

# INVESTIGATING THE LEVERAGE COMPOSITION OF PAKISTANI FIRMS THROUGH THEIR DETERMINANTS

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## Abstract

*To have an ideal mix of debt and equity in a balance sheet of an entity is till to date a very complicated issue for managers as there is no such rule to predict an optimal capital structure. An in-depth understanding is required for the corporate culture, the degree of the development of the capital market and the economy in which the firms operate. This study seeks to investigate the leverage composition of Pakistani corporations through their determinants. Fixed effect regression is used to show the relationship of determinants of capital structure on leverage corporations listed on Karachi Stock Exchange (KSE) for the period of 2006 to 2013. The results suggest that agency cost, growth, age, and size are significantly and negatively associated with the capital structure of Pakistan firms, however, collateral value of asset is significantly but positively associated with the capital structure of the firm. On the other hand, free cash flows, non debt tax shield, profitability, business risk and bankruptcy cost are not significantly associated with leverage composition of the firms and are against the signaling theory and pecking order theory. The key importance of this study is that no prior research was done for determinants like agency cost, free cash flows, bankruptcy cost and age as determinants of capital structure for Pakistani firms among other determinants. Further, this study does not confine to a particular sector rather it covers all companies listed by Karachi Stock Exchange.*

**Key Words:** Leverage, Determinants of Capital Structure, Agency cost, Collateral value of assets, Bankruptcy cost.

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## 1. Introduction

Capital structure irrelevance theory was introduced by Modigliani and Miller (1958) and since then arguments have progressed for the leverage decision of the firm. MM theory suggests that the value of the firm is independent of its capital structure under certain assumptions. Even though this theory is based on unrealistic assumptions, there are a number of variables that narrate the value to the firm and often identify as determinants of the capital structure e.g. agency cost, collateral value of asset, growth, free cash flows, and age of the firm, business risk, bankruptcy risk, profitability and non debt tax shield. Hence, the main purpose of the firm is to maximize the wealth of the stockholders by evaluating a suitable finance mix. Combination of debt and equity capital becomes the most controversial corporate issue over the past four decades. The capital structure decisions directly influence the market value of the firms and the cost of the firm.

How to have an ideal mix of debt and equity in a balance sheet of an entity is till to date a very complicated issue as there is no such rule to predict an optimal capital structure. An in-depth understanding is required for the corporate culture, the degree of the development of the capital market and the economy in which the firms operate. Firms can only achieve their objectives through skillful intellectual managers and the management can perform better without thinking about finance shortage or finance mix. So soon after the arrival of (Modigliani & Miller, 1958), the western world started financing their corporations without bothering the mode of finance i.e. debt or equity and forgot about the equity debt mix and just focused on growth and achievement of commercial business objectives. Companies achieved local and international remarkable growth. Due to rapid growth historic numbers soon became meaningless. Corporations started focusing more about their market values and future fund flows rather than the book value of assets. Financial ratios are also designed on the market values of the company. Human capital also becomes an important part of the company.

Pakistan is one of the developing countries with lot of issues involving unstable micro and macroeconomic situations, political crisis, social behavior, geographical

structure, complicated tax mechanism and non robust legal system. It is equally important to find out those factors that influence a firm's capital structure choice. However, in case of developing economies, inadequate literature is available regarding capital structure of corporations in Pakistan. Eldomiaty (2008) mentioned that because of the insufficient information problems, the capital markets of the developing economies are not efficient enough to compare with developed market. Therefore, the outcomes of the developed countries cannot be generalized with the developing countries like Pakistan where political risk is very high, foreign currency fluctuations are very frequent, business risk is lofty, and the capital market is in developing phase. Most of the debate in the country on low investment ratios has been centered around factors such as infrastructure, law and order, skill shortages and bureaucratic hassles (Hussain, 2006).

The key importance of this study is that no prior research was done for determinants like agency cost, collateral value of assets, free cash flows, bankruptcy cost and age as determinants of capital structure for Pakistani firms. Further, this study does not confine to a particular sector rather it covers all companies listed by Karachi Stock Exchange. Therefore, this study shows an in depth analysis of determinants of capital structure of Pakistani firms. Moreover, this study is very functional for the managers of the corporations and provides guidelines for efficient use of the determinants of capital structure in order to maximize firm performance. Government authorities, taxation bodies and policy makers can also be benefited from the findings of the study. Hence, this study also served the purpose of a rich contribution in the existing literature regarding the determinants of capital structure of firms in Pakistan.

## **2. Literature Review**

Theories of corporate structure draw a closer attention in the world of finance when Modigliani and Miller (1958) presented capital structure irrelevance principle. This principle states that in a perfect market, whatever the mode of finance the firm uses, it is irrelevance to the firm's value. And since then, many other theories were presented with the help of basic idea provided by Modigliani and Miller (1958) like trade off theory, pecking order theory, OLI theory, signaling theory, etc. These theories highlight different

determinants of capital structure and draw attention to their importance in the perspective of capital structure.

Pecking order theory is based on asymmetric information of the firm. In this theory, Myers (1984) explained that how a company prioritized its financing decisions. The main theme of the theory is that the firm takes finances from easier sources first i.e. internal finance. Pecking order theory also suggests that there is an inverse relationship between profitability and leverage. Modigliani and Miller (1958) theorem was a very simple utopian kind of model where it was assumed that there are no tax benefits, no agency costs and bankruptcy cost. And it tried to convince its reader about being inert to whether a capital is used or debt is employed for a firm's operations. However, M&M proposition II did take into account these costs and explained that although the firm's WACC decreases with debt inclusion, yet it becomes more risky. The signaling theory talks about firm's management decisions taken as being signals by the other stakeholders to it. This allows good firms managers to signal to stakeholders about their firm's value and thus enable them to take decisions accordingly. Such popular signals involve dividend policy, issue of bonus shares, stock splits.

## ***2.1 Determinants of Capital Structure - Around the World***

Al Amri and Al Ani (2015) examined determinants of capital structure for three sectors (food, construction and chemical) of Omani industrial companies for the period of 2008 -2012. They found that there is a significant and positive relationship between risk and tangibility and leverage and there is a significant but negative relationship between growth rate and profitability and leverage, while there is no association with size. Baltaci and Ayaydin (2014) explored Turkish banking sector and found that capital structure is positively and significantly related with size, industry leverage and GDP growth. They further find that capital structure is significantly but inversely related with financial risk, profitability, tangibility and inflation.

Forte, Barros, and Nakamura (2013) investigated capital structure of Brazilian firms and found that profitability is significantly and negatively related to capital

structure. Also, growth is positively and significantly related to leverage. Further, size is positively related and age is negatively related to the leverage.

Mac an Bhaird and Lucey (2010) explored 299 Irish enterprises and found that age, intangibility, collaterals and size are the significant determinants of capital structure. They further found that ownership structure, size, age and collateral are similar across industry. Kouki and Said (2011) conducted research on 244 French listed companies and found that trade off theory, pecking order theory and market timings are not significant. Huang (2006) revealed an inverse relationship between leverage and profitability, non debt tax shield, growth opportunities and managerial shareholdings.

## ***2.2 Determinants of Capital Structure – Pakistan***

Khan, Jan, and Khan (2015) explored cement sector of Pakistan. By using pooled regression model, they found that there is an inverse relationship of firm size and leverage of the firm which is against static trade off theory. Qadri (2015) investigated Pakistani non financial firms listed on Karachi stock exchange for the period of 2004 to 2012. This study showed a significant and negative association between profitability and leverage, supporting pecking order theory. Moreover, this study showed a significant and positive association of tangibility and size with leverage supporting trade off theory.

Masnoon and Saeed (2014) examined automobile sector of Pakistan for the period of 2008 to 2012. This study found that leverage has an inverse and significant relationship with profitability and liquidity, whereas, leverage has a positive insignificantly relationship with earning variability. Ahmed Sheikh and Wang (2011) examined firms listed on Karachi stock exchange for the period of 2003 to 2007 and found that profitability, liquidity, earnings volatility, and tangibility are negatively associated to leverage, while firm size is positively associated to leverage. Non-debt tax shields and growth opportunities do not appear to be significantly related to leverage. Ahmad and Zaman (2013) analyzed textile sector listed on Karachi stock exchange of Pakistan and revealed that profitability and size is significantly and negatively related to leverage while tangibility and growth were positively related to leverage.

Afza and Hussain (2011) investigated three sectors (automobile, engineering and cable and electric goods) listed on Karachi stock exchange by using pooled data regression model. The results of this study supported static trade off theory and pecking order theory. Hijazi and Tariq (2006) investigated listed firms of cement industry of Pakistan and found that firm size, tangibility, growth and profitability is associated to leverage. Shah and Khan (2007) examined non financial firms listed on Karachi stock exchange for the period of 1994 to 2002 and found that tangibility, volatility and non debt tax shield are significantly related with leverage, hence confirming trade off theory and profitability is significantly associated with leverage confirming pecking order theory, whereas, size is insignificant to leverage.

From the above literature review, it can be wrap up that no prior research was done for determinants like agency cost, collateral value of assets, free cash flows, bankruptcy cost and age as determinants of capital structure for Pakistani firms. However, these variables show a significant relationship with leverage in developed countries Baltacı and Ayaydın (2014), Forte et al., (2013), [Mac an Bhaird and Lucey \(2010\)](#) etc. Therefore this study includes all those variables that have already tested in all developed economies studies but first time include in developing economy senario like Pakistan.

### **3. Theoretical Framework And Hypothesis Development**

- ***Agency Cost***

Agency cost is one of the most important determinants of capital structure. It begins with the conflicts of interest between debt holders and equity holders (Myers, 1977). Firm having high agency cost have high cost of debt and thus leads to have lower debt ratio (Fama, 1980; Jensen, 1986; Titman, 1984).

*H01:* There is no significant relationship between agency cost and leverage of Pakistani firms.

- ***Bankruptcy Cost***

Bankruptcy cost depends on costs like legal fees, loss of sales, employees and suppliers and the probability of its happenings. If financing through debt increase, the probability of bankruptcy also increases and as a result bankruptcy cost increase. Firms with higher bankruptcy cost have lower debt.

*Ho2:* There is no significant relationship between bankruptcy cost and leverage of Pakistani firms.

- ***Non Debt Tax Shield***

It is usually argued that company with more non debt tax shields should have less debt since the tax advantage of debt are comparatively less important (Akhtar & Oliver, 2009).

*Ho3:* There is no significant relationship between non debt tax shield and leverage of Pakistani firms.

- ***Profitability***

**Myers (1984)** argued that if a firm is more profitable then it will have more internal financing than external sources according to pecking order theory of capital structure. Therefore it can be proposed that the firms with higher profit have higher internal finance and hold less debt. Internal finance is less costly and easier whereas external finance is more costly. Hence it can hypothesize that there is an inverse relationship between profitability and leverage.

*Ho4:* There is no significant relationship between profitability and leverage of Pakistani firms.

- ***Size***

Bigger firms usually have larger exposure to the public than smaller firms and consequently need to provide more information to consumers, creditors, suppliers,

forecasters and government personals (Cooke, 1991). Larger firms have more resources to provide relevant information to stakeholders and as a result, larger firms have more debt with more attractive terms as compare to smaller firms. Hence, a direct association is expected between firm size and leverage. Empirical studies suggested size as a determinant of capital structure (Ferri & Jones, 1979; Scott Jr & Martin, 1975) and (Aggarwal, 1990).

*Ho5:* There is no significant relationship between size and leverage of Pakistani firms.

- ***Collateral Value Of Assets***

**Rajan and Zingales (1995)** found that tangibility of assets or collateral value of assets is a determinant of capital structure. Corporations with more tangible assets are expected to have more debt because having more tangible assets gets debt easily on more favorable terms. On other side, Graham Jr. (1988) suggested that the corporations having high intangible assets have lower cost of borrowings cause better security for debt holders.

*Ho6:* There is no significant relationship between collateral value to assets and leverage of Pakistani firms.

- ***Business Risk***

Business risk can be defined as the risk related with the future operations of the company. Firms with less business risk, (the risk that is connected with the upcoming business operations) are assumed more financial risks.

*Ho7:* There is no significant relationship between business risk and leverage of Pakistani firms.

- ***Growth***

Theoretically it is suggested that the firm with higher growth rate will have lower debt in their capital structure. A company that grows fast invests huge amount in research and development.

*Ho8:* There is no significant relationship between growth and leverage of Pakistani firms.

- *Age*

As the firm grows, more information is available for the firm's probable viability in the future. More information cause less leverage in the capital structure of the firm.

Ho9: There is no significant relationship between age and leverage of Pakistani firms.

- *Free Cash Flows*

Jensen (1986) define free cash flows as the cash flow that is left after all positive NPV projects are funded. Harris and Raviv (1991) argued that firm with greater free cash flows will have lesser debt and vice versa.

Ho10: There is no significant relationship between free cash flows and leverage of Pakistani firms.

**Table 1: Proxies for Variables**

Variables	Proxies	References
<b>Leverage</b>	(Long term debt) / (long term debt +Market value of Equity)	(Burgman, 1996),(Chkir & Cosset, 2001)
<b>Agency Cost</b>	(Cash and Marketable Securities) / 3 years of average total Assets	(Titman & Wessels, 1988)
<b>Free Cash Flows</b>	(EBIT+Depreciation+Amortization -Tax-Interest-Dividends) / (Average Total Assets)	(Jensen, 1986), (Akhtar, 2004)
<b>Growth</b>	(Change in Total Assets) / (Total Assets)	(Jensen, Solberg, & Zorn, 1992) (Mehran, 1992), (Shah & Hijazi, 2004)
<b>Age</b>	Natural log (age of firm in years from date of incorporation)	(Bradley, Jarrell, & Kim, 1984), (Chaplinsky, 1984), (Lee & Kwok, 1988)
<b>Non Debt Tax Shield</b>	(Total Annual Depreciation Expense) / Total Assets	(Bradley, Jarrell, & Kim, 1984), (Titman & Wessels, 1988)
<b>Size</b>	Natural log of Total Sales	(Ferri & Jones, 1979),(Scott Jr & Martin, 1975), (Aggarwal, 1990),(Rajan & Zingales, 1995)
<b>Collateral Value of Assets</b>	(Fixed Assets) / Total Assets	(Rajan & Zingales, 1995), (Friend & Lang, 1988) (Chittenden, Hall, & Hutchinson, 1996)
<b>Profitability</b>	(Net Income) / Total Sales	(Doukas & Pantzalis, 2003), (Rajan & Zingales, 1995), (Shah & Hijazi, 2004)
<b>Business Risk</b>	Volatility of Net Operating Income	(Burgman, 1996), (David M Reeb et al., 1998) (Lee & Kwok, 1988)
<b>Bankruptcy Cost</b>	SD of first Difference in EBIT / Total Assets	(Bradley, Jarrell, & Kim, 1984), (Lee & Kwok, 1988), (Chaplinsky, 1984)

Table 1 shows the proxies for dependent variable leverage and independent variables agency cost, free cash flows, growth, age, non debt tax shield, size, collateral value of asset, profitability, business risk, bankruptcy cost and foreign exchange risk.

#### **4. Research Methodology**

##### **4.1 Population**

The initial data is collected from the publication of State Bank of Pakistan titled as “Financial Statement Analysis of the Companies (Non-Financial) listed at Karachi Stock Exchange”. The publication includes only non financial firms. Some data is also collected from companies’ websites and annual reports.

##### **4.2 Sample**

In this study, random stratified sampling technique is used and data is collected for the period of 2006 to 2013. SBP Publication contains 399 firms of different sectors. Slovin’s sampling technique is used to determine the sample size for this study as used in different previous studies. (Meyer, Mudambi, & Narula, 2011; Onimisi, 2010; Sharif, Naeem, & Khan, 2012; Yasa et al., 2013). It is usually impossible to survey every member in the population because of time or money constraint therefore, Slovin formula is useful to determine the sample size at a given error tolerance.

Slovin’s formula is:

$$n = N/(1+Ne^2)$$

Where;

n = Number of samples in the data

N = Total population

e = Error tolerance

I considered error tolerance 5%

Therefore:

$$n = \frac{399}{1+399(.05)^2}$$

$$n = 199.77$$

= **Approximately 200 firms**

**Table 2: Industry-wise Sample Size by Using Slovin's Formula**

Industries	TOTAL	SLOVIN'S FORMULA	SAMPLE
Textiles	155	$(155*200)/400 = 77.5$	78
Sugar and Other Food Products	54	$(54*200)/400 = 27$	27
Chemicals, chemical products and Pharmaceuticals	43	$(43*200)/400 = 21.5$	22
Electrical Machinery and Other manufacturing	39	$(39*200)/400 = 19.5$	20
Cement and other Mineral Products	28	$(28*200)/400 = 14$	14
Motor vehicles, trailers and auto parts	22	$(22*200)/400 = 11$	11
Fuel & Energy	18	$(18*200)/400 = 9$	9
Information, Communication, transport and other services	22	$(22*200)/400 = 11$	11
Refined petroleum products	9	$(9*200)/400 = 4.5$	5
Paper, paperboard and products	9	$(9*200)/400 = 4.5$	5
Total:	399	$(400*200)/400 = 200$	202

From the table 2 it can be analyzed that Pakistan's non financial sector is a diversified sector with different nature of firms however, textile industry is the biggest industry in Pakistan with highest number of companies and it ranges from spinning and weaving to make up textile items. Sugar and other food is the second largest industry of Pakistan and chemicals and pharmaceutical are the third largest industry. As Pakistan is a developing country, high tech industries are smaller in number like motor vehicles, auto parts, refined petroleum products, paper and board products, etc.

**Table 3: Firms' Years\* Distribution of companies by Economic Groups**

Economic Groups	Total	%
Textiles	624	38.0
Sugar and Other Food Products	216	13.4
Chemicals, chemical products and Pharmaceuticals	176	10.9
Electrical Machinery and Other manufacturing	160	10.4
Cement and Mineral Products	112	6.9
Motor vehicles, trailers and auto parts	88	5.4
Fuel & Energy	72	4.5
Information, Communication, transport and other services	88	5.5
Refined petroleum products	40	2.5
Paper, paperboard and products	40	2.5
<b>Total:</b>	1616	100
*Firms' Years can be defined as the number of firms multiplied by the number of years in the sample, i.e. 202 firms multiplied by 8years = 1616 firms' years.		

Table 3 represents the distribution of firm's years with respect to economic groups. Hence textile is the biggest economic group of Pakistan with total 624 firms' years with 38% in total. The second largest economic group is sugar and other food

products which have 216 firms' years in total. Chemicals and pharmaceuticals and electric machinery and other manufacturing are also big economic groups with 176 and 160 firm's years respectively. In contrast refined petroleum products and paper, and paper board products are the smallest economic groups with 40 firms' years each.

**Table 4: Descriptive Statistics of Leverage and Determinants of Capital Structure**

	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
<b>LEV</b>	1612	0.172	0.246	0.000	1.000
<b>AC</b>	1613	0.050	0.150	0.000	4.915
<b>FCF</b>	1615	0.026	0.344	-0.277	12.042
<b>GRO</b>	1613	0.692	11.849	-1.000	440.803
<b>BC</b>	1613	9.321	31.628	0.020	823.977
<b>AGE</b>	1614	3.341	0.556	0.000	4.913
<b>NDTS</b>	1613	0.107	1.796	0.000	57.930
<b>PROF</b>	1595	-1.512	71.583	-2802.000	550.000
<b>CVA</b>	1613	0.473	0.241	0.000	1.973
<b>BR</b>	1612	-6.476	214.014	-6035.644	651.989
<b>SIZE</b>	1595	14.933	1.705	0.000	20.819

Table 4 shows the descriptive statistics of dependent variable (leverage) and independent variables (determinants of capital structure) of six years from 2006 to 2013. Leverage is 0.172 means on average generally Pakistani firms hold 17.2% debt in their capital structure. Agency cost is 0.050 while free cash flows are 0.026. There is a positive growth of corporations (69.2%) which is a good sign for Pakistan. Profitability is negative (-151%) which is a worrying sign on other hand. Financial crises, energy crises and other unfavorable factors may be the reasons for negative profitability. Further, average collateral value of asset is 0.473 and business risk of Pakistani firms is -6.476. Average bankruptcy cost is 9.3321.

### **4.3 Ethical Issues**

As data is the secondary data, publically available on websites, no confidentiality or anonymity issues will arise.

#### **4.4 Data Analysis**

Initial data is collected and entered into Microsoft excel worksheet. The collected data has been entered accurately and systematically. The data for this research is the panel data means the data is the combination of time series data and cross sectional data therefore it has been organized accordingly and panel was created. In order to obtain the accurate empirical results, this study is using STATA 12 which is a very useful statistical tool for panel data. Different test have been applied in this research like descriptive statistics for the comparison of mean of variables and regression analysis for the relationship of variables.

### **5. RESULTS AND DISCUSSION**

Empirical model

$$\text{LEV} = \alpha + \beta_1 \text{AC}_{it} + \beta_2 \text{BC}_{it} + \beta_3 \text{NDTS}_{it} + \beta_4 \text{PROF}_{it} + \beta_5 \text{SIZ}_{it} + \beta_6 \text{CVA}_{it} + \beta_7 \text{GRO}_{it} + \beta_8 \text{FCF}_{it} + \beta_9 \text{AGE}_{it} + \beta_{10} \text{BR}_{it} + u_{it}$$

Where, LEV = Leverage

AC = Agency Cost

BC = Bankruptcy Cost

NDTS = Non Debt Tax Shield

PROF = Profitability

SIZ = Size

CVA = Collateral value of Assets

GRO = Growth

FCF = Free Cash Flows

AGE = Age

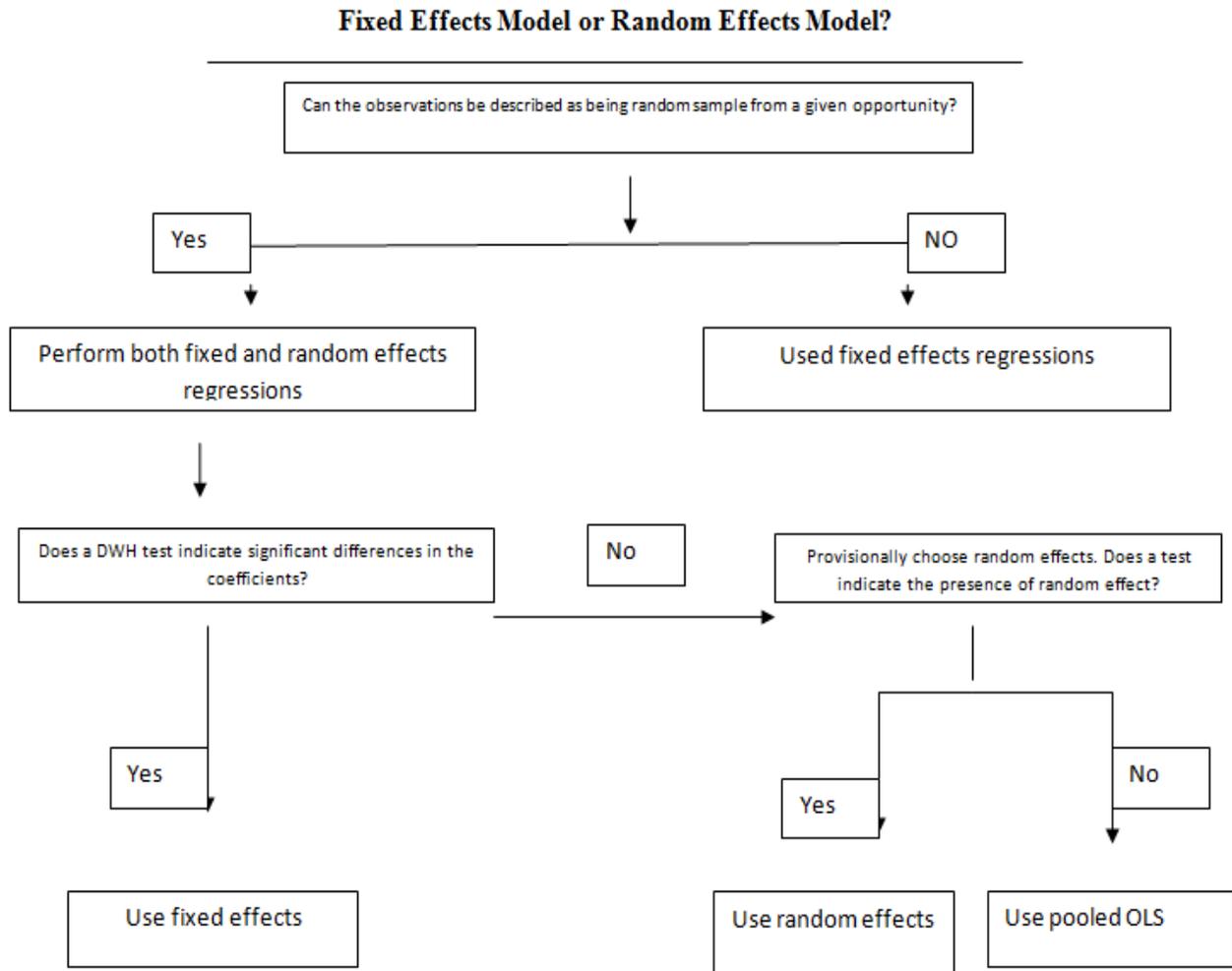
BR= Business Risk

### **6. Results And Finding**

Sample for this study contains data across firms and over time so panel data analysis is appropriate. Panel data analysis has many advantages like it provide a hefty number of data points, increasing the degree of freedom, also decreasing the co-linearity among variables and helps in developing well-organized economic estimate (Hsiao, 1986). Further, panel data has advantage of make out and determine those effects that are simple not deductable in exclusive cross sectional or exclusive time series data (Baltagi, 1995). Moreover, Hsiao (1986) mentioned that panel data allows the application of variable intercepts models that initiate firm/industry type and/or time specific effects into the regression equation that minimize or evade the omitted variable bias. The most popular tools for analysis of panel data are fixed effect model and the random effect model. In this thesis the author is using the following decision making criteria for selection of the model presented by (Dougherty, 2011).

According to Figure 1, first of all, there is a need to perform both the fixed effect regression and the random effect regression if the data is selected randomly. Then

**Figure 5.1**



**Figure 1** Source: Adapted from (Dougherty, 2011). Decision making criteria for selection of model.

**Source: Adapted from (Dougherty, 2011). Decision making criteria for selection of model.**

**Table 5.1: Fixed Effect Model**

LEV	Coef.	Std. Err.	t	P value
AC	-0.146	0.078	-1.860	0.063***
FCF	0.007	0.018	0.360	0.718
GRO	-0.002	0.001	-3.960	0.000*
AGE	-0.241	0.039	-6.220	0.000*
NDTS	0.000	0.004	-0.020	0.986
SIZE	-0.022	0.009	-2.580	0.010*
CVA	0.230	0.039	5.910	0.000*
PROF	0.000	0.000	0.760	0.447
BR	0.000	0.000	-0.380	0.705
BC	0.000	0.001	0.920	0.356
_cons	1.203	0.164	7.360	0.000
<b>R-square within 0.0878, between = 0.1398, and overall = 0.098</b>				
<b>F Statistics = 13.27, and Prob &gt; F = 0.000, Variable is significant at</b>				
<b>* 1, ** 5, and ***10% level of significance (two-tailed)</b>				

Table 5.2 :

**Random Effect Model**

LEV	Coef.	Std. Err.	z	P Value
AC	-0.1475	0.0618	-2.3800	0.017*
FCF	0.0051	0.0186	0.2700	0.7850
GRO	-0.0019	0.0005	-3.8800	0.000*
AGE	-0.0666	0.0161	-4.1400	0.000*
NDTS	-0.0001	0.0036	-0.0300	0.9780
SIZE	-0.0202	0.0056	-3.6100	0.000*
CVA	0.3210	0.0301	10.6700	0.000*
PROF	0.0000	0.0001	0.3300	0.7400
BR	0.0000	0.0000	-0.5200	0.6000
BC	0.0003	0.0004	0.7500	0.4550
_cons	0.5495	0.0990	5.5500	0.0000
<b>R-square within 0.0711, between = 0.3148, and overall = 0.1920</b>				
<b>Wald Chi2 = 210.19, and Prob &gt; Chi2 = 0.000, Variable is significant at</b>				
<b>* 1, ** 5, and ***10% level of significance (two-tailed)</b>				

Table 5.3 : Hausman Test

	Fixed	Random	Difference
AC	-0.1458	-0.1475	0.0016
FCF	0.0066	0.0051	0.0016
GRO	-0.0022	-0.0019	-0.0003
AGE	-0.2414	-0.0666	-0.1748
NDTS	-0.0001	-0.0001	0.0000
SIZE	-0.0221	-0.0202	-0.0019
CVA	0.2298	0.3210	-0.0912
PROF	0.0001	0.0000	0.0000
BR	0.0000	0.0000	0.0000
BC	0.0005	0.0003	0.0002
<b>Chi2 = 50.16, Prob &gt; chi2 = 0.000</b>			

As mentioned earlier, data selected randomly for this study, there is a need to perform both the fixed effect regression and the random effect regression according to

Figure 1. Therefore, first of all these tests are applied to the sample of firms in Pakistan. Both models are overall statistically good fit model as F test is significant in fixed effect model and Chi<sup>2</sup> is significant in random effect model in table 5.1 and 5.2. However, R<sup>2</sup> (within) is higher in fixed effect model as compare to random effect model (0.0878 vs 0.0711) and R<sup>2</sup> between and overall is higher in random effect model as compare to fixed effect model (0.1398 and 0.098 vs 0.3148 and 0.1920). In table 5.3, DWH test reject the null hypothesis and shows significance at 1% level which means that this study entail the fixed effect model and there is no need to further BPLM test and OLS test.

According to table 5.1, agency cost is significantly but negatively related to the leverage (p-value = 0.063). Bankruptcy cost is not a significant determinant of capital structure for Pakistani firms (p-value = 0.356). Non debt tax shield is not a significant determinant of capital structure (p-value = 0.968). DCs (p-value = 0.453) or MNCs (p-value = 0.591). Profitability is not significant (p-value = 0.447) which is against Pecking Order Theory of Myers (1977). Size is a significant determinant of capital structure for all Pakistani firms (p-value = 0.010). Collateral value of assets is a significant determinant of capital structure (p-value = 0.000) and shows a positive relationship (coefficient = 0.023) with leverage indicating that if collateral value of asset increases, the leverage of the company also increases. Growth is a significant determinant of capital structure for the sample of Pakistani firms (p-value = 0.000) at the significance level of 1%. The results show a negative relationship with the leverage for firms (coefficient = -0.002). Age is significant determinant of capital structure for firms (p-value = 0.0000) and shows a negative relationship with the leverage. Business risk is not significant (p-value = 0.705). Free cash flows is a significant determinant of capital structure for all firms (p-value = 0.0000) and for DCs (p-value = 0.0010). Free cash flows shows no relationship with leverage for (p-value = 0.705).

**Table 6: Pearson Coefficient Correlation**

	LEV	AC	FCF	GRO	AGE	NDTS	SIZE	CVA	PROF	BR	BC
LEV	1										

<b>AC</b>	-0.1488	1									
<b>FCF</b>	-0.0079	-0.0089	1								
<b>GRO</b>	<b>-0.0236</b>	0.1248	-0.0024	1							
<b>AGE</b>	-0.127	-0.076	0.0054	-0.0078	1						
<b>NDTS</b>	0.011	-0.0021	0.7021	0.0194	-0.0018	1					
<b>SIZE</b>	-0.1965	0.0365	-0.0183	-0.2376	0.0603	-0.0528	1				
<b>CVA</b>	-0.0419	0.004	0.002	0.1836	-0.0054	0.0001	0.1809	1			
<b>PROF</b>	0.4075	-0.0936	-0.0386	0.0606	-0.1035	-0.0108	-0.2405	0.0273	1		
<b>BR</b>	-0.003	0.0093	-0.0018	0.0036	-0.0196	0.0016	-0.048	0.104	0.0107	1	
<b>BC</b>	0.0065	0.6143	0.0456	0.3642	-0.0251	0.0942	-0.4449	-0.1493	-0.0048	-0.0087	1

### 6.1 *Pearson coefficient correlation*

Correlations among variables can cause multicollinearity which may create problems in regression analysis. Table 6 shows correlations above 0.6 which explains that there is no multicollinearity among variables in however a modest correlation between free cash flows and non debt tax shield (0.702). Therefore, a multicollinearity test is further required to check any dependence among these variables in case of MNCs.

**Table 7: Variance Inflation Factor**

<b>Variable</b>	<b>VIF</b>	<b>1/VIF</b>
<b>BC</b>	2.88	0.34683
<b>AC</b>	2.12	0.47216
<b>NDTS</b>	2.00	0.50092
<b>FCF</b>	1.98	0.50571
<b>SIZE</b>	1.61	0.61978
<b>GRO</b>	1.28	0.78052
<b>PROF</b>	1.14	0.87522
<b>CVA</b>	1.10	0.91215
<b>AGE</b>	1.03	0.97221
<b>BR</b>	1.00	0.99622
<b>Mean VIF</b>	1.61	

### 6.2 *Multicollinerity test*

When correlation among variables is high i.e. more than 0.6, either positive or negative, then the problem of multicollinearity may arise. To check whether

multicollinearity exists among variables, a variance inflation factor (VIF) test is applied and hence the results show that (Table 7) that there is no multicollinearity exists among variables.

## **7. Conclusion**

This study used 202 Pakistani companies and analyzed eight years data for the annual periods of 2006 to 2013 and investigated the leverage composition of firms and the determinants of capital structure namely agency cost, bankruptcy cost, profitability, age, growth, collateral value of assets, non debt tax shield, free cash flows, size, business risk and foreign exchange risk. Fixed effect model was used to regress the variables. This study found that agency cost, growth, age, and size are significantly and negatively associated with the capital structure of Pakistan firms, however, collateral value of asset is significantly but positively associated with the capital structure of the firm. On the other hand, free cash flows, non debt tax shield, profitability, business risk and bankruptcy cost are not significantly associated with capital structure of the firms and are against the signaling theory and pecking order theory.

From this study, one can conclude that firms in Pakistan are using collateral values for getting more leverage out of their assets. Further, as agency cost, growth, age and size of the firm increases, shareholders prefer to invest rather than taking external debt. Therefore, this study demonstrates imperative policy implications for managers and investors of the firms. This fact must be taken into account while making the finance mix decisions for securing the benefits of stakeholders.

Further research is required on several other factors that affect the capital structure of the companies like diversification, i.e. product diversification and geographical diversification. Both kinds of diversification not only affect capital structure of the companies but also have an impact on the profitability of the firms. Political risk is also a very important determinant of capital structure. Further, human capital is also a very vital determinant of capital structure in modern world. Very less work has been done on human capital. Firm's specific factors may also affect the leverage of the firm therefore

one can explore those firms' specific factors. Impact of inflation on leverage can also be assessed.

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