

# Impact of Block Ownership and Contestability on Leverage; An Empirical Analysis of Manufacturing Companies Listed on PSX

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## Abstract

The research investigates the influence of the predominant block holder and contestability on corporate leverage. The study regards book leverage as the dependent variable. Shareholders possessing 10% or more of voting rights are classified as independent variables. Additionally, for the contestability effect, coalitions are regarded as independent variables due to their positive correlation with contestability. Six control variables were considered Size, Age, Tax, Asset Tangibility, ROA, and NDTS.

The study indicated that leverage and the largest block holder were negatively related. This means that the biggest block holders will want less debt because they have more voting power. The results showed a positive link when the second and third largest owners challenged the largest block holder. This suggests that when the second and third largest shareholders are present, the level of debt in a company goes up.

The sample time frame is from 2016 to 2021. We got data from the Pakistan Stock Exchange website for 146 companies in the manufacturing industry in Pakistan.

**Keywords:** Ownership Concentration, Contestability, Leverage, Block holder

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## Background

Ownership concentration is the power that the biggest equity holder has (Grosfeld & Hashes, 2007). Shareholders are the most significant people who have a say in all of the company's actions. Concentration of ownership is a factor that can affect decisions made at any level of a company. It can directly impact a firm's performance; it improves the firm's performance regardless of who the concentrated owners are (Ma, Naughton & Tian, 2010). Ownership concentration is also looked at in relation to corporate governance. A firm needs to think carefully about its capital structure when it has a lot of ownership concentration. A company's capital structure may include loan financing, equity financing, and other types of finance. People all across the world have studied in great detail how high ownership concentration affects capital structure. Studies have demonstrated that elevated ownership concentration significantly affects and can alter a firm's capital structure. The primary block holder, or controlling shareholder, exerts a distinct influence on the firm's leverage level; this influence may vary significantly when the controlling block holder is confronted by the second and third largest shareholders. According to Santos, Moreira, and Vieira (2013), there is a connection between ownership concentration and leverage and concerns with agency, risk, and control. Some research indicate that elevated ownership concentration mitigates agency difficulties. The biggest shareholder thinks a lot about risk, therefore he makes the company take on less debt and rely more on equity financing. This causes the company's capital structure to shift a lot.

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Another thing that affects the capital structure is contestability. This means that the capital structure alters when there are second and third largest shareholders, as opposed to when there is greater power with the controlling shareholder. Contestability has a big effect on leverage, which can have a big effect on the company. Contestability has a beneficial effect on debt levels (Lotto, 2016). This means that the second and third largest shareholders may keep an eye on the major shareholder, which could change the company's capital structure. The examination of ownership concentration and contestability, along with their effects on capital structure, will affect the firm's capital structure and risk level.

### **Gap and Research Significance**

This research study seeks to analyze the influence of high ownership concentration and contestability on firm leverage levels, utilizing control variables and selecting firms from Pakistan's manufacturing industry. A high level of ownership concentration and contestability can have a big effect on a company's capital structure, which can lead to higher profits for the company. This research study will analyze the elevated ownership concentration alongside two distinct tiers of controlling shareholders. And the contestability will also be looked at with shareholders who have varied amounts of voting rights.

### **Problem Statement**

To investigate the effect of high ownership concentration and contestability on firm leverage.

### **Research Questions**

Does the main block holder or controlling shareholder affect the debt level positively or negatively? If the main block holder is challenged by second and third largest block holder, then what is the impact?

### **Objective of the Study**

- To examine the effect of largest block holder on leverage level
- To examine the level of debt with presence of second and third largest shareholders.

### **Significance of the study**

The study will help to identify major issues which comes when firms are highly concentrated. The study not only examines the effects of high ownership concentration on debt level but also agency problems, information asymmetry, etc. which arises in a firm.

### **High ownership concentration and capital structure**

Ownership concentration means more power with large block shareholders. Ownership concentration is an important factor of decision making in corporations, such as capital structure, firm performance, corporate risk taking etc.

Corporate governance varies by country (Madhani, 2016). Madhani also says in 2016 that ownership concentration has a big benefit when it comes to keeping an eye on management and lowering agency problems and costs. Shareholders with more authority are vital for keeping managers in check, which lowers agency costs. When ownership is concentrated, it makes other controls less useful, like the board of directors, and it makes monitoring better. As ownership concentration diminishes agency issues, the board's monitoring role will diminish in significance, and firms will no longer rely on corporate governance measures. Agency problems happen when the interests of the principal and the management are at odds with one other. The management acts on behalf of the principle, with the goal of maximizing shareholder value. However, there are occasions when the manager's greatest interest is to make decisions that benefit them and increase their personal wealth.

Conversely, Bragoli, Cortelezzi, and Marseguerra (2016) propose that highly concentrated ownership may also elevate agency costs and capital providers. Some countries in Europe and East Asia are less likely to modify their technology. The concentration of ownership in a corporation can make agency costs go up or down for investors and companies. Agency costs come from hiring an agent by the principal (Hastori, Siregar, Sembel & Maulana, 2015). Hastori et al. (2015) assert that effective corporate governance diminishes agency costs. The Asian economic crisis in 1997 made it harder to have good corporate governance. It also says that having a lot of ownership concentrated gives you greater power to keep an eye on agents (managers). This means that a company with a lot of block owners, who own most of the shares, has a lot of power over the company's actions. Also, big block shareholders that own a lot of shares try to protect themselves and get their money back. The main causes of agency problems in a company are its capital structure and its policies for paying dividends. Managers will invest in projects that are low-risk and avoid projects that are high-risk and high-return, which stockholders prefer (Rossi, Boylan & Cebula, 2018). This means that big shareholders will want low debts because debtholders won't accept high-risk projects and won't let shareholders invest in them either. This is

because high-risk projects could go bankrupt, and debtholders will be afraid of not getting their money back with a fair return.

Rossi et al. (2018) asserted that capital structure correlates with investment. Additionally, it states that the use of debt financing has a nonlinear relationship and that PLCs act differently than LTDs. PLCs and LTDs have different types of ownership. PLCs have a diluted ownership style, which makes the company more reliant on outside sources of financing. They prioritize debt financing at first, and as R&D strengthens, the company wants to lower its level of leverage. On the other hand, LTDs have concentrated ownership, which means that the relationship between R&D costs and leverage level decreases. This means that organizations with a lot of ownership concentration will want to keep their debts low. This is mostly true for private limited corporations that do research and development. In 2018, Rossi et al. noted that the majority of organizations possess a concentrated ownership structure, which helps mitigate agency problems through oversight. Additionally, these corporations implement regulations that can compel minority shareholders based on debt size, dividend policy, and cash reserves. Agency theory serves as a determinant of a corporation's capital structure, wherein the firm seeks to minimize costs by distributing ownership and control (Goh et al. 2018). Also, the investor's monitoring and supervision are seen as agency costs. The more shares specific shareholders own, the more power they will have over management, which will cut down on agency difficulties (Saona, Martin & Jara, 2018). Florackis, Kanas, and Kostakis (2015) assert that monitoring force is implemented throughout the firm's selection of debt financing, hence mitigating agency concerns. Moreover, the creditors possess the potential to drive the company into bankruptcy should the management fail to meet its debt obligations. It also says that if big shareholders can fix the problems that managers and principles have with each other, then there will be a good link between debt and ownership concentration. It also says that if the agency problem isn't fixed and the controlling shareholder puts money into riskier projects, it will hurt creditors, take their wealth, and eventually lead to a bad relationship between ownership concentration and debt level.

Boateng, Cai, Borgia, Bi, and Ngwu (2015) propose that substantial shareholders should engage actively in corporate-level decision-making. When debt comes with supervision, big shareholders will want minimal debts. It also says that having different amounts of information is vital for a company's financing decisions. At first, companies use their retained earnings to pay for new investments. After that, they prefer low-cost debt, and their last choice can be external stock financing. The level of debt financing is dictated by asymmetric knowledge (Goswami, Noe & Rebello 1995). Qu, Wonchuti, Wu, and Chen (2018) assert that managers possess superior information on the firm; however, they fail to effectively communicate to investors their unwillingness to invest in high-priced stocks, thus necessitating the firm to issue its stocks at a reduced price. So, if there is a lot of knowledge asymmetry, the company will sell stocks for less money. This means that the company will have a lot of debt because of the high level of information asymmetry. This means that big block holders aim to make the information gap smaller. When equity financing gets cheaper, companies with a lot of concentrated ownership will have less debt. Some empirical studies also provide the relationship between debt level and high ownership concentration. Goh et al. (2018) suggests a positive relationship between debt level and high ownership concentration. Farooq (2015) states a negative relationship between high ownership concentration and debt level. Saona, Martin, and Jara (2018) also suggests a negative relationship between closely held shares and debt level to avoid monitoring. Thus, we formulate the first Hypothesis:

**H1:** All else equal, High level of concentration in hands of large block holder causes low level of debt.

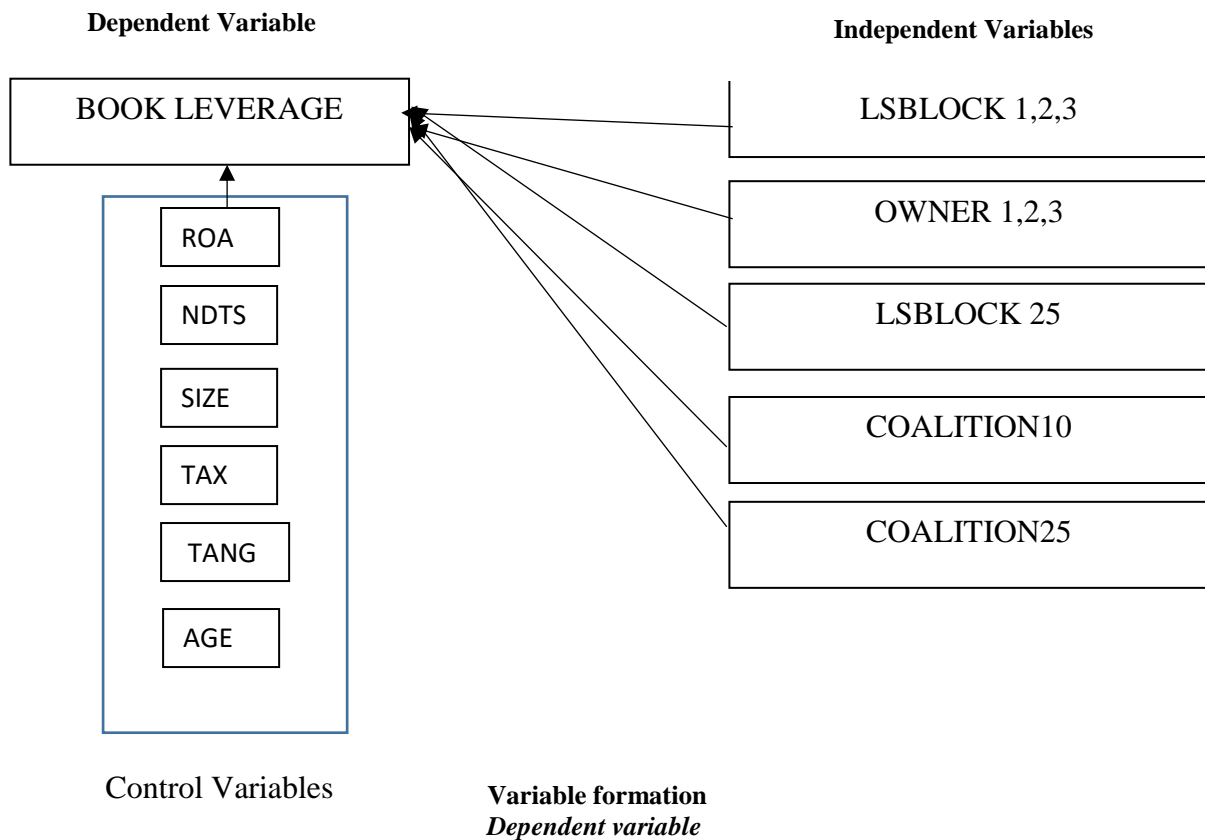
### **Problem Statement**

To investigate the effect of high ownership concentration and contestability on firm leverage. the study looks to the block holder's effects on firm capital structure.

### **Objective of the study**

This study aims to find answers to how high ownership concentration affects firm leverage level, which investigates the relationship between firm leverage and high ownership concentration in the hands of main block holder. It also investigates the contestability effect on firm leverage. It will analyze whether more power in hands of main block holder causes a decrease in leverage or not. Along with this it will also study the if the main block holder is challenged by second and third largest shareholder.

**Theoretical Framework**



**Figure 1: Theoretical Framework**

It is the variable which is affected by independent variables. The dependent variable in this study is book leverage. book leverage is one of the used measures to calculate leverage of firm. book leverage is calculated as follow:

$$\text{Book Leverage} = (\text{Long term liability} + \text{Current Liability}) / (\text{Long term liability} + \text{Current Liability} + \text{Book equity})$$

**Independent variables**

Independent variables are those variables which have effect on dependent variable (Tahu et al., 2017). Independent variables taken in this study are as follow:

*In order to test first hypothesis, following independent variables are used:*

LSBLOCK1, LSBLOCK2, LSBLOCK3: The percentage of voting rights held by largest, second largest, and third largest shareholder. the cutoff point to award this qualification is 10% of voting rights (Santos, Moreira & Vieira, 2013).

OWNER1 =  $OWN1 * LSBLOCK1$ , where OWN1 is dummy variable which indicates low ownership concentration. It equals one when the largest shareholder is holding voting rights between (>10 and <25%).

OWNER2 =  $OWN2 * LSBLOCK1$ , where OWN2 is dummy variable which indicates intermediate ownership concentration. It equals one when the largest shareholder is holding voting rights between (>25 and <50%).

OWNER3 =  $OWN3 * LSBLOCK1$ , where OWN3 is dummy variable which indicates high ownership concentration. It equals one when the largest shareholder is holding voting rights of (>50%).

The variables OWNER1,2,3 are created in order to test the linearity of the effect of block holder (Santos et al. 2013).

LSBLOCK25: This variable is used for the robustness of block holder effect. The LSBLOCK25, means largest shareholder but the cutoff point here is 25% of voting rights.

*To test second hypothesis, following independent variables are used:*

COALITION10: it is calculated as  $(LSBLOCK2 + LSBLOCK3)/(LSBLOCK1 + LSBLOCK2 + LSBLOCK3)$ . The ratio is positively related to contestability, which means largest shareholder is challenged by second and third largest shareholders (Santos et al. 2013).

COALITION 25: it is calculated with the same formula of COALITION10 but the cutoff point is 25%.

#### **Dummy variables**

OWN1: where OWN1 is dummy variable which indicates low ownership concentration. It equals one when the largest shareholder is holding voting rights between ( $>10$  and  $<25\%$ ).

OWN2: where OWN2 is dummy variable which indicates intermediate ownership concentration. It equals one when the largest shareholder is holding voting rights between ( $>25$  and  $<50\%$ ).

OWN3: where OWN3 is dummy variable which indicates high ownership concentration. It equals one when the largest shareholder is holding voting rights of ( $>50\%$ ).

MLS: is a dummy variable which equals one when there are at least two largest shareholders. The cutoff point is 10%.

#### **Control variables**

Control variables are used to uplift or boost the validity of research by limiting the influence of other extraneous variables. Using control variables helps to establish a causal relationship between our main variables and it avoids biased results. the control variables used in this study are as follow:

##### *Profitability*

According to Alipour, Mohammadi and Derakhshan (2015) firms with greater profitability have a positive relationship with leverage, because those firms attract creditors easily because of its less risk of bankruptcy. On the other hand, Chen, Harford and Kamara (2019) suggests a negative relationship between profitability and financial leverage. following Santos et al. (2013) we take ROA as proxy for profitability and calculate ROA as  $EBITDA/TA$ , where EBITDA is earning before tax, depreciation and amortization, and TA is total assets.

##### *Size*

The size of firm has a positive impact on debt, large sized companies have lower level of chance to become bankrupt and it results in attracting more leverage level (Alipour et al. 2015). Size is calculated as  $(SIZE = \ln(\text{Total assets}))$ .

##### *Asset tangibility*

Ballos et al. (2016) suggests a negative relationship between asset tangibility and leverage. Asset tangibility is calculated as  $FA/TA$ , where FA is fixed assets and TA is total assets.

##### *Taxes*

There is a direct relationship between tax and leverage (Vatavu, 2015). In this study tax is calculated as ratio of paid taxes to earnings before tax.

##### *Non debt tax shields*

Santos et al. (2013) suggests a negative relationship between non debt tax shields and leverage. NDTs is calculated as depreciation divided by total assets.

##### *Age*

The more the age of the firm the more the leverage level and long term debt to total assets (Bajagai et al. 2018). Age is calculated as  $\ln(\text{YEARS})$ , where YEARS is the number of years since the firm began its activity.

#### **Statistical Test**

Weighted least squares or GMM model was used to analyze the panel data.

#### **Statistical Models**

To test *H1* which states that there is negative relationship between main block holder and leverage, following models are used:

*Leverage* =

$$\alpha + \beta_1 LSB1 + \beta_2 AGE + \beta_3 SIZE + \beta_4 TANG + \beta_5 TAX + \beta_6 NDTS + \varepsilon$$

*Leverage* =

$$\alpha + \beta_1 OWNER1 + \beta_2 OWNER2 + \beta_3 OWNER3 + \beta_4 AGE + \beta_5 SIZE + \beta_6 TANG + \beta_7 TAX + \beta_8 NDTS + \varepsilon$$

*Leverage* =

$$\alpha + \beta_1 LSB25 + \beta_2 AGE + \beta_3 SIZE + \beta_4 TANG + \beta_5 TAX + \beta_6 NDTS + \varepsilon$$

**Variable Representation**

In above regression models the details of variables are given as in below table:

**Table 1: Variables details**

<i>LEVERAGE</i>	<i>Book leverage</i>
<i>LSB1</i>	LSBLOCK1 holding equal or more than 10% of voting rights
<i>OWNER1</i>	OWN1*LSBLOCK1
<i>OWNER2</i>	OWN2*LSBLOCK1
<i>OWNER 3</i>	OWN3*LSBLOCK1
<i>LSB25</i>	LSBLOCK25 holding equal or more than 25% of voting rights
<i>COALITION10</i>	(LSBLOCK2 + LSBLOCK3)/(LSBLCOK1 + LSBLOCK2 + LSBLOCK3)
<i>COALITION25</i>	(LSBLOCK2,25 + LSBLOCK3,25)/(LSBLOCK1,25 + LSBLOCK2,25 + LSBLOCK3,25) the percentage of voting rights is equal or more than 25%.
<i>OWN1</i>	Dummy variable, low ownership concentration, (>10% and <25%)
<i>OWN2</i>	Dummy variable, Intermediate ownership concentration, (>25% and <50%)
<i>OWN3</i>	Dummy variable, High ownership concentration, (>50%)
<i>MLS</i>	Dummy variable, equals one when at least 2 largest shareholders, cutoff point is 10%
<i>AGE</i>	Ln(YEARS)
<i>TAX</i>	Ratio of paid taxes to earnings before tax
<i>SIZE</i>	Ln(Total Assets)
<i>TANG</i>	Asset Tangibility, calculated as FA/TA
<i>ROA</i>	Return on asset, calculated as EBITDA/TA
<i>NDTS</i>	Non debt tax shields, depreciation divided by total assets

**Data Collection**

Data was collected from annual reports of manufacturing companies operating in Pakistan. The annual reports were downloaded from company’s websites as well as data portal of Pakistan Stock Exchange website.

**Target Population**

The target population for this study is manufacturing companies of Pakistan operating in the industry.

**Sample and Sampling Technique**

A sample of 146 companies was selected from the manufacturing companies operating in Pakistan. Data was collected for the period from the year 2016 to 2021.

Convenience sampling technique was used in the study; this technique is based on the accessibility of data.

**Empirical Properties**

To assess whether high ownership concentration have impact on leverage or does the contestability effect firm leverage, 17 variables are identified. Dependent variable is book leverage, the independent variables are LSB1, LSB25, OWNER1, OWNER2, OWNER3, COALITION10, and COALITION25, rest of variables are dummy and control variables. These variables were taken to explain the results. The data was collected from 146 companies from period 2016 to 2021.

**Descriptive Statistics**

The summary statistics is shown in below table

**Table 2: Summary of Descriptive Statistics**

Variable	Mean	Median	Std. Dev.	Min	Max
LEV	0.601	0.510	0.791	0.000283	15.0
LSB1	0.388	0.320	0.432	0.00	11.0
OWNER1	0.0493	0.00	0.0821	0.00	0.250
OWNER2	0.0871	0.00	0.155	0.00	0.499
OWNER3	0.240	0.00	0.484	0.00	11.0
LSB25	0.338	0.320	0.462	0.00	11.0
COALITION10	0.224	0.151	0.242	0.00	0.987
COALITION25	0.0350	0.00	0.135	0.00	0.987
AGE	3.68	3.64	0.523	1.61	5.08
SIZE	22.8	22.8	2.02	14.9	28.0
ROA	0.933	0.0785	13.0	-1.44	284.
TANG	-0.760	0.528	16.9	-254.	0.991
TAX	0.479	9.34e-005	10.6	-9.98	310.
NDTS	0.326	0.0281	3.83	0.00	58.3

**Mean**

In the above table, firm size has the highest mean among the variables i.e., 22.8 and COALITION25 has the lowest mean value i.e., 0.0350. The dependent variable Leverage has a mean value of 0.601. LSB1 or largest block holder has a mean ratio of 0.388, which means the average ratio of voting rights held by a block holder in a firm. OWNER1, OWNER2, and OWNER3 has mean of 0.0493,0.0871, and 0.240 respectively. LSBLOCK25 has a mean ratio of 0.338. COALITION10 has a mean value of 0.224. The mean value of Age of firm is 3.68, ROA has a mean value of 0.933. The asset tangibility shows a mean value of -0.760, followed by Tax and NDTS having mean values of 0.479 and 0.326 respectively.

**Median**

Firm size has the highest median value in this table followed by age with a value of 3.64. OWNER1,2,3 shows a median of zero respectively. Leverage shows a median of 0.510. LSB1 shows median value 0.320 and LSB25 shows the same value. COALITION10 and COALITION25 has median values of 0.151 and 0.00 respectively. Age of the firm has median value of 3.64 which is second highest among the median values. ROA has median value of 0.0785, asset tangibility or TANG as shown in the table has median value of 0.528. Tax and NDTS has median values of 9.34e-005 and 0.0281 respectively.

**Standard Deviation**

The highest standard deviation value in the above table is of asset tangibility which is 16.9, this shows that the variation is high in asset tangibility, this is because firms taken in this data set are very much different with each other and there was no filter applied to the data. it is followed then by ROA with a value of 13.0. Leverage has the standard deviation value of 0.791. The lowest standard deviation value is of OWNER1 which is a value of 0.0821.

**Minimum**

Leverage has a minimum value of 0.000283. LSB1, OWNER1,2,3, COALITION10, LSB25, COALITION25, and NDTS has minimum values of zero respectively. Size of firm has the highest minimum value of 14.9 among other variables. Second largest minimum value is of Age which 1.61. ROA, TANG, and TAX has minimum values of -1.44, -254, and -9.98 respectively.

**Maximum**

Tax has the highest maximum value among the other variables, leverage has maximum value of 15. The lowest maximum value is 0.250 which is of OWNER1. OWNER2, and OWNER3 has values of 0.499 and 11 respectively. LSB25 has a maximum value of 11. COALITION10 and COALITION25 have the same maximum values of 0.987. ROA has the second largest maximum value of 284, followed by NDTS and firm Size with maximum values of 58.3 and 28. Age of firm has maximum value of 5.08 and asset tangibility has maximum value of 0.991.

**Correlation Matrix**

**Table 3: Correlation coefficients, using the observations 1:1 - 146:6**

LSB1	OWNER1	OWNER2	OWNER3	
1.0000	-0.2805	-0.0348	0.9518	LSB1
	1.0000	-0.3385	-0.2975	OWNER1
		1.0000	-0.2794	OWNER2
			1.0000	OWNER3
	LSBLOCK12 5	COA10	COA25	
	0.9853	-0.1995	-0.0072	LSB1
	-0.4403	0.3951	-0.1563	OWNER1
	0.0277	0.2084	0.2913	OWNER2
	0.9432	-0.3126	-0.0736	OWNER3
	1.0000	-0.2569	0.0211	LSBLOCK12 5
		1.0000	0.3711	COA10
			1.0000	COA25

The above table shows table of multi-collinearity between independent variables. LSB1 and OWNER1,2,3 relation is not considered because they are not used in the same equation or model, and same for LSB25. OWNER1, OWNER2, and OWNER3 multi-collinearity is evaluated and as the table 3 indicates they are not multi-collinear with each other because their values are less than 0.6 (see table 3).

**Empirical review**

**Hypothesis 1**

Three equations with same dependent variable and different independent variables were conducted for results of first hypothesis.

**Table 4: Empirical results, model 1, dependent variable book lev**

Variables	Pooled OLS		Fixed Effect		Random Effect		Weighted Least Square	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
<b>Const</b>	3.04506	0.0004 ***	4.34868	0.0004 ***	3.47539	<0.0001 ***	2.18828	<0.0001 ***
<b>LSB1</b>	3.04506	<0.0001	0.0888023	0.0925	0.0569708	0.2517	-0.0655317	0.0001

		***		*				***
<b>AGE</b>	-3.34527e-05	0.9996	0.246104	0.4309	0.0187743	0.8425	-0.0133054	0.1470
<b>SIZE</b>	0.00579670	0.9075	-0.205337	<0.0001***	-0.129864	<0.0001***	-0.0678004	<0.0001***
<b>ROA</b>	-0.107906	<0.0001***	-0.000859398	0.7799	-0.000615746	0.8402	-0.000631545	0.1518
<b>TANG</b>	-0.000558773	0.9028	0.000984143	0.9260	0.000948983	0.9284	-0.00134756	0.3793
<b>TAX</b>	0.000471203	0.9762	0.000105041	0.9528	7.53614e-05	0.9657	0.000230729	0.7769
<b>NDTS</b>	-0.000465665	0.8490	-0.0213020	0.6181	-0.0130443	0.7556	-0.0167527	0.0053***
<b>Durbin Watson</b>	1.90278		1.625928		1.625928		NA	
<b>R-Squared</b>	0.073044		0.662802		NA		0.407273	
<b>F-statistic (p-value)</b>	9.35e-12		4.50e-99		NA		3.34e-94	
<b>Chow Test for differing group intercepts (F-test statistic (p-value))</b>					8.72087 (1.66481e-090)			
<b>White's Test for Heteroskedasticity</b>					135.282438 (0)			
<b>Breusch-Pagan test (Chi-Square test statistic (p-value))</b>					686.334 (2.80255e-151)			
<b>Hausman test (Chi-Square test statistic (p-value))</b>					5.97816 (0.542302)			
<b>***Significant-at-1%, **Significant-at-5%, *Significant-at-10%</b>								

The above table shows the results of regression analysis for hypothesis 1, model 1. Four regression models are conducted, Pooled OLS, Fixed-effect, Random-effect, and WLS. From these regression models we selected the best model for the equation 1 of hypothesis 1.

Starting with Pooled OLS and Fixed-Effect model, to choose the best model between the two, they are compared based on the goodness of fit. To discover the goodness of fit, and choose between Pooled OLS and Fixed-Effect models, chow test was used. For this p-value of the Chow test is considered. The p-value is less than 0.05 (see table 4) which leads to rejection of the null hypothesis that states "Pooled OLS is good" and approval of Fixed-Effect model as a desired model for the data. Durbin-Watson test was applied to check if the data has autocorrelation problem. The value of Durbin-Watson of Pooled OLS (see table 4) shows that there is problem of autocorrelation in the data. Hence, there is problem of auto-correlation results of Pooled OLS are overturned. So the significant results from the Chow test stated that Fixed-Effect Model is preferred to Pooled OLS model (see table 4). Data was also analyzed for heteroskedasticity. White's test for heteroskedasticity was used. The results showed that there was heteroskedasticity in the data. Hence, there was presence of heteroskedasticity the results of Fixed-Effect Model were considered invalidated. So, more tests were necessary to find out the best model on the basis of goodness of fit.

The Breusch Pagan test was used to find out whether Pooled OLS is preferred or Random Effect model is considered validated. Breusch Pagan test p-value showed a value less than 0.05(see table 4) which means the null hypothesis "Pooled OLS is good" was rejected and it led to prefer Random Effect model. The random effect model doesn't resolve the auto-correlation problem in the data, therefore the results of this model are invalidated.

Lastly, another test was applied to the data to find out whether Random-Effect Model is a good fit or the fixed effect model is good. For this the p-value of Hausman test was considered, and it showed a value more than 0.05 (see table 4), which led to accept the null hypothesis "Random-Effect is good" and reject fixed effect model. Hence the Random-Effect doesn't resolve the problem of auto-correlation as stated above, the results of this model are overturned.

Consequently, the Weighted Least Square test or WLS test was the only model that showed significant results. WLS is considered a consistent model because it resolves the issue of autocorrelation in the data.

To check the relationship between largest shareholder and leverage, it was probable to detect a significantly negative LSB1 coefficient. The table shows a negative coefficient for LSB1. Which means a negative relation between dependent variable leverage and independent variable LSB1. This result perfectly aligns with our first

hypothesis which stated a negative relationship of high ownership concentration and debt level. This result was consistent with literature that reported a negative relationship between largest shareholder and firm leverage level (Santos et.al, 2013), (Schmid, 2013), and (Farooq, 2015). Size of firm has a significant negative coefficient. Which means with increase of firm size the leverage level of firm will decrease. This result aligns with literature of (John & Adebayo, 2013). Non-Debt tax shield have a negative significant effect on leverage. This indicates that firms which has large non-debt tax shields, for example tax deductions from depreciation can lower the levels of leverage because of the tax benefits firms receive. It also provides savings on taxes, and it can be used to lower the need for external financing. Age of firm has a negative insignificant effect on leverage. ROA has a negative coefficient and insignificant effect on leverage level. Tangibility has a negative coefficient and insignificant effect on leverage. Tax has a positive coefficient but an insignificant effect on leverage level. This is due to economic fluctuations and regulatory impacts. The R-Squared value of the model for WLS is 40.7%, and the F-statistics shows a value less than 0.05 (see table 4) which indicates a good fit model.

**Table 5: Empirical results, model 2, dependent variable book lev.**

Variables	Pooled OLS		Fixed Effect		Random Effect		Weighted Least Square	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
<b>Const</b>	3.00162	<0.0001 ***	4.44164	0.0003 ***	3.47673	<0.0001 ***	2.21796	<0.0001 ***
<b>OWNER1</b>	0.117428	0.7564	0.224351	0.6835	0.112718	0.8002	0.0349943	0.5847
<b>OWNER2</b>	-0.153752	0.4382	-0.0647209	0.8462	-0.0867408	0.7371	-0.174501	<0.0001 ***
<b>OWNER3</b>	0.0078591 6	0.8989	0.0871017	0.1054	0.0550303	0.2750	-0.0491950	0.0010 ***
<b>AGE</b>	0.0107799	0.8299	0.249412	0.4254	0.0223190	0.8145	-0.0148277	0.1049
<b>SIZE</b>	-0.106564	<0.0001 ***	-0.209586	<0.0001 ***	-0.130022	<0.0001 ***	-0.0690141	<0.0001 ***
<b>ROA</b>	-0.000567 676	0.9013	-0.00087599 8	0.7760	-0.0006015 37	0.8438	-0.000599009	0.0830*
<b>TANG</b>	0.0001696 57	0.9914	0.00100716	0.9243	0.000939981	0.9291	-0.00132883	0.2681
<b>TAX</b>	-0.000508 159	0.8356	8.32862e-05	0.9626	6.14943e-05	0.9720	0.000163448	0.8438
<b>NDTS</b>	-0.014165 5	0.8187	-0.0217373	0.6114	-0.0127469	0.7611	-0.0159995	0.0007 ***
<b>Durbin Watson</b>	1.898534		1.625927		1.625927		NA	
<b>R-Squared</b>	0.074359		0.663046		NA		0.454568	
<b>F-statistic (p-value)</b>	5.42e-11		3.34e-98		NA		9.6e-108	
<b>Chow Test for differing group intercepts (F-test statistic (p-value))</b>					8.68723 (4.77563e-090)			
<b>White's Test for Heteroskedasticity</b>					156.540612 (0)			
<b>Breusch-Pagan test (Chi-Square test statistic (p-value))</b>					685.549 (4.15191e-151)			
<b>Hausman test (Chi-Square test statistic (p-value))</b>					6.05758 (0.734142)			

\*\*\*Significant-at-1%, \*\*Significant-at-5%, \*Significant-at-10%

The table 5 shows the regression results for H1, model or equation 2, in which new independent variables OWNER1,2,3 were introduced. As stated above four regression models were applied and consider different factors to choose one model for the equation. The Durbin Watson test showed a problem of autocorrelation in the panel, hence the results of Pooled OLS model were overturned. Furthermore, compared Pooled OLS and Fixed-Effect models based on the Chow test. The Chow test showed a significant value, which means the rejection of null hypothesis "Pooled OLS is good" and acceptance of Fixed-Effect model for the data. Based on White's test of heteroskedasticity, there was a significant result, which means Fixed-Effect model results were considered invalidated. Next the Breusch Pagan test was considered to find out the best fir model between Pooled OLS and Random-Effect models. The test showed a significant p-value (see table 4.4) and resulted in

rejection of null hypothesis “Pooled OLS is good” and to accept Random-Effect model as a better fit. But as stated prior the Random effect model doesn’t consider the problem of autocorrelation, hence another test was necessary to find out the better model.

Finally, the Hausman test was applied to find out between Fixed-Effect and Random-Effect models, the test showed p-value more than 0.05 (see table 5), which resulted to accept null hypothesis “Random is good” and Fixed-Effect model was rejected, but again the Random-Effect model doesn’t address the autocorrelation problems, hence WLS or weighted least square model was the only model which showed significant and consistent results, which also resolves the issues of autocorrelation in the panel.

In order to check the linearity of the relationship, the above regression results were presented with OWNER1,2,3 as main independent variables. OWNER1 which indicates low ownership concentration shows positive coefficient and an insignificant effect on leverage. this indicates that shareholders with low ownership concentration doesn’t affect the leverage level significantly. OWNER2 and OWNER3 which shows intermediated and high ownership concentration has a negative coefficient and significant effects on leverage level (see table 5). This result was in line with literature of the study (Santos et al. 2013). Size has a negative coefficient and a significant effect on leverage (see table 4.4). non-debt tax shield has a negative coefficient and a significant effect on leverage level (see table 5). ROA has minor negative coefficient and a significant effect on leverage level (see table 4.4). This is because firms may rely on internal funds for financing projects or investments as long as they are highly profitable which in turn decreases the level of leverage. firms with higher ROA experience lower financial risks. Age has negative coefficient but an insignificant effect on leverage (see table 4.4). Asset tangibility has a negative coefficient but an insignificant effect on leverage level (see table 4.4). The reason behind this is the influence of market conditions of Pakistan, and also the in this study industry-specific factors are not considered because manufacturing industry in itself has very different types of companies with different types of assets they hold. Tax shows a positive coefficient and an insignificant effect on leverage (see table 5). The R-squared value for Weighted Least Squared model is 45.45%. which means almost half of the observed variations are explained by the model’s inputs. F-statistics shows that the model is significant because the p-value is less than 0.05 (see table 5).

**Table 6: Empirical results, model 3, dependent variable book lev**

Variables	Pooled OLS		Fixed Effect		Random Effect		Weighted Least Square	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
<b>Const</b>	3.04254	<0.0001 ***	4.31716	0.0004* **	3.47933	<0.00 01 ***	2.16788	<0.0001 ***
<b>LSB25</b>	-0.006123 09	0.9138	0.0831294	0.1081	0.0524312	0.2798	-0.0632859	<0.0001 ***
<b>AGE</b>	0.0058604 3	0.9065	0.243805	0.4352	0.0181245	0.8479	-0.0128217	0.1611
<b>SIZE</b>	-0.107715	<0.0001 ***	-0.203310	<0.0001 ***	-0.129741	<0.00 01***	-0.0671065	<0.0001 ***
<b>ROA</b>	-0.000562 225	0.9022	-0.00084789 5	0.7828	-0.0006143 76	0.8405	-0.000629914	0.1514
<b>TANG</b>	0.0004452 75	0.9775	0.000992591	0.9253	0.000958360	0.9277	-0.00135178	0.3761
<b>TAX</b>	-0.000462 204	0.8501	0.000111164	0.9500	7.67597e-05	0.9650	0.000163916	0.8395
<b>NDTS</b>	-0.014201 3	0.8182	-0.0210209	0.6228	-0.0130159	0.7562	-0.0166545	0.0055 ***
<b>Durbin Watson</b>	1.903275		1.625080		1.625080		NA	
<b>R- Squared</b>	0.073057		0.662686		NA		0.407629	
<b>F-statistic (p-value)</b>	9.30e-12		5.03e-99		NA		2.58e-94	
<b>Chow Test for differing group intercepts (F-test statistic (p-value))</b>					8.71595 (1.86798e-090)			
<b>White’s Test for Heteroskedasticity</b>					141.578949 (0)			
<b>Breusch-Pagan test (Chi-Square test statistic (p-value))</b>					685.869 (3.53747e-151)			

<b>Hausman test (Chi-Square test statistic (p-value))</b>	5.8891 (0.552757)
<b>***Significant-at-1%, **Significant-at-5%, *Significant-at-10%</b>	

To check the robustness of the results, the above table shows results of regression for new independent variable LSB25 or largest shareholder with equal or more than 25% of voting rights. As the results of Durbin Watson for Pooled OLS model showed a problem of auto collinearity so the results of Pooled OLS model were overturned. To find a better model further tests were conducted. To choose between Pooled OLS model and Fixed-Effect model, Chow test p-value (see table 6) showed a significant value, based on this the null hypothesis “Pooled OLS is good” was rejected and alternate hypothesis “Fixed-Effect is good” was accepted. Since, looking to White’s test value (see table 6), the data showed a problem of heteroskedasticity, hence we overturned the results of Fixed-Effect model.

Pooled OLS and Random-Effect models were compared to find the best fit model. For that Breusch Pagan test was applied, the p-value of the test was less than 0.05 (see table 6), hence it resulted in rejection of null hypothesis “Pooled is good” and acceptance of Random-Effect model. Still the data has problem of auto collinearity, since the Random-Effect model doesn’t solve the issue, further tests were conducted.

Next, Fixed-Effect and Random-Effect models were compared on the basis of Hausman test, the p-value was more than 0.05 (see table 6), hence it resulted in acceptance of null hypothesis “Random-Effect is good”. As stated above the model doesn’t resolve the issues of collinearity, so the results of Random-Effect were invalidated.

WLS or weighted least square model remained the only model with significant and consistent results, which resolved the heteroskedasticity and auto correlation problems, hence we select WLS as a good fit model for the panel.

In order to check robustness of the results, LSB25 variable relation was checked with leverage level. The results were perfectly aligning with the study (Santos et al. 2013), which showed a negative coefficient and a significant effect on leverage level (see table 6). Which means the higher ownership concentration the lower the leverage level. Size of firm showed a negative coefficient but a significant effect on leverage level. Non-debt tax shield has a negative coefficient and a significant effect on leverage (see table 6). Age has negative coefficient but an insignificant effect on leverage. The reason behind this could be a non-linear relationship between age of firm and leverage, means the impact of age of firm may differ during different life cycles of the firm. ROA has a negative coefficient but an insignificant effect on leverage (see table 6). Asset tangibility has negative coefficient and insignificant impact on leverage (see table 6). Tax has a positive coefficient but an insignificant effect on leverage. The r-squared value for the model is 40.8%. F-statistics shows a significant value of less than 0.05 (see table 6) which means the model is a good fit.

### Hypothesis 2

Three equations with same dependent variable book leverage, and different independent variables were used for results of hypothesis 2.

**Table 7: Empirical results, model 4, dependent variable book lev**

Variables	Pooled OLS		Fixed Effect		Random Effect		Weighted Least Square	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
<b>Const</b>	2.99099	<0.0001 ***	4.36589	0.0004* **	3.48017	<0.0001 ***	2.28424	<0.0001 ***
<b>LSB1</b>	0.0044087 9	0.9420	0.0870131	0.1011	0.0568729	0.2544	-0.0588580	0.0004 ***
<b>MLS</b>	0.0388793	0.4671	-0.0330983	0.7325	-0.0028136 6	0.9695	0.0173365	0.0386**
<b>AGE</b>	0.0026194 2	0.9583	0.249045	0.4259	0.0190824	0.8407	-0.0166034	0.0830*
<b>SIZE</b>	-0.105996	<0.0001 ***	-0.205787	<0.0001 ***	-0.130057	<0.0001 ***	-0.0718118	<0.0001 ***

<b>ROA</b>	-0.000462 968	0.9195	-0.00086035 7	0.7798	-0.0006174 83	0.8398	-0.000623760	0.1591
<b>TANG</b>	0.0008897 34	0.9551	0.000987525	0.9258	0.000946172	0.9286	-0.00129220	0.4018
<b>TAX</b>	-0.000528 163	0.8292	0.000105092	0.9528	7.60988e-05	0.9653	0.000666848	0.4089
<b>NDTS</b>	-0.011968 8	0.8466	-0.0213394	0.6177	-0.0130847	0.7550	-0.0169233	0.0051** *
<b>Durbin Watson</b>	1.905202		1.625477		1.625477		NA	
<b>R-Squared</b>	0.073610		0.662857		NA		0.480192	
<b>F-statistic (p-value)</b>	2.42e-11		1.31e-98		NA		1.0e-117	
<b>Chow Test for differing group intercepts (F-test statistic (p-value))</b>					8.70267		(2.91235e-090)	
<b>White's Test for Heteroskedasticity</b>					143.328225		(0)	
<b>Breusch-Pagan test (Chi-Square test statistic (p-value))</b>					685.006		(5.44781e-151)	
<b>Hausman test (Chi-Square test statistic (p-value))</b>					6.33595		(0.609656)	
<b>***Significant-at-1%, **Significant-at-5%, *Significant-at-10%</b>								

The above table shows regression results for equation or model 1. Four regression models were used, Pooled OLS, Fixed-Effect, Random-Effect, and WLS. To see whether Pooled OLS was a good model, Durbin Watson test was applied, the result showed that there is problem of collinearity hence results of Pooled OLS were overturned. To find out the best model, Pooled OLS and Fixed-Effect models were compared initially. The two models were compared on the basis of Chow test p-value which is presented in above table 7. The Chow test p-value is less than 0.05 (see table 7), hence the null hypothesis "Pooled OLS is good" was rejected and the alternate hypothesis "Fixed-Effect is good" was accepted. White's test was conducted for heteroskedasticity (see table 7) and the result showed that the data has problem of heteroskedasticity, therefore the result of Fixed-Effect model were considered invalidated.

Next was to compare between Pooled OLS and Random-Effect models, the Breusch Pagan test was taken under consideration, the test showed a p-value less than 0.05 (see table 7) therefore we reject the null hypothesis "Pooled OLS is good" and accept the Random-Effect model as a good fit. But the Durbin Watson test results (see table 7) showed a problem of auto collinearity and it caused to consider the results of Random-Effect model as invalidated.

Eventually, the Hausman test was run to compare between Fixed-Effect and Random-Effect, the result showed a p-value of more than 0.05 (see table 7), hence we accept the null hypothesis "Random-Effect is good". But the panel has problems of auto collinearity since the Random-Effect model doesn't resolve the issue therefore the results were considered invalidated.

WLS remained the only model which resolves the problems stated in above discussions and shows a consistent and significant results.

Hypothesis 2 stated that with the presence of second and third largest shareholders, the level of debt increases. The above table 4.6 shows the results of impact on leverage when there is presence of multiple controlling block holders. The results show a positive coefficient and a significant effect on leverage. As stated in literature review in chapter 1 of the study, the debt level increases with presence of multiple block holders because it protects their interests in conduct of business. This result is in line with literatures of (Santos et al. 2013), and (Nasr et al. 2015). The more the debt the more the monitoring of controlling block holder by second and third largest shareholders (Garcia et al. 2010). Age of firm has a significant impact on leverage with a negative coefficient. That's because older firms may have greater accumulated internal funds with passage of time, either through great investments or retained earnings. Which can be used to finance projects and investments without relying on external funds, this aligns with the result of (Memon, Chen & Samo 2019). Size of firm has a negative coefficient and a significant effect on firm leverage level (see table 7). With the increase of firm size, the firm has larger sources of funds such as cash reserves, retained earnings or more valuable assets, which results in lower level of leverage. ROA has weak negative coefficient but insignificant effect on leverage level. Asset tangibility has also a weak negative coefficient but insignificant effect on leverage level (see table 7). Tax has a very weak positive coefficient and an insignificant effect on leverage. non-debt tax shield has a negative

coefficient and a significant effect on leverage. The R-squared value of WLS is 48.01%, and F-statistics shows a significant p-value less than 0.05, which means the model is a good fit.

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