

# Capital Structure Determinants: Evidence from Banking Sector of Pakistan

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## Abstract

Using the firm level panel data analysis, this study develops to explore the preliminary determinants of capital structure of banking firms of Pakistan. The findings discover the idea of major determinants from the perspective of previous theories of capital structure are size of the firm, profitability in terms of return on assets and return on equity after taxes and Gross Domestic Product GDP over a period of time. The capital choice decision for the banking firms in Pakistan is symmetric to the pecking order theory explaining the fact that there is negative and significant association between leverage and return on equity after taxes. The significant difference across the banking firms and some financial limitation are the factors which are influencing the decision of debt-to-equity mixture. We have used Panel Data models like least square dummy variable model LSDVM, Fixed effect mode, random effect model and pooled regression mode. Through statistical tests our results are in favor of random effect regression outcomes. Furthermore outcomes are quite beneficial for the managers while defining the optimum level of debt to equity mixture especially in the banking sector.

**Keywords:** Leverage, GDP, size, pecking order, capital structure

## Introduction:

The core concept of capital structure of the firm is under great observation by the researchers. Majority of the research work and related literature links to the US based firms (Chang et al., 2014). In contemporary business environment, country wide and cross country studies have revealed the fact that the fundamental assumption behind the determinants of capital structure is very much crucial to discuss. In the recent years, number of studies has been done for core objective to address the question like “what are the foundation institutional and firm based differences through which capital structure decision will be carried out”. Notable amongst them are (Fan et al., 2012; Öztekin, 2013; Gungoraydinoglu and Öztekin, 2011).

The fundamental prediction of the Modigliani and Miller is based on the assumption that value of a firm in a perfect market competition is totally autonomous from the capital structure and hence for this reason the total of the capital in the form of either debt or equity can be utilized as an alternative for each other (Deesomsak et al., 2004). On the other hand, if the core assumption of perfect market will be removed the end conclusion might be in the outcome of significance of capital structure in the overall value of the firm. For this reason countless studies have been done through very strong empirical findings for the sport of arguments in favor or in against of capital structure and its determinants (De Jong et al., 2008; Karadeniz et al., 2009). At the same point in time the outcomes of the previous studies have proven that firm specific factors are much critical in order to take the debt and equity mixture for the firm.

In the earlier studies of they have stated the argument that corporate overall strategy and tactical planning point of view specifically on the administrative and managerial issues would acquiesce would likely to provide the more and appropriate understanding about the capital structure of the firm (Barton and Gordon, 1987). Four decades back (Andrews, 1971) has claimed the fact that capital structure and relevant decision is entirely based on the firm specific (internal factors) and economy or environment specific (external factors). Park and Jang (2013) have defined such relationship as the “strategy-capital structure”. This proposal explains the fact that capital structure of the business and firm strategic attitude are more likely to be understood.

From the perspective of Pakistan, number of factors is present that have put influence on the firm’s capital structure decision. Some of the firms give preferences to the use in inner sources like the retained earnings or the reserves while some are using the external financing from the various financial institutions. However in the country like Pakistan, the market and firm structure is lit bit different where the majority of the firms are small and medium of size having not an opportunity of being capital intensive. In order to meet the

financial needs they have to get the loans and to raise the personal funds as well. The purpose of present study analysis is to examine the major determinants of capital structure by considering the banking sector. In the following section we have reviewed the conceptual and theoretical work associated to the capital structure and its major determinants. We have analyzed the planned conceptual model using least square regression approach by considering the pooled regression model, least square dummy variable Model LSDVM, Fixed effect Estimator and Random Effect. In the final part we have concluded with theoretical and practical implications.

### **Literature Review:**

Capital structure and firm performance are the two core concepts of discussion in the previous studies. Since the concept defined by (Modigliani and Miller, 1958) that firm value is not associated with the capital structure decision but the choice in between the debt and equity mixture is a main topic in corporate finance literature. However after the revision of this concept they have further stated the fact that corporate value can be maximized when the firm is entirely finance by the debt (Modigliani and Miller, 1963; Chen, 2008). In order to get the complete understanding of corporate performance with respect to capital structure three major theories are discussed over here:

**Trade off Theory:** The core assumption behind the trade off theory is that there is an optimal level of capital structure through which the value of the firm is maximized. This concept has been explained by (Chen, 2008; Tang and Jang, 2007) who have stated that at an optimal point of capital structure is one in which marginal benefit of the debt is most likely equal to the marginal cost of the debt. By making comparison of both the debt and equity financing debt is to be considered as less expensive because it is a tax deductible expense but more risky for the business. In order to save itself from the potential and future perspective chance of losses, every firm use the optimal level of capital structure through the trade off is created in between the benefit (tax deductions) and cost (bankruptcy) (Karadeniz et al., 2009). By using the framework of trade-off theory number of studies has been conducted to determine the capital structure and firm's performance (Castanias, 1983; Ferri and Jones, 1979; Tang and Jang, 2007).

**Pecking Order Theory:** At the same point in time, the core assumption for the pecking order theory is level of debt in the firm grows up when investment level increase from the retained earnings and can be decline with the investment decline comparatively to the intensity of retained earnings in the business (Park and Jang, 2013). It means that leverage is slow for all those firms who have more profit generation capacity when the investment level is preset (Jang and Park, 2011).

**Agency Theory:** The final concept is regarding the agency theory which suggest that there is conflict of interest in between the managers (the agents) with those of stockholders so called principal (Jensen, 1986; Jensen and Meckling, 1979). The findings of have stated the fact that the conflict of interest in between the shareholders and key managers of the firm may be severe in its true nature for the small business firms, which ultimately cause an enhancement of moral hazards with some adverse selection problems (Van Der Wijst, 1989; Ang, 1992).

Besides the above discussion, by considering the perspective of financial distress various researchers have explained the fact that larger business firms have a propensity to be more diversified and because of such diversification have less chance of failure. As an end result larger size can be the contrary surrogate for the profitability of the insolvency because relatively small firms have to face more level of risk in the form of higher bankruptcy cost (Ang et al., 1982; Gruber and Warner, 1977). The size of the firm can directly relate to the level of the debt. (Mateev et al., 2013) have done works from the perspective of SMEs in Central and Eastern Europe countries through pannel data analysis. Their findings have provided strong evidence in favor of the packing order theory and have found negative but significant correlation in between the leverage and profitability. Meanwhile by controlling some of the firm's specific factors like growth opportunities, sales growth, liquidity and assets structure cash flow of the firm is to be found out of the strong determinant of capital structure. For the moment, the value of cash flow's coefficient remains statistically significant but negatively associated for the medium size business firms. The stated outcome suggests that firms with the large amount of funds available within the firm use less external funds.

In the study of (De Miguel and Pindado, 2001) they have analyzed the firm based characteristics which are considered as major determinants of capital structure by focusing on previous theories and research work. Their major objective is to work on the idea that how various organizational factors are contributing towards the firm's capital structure decision. Through with the help of targeted adjusted model, they have demonstrated that transaction costs for the Spanish based firms are likely to be inferior to those of US based firms. Findings of the study are quite consistent with the investment and financing decision as well.

More precisely the economical significant level of capital structure can lower the level of risk in the business but adversely if a firm deviate too from the optimum has to face the higher level of risk of failure (Chung et al., 2013). They have done their work on the oil industry and have stated the fact that there is no significant outcome which supports the argument that capital structure policy affects failure. Business Firms emerge to add leverage when they countenance striking growth prospect or at the time when poor operating

performance diminish equity worth or else compels borrowing. Their main objective is to address the issue that how the various business firms with very low level of leverage can operate and survive for number of years without being targeted for acquisition.

Besides with the other determinants of capital structure, literature suggest that mainly the conflict of agency cost, non-symmetrical information in between the managers and shareholders, market structure, tax system in the overall economy and market behavior have significant impact. In the study of (Wald, 1999) he explained the various firm specific factors for the determination of capital structure. The inner firm factors are the tangibility of the assets, size of the firm, and profit for the years, sales volume and business growth with earnings volatility, liquidity position of the firm, several production and product related characteristics.

By considering the manufacturing sector the study of (Afza and Hussain, 2011) they have discussed some important findings with respect to capital structure determinants in Pakistan. They have suggested that pecking order theory and trade off theory plays a vital role in determination of capital structure in Pakistani Firms. They have provided some very good reasons for the managers to make some vibrant financing decision symmetrical to the industry in which they are doing the operational activities of the business. Industries with strong assets structure must have to avail the benefits of assets tangibility.

The research findings of has provided strong favors to the concept of capital structure determinants in Pakistan with that of the western firms. Findings of the study are quite identical to the theories of pecking order, trade off and agency conflicts by showing the outcome that mostly the size of the firm deports debt financing and volatility in earnings; profitability, assets tangibility etc have a negative relation with that of the leverage. Variables of the study and development of hypothesis:

For the study, the factors which can be considered as major determinants of capital structure of the various banking firms currently working in Pakistan are as under:

Dependent variable:

The major dependent variable which is taken under consideration for the determination of capital structure is leverage. Leverage is also named as the mixture of debt and equity. The fundamental assumption behind the financial leverage is it is the portion of debt and equity used by a firm in order to finance its business operations and projects. The core objective for the financial leverage is to work for the maximization of the shareholders wealth while minimizing the cost of debt at the same point in time. In most of the cases the value of the leverage is calculated as the ratio of total capital to total assets ratio. Meanwhile in the case of banking firms or similar financial institutions it is calculated as total borrowings of the firms to total assets ratio. Formula is as under

**Leverage: CTA:**

$$\text{Leverage: CTA} = \frac{\text{Total Borrowings}}{\text{Total Assets}}$$

**Independent variables:**

**Size:**

Size is generally refers to the total assets employed by the business firm over a period of time, though which the operational activities are executed. Higher the value of size of the firm in terms of total assets means stronger the position of the business in the market. Size of firm is calculated by taking the log of total assets of the firms. However the square of log of total assets is to be considered more reliable and significant values because of increased variation size of the firm can be considered for both positive and negative sign with the leverage. But most of the time from the previous study analysis it is most likely to observe highly significant and positive value with the debt financing of the firm.

Formula:

$$\text{Formula: } \log(\text{Total Assets})$$

**Profitability:**

Profitability is generally refers to the positive return from the invested capital by the firm through its operational activities over a period of time. Normally profitability is measured through return on total assets of the firm and return on equity of the firm. Higher profit generation in the form of either return on assets or return on equity means better operational activities as compared to competitors in the market. Profitability seems to be strongly positive and significant association with the financial leverage of the firm because of strong financial position. In the present analysis we use the following formula for the profitability

$$\text{Formula: ROEAT} = \frac{\text{Return on Equity after Tax}}{\text{Total Assets}}$$

$$\text{Formula: ROAAT} = \frac{\text{Return on Assets after Tax}}{\text{Total Assets}}$$

**GDP:**

Gross Domestic Product is refers to the total value of final goods and services which are produced in the country in a specific time period specifically measured in terms of dollars. Higher the value of GDP means economic growth of the country and economic prosperity as well. The value of GDP seems to have significant

impact on the leverage decision of the firm and under the various type of developed of emerging countries such relationship is different for the difference in law, regulations and other compounding factors held therein.

Formula: GDP: **Gross Domestic Product in USDollars**

**Tax rate:**

It is defined as the percentage of tax at which the income of individual or a company is taxed and is usually used for getting the edge of tax deductibility. Through the payment of interest on the debt portion of the total equity, taxable income is reduced and ultimately the tax rate is lower than before so the firm can get the advantage over the tax liability. This is because of by using the debt portion in the firm. With such advantages firms sometimes give preference to use some level of debt financing in the business. In current study we have used the effect tax rate as a measuring proxy for the tax rate

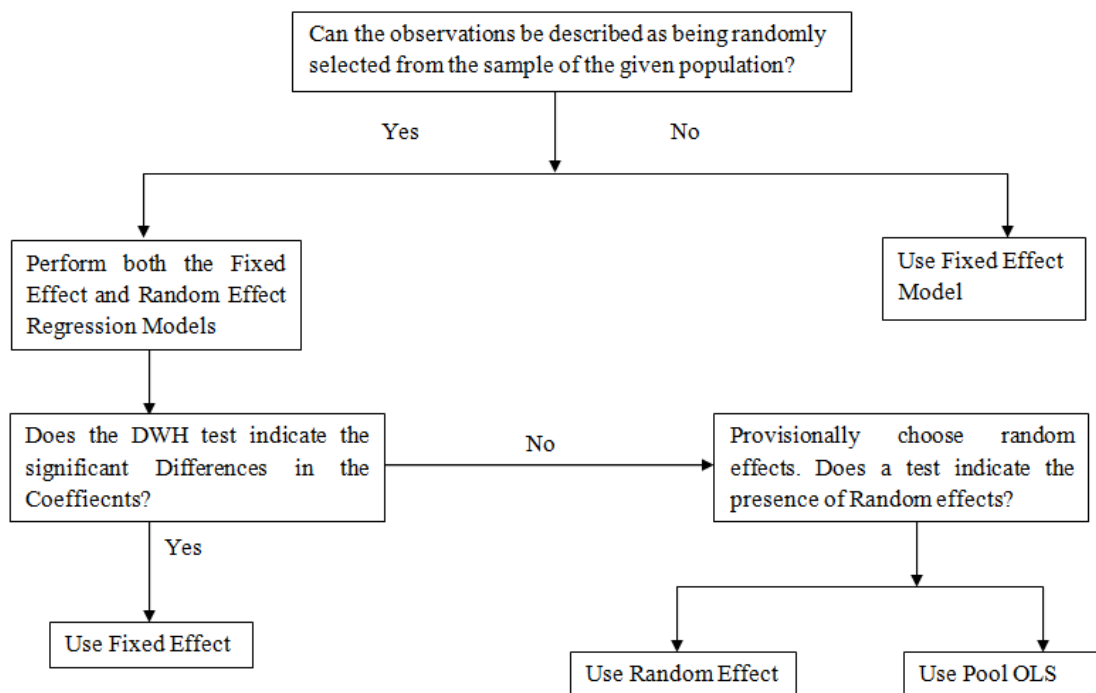
**Fixed Assets Tangibility:**

It shows the total amount of the tangible assets like property plant and equipment and current assets like inventory which provide the creditors with the guarantee for pay back of the money they lend and enhance the proportion of debt in the capital structure. It is largely observed as te positive association with the financial leverage as the existence of more tangible assets will definitely enhance the value of collateral for creditors and ultimately firm has an ease in getting the large amount of the debt financing from the external sources

Formula: **Fixed Assets/Total Assets**

**Data Model:**

When the same units are under observation in the cross sectional sample data, the resultant data set is called pannel data or pannel longitudinal data. The application of econometric models is more complex for the pannel data set as it has both the characteristics of time series and cross sections or multi firm dimensions. Diagram below presents the various steps which are followed to perform further analysis:



**Seemingly Unrelated regressions:**

Seemingly unrelated model is a special case of regression models which proposed by Zellner, that consists of several regression equations having its on explained and explanatory variables. But at the major drawback is that it does not cover all the leading problems like serial correlation or model of hetroskedasticity. It can further generalized into simultaneous equations model in which the right hand side regressors are allowed to be the endogenous variables. The fundamental assumption behind the SUR model is that for each individual observation i there are M depend variable. For each individual observation I, there are M dependent variables as well:

$$y_{it} = x'_{it}\beta_i + \varepsilon_{it}, \quad i = 1, \dots, m.$$

**Fixed effect model:**

The fixed effect model is a model for pooling the data which allows the cross sectional heterogeneity by allowing intercepts to vary across individuals.

$$y_{it} = \beta_{it} + \beta_2x_{2it} + \beta_3x_{3it} + \varepsilon_{it}$$

Several strategies for estimating the fixed effect models, the Least Square dummy variable model which uses the concept of dummies where as within the effect do not. In the first step is to create the dummies for all the seventeen banks which are under observation and also to suppress the intercept to avoid the dummy variable trap. Then to test the equality of the intercepts form the null and alternative hypothesis.

$$H_0: \beta_{11} = \beta_{12} = \dots = \beta_{1N}$$

$$H_1: \text{the } \beta_{11} \text{ are not all equal}$$

So the results of the F calculated through stata are as under:

$$\begin{aligned} F(6,110) &= 8.10 \\ \text{Prob} > F &= 0.0000 \end{aligned}$$

**Random Effect Model:**

The one-way random group effect model is formulated as under equation:

$$y_{it} = a + \beta x_{it} + u_i + v_{it}, w_{it} + v_{it}$$

Where

$$u_i \sim IID(0, \sigma_u^2) \text{ and } v_{it} \sim IID(0, \sigma_v^2)$$

The  $u_i$  are assumed independent of  $v_{it}$  and  $x_{it}$ , which are also independent of each other for all  $i$  and  $t$ . While this assumption is not necessary in fixed effect model.

**Pool regression:**

This approach can be used when the group to be pooled are relatively are similar or homogeneous. Level differences can be removed by mean centering. This model is applicable by directly running ordinary least square regression.

$$y_{it} = \beta_{1it} + \beta_{2it}x_{2it} + \beta_{3it}x_{3it} + \dots \dots \dots \beta_{Nit}x_{Nit} + e_{it}$$

Results and discussion:

**Descriptive Statistics**

**Table: 01**

Variables	Observations	Mean	Mean Std. Dev.	Min	Max
LEVERAGE	149	0.087118	0.0634844	-0.03278	0.418803
LTASSIZE	149	16.33778	1.06001	13.57429	18.19265
ROAAT	149	0.006783	0.0206106	-0.08148	0.037189
ROEAT	149	0.140497	0.3312876	-1.98941	2.253035
GDPGR	136	5.134804	1.902688	1.595981	7.667304
FATATANGIBILITY	149	0.027073	0.0204656	0	0.174354
ETREFFTXRTE	149	0.14046	0.7494535	-5.79647	0.801178

Table 01 explains the outcomes for the descriptive statistics here we can see that value of mean for assets size is maximum which is 16.33 while the mean value for the fixed assets tangibility is minimum which is .02703. The value of standard deviation for the mean value is highly deviated of Gross Domestic Product and minimum for the fixed assets tangibility.

Before the selection of major explanatory variables, it is quite obvious to check whether there is any type of degree of degree of correlation between them or not. For this purpose the problem of Multicollinearity has been tested through the correlation analysis. Table below defined the correlation matrix between the variables of the study.

**Correlation Matrix**

**Table: 02**

	CTALEV	LTASSIZE	ROAAT	ROEAT	GDPGR	FATATANGIBILITY	ETREFFTXRTE
CTALEV	1						
LTASSIZE	-0.4550	1					
	0.0000						
ROAAT	-0.2714	0.4283	1				
	0.0000	0.0000					
ROEAT	-0.2612	0.2959	0.5374	1			
	0.0013	0.0002	0.0000				
GDPGR	-0.1341	-0.1521	0.1746	0.2049	1		
	0.1239	0.0804	0.0444	0.0180			
FATATANGIBILITY	0.2552	-0.1378	0.4248	0.2972	0.1582	1	
	0.0017	0.0937	0.0000	0.0002	0.0690		
ETREFFTXRTE	-0.1509	0.2153	0.1574	0.1137	0.0073	0.0854	1
	0.0662	0.0084	0.0552	0.1675	0.9336	0.3001	

Here we have examined that there is no high degree of correlation between the selected set of variables. So, all the major variables which are selected for the current study have been considered for the further analysis. Meanwhile the value of variance inflation factor VIF for all the variables indicate that there is no problem for the correlation if it exists in between the variable since the mean value of VIF is less than 05 which is 1.36

**Variance inflation Factor:**

**Table: 03**

Variable	VIF	1/VIF
ROAAT	1.82	0.550292
ROEAT	1.45	0.688676
LTASSIZE	1.36	0.736286
FATATANGIBILITY	1.29	0.777617
GDPGR	1.14	.878312
ETREFFTXRTE	1.09	0.921408
<b>Mean VIF</b>	<b>1.36</b>	

Mean value 1.36 is < 05

**Regression Results**

**Table: 04**

VARIABLES	LSDVM			FIXED EFFECT			RANDOM EFFECT		POOLED REGRESSION	
	Coef.	Std.	P>t	Coef.	Std.	P>t	Coef.	P>z	Coef.	P>t
CTALEV										
LTASSIZE	-0.0149		0.004***	-0.0149		0.004***	-0.02031	0.000***	-0.02738	0.000***
ROAAT	0.913267		0.000***	0.913267		0.000***	0.794294	0.000***	0.359509	0.162
ROEAT	-0.01759		0.054*	-0.01759		0.054*	-0.01713	0.063*	-0.01183	0.398
GDPGR	-0.00626		0.000***	-0.00626		0.000***	-0.0063	0.000***	-0.00537	0.017**
FATATANGIBILITY	0.038729		0.812	0.038729		0.812	0.154719	0.338	0.668519	0.002***
ETREFFTXRTE	-0.00532		0.191	-0.00532		0.191	-0.00655	0.105	-0.00806	0.131
_cons	0.355019		0.000	0.355019		0.000	0.441097	0.000	0.539757	0.000

In table 03 we have presented the outcomes of coefficients with the p-values for the least square dummy variable model, fixed effect model, random effect model and pooled regression. The value of coefficient for the size of assets is negatively related to the leverage of the firm indicating the fact that when the size of assets increases the value of leverage decrease and vice versa. One unit change in the value of size of assets causes an inverse impact on the leverage of the banking firm which is the measured as the total borrowings to total assets ratio. The value of coefficient for size of total assets is significant at 01% level since p-value for both the LSDV model and Fixed Effect Model is .004. the findings of the study are quite consistent with those of (Rajan and Zingales, 1995).

The value of coefficients for the return on assets as a measuring tool for the profitability is 0.913267 for the LSDV Model indicating the fact that one unit change in the value of ROA causes a positive change of .913267 in the value of leverage of banking firms. This value is significant at 01 % level of significant. This suggest that increase in the value of debt-equity mixture due to increase in the profitability are statistically significant. Meanwhile the coefficient value for the return on equity after tax is -.01759 which is significant at 10 % level and have negative association with the one unit change in the Return on equity after tax caused this change in debt to equity mixture of banking firms.

The value of coefficient for Gross Domestic Product GDP is -.00626 which is highly significant at 01 %, indicating that one unit change in value of GDP cause a negative change of .00626 in leverage of banking firms

over a period of time. The coefficient value for the fixed assets tangibility is insignificant in LSDV model but it is showing the significant coefficient value of .668519 in pooled regression outcomes at 01 % level of significance. The coefficient value for effect tax rate has also insignificant outcomes for all the models of the study. Such insignificant outcomes explaining the fact that there is no association in between the effect tax rate and level of debt to equity mixture of the firm.

#### **Fixed or Random: Hausman Test:**

In order to compare the outcomes of both of fixed and random effect and to decide which one is better for the end conclusion we use the Hausman Test by using the Stata

For this purpose following null and alternative hypothesis has been developed:

H0: the difference in the coefficient is not systematic

H1: the difference in the coefficient is systematic

In order to test whether to reject the null or to accept it, probability value has obtained.

$$\text{Prob} > \text{chi2} = -13.57$$

The probability value is not significant at 05 % so we conclude that outcomes are statistically insignificant in terms of H0, concluding that there exists a significant difference in between the coefficients for both the fixed and random effect. If the above stated value is significant at 05 % then we can use the fixed effect outcomes. At present we are recommending the outcomes of random effect.

#### **Testing for the Random effect: Breusch-Pagan Lagrange multiplier (LM)**

The Lagrange multiplier helps to decide between the random effect model and simple ordinary least square regression model. The null hypothesis is as under:

H0: value of the variance across the entities is zero

This indicates that no significance difference across the units mean no panel effect exists. The results are as under:

$$\begin{aligned} \text{chi2} (1) &= 122.67 \\ \text{Prob} > \text{chi2} &= 0.0000 \end{aligned}$$

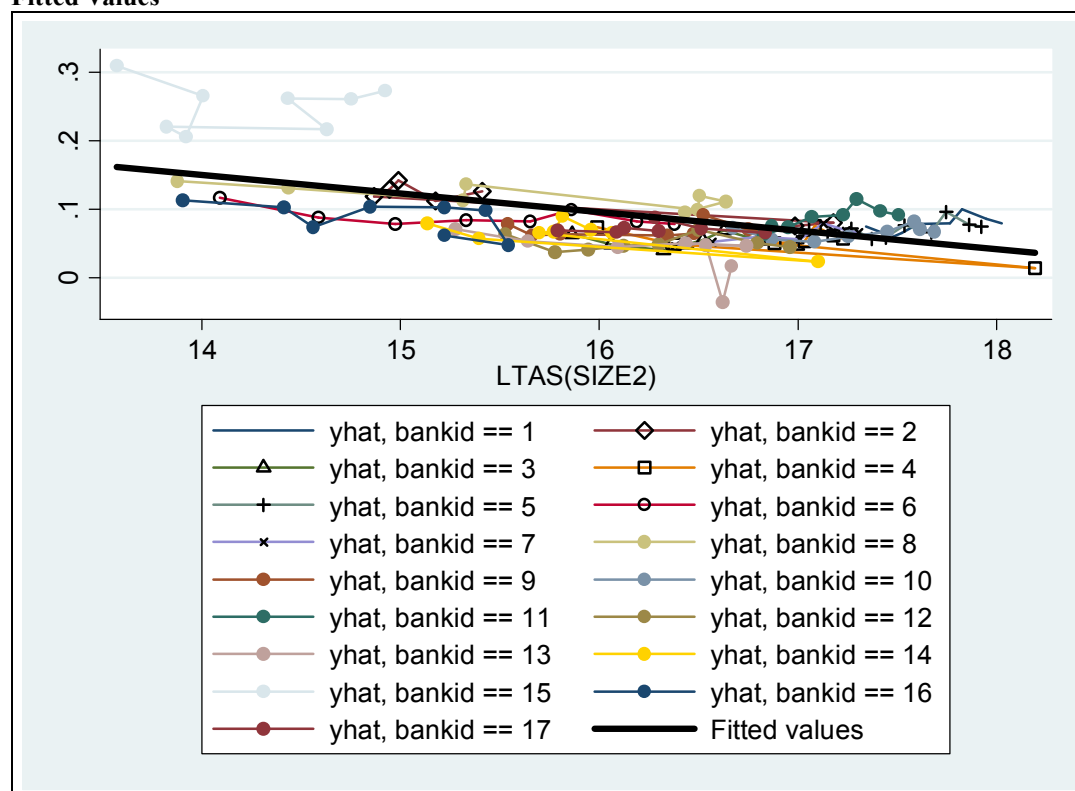
As the above stated probability value is significant at 01 % level. Here we can conclude that we reject the null hypothesis that value of variance across the entities is zero. So we will recommend the outcomes of random effect model.

#### **Conclusion and Recommendation:**

Current study analysis used the LSDV model, Fixed effect Estimator, random effect and pooled regression to empirically examine the determinants of capital structure from the perspective of commercial banks of Pakistan. Based on the previous theories and research findings we have considered the major determinants of debt to equity mixture in banking sector and have used the significant proxies as well. Besides this we also carefully investigate the whole outcomes in order to confirm the linear structure of the model and multivariate normality assumption.

Our empirical analysis shed lot of significant insights on the financing behavior of banks in Pakistan. Meanwhile we have identified some of the major factors that have so far been ignored in the literature for the Pakistani banks and their capital structure choice. Furthermore our results provide the static trade-off hypothesis. At the same point in time our results are quite consistent with the pecking order theory that leverage of the firm is low when it has more profit generation capacity.

**Figure: 02**  
**Fitted Values**



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