.

The mean value of debt ratio is 57% which shows that Pakistani companies use on an average 57% debt in businesses, there is little deviation in the usage of debt that is 21% only. Profitability has a lowest value of -3.11 and an extreme value of 5.62, have an average value of 0.12 and deviation from standard of 0.17, Cash ratio lies between -0.00 to 1 have mean of 0.04 and standard deviation of 0.08. Tobin's Q lies between 0.08 to 51.25 have an average of 1.16 and standard deviation of 1.82, Tangibility's minimum and maximum values are 0 and 7.18 respectively with an average of 0.79 and standard deviation of 0.40. Log TA has a smallest value of 7.09 and extreme 20.02, with a mean value of 14.42 and a standard deviation 1.68, Age lies between 1 to 6.03 years having mean of 4.29 years and standard deviation of 0.58 years, while b_risk of these firms have a smallest value of 0 and extreme value of 6.52 have an average of 0.76 and standard deviation of 0.81.

There is 81% deviation from mean in business risk of the companies which means that each company face risk according to its nature.

Table 2. *Descriptive Analysis for small firms*

Variables	obs.	Mean	St.Dev	Minimum	Maximum
Debt ratio	1010	0.532	0.255	0	0.997
Profitability	1006	0.956	0.292	-3.111	5.625
Cash ratio	1009	0.043	0.106	0	1
Tobin's Q	1000	1.212	2.483	0.087	41.20
Tangibility	1009	0.917	0.956	0	7.184
Log TA	1010	12.27	0.826	7.090	13.11
Age	1002	4.158	0.537	2.386	5.290
B-risk	746	0.823	0.860	0.000	4.925

In this table, the debt ratio has the lowest value 0 and maximum value 0.99 having mean value of 0.53 and a standard deviation value 0.25. The mean value of debt ratio is 53% which shows that Pakistani companies use on an average 53% debt in businesses, there is little deviation in the usage of debt that is 25% only. Profitability has a lowest value of -3.11 and an extreme value of 5.62, have an average value of 0.95 and deviation from standard of 0.29, Cash ratio lies between 0 to 1 have a mean of 0.04 and a standard deviation of 0.10. Tobin's Q lies between 0.08 to 41.20 have an average of 1.21 and a standard deviation of 2.48, Tangibility's minimum and maximum values are 0 and 7.18 respectively with an average of 0.91 and standard deviation of 0.59.

Log TA has a smallest value of 7.09 and extreme 13.11, with a mean value of 12.27 and a standard deviation 0.82, Age lies between 2.38 to 5.29 years having mean of 4.15 years and standard deviation of 0.53 years, while b_risk of these firms have a smallest value of 0 and

extreme value of 4.92 have an average of 0.82 and standard deviation of 0.86. There is 86% deviation from mean in business risk of the companies which means that each company face risk according to its nature.

Table 3. *Descriptive Analysis for medium firms*

Variables	obs.	Mean	St.Dev	Minimum	Maximum
Debt ratio	2369	0.596	0.196	0.008	0.997
Profitability	2365	0.126	0.122	-1.748	1.292
Cash ratio	2368	0.035	0.062	-0.000	0.490
Tobin's Q	2362	1.059	1.460	0.143	51.25
Tangibility	2367	0.815	0.316	0	2.254
Log TA	2369	14.16	0.610	13.11	15.28
Age	2360	4.305	0.543	1.693	5.997
B-risk	1805	0.792	0.830	0	5.999

In this table, debt ratio has the lowest value 0.008 and maximum value 0.99 having mean value of 0.59 and a standard deviation value 0.19.

The mean value of debt ratio is 59% which shows that Pakistani companies use on an average 59% debt in businesses, there is little deviation in the usage of debt that is 19% only. Profitability has a lowest value of -1.74 and an extreme value of 1.29, have an average value of 0.12 and deviation from standard of 0.12, Cash ratio lies between -0.00 to 0.49 have a mean of 0.03 and a standard deviation of 0.06. Tobin's Q lies between 0.14 to 51.25 have an average of 1.05 and a standard deviation of 1.46,

Tangibility's minimum and maximum values are 0 and 2.25 respectively with an average of 0.81 and standard deviation of 0.31.

Log TA has a smallest value of 13.11 and extreme 15.28, with a mean value of 14.16 and a standard deviation 0.61, Age lies between 1.69 to 5.99 years having mean of 4.30 years and standard deviation of 0.54 years, while b_risk of these firms have a smallest value of 0 and extreme value of 5.99 have an average of 0.79 and standard deviation of 0.83.

There is 83% deviation from mean in business risk of the companies which means that each company face risk according to its nature.

Table 4 *Descriptive Analysis for large firms*

Variables	St.Dev	obs.	Mean	Minimum	Maximum
Debt ratio	1335	0.577	0.205	0.030	0.999
Profitability	1332	0.149	0.115	-0.542	0.641
Cash ratio	1336	0.060	0.103	3.452	0.706
Tobin's Q	1327	1.333	1.818	0.249	40.52
Tangibility	1335	0.677	0.319	0	1.940
Log TA	1336	16.49	0.954	15.28	20.02
Age	1335	4.368	0.657	1	6.030
B-risk	1090	0.634	0.734	0	6.524

In this table, the debt ratio has the lowest value 0.03 and maximum value 0.99 having mean value of 0.57 and a standard deviation value 0.20.

The mean value of debt ratio is 57% which shows that Pakistani companies use on an average 57% debt in businesses, there is little deviation in the usage of debt that is 20% only. Profitability has a lowest value of -0.54 and an extreme value of 0.64, have an average value of 0.14 and deviation from standard of 0.11, Cash ratio lies between 3.45 to 0.70 have a mean of 0.06 and a standard deviation of 0.10. Tobin's Q lies between 0.24 to 40.52 have an average of 1.33 and a standard deviation of 1.81,

Tangibility's minimum and maximum values are 0 and 1.94 respectively with an average of 0.67 and standard deviation of 0.31.

Log TA has a smallest value of 15.28 and extreme 20.02, with a mean value of 16.49 and a standard deviation 0.95, Age lies between 1 to 6.03 years having mean of 4.36 years and standard deviation of 0.65 years, while b_risk of these firms have a smallest value of 0 and extreme value of 6.52 have an average of 0.63 and standard deviation of 0.73.

There is 73% deviation from mean in business risk of the companies which means that each company face risk according to its nature.

Correlation Analysis

Correlation analysis is a technique to evaluate the strength of a relationship between the two variables which are numerically measureable.

The table of correlation analysis shows the results among the selected variables. This analysis works for two important objectives. First is to find out whether there are bivariate relationship between each couple of the dependent and independent variables. The second is to certify that the associations among the explanatory variables are not so high to the magnitude of having multi-collinearity problems. The Multicollinearity is a condition in which two or more descriptive variables in a multiple regression model are extremely linearly related. The rule of thumb regarding the presence of multicollinearity states that if the correlation coefficient is > 0.8 then severe multicollinearity may be present. In this table of correlation, there is no problem of multicollinearity as not even a single value greater than 0.8.

Table 5 *Correlation Analysis*

Variables	Debt ratio	Profitability	Cash ratio	Tobin's Q	Tangibility	Log TA	Age	B-risk
Debt ratio	1							
	(1.0000)							
Profitability	-0.172	1						
	(0.0000)							
Cash ratio	-0.231	0.189	1					
	(0.0000)	(0.0000)						
Tobin's Q	-0.050	0.157	0.120	1				
	(0.0000)	(0.0000)	(0.0000)					
Tangibility	0.079	-0.112	- 0.207	-0.045	1			
	(0.0000)	(0.0000)	(0.0000)	(0.0018)				
Log TA	0.073	0.111	0.055	0.039	-0.22	1		
	(0.0000)	(0.0000)	(0.0001)	(0.0075)	(0.0000)			
Age	-0.039	-0.001	0.002	-0.021	-0.145	0.112	1	
	(0.0068)	(0.9209)	(0.8884)	(0.1443)	(0.0000)	(0.0000)		
B-risk	0.017	-0.134	(-0.118)	-0.80	0.091	-0.103	0.032	1
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

The table of correlation analysis presented that independent variables (Profitability, Cash ratio, Tobin's Q and age) are negatively correlated to the dependent variable Debt ratio; however, Tangibility, log TA and B_risk are positively related with dependent variable Debt ratio. All independent variables are significantly correlated with dependent variable.

Table 6 *Correlation Analysis for small firms*

Variables	Debt ratio	Profitability	Cash ratio	Tobin's Q	Tangibility	Log TA	Age	B-risk
Debt ratio	1							
	(1.0000)							
Profitability	-0.040	1						
	(0.194)							
Cash ratio	-0.195	0.082	1					
	(0.000)	(0.008)						
Tobin's Q	-0.083	0.035	0.102	1				
	(0.007)	(0.257)	(0.001)					
Tangibility	0.044	-0.094	- 0.184	-0.022	1			
	(0.159)	(0.002)	(0.000)	(0.479)				
Log TA	0.160	-0.016	-0.193	-0.034	-0.29	1		
	(0.000)	(0.610)	(0.000)	(0.273)	(0.359)			
Age	0.007	0.009	0.069	-0.027	-0.027	-0.149	1	
	(0.820)	(0.773)	(0.028)	(0.000)	(0.383)	(0.000)		
B-risk	0.009	-0.065	-0.029	-0.033	-0.039	-0.024	-0.003	1
	(0.800)	(0.073)	(0.420)	(0.360)	(0.281)	(0.502)	(0.928)	

This table of correlation shows that profitability has negative insignificant relationship with debt ratio which means that when profitability ratio of business would increase debt ratio would decrease, the cash ratio also has negative insignificant relationship with debt ratio,

Tobin's q has significant negative relationship with debt ratio, tangibility has positive insignificant relationship with debt ratio, log TA has significant positive relationship with debt ratio while age and business risk have positive insignificant relationship with debt ratio.

Table 7 *Correlation Analysis for medium firms*

Variables	Debt ratio	Profitability	Cash ratio	Tobin's Q	Tangibility	Log TA	Age	B-risk
Debt ratio	1							
Profitability	-0.297	1						
	(0.000)							
Cash ratio	-0.307	0.286	1					
	(0.000)	(0.000)						
Tobin's Q	-0.042	0.236	0.117	1				
	(0.038)	(0.000)	(0.000)					
Tangibility	0.162	-0.109	-0.179	-0.111	1			
	(0.000)	(0.000)	(0.000)	(0.000)				
Log TA	-0.027	0.077	0.007	-0.179	0.030	1		
	(0.183)	(0.000)	(0.971)	(0.132)	(0.000)			
Age	-0.103	-0.017	-0.067	-0.113	-0.085	0.066	1	
	(0.000)	(0.394)	(0.001)	(0.000)	(0.000)	(0.001)		
B-risk	0.098	-0.112	-0.141	-0.075	0.140	-0.046	- 0.047	1
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.047)	(0.042)	

This table represents the correlation analysis for medium firms, in which, profitability, cash ratio, Tobin's q and age has negative relationship with debt ratio while tangibility and business risk have positive relationship with debt ratio. All variables are significantly correlated with debt ratio except log TA.

Table 8 *Correlation Analysis for large firms*

Variables	Debt ratio	Profitability	Cash ratio	Tobin's Q	Tangibility	Log TA	Age	B-risk
Debt ratio	1							
Profitability	-0.036	1						
	(0.000)							
Cash ratio	-0.200	0.320	1					
	(0.000)	(0.000)						
Tobin's Q	-0.008	0.371	0.128	1				
	(0.745)	(0.000)	(0.000)					
Tangibility	0.069	-0.062	-0.247	-0.056	1			
	(0.011)	(0.021)	(0.000)	(0.040)				
Log TA	0.039	0.089	0.034	-0.057	0.022	1		
	(0.145)	(0.001)	(0.206)	(0.037)	(0.422)			
Age	-0.026	-0.058	-0.123	0.051	-0.112	0.050	1	
	(0.335)	(0.032)	(0.000)	(0.061)	(0.000)	(0.063)		
B-risk	0.223	-0.232	-0.145	-0.118	0.125	-0.083	- 0.005	1
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.846)	

This table shows correlation analysis for large firms, profitability, cash ratio, Tobin's q and age has negative correlation with debt ratio while tangibility, log TA and business risk has positive relationship with debt ratio. Profitability, cash ratio, tangibility and business risk are significantly correlated while Tobin's q, log TA and age are insignificantly correlated.

Regression Analysis

Regression analysis shows the impact of independent variables on the dependent variables. The following table shows the impact of profitability, cash ratio, Tobin's q, tangibility, log TA, age and business risk on the debt ratio. This table of regression analysis shows the result of OLS, random effect, and fixed effect estimation methods. Three models have been used here to check the sensitivity of outcomes of each method.

Effect of different factors on debt ratio

This table presents the relationship between different factors and debt ratio.

The value of F-statistics of 74.18 ($P < 0.05$), 15.76 ($P < 0.05$) and 15.76 ($P < 0.05$) demonstrate that the independent variables are

mutually and statistically significant in the OLS, Fixed effect and Random effect models in explaining variations in Debt ratio. The values of R-square are 0.126, 0.072, and 0.035 demonstrates that the independent variables mutually represent about 12.6%, 7.2% and 3.5% variation in debt ratio in the OLS, Fixed and Random effect models respectively. These values of R- square are very low as these were in the previous studies such as the study of Hijazi and Shah (2004) on the determinants of capital structure in stock exchange listed nonfinancial firms in Pakistan shows the value of R- square that is 25%. The study of Akber et al. (2009) on the determinants of capital structure, a case from Pakistan textile sector (spinning units) has 9.8% value of R-square.

Table 9 *Regression Analysis*

Repressors	OLS		Random Effect		Fixed Effect	
	Coefficient	SE	Coefficient	SE	coefficient	SE
Profitability	-0.381***	(0.026)	- 0.265***	(0.022)	-0.261***	(0.023)
Cash ratio	-0.435***	(0.039)	- 0.203***	(0.034)	-0.161 ***	(0.036)
Tobin's q	0.001	(0.001)	0.006 ***	(0.001)	0.007***	(0.001)
Tangibility	0.029**	(0.009)	0.019 *	(0.104)	0.206 *	(0.011)
Log TA	0.158** *	(0.002)	0.016 ***	(0.003)	0.033 ***	(0.005)
Age	-0.179	(0.005)	-0.080 ***	(0.010)	-0.146 ***	(0.015)
Business risk	0.015***	(0.004)	0.005 **	(0.002)	0.005 **	(0.002)
No. of observations	3608		3608		3608	
No. of groups	412		412			
R-square	0.126		0.035		0.072	
Adj. R- square	0.124					
f-stat	17.18		15.76		15.76	
p-value	0.0000		0.0000		0.0000	

*Note: Significantly disparate from zero at:*10%, ** 5%, ***1% levels: this table shows the result for dependent variable debt ratio, while the independent variables are Profitability, Cash ratio, Tobin's q, Tangibility, log TA, Age, and Business risk.*

Profitability is inversely related with debt ratio and its value is significant at 1% level of significance. The researchers find evidence that profitability of the firm is negatively associated with debt, as more profitable firms are likely to have low debt ratio relative to market value of equity. Chiarella et al. (1991) found that the relationship between profitability and debt was negative; confirming the idea that firms prefer while using internal sources to finance their assets as opposed to external sources.

In addition, the inverse relationship also supports the application of agency theory that expects that profitable firms are preventable to borrow from inefficient markets because of the disciplinary part of debt.

The age has negative impact on leverage ratio. This negative relationship forecasts that the Pakistan's companies prefer to use a minor share of debt in capital construction.

The basic intention to use less debt is that when the company persists in business for a long period of time, then it may accumulate further reserves to run the company's operations and subsequently keeps the company away to go for debt financing (Nivorozhkin, 2005).

B_risk is positively related with debt ratio, other researchers such as Chen and Strange (2005) also support a direct relationship between business risk and debt ratio. They stated that bankruptcy is rare in China, particularly in the listed companies, as the government provides support when needed. There are several cases in the sample of 972 companies in the study where the assets of companies are well below their liabilities, but these companies continue to exist as banks are not allowed to force companies to close. The companies with longer trading histories will have more access to debt financing due to reduced information asymmetries.

Mohammad (2014) concluded in his study that business risk and leverage are positively correlated and these findings are related with agency cost theory which states that the expected rate of return from investor should be adequate to the risk of the firm.

The positive relationship between the capital structure and the risk of insurance companies showed that the ratio of debt increases with the

increase in the proportion of claims. This specifies that the insurance companies acquire external funds in order to comply with the claim of the life insurer at any time like in the case of death or at expiration of policy.

Comparison across the Firms (According To Size)

The fixed effects model is used here for analysis. This model represents the observed numbers in terms of explanatory variables that are treated as if the numbers were not randomly distributed. Green (2008) stated that the critical difference between fixed and random effects model is whether the overlooked individual effect represents the elements that are correlated with the independent variables in the model, instead of whether those special effects are stochastic or not. If the analysts have a reason to consider that dissimilarities across individuals have more or less any impact on the dependent variable then they should use random effects model. The benefit of using random effects model is that one can include the variables that do not vary with time like gender. If fixed effects model is used then these variables are absorbed by the intercept. The random effects model works under the assumption that the individual's error term is uncorrelated with the predictors which permits for time-invariant variables to show a part as explanatory variables. In random-effects model, one needs to identify those entities that may or may not affect the predictor variables. The issue with this model is that some variables may not be accessible which leads to misplaced variable bias in the model. The random effects model permits to generalize the interpretations outside the sample used in the study.

Table 10 *Fixed Effects Results*

Repressors	OLS		Random Effect		Fixed Effect	
	Coefficient	SE	Coefficient	SE	coefficient	SE
Profitability	-0.129***	(0.042)	- 0.265***	(0.022)	-0.261***	(0.023)
Cash ratio	-0.309***	(0.079)	- 0.203***	(0.034)	-0.161***	(0.036)
Tobin's q	0.007 ***	(0.002)	0.006***	(0.001)	0.007***	(0.001)
Tangibility	0.107***	(0.020)	0.019*	(0.104)	0.206*	(0.011)
Log TA	0.112***	(0.017)	0.016***	(0.003)	0.033***	(0.005)
Age	-0.185***	(0.037)	-0.080***	(0.010)	-0.146***	(0.015)
Business risk	-0.006	(0.006)	0.005**	(0.002)	0.005**	(0.002)
No. of observations	731		1793		1084	
No. of groups	160		286		166	
R- square	0.016		0.182		0.062	
f-stat	14.12		24.04		19.96	
p-value	0.0000		0.0000		0.0000	

Note: *Significantly disparate from zero at:*10%, ** 5%, ***1% levels: this table shows the result for dependent variable debt ratio. While the independent variables are Profitability, Cash ratio, Tobin's q, Tangibility, log TA, Age, and Business risk.*

The p-value of F-Stat is significant in small medium and large firms. Profitability has negative effects on debt ratio whether the company is small, medium or large. It shows that firms prefer to use internal funds first and when they feel that internal reserves are not sufficient to fulfil the requirements of the company then they move for external funds. The size of the firm does not matter while following the pattern of internal funding to external. So, higher profits will lead to low debt. The cash ratio has negative impact on debt ratio if the firm is small and medium but this impact gets positive value as the size of the firm increases. The negative cash ratio indicates that if the firm has large amount of cash in the business then it has no need to go for debt financing, operations would be managed through internal finance. That is in accordance with the theory of pecking order. In case of large corporations, positive value shows that company can get loan very easily as it has more tangible assets to mortgage and the capacity to repay the loan. The negative sign of tangibility in medium and large firms supports the argument of pecking order theory. Tobin's q has the positive impact on debt ratio in each size of the firm with a little increase in the value. Tangibility has the positive value for small firms and negative for medium & large firms. The positive relationship between small size firm's tangibility and leverage ratio shows that availability of tangible assets makes it

easier to get loans from financial institutions. Log TA has positive impact on debt ratio in small and large firms and negative in medium size firm. Age has negative impact on debt ratio in each firm irrespective of its size. This counter relationship foresees that in Pakistan the established companies prefer to use a minor share of debt in capital construction. The basic intention to use less debt is that when the company persists in business for a long period of time, then it may accumulate further reserves to run the company's operations and subsequently keeps the company away to go for debt financing (Nivorozhkin, 2005).

B_risk has negative impact on debt ratio in small size firms but positive in large and medium firms.

The Small size firms are risk averse that is why they do not prefer debt financing. Alnajjar (2015) documented that when company's profits are not stable then managing authority take a decision to lower the debt level in their policy of financing, so that they could avoid the bankruptcy risk.

Bankruptcy costs are very higher for small companies but medium and large companies consider it minor. When medium and large size firms face risk in business they go for debt financing to survive. Rafiq et al. (2008) concluded in their study that size is positively correlated with business risk suggesting that big firms in the chemical sector have more variation in income than small firms.

Bankruptcy cost theory proposes that the bankruptcy costs are minor for large firms that is why they do not hesitate to employ more debt Shah and Hijazi, (2004) found that Pakistani firms have more short-term financing, because normally there are small size companies operating in the market and they face difficulties to access the capital markets

CONCLUSION

The findings of the study are consistent with the prior research. Profitability, cash ratio and age have negative relationship with debt ratio, whereas, Tangibility, Log of total assets, Tobin's q and business risk are positively correlated.

The negative relationship between profitability and debt shows that Pakistani manufacturing companies do not use debt to enhance their performance by achieving the tax benefit. It provides support for the idea of pecking order theory that companies use internal financing first and as a last option it goes for external financing. Log of total assets (proxy of firm size) has positive impact on debt ratio which supports the idea of trade-off theory of capital structure; it indicated that size reveals larger diversification, economics of scale in production, having higher access to new technology and inexpensive sources of funds. Tangibility also has positive impact on debt and these results are also supported by the static trade-off theory of capital structure, which stated that the leverage increase with tangible assets of the company. The positive impact of business risk on debt confirms the estimate of agency cost theory that the required rate of return from investors should be appropriate to the risk they have in the business.

Policy Implication

The capital structure varies from company to company, every company chooses that combination of debt and equity which not only reduce its cost of capital but also maximize the company's value. Every company is different in its organizational setting and has its own policies to meet the financing needs. The decision of capital structure also varies according to the size of the company as shown in table 10.

The cash ratio has negative impact on the debt in small firms but negative in medium and large firms. Tangibility has positive effects on the debt ratio of the company in small firms and negative in medium and large firms. Profitability and Tobin's q has the same significant positive impact on debt ratio in all size of the firms. In general, managers of the companies should dedicate their time and energies to those variables that have significant direct link between determinants of capital structure and debt ratio with the intention of minimizing the weighted average cost of capital which in turn will maximizes the wealth of shareholders.

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