

# **The Relationship between Capital Structure, Ownership Structure and Firm Efficiency: Empirical Study of Pakistan**

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## **Abstract**

*The aim of the study is to examine the importance of efficiency in order to measure the performance of an organization. In order to measure efficiency of firm a very important model of Data Envelopment Analysis (DEA), constant return to scale (CRS) is used to get the accurate figure of technical efficiency. The inputs variables are total assets and total equity and outputs variables are total sales and net profit before tax are used to measure technical efficiency. This study further studied the relationship of technical efficiency with capital structure and ownership structure and found significant relationship between them. To obtain the accurate results this study used different techniques such as correlation analysis, ordinary least square regression analysis on a panel data of 100 non-financial companies listed on Karachi Stock Exchange (PSX-100) covering a time period of six years (2010-2016). This research examined a significant positive relationship between leverage, ownership concentrations, family owned ownership and firm efficiency (technical). On the other the study found a negative relationship between managerial ownership, institutional ownership and firm technical efficiency.*

**Key words:** firm efficiency, leverage, ownership structure and Pakistan Stock Exchange.

## **Introduction**

Now a day's managers facing number of challenges and problems, the capital structure decision made by the management is very important in

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selecting the optimal structure, it is obligatory for management of the firm to select capital structure in such a way to increase firm value which is an important decision. The basic definition of capital structure is that how a firm or organization is financed, capital structure is the combination of debt and equity sustain by the firm, the selection of capital structure is issue of great interest in the literature of corporate finance, the main reason is due to the leverage ratio that is mix of funds which affects availability and cost of capital and also the investment source of firms, currently most of practical research is applied on listed companies of different stock exchanges.

Modigliani and Miller (1958) examine that strategies do not affect firm value in perfect capital market, but later on argue that change in capital structure can increase the firm value due to tax advantage of debts.

MM (1958) suggested that under perfect capital market assumptions, tax free economy, homogenous expectations, and no transaction costs, capital structure show irrelevant behavior in determining value of the firm.

Efficiency is one of the most important factor in a business success due to proper utilization of resources of firm. Many firm use new techniques and tools in there organization in order to bring efficiency, in simple words, efficiency means relationship between inputs of the organization and its outputs (Low, 2000). But more specifically efficiency is the limit of an organization to which it uses all of its resources (inputs) to meet its organizational goals (outputs) (Ilona and Evelina, 2013). Moreover managers are facing hug financial issues to find the accurate measure of firm performance (Hashem and Mehdi, 2010).

The very widely used measure to find out efficiency of firm is (DEA) Data Envelopment Analysis. DEA approach is used and applied in most of the previous literature to find out the efficiency of different firm and organizations such as, banks, universities, and industrial firms (Yue, 1992).

The (DEA) Data Envelopment Analysis uses multiple inputs and outputs and gives a result showing a sole measure of efficiency (Morita and Aykiran, 2009). Ownership structure is also a very important element that highly affects performance of the firm and efficiency. Ownership structure refers to the control of a company, it might be in few people's hands, government, management, and family owned business etc. It is also define as the distribution of equity with regards to vote and capital, the relationship of equity ownership and performance has got very importance in the corporate finance literature. Some

previous research contradictory results exist on firm efficiency of different companies through different ownership structures such as managerial ownership and concentration ownership which help to examine the relationship of firm technical efficiency and scale efficiency with ownership structure. (Ongore, 2011) conducted study on companies operated in Kenya reported a significant relationship between ownership structure and companies performance by using agency theory uses Return on Assets, dividend Yield and Return on Equity for company performance. (Ongore. 2011) also studied that managerial ownership has uncertain effect on a performance of a company.

This study used four ownership structure variables in order to explore the effect of all on firm efficiency. Enough research works have been done on firm efficiency and ownership structure, but the relationship of capital structure, equity ownership structure and firm efficiency has not been studied in combine by using Data Envelopment Analysis as measuring tool for accurate result of efficiency empirically tested in Pakistani context. As for as this study is concerned it can be ever first study which investigate the impact of capital structure and ownership structure with a firm technical and scale efficiency in the context of Pakistan. Various studies investigated contradictory results of ownership structure with efficiency of firm. However this study explore relationship among these all variable using (DEA) Data Envelopment analysis tool as measuring technical efficiencies.

This research study adds value to the literature by exploring the impact of capital structure and equity ownership structure on firm technical efficiency measured by Data Envelopment Analysis (DEA).

### **Literature Review**

There is a well-documented research available on the association of capital structure, ownership structure and firm efficiency in previous research studies, this study attempt to discuss the existing literature on capital structure, ownership structure and firm efficiency, and number of tools to establish relation among these variables in the context of Pakistan. Firm value maximization is the primary goal of every organization, so the management develops different strategies to accurately and efficiently utilize resources to achieve their goals. Efficiency in short is the inputs and output ratio. And that's why every organization tries to adopt new techniques and methodologies to use minimum inputs and maximize their outputs for the sack of achieving their organizational goals and to get the maximum efficiency level. There are number of factors that influence firm goals. Here we are discussing the effect of capital structure and ownership structure on firm efficiency.

The conflict of interest among the owners manager and outside shareholders and also those between minority and controlling shareholders lie at the heart of corporate governance literature, in the previous literature a lot of research is available on the effect of ownership structure on firm performance (Morck et al. 1988; McConnell and Servaes 1990; Hermalin and Weisbach 1991; Himmelberg et al. 1999).

### **Capital structure**

The basic definition of capital structure is that how a firm or organization is financed, capital structure is the combination of debt and equity sustain by the firm, the selection of capital structure is issue of great interest in the literature of corporate finance, the main reason is due to the leverage ratio that is mix of funds which affects availability and cost of capital and also the investment source of firms, currently most of practical research is applied on listed companies of different stock exchanges.

### **Capital structure and firm Efficiency**

Performance of firm is affected significantly by different variables and factors; one of the significant factor among them is capital structure, many empirical research has been carried out to explore the positive, negative or no relation among the capital structure and firm performance. Pathak (2011) examine in his research study that the level of debts has negative significant relationship with firm performance which is consistent with some studies of Asian countries but not relevant to the findings of western economy studies, the reason behind this conflicting result can be relatively high cost of borrowing by the developing countries like India as compare to the western countries. (Khan 2012) studies finding were same as agency cost model of (Jensen and Meckling 1975) and did not explore any significant impact of efficiency on leverage.

Roden Lewellen (1995) examines 48 US firms capital structure for the period of 1981-1990 and founded a positive association between capital structure and profitability. (Hadlock and James 2002) argue that high level of profitable corporations use capital structure with high debts level. (Abor 2005) examine a significant positive relationship between capital structure, and performance for the period of 1998-2002 in the Ghanaian listed firms,

Kester (1986) conducted a research study and investigate a negative association of capital structure and profitability (performance) in Japan and US firms. (Friend and Lang 1988) reported similar results. And many more such as (Rajan and Zingales 1995) conducted study and found the same results in G-7 countries, (Wald 1999) studied this relationship in develop countries and examine the same results, (Haung

and song 2006) also investigated a negative relationship between performance and leverage in China firms. (Ebaid2009) studies the capital structure choices impact on firm performance of 64 firms for the period of 1997-2005 in capital market of Egypt. And uses three measures of performance gross profit margin, ROA and ROE, and suggested that choices of capital structure has weak or near to zero impact on performance of firms.

### **Ownership Structure**

Ownership structure refers to the control of a company, it is also define as the distribution of equity with regards to vote and capital, it may be hands of financial institutions, government, people and managers, the relationship of equity ownership and performance has got very importance in the corporate finance literature, does the ownership concentration, managerial ownership and family control ownership affects the market and financial performance of the firms? Discussion and literature tried to answer these questions.

### **Ownership Concentration and Firm Efficiency**

Ownership concentration can be defining as that the control of organization in the hand of few people or parties and they are considered to take the important decisions of the organization. In concentrated ownership, the owners evaluate and monitor the developmental activities and enable the firm to use all of resources in an efficient and effective way and achieve the firm efficiency for relatively better performance of the firm. On the other hand firm with dispersed ownership most of the individuals are not much interested to actively participate in the control and management of the firm which leads to poor firm performance.

Djankov and Claessens (1999) studied the Czech firms and suggested that increase in concentrated ownership has a direct relation with firm profitability and labor productivity. Kuznetsov and Muravyev (2001) investigated the direct association between technical efficiency of firm and ownership concentration by analyzing the Russian non-financial privatized firms. Some studies also examine that ownership concentration has a direct relationship with corporate performance of firms in the context of Pakistan. (Nguyen 2011) also reported that a firm performance is enhanced with ownership concentration.

While some of the research studies investigated negative relation between concentrated ownership and performance of the firm. (LehnandDemsetz1985) discussed that a negative relationship survives between concentrated ownership and market value of the firm. Chen and Dickinson explore negative association between concentrated ownership

and performance of the firm by using top five share holder proxies for concentrated ownership. They suggested that negative association may be due to the state ownership existence in ownership concentration. (Ongore 2011) investigated that ownership concentration has a significant negative relationship with performance of firm by using Kenya's forty two listed companies.

On the basis of above literature it can be hypothesized that there is a significant relationship between ownership concentration and efficiency of firm.

### **Managerial Ownership and Firm Efficiency**

Managerial ownership also plays vital role in firm performance and efficiency. The previous research studies indicate contrary results of managerial ownership and firm performance. (Hirshleifer and Thakor 1992) argue that due to risk adverse behavior of few managers they do not go for risky decisions (projects) to secure the growth career of the firm and many times their decisions avoided decreasing firm value. (Shah et al 2011) and Wahla, (Shah and Hussain 2012) examine a negative association of managerial ownership and firm's performance in the context of Pakistan.

But some of previous studies explore, those companies which have high managerial ownership, managers have the right and authority to invest in those projects which is highly risky as well as more profitable which lead to increase the performance of firm. (Morck 2000), and (Chen, Mande and Guo 2003) also found a direct association between managerial ownership and firm's value. Javid and Iqbal (2008) investigated 60 Pakistani firms and examine a direct relationship between managerial ownership and firm's performance. Most of firms pay enough packages and incentives to their managers in order to have good firm performance and to bring the maximum efficiency in firms. This study is also identifies significant association between managerial ownership and firm efficiency.

### **Family owned ownership and Firm Efficiency**

Family owned ownership means when a company majority of shareholders are family members and operate and control the firm. (Reeb and Anderson 2003) examine US family owned firms and suggested that family owned is US have greater profitability and value than those having non-family owned firms. (Maury 2006) explore non-financial companies among thirteen European states and founded that the profitability of family control and owned firm have 16 percent higher profitability as well as 7 percent higher valuation than that of non-family

owned companies. From above discussion we can say those firms having family owned ownership perform well than that of non-family owned ownership. Every member of the family tries to use the resources of the firm efficiently to achieve organizational goals of maximizing firm value. And in this respect each and every member of family goes for risky projects, which are beneficial and profitable for organization so as to increase firm value. As we know that higher the risk higher will be the return. So firm can get maximum outputs if firms efficiently utilize its resources (inputs) by investing in risky projects.

### **Institutional Ownership and Firm Efficiency**

Institutional ownership represents the control of company in the hand of the financial institutions like banks, insurance companies and other financial companies. Financial institutions follow highly risk adverse behavior and because of this risk averse behavior they do not make investment in uncertain projects that increase the firm value. And might be due to this risk adverse behavior they may not be able to utilize effectively the firm resource. (Morck, Shivdasani and Nakamura 2000) have examine a negative relationship between institutional ownership and firm's value of Japanese firms. (Bhattacharya and Graham 2007) explore the significant negative relation of institutional ownership with performance of firm by investigating 116 listed companies in Finland. (Lanouar and Elmarzougu 2010) suggested negative but significant relationship between institutional ownership and firm's performance in France. While some previous studies examine direct association between institutional ownership and firm's performance, (Bjuggren, Eklund and Wiberg 2007) suggested from his research study a direct association exists between institutional ownership and firm performance after studying 300 Swedish listed companies.

On the basis of above previously studied research discussion it is expected that a negative relationship exists between institutional ownership and firm efficiency.

### **Firm Efficiency**

Efficiency is a very important factor, which is considered in the success of business. Management brings all its efforts to properly use and utilize its resources in order to achieve organizational goals effectively and efficiently. In simple words Efficiency refers to the ratio between output and input. Firm efficiency describes that how much the firm produces output by using inputs. There are various types of efficiencies, which are used for measuring, and evaluation of organizational performance. In the past, researchers and business practitioners used Pure technical

efficiency, Scale efficiency, Technical efficiency, Profit efficiency, X-efficiency, Productive efficiency, cost efficiency and other types of efficiencies for evaluation of the organization performance. For firm efficiency various methods were used to calculate the accurate figure of efficiency. Each technique has its merits and demerits. Some previous research studies used a parametric approach called Stochastic Frontier Analysis (SFA) that calculates efficiency, while some of researchers used financial ratios as measure of efficiency and Data Envelopment Analysis (DEA) to calculate efficiency. (Charnes, Cooper and Rhodes 1978) and calculated firm efficiency first time present a non-parametric approach Data Envelopment Analysis (DEA) by using inputs and outputs of the firm with the help of linear programming. Farrell (1957) was first find out the basis for computing efficiency and production output at low level and furthermore he studied two that there are two parts of efficiency, one is allocative efficiency and second one is Technical efficiency, As for as allocative efficiency is concern it shows the capability to take better combination of inputs to produce the target level of outputs. Technical efficiency refers to a firm's capacity to produce higher level of inputs at a given level of inputs. (Charnes, Cooper and Rhodes 1978) added multiple inputs and outputs in model and extend the works of (Farrell 1957). They suggested Constant Return to Scale Model or CCR model represented by their name is suitable when firm is going to maximize the technical efficiency from a given level of inputs. But it may be possible to decrease inputs to accomplish high efficiency. Therefore in order to achieve high efficiency (Banker, Charnes and Cooper 1984) developed another Variable Return to Scale Model or BCC Model that is used to achieve a given level of production by a minimum level of inputs. The extended model adds Technical Efficiency to the pure technical efficiency, and scale efficiency. In the past research studies, the researchers and business practitioners used the above models to calculate and evaluate firm efficiency.

According to (Zheka 2005) there are two basic reasons to use technical efficiency in transition context, Firstly; many companies' shares do not freely trade because there is a high inflexibility in the stock market. Secondly, technical efficiency helps to foresee the effect of corporate governance on firm value and enables to investigate the base of the corporate governance problem, particularly in a case where resources are an insufficiently used. They argued that firm efficiency and firm value moves in same direction and link of corporate governance with firm efficiency are further likely to foresee the association between firm value and corporate governance particularly in a context when organization worth is not observable. He also stated that there was a



direct association of foreign ownership with firm efficiency but there was no evidence found in Ukraine that increases in Government ownership would decrease the firm efficiency. (Sufian2006) reported the efficiency of financial companies and Malaysian merchant banks by applying Data envelopment analysis. (Thomsen, Pedersen and Kvist2006) studied in their article that Anglo-American countries have no significant influence of individual ownership on the firm value. (Margarities and Psillaki2007) studied the relationship between leverage and firm efficiency by using non-parametric DEA approach and found direct relationship between leverage and production frontier, (Margarities and Psillaki2009) also found parallel results that firm efficiency can be improved by taking high leverage. (Morita and Avkiran2009) reported that DEA is a most typical technique for the measurement of efficiency assessment with multiple inputs and outputs. According to (Skokan and Stanickova2012) DEA is an applied technique to model operational processes for the evaluation and assessment of organizational performance across different fields, industries or countries.

The above literature showed that DEA is the most wide and commonly used method for measurement of efficiency. (Morita and Avkiran2009) reported that firm efficiency was straight affected by the selection of inputs and outputsvariable. So after the above discussion this study also used two input variables, total assets and total stockholder's equity and two output variables, total revenue and net profit before tax for the measurement of technical efficiency and scale efficiency of non-financial firms in the context of Pakistan.

### **Hypotheses of the Study**

On the basis of above discussion of literature this study covers the following major hypotheses so as to examine the relationship between capital structure, ownership structure and firm efficiency.

Null hypothesis are given below.

Hypothesis 01 ( $H_0$ ) there is no significant relationship between capital structure and firm efficiency.

Hypothesis 02 ( $H_0$ ) there is no significant relationship between ownership structure and firm efficiency.

Alternative hypothesis are given below.

Hypothesis 01 ( $H_1$ ) There is significant relationship between capital structure and firm efficiency.

Hypothesis 02 ( $H_1$ ) There is significant relationship between ownership structure and firm efficiency.

### **Data Collection, Sample and Variables**

This research study cover a sample of 100 companies from non-financial sector listed on Pakistan Stock Exchange (KSE). The data cover a period of six years (2010 to 2016). This study exclude financial sector from sample selected because their capital structure and profit are different (Shah 2009). The firms having ownership structure data but incomplete are also excluded from selected sample. The data sample is a panel data set. Companies are selected from various sectors of the economy. More ever the sample is selected due to the availability of the data of all variables used in this research study. The capital structure variable, ownership structure variable and efficiency data is obtained from annual reports of each and every firm.

To explore this relationship, correlation and regression analysis were used. The regression model is given below.

$$Efficiency_{it} = \alpha_{it} + \beta_1(Capital\ Structure)_{it} + \beta_2(Ownership\ structure)_{it} + \varepsilon_{it}$$

To test the given hypothesis the above model is used. The ownership structure variable is further sub divided into three variables, which include ownership concentration, institutional ownership, and managerial ownership. Capital structure variable used Debts to Equity ratio of every firm.

### **Measurement of Efficiency**

To calculate the efficiency of the firm researchers used different techniques in order to find out the correct figure of efficiency. These techniques include Analytical hierarchal process, financial ratios, and Data Envelopment analysis. The two preliminary reasons to use technical efficiency in transition context according to (Zheka2005) are. First due to rigidity in stock market most of companies' shares do not trade freely. Second, technical efficiency helps to show effect of ownership structure and corporate governance on value of firm, and help to explore the problem particularly when there is insufficient use of resources.

### **Data Envelopment Analysis (DEA)**

Data envelopment analysis is efficiency evaluation method which is presented by (Chames, Cooper and Rhodes 1978) for the measurement of firm efficiency and used constant return to scale assumption and this model is later on extended by (Banker, Cooper and Chames1984) by using variable return to scale assumption to measure the efficiency. The only difference between these two models is free variable denoted by  $U_o$ . Data Envelopment Analysis combine to use multiple inputs and output variables of a firm which is known as decision making unit (DMU) and

gave a single result which shows the efficiency between input and output variables of DMU.

In previous studies, DEA has used for efficiency measurement of different firms which may be financial and non-financial firms. This study use Data Envelopment analysis technical efficiency model to find out the annual technical efficiency of all firms used in the study from 2010 to 2016, Technical efficiency is defining as at a given level of inputs a firm capacity of production to produce a high level of output. Constant return to scale (CCR) model is suitable when firms at a given level of inputs maximize its technical efficiency. Technical efficiency (TE) is further decomposed to pure technical efficiency (PTE) and scale efficiency (SE) by the extended model.

This study used two inputs variables and two output variables for the measurement of technical efficiency of all non-financial firms used in this study, inputs variables were total assets and total stockholder's equity and total outputs variables were total revenue and net profit before tax.

#### **Measurement of Ownership Structure Variables**

In this research study the following ownership structure variables were used to measure the ownership structure followed by (Alam2013), which include ownership concentration, managerial ownership and institutional ownership. The measurements of these variables are given below;

<b>Ownership Variable</b>	<b>Description</b>
Ownership Concentration	Total number of shares owned by top 5 shareholders / total number of shares * 100.
Managerial Ownership	Total number of shares held by board of directors / total number of shares outstanding * 100.
Institutional Ownership	A dummy having 1 value if a firm majority shareholder (more than 20%) are banks and 0 otherwise.
Family owned ownership	Value of 1 if board of directors is represented by a family or it is a family-run business, otherwise 0

### Panel Regression Model

$$TEff_{it} = \alpha + \beta_1(MO)_{it} + \beta_2(OC)_{it} + \beta_3(IO)_{it} + \beta_4(FO)_{it} + \beta_5(LEV)_{it} + \mu_{it}$$

Where

TEff =	Technical Efficiency of ith firm in time t
$\alpha$ =	Intercept of the equation
$\beta$ =	Coefficient of Independent variables
OC =	Ownership Concentration of ith firm in time t
IO =	Institutional Ownership of ith firm in time t
MO =	Managerial Ownership of ith firm in time t
FO =	Family owned ownership of ith firm in time t
LEV=	Debt to Equity ratio of ith firm in time t
$\mu$ =	Error term of ith firm in time t in the equation

### Results and Discussion of the Study

The panel data set is used in the study, which is a combination of time series and cross section data. Data set covers a time period of 2010-2016. First for the efficiency measurement Data Envelopment Analysis is used (technical efficiency), to explore the effect of capital structure and ownership structure on firm efficiency (technical efficiency), the study use different panel data techniques such as Descriptive statistics, correlations analysis, Heteroskedasticity test, and OLS analysis.

### Correlations analysis tables of variables used.

Variables	Teff	Lev	OC	MO	IO	FO
<b>Teff</b>	1					
<b>Lev</b>	0.13**	1				
<b>OC</b>	0.20**	0.08*	1			
<b>MO</b>	-0.08*	-0.02	-0.16**	1		
<b>IO</b>	-0.10**	-0.005	-0.07	-0.02	1	
<b>FO</b>	0.036	-0.047	-0.03**	0.04**	0.023	1

\*\*, \* represent significance at 1% and 5% levels respectively.

### Regression analysis of variables used

The panel data regression is used to explore the effect of capital structure and ownership structure on firm efficiency (technical). To test the hypothesis the following techniques are used to find out the accurate results.

### Panel data technique of variables used

To explore the effect of capital structure and ownership structure on firm efficiency (technical) panel data regression analysis is used. The following table shows common effect model results, as (Gujrati 2004) suggested that F-statistic value will be used to choose the accurate model

among the common effect model and fixed effect model, and to suggest the best model among fixed effect model and random effect model Hausman test is used. If P-value is less than 0.05 this means that fixed effect model will be used, and if P-value is greater than 0.05 this means that random effect model will be used for analysis. First to select model among common effect model and fixed effect model F-value is calculated by the following formula.

$$F = \{(R^2_{FE} - R^2_{CE})/N-1\} / \{(1-R^2_{FE})/NT-N-K-1\}$$

Where

$R^2_{FE}$  = fixed effect model  $R^2$

$R^2_{CE}$  = common effect model  $R^2$

N = Number of cross sections

T = Number of time period      K = Number of independent variables

By calculating the F-value with the help of above formula, the value is 0.663989, which is less than 2. Thus the null hypothesis is accepted and alternative hypothesis is rejected that is fixed effect model should be used. And this means that common effect model should be used among common effect model and fixed effect model.

#### **Common effect model results**

##### **Dependent Variable = Technical Efficiency**

<b>Independent Variables</b>	<b>Coefficients</b>	<b>t-value</b>	<b>p-value</b>
<b>Leverage</b>	0.02045	3.10	0.0020
<b>Ownership Concentration</b>	0.02346	4.85	0.0000
<b>managerial Ownership</b>	-0.0820	-2.14	0.0322
<b>Institutional Ownership</b>	-0.078318	-2.44	0.0148
<b>Family owned ownership</b>	0.037766	1.89	0.0584
<b>R Square</b>	0.06		
<b>F value</b>	9.69		
<b>Prob (F-statistic)</b>	0.000000		

The above table represent the explanatory power of model used which are, F-value 9.69, P-value 0.0000 and R square 6 percent. The coefficient of leverage is positive and its value is 0.002045, t-value is 3.10 and Probability value is 0.0020, this shows that leverage has significant positive relationship with firm technical efficiency at 5% significance level, it may also interpreted as unit increase in leverage brings 0.002045 units increase in technical efficiency of firm, remaining other things constant. And this result proves our first hypothesis.

The ownership concentration coefficient is 0.002346 which is positive and t-value is 4.85 having probability value is 0.0000, these results

shows that ownership concentration has positive significant relationship with efficiency (technical efficiency) at 0% significance level, it might also be interpreted that one unit increase in ownership concentration brings 0.002346 units increase in technical efficiency of the firm remaining other things constant. And thus it proves our second hypothesis.

If we look at the coefficient of managerial ownership which is -0.000820 which is negative and t-value is -2.14 having probability value 0.0322, if we look at these values this shows that managerial ownership has negative but significant relationship with technical efficiency of a firm with significance level of 5%, we can also interpret these results that one unit increase in managerial ownership will bring 0.000820 units decrease in firm technical efficiency keeping other things constant, and as a result it prove our third hypothesis.

Similarly the coefficient value of institutional ownership is -0.078318 which is negative and its t-value is -2.44 and probability value is 0.0148, these results shows that institutional ownership has negative but significant relationship with technical efficiency at 5% significance level, which means one unit increase in institutional ownership brings 0.078318 decrease in firm technical efficiency keeping other things constant, and it help to prove our forth hypothesis.

The last explanatory variable is family owned ownership having coefficient value of 0.037766 which is positive its t-value is 1.89 and probability value is 0.0584, these results shows that family owned ownership has significant positive relationship with firm technical efficiency at 10% significance level, this means that a unit increase in family owned ownership brings 0.0377 unit increase in firm technical efficiency at a significance level of 10% remaining other things constant, and thus it proves our last and fifth hypothesis.

### **Conclusion**

This study is conducted to explore the effect of capital structure and ownership structure on firm technical efficiency. First is to measure the efficiency of firm's very important data. Data envelopment analysis (DEA) model is used, a scale of data envelopment analysis (DEA) which is called constant return to scale model is used in order to get the actual figure of technical efficiency. Constant return to scale model use multiple inputs and multiple output variables to get the overall technical efficiency score of a firm, the study uses total assets and total equity as inputs variables total sales and net profit before tax as output variables. Furthermore this study also finds out the association of technical efficiency, capital structure and ownership structure. Capital structure

variable uses debts to equity ratio of all 100 non-financial firms listed on PSX

To get the accurate empirical results, this study used the correlations analysis technique and ordinary least square (OLS) regression analysis model on total of 100 non-financial firms listed on Pakistan stock exchange covering a six years period from 2010 to 2016. The results of study rejected the major hypothesis of the study and find out that capital structure and ownership structure has a significant effect on firm technical efficiency in the context of Pakistan.

Ordinary least square (OLS) regression model produces these results. On the basis of empirical results the conducted study has found significant positive relationship between leverage and firm technical efficiency, ownership concentration and firm technical efficiency, family owned ownership and firm technical efficiency in the context of Pakistan, and founded significant negative relationship between managerial ownership and firm technical efficiency, institutional ownership and firm efficiency in the context of Pakistan. The results of panel data technique are similar to the results of Zheka (2005), studied the association of firm efficiency and ownership structure in the context of Ukraine. And on the basis of above empirical results it is argued that between capital structure ownership structure and firm technical efficiency a significant relationship exists.

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