

# Impact of Leverage on Earning Management Empirical Evidence from Manufacturing Sector of Pakistan

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## Abstract

The current study examines the impact of leverage on earning management in manufacturing sector of Pakistan. It selects the list of 159 non financial firms from Pakistan stock exchange for the time period from 2009 to 2015. The study has used Modified Jones Model 1995 as a proxy of earning management. Independent variable includes leverage along with three control variables i.e. growth, firm size and return on assets. The findings reveal that there is significant positive relationship between leverage and earning management activities while other variables of the firm i.e. return on assets and firm size were also found to be significant, whereas no significant relationship was found between growth and earning management activities. This study has also discussed the relationship between earning management and discretionary accruals. Implications of the study for different stakeholders have also been discussed.

**Keywords:** Earning Management, Discretionary Accruals, Leverage, Non-Discretionary Accruals.

## Introduction

Accounting system offers some gaps/opportunities to interfere in financial statements to show the anticipated profit figure to the stakeholders. Earning management has been defined on many ways. According to Schipper (1989), Earning management is intentional interference in financial statements in order to gain some personal or organizational benefits. Bloom, Sadun, and Van Reenen (2015) defined earning management is a process of manipulation in financial reporting to gain some potential benefits for organization. In simple words, earning management is the manipulation of financial statements to get the desired level of earnings in order to meet shareholder's expectations or to attain some organizational benefits. However, earning management is not always linked with manipulation of accounting data but more associated towards selecting an accounting procedure within limits of Generally Accepted Accounting Principles (GAAP) (Veronica, 2015).

Earning management was initiated in last years due to large corporate scandals in Europe and U.S e.g. Enron, WorldCom and Xerox (Goncharov, 2005). There are two techniques of earning management i.e. Accrual based earning management (AEM), and real earning management (REM). AEM is the manipulation in financial reporting procedures within GAAP( generally accepted accounting principles) whereas real earning management is deviation in real transactions of normal business practices (Roychowdhury, 2006). During last years significant research has been done in accrual based and real earning management. Different techniques and approaches have been developed and adopted to measure earning management i.e use of discretionary accruals and income distributions (Dilger & Graschitz, 2015). According to Dechow and Skinner (2000), accrual based earning management is the most common tool to measure the earning quality as it involves general accounting procedures.

## Literature Review and Hypothesis development

Earning has a long history; it has been highlighting on circumstances in which earning management is practicing and consequences of earning management behavior. Some earlier studies had focused on selecting accounting methods and choice of accounting tools as a proxy of earning management (Cahan, 1992; DeAngelo, 1988; Dechow & Dichev, 2002; Dechow, Sloan, & Sweeney, 1995; Jones, 1991).

Many studies in literature have used accruals as a proxy of earning management whereas there are also some studies that are based on real earning management technique. Bruns Jr and Merchant (1990) identified that managers are more involved in real earning management activities than accrual based earning management as real earning management is difficult to detect as it involves manipulation in real transactions. But according to Healy (1985) and Dechow and Skinner (2000), accrual based earning management is most important tool in earning management. Past studies have used different methods in accrual based earning management field. But the most powerful tool to measure earning management has been the use of discretionary accruals i.e. Modified Jones Model (Dechow et al., 1995). In 1991, Jones (1991) introduced a model to measure the discretionary accruals as a measure of earning management that was further modified by (Dechow et al., 1995) to eliminate the conjecture propensity of Jones Model 1991 to calculate the discretionary accruals with the error when managers use their judgment over revenues.

Significant research exists on the association between financial leverage and earning management based on accrual based and real earning management techniques. There exist two different aspects in explaining the

relationship between leverage and earning management. Some past studies suggest that leverage increase the prospective for managers to manage earnings to evade debt covenant cost. Sweeney (1994) provide direct proof to support the hypothesis that high debt levels induce the managers to select income increasing accounting procedures. Literature also reveals that managers manipulate income in order to portray strong financial position and firms with high debt level are more involved in earning management activities in order to avoid from reporting loss (Burgstahler & Dichev, 1997; Degeorge, Patel, & Zeckhauser, 1999; Waweru & Riro, 2013).

Positive association between leverage and earning management can also be evidence with the financial distressed theory explained by (Fung & Goodwin, 2013). This study inspected the impact of debt on earning management in financial distressed firms; results showed that there is positive link earning management and between short term debt in financial distressed firms. Ujah and Brusa (2011) also inspected the impact of cash flow volatility and financial leverage on accrual based earning management activities. This study identified that both cash flow volatility and leverage affect the degree to which firms control their earnings, moreover customer staples and consumer cyclical groups are more involved in earning management activities.

Although significant literature have revealed the positive linkage between financial leverage and earning management but still there are some evidences of studies with opposite view. Iturriaga and Hoffmann (2005) identified the negative link between leverage and accrual based earning management on the basis that managers of high leveraged firms are less involved in earning manipulation because creditors are more concerned in debt services than any other accounting information.

Although extended literature has been found on earning management in Pakistan e.g. (Haider, Ali, & Sadiq, 2012; Naz, Bhatti, Ghafoor, & Husein, 2011; Tabassum, Kaleem, & Nazir, 2014; Tahir, Sabir, & Shah, 2011) but the effect of leverage on earning management is still pending for investigation. This study contributes the continuing debate on the relationship between leverage and accrual based earning management in manufacturing sector of Pakistan.

Based on the above arguments, the following hypotheses were constructed:

$H_{1o}$  = Financial Leverage has no significant affect on the Accrual Based Earning Management

$H_{1f}$  = Financial Leverage has significant affect on the Accrual Based Earning Management

$H_{2o}$  = Firm size has no impact on the Accrual Based Earning Management

$H_{2f}$  = Firm size has an impact on the Accrual Based Earning Management

$H_{3o}$  = Return on Assets has no impact on the Accrual Based Earning Management

$H_{3f}$  = Return on Assets has an impact on the Accrual Based Earning Management

$H_{4o}$  = Firm growth has no impact on the Accrual Based Earning Management

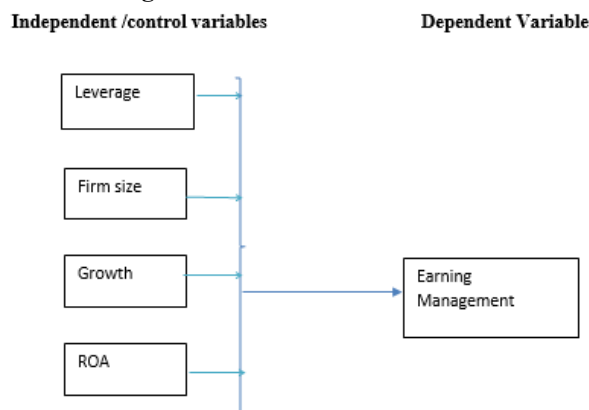
$H_{4f}$  = Firm growth has an impact on the Accrual Based Earning Management.

### Research Methodology

This study has selected 159 non-financial firms that are listed on Pakistan Stock Exchange from major four sectors i.e. textiles, cement, chemical & pharmacy and other manufacturing companies for the period from 2009 to 2015. All Financial firms were excluded due to their different capital structure and accounting practices. Data was gathered from annual reports published on official websites and also from “financial statement analysis of non-financial firms listed on Pakistan Stock Exchange”. Data was collected on the basis of availability of consecutive years. Modified Jones Model (Dechow et al., 1995) has been used as a measure of accrual based earning management and panel data analysis techniques have been used by Stata software.

This study uses the earning management as dependent variable and leverage as independent variable along with three control variables i.e. return on assets (roa), firms growth (growth) and firm size. On the basis of literature review, theoretical framework of research study is as follows:-

**Figure 1: Theoretical Framework**



## Measuring Dependent Variable

### Earning Management

Based on the literature, this study uses the proxy of discretionary accruals to measure earning management. To measure discretionary accruals Modified Jones Model (Dechow et al., 1995) was used.

The **Modified Jones model** to calculate the non discretionary part of accruals is as follows:-

$$NDACC / A_{it-1} = \beta_{1j} [1/A_{it-1}] + \beta_{2j} (\Delta REV / A_{it-1} - \Delta REC_{it}) / TA_{it-1} + \beta_{3j} (PPE_{it} / A_{it-1}) \quad Eq (1)$$

**Where:**

NDACC= Non-Discretionary accruals

$A_{t-1}$  = Total assets for the period t-1

$\Delta REV$  = Change in revenue

$\Delta REC$  = Change in the values of account receivables from last year

PPE = Property Plant and equipment (gross, operating fixed assets at cost)

In order to use the specific parameters of firm in above equation the following equation was used in regression.

$$TACC_{it} / A_{it-1} = \beta_{1j} [1/A_{it-1}] + \beta_{2j} [(\Delta REV_{it} - \Delta AR_{it}) / A_{it-1}] + \beta_{3j} [PPE_{it} / A_{it-1}] + \epsilon_{it} \quad Eq(2)$$

Wherein, total accruals (TACC) can be calculated through balance sheet approach i.e.

$$TACC = (\Delta CA - \Delta CASH - \Delta CL + \Delta STDEBT - DEPN)$$

Where

TACC total accruals

$\Delta CA$  change in current assets

$\Delta CL$  change in current liabilities

$\Delta CASH$  change in cash in hand

$\Delta STDEBT$  change in short term debt

DEPN depreciation

To measure the non-discretionary accrual amount, specific amounts of firm for each independent variable are employed for each period industry wise based on the fact that each variable ( $TACC/A_{it-1}$ ,  $\Delta REV_{it} - \Delta AR_{it}$ ,  $PPE_{it} / A_{it-1}$ ) is coming from same firm with each dataset being from different time period. Once  $\beta_{1j}$ ,  $\beta_{2j}$ ,  $\beta_{3j}$  have been measured for the cross section of the firms for the period from 2009 to 2015 through above regression equation (Eq 2), these coefficients are added in Eq (1) to calculate non-discretionary accrual part of firms

Discretionary accruals (DACC) are then calculated by taking difference of total accruals (TACC) and non-discretionary accrual (NDACC) which is the proxy of accrual based earning management.

$$DACC = TACC - NDACC$$

All the variables in the regression model are standardized by total assets (t-1) to remove the problem of size effect of firm.

### Measurement of Independent Variables

Main independent variable in this study is leverage. Leverage is defined as use of long term to finance firm's assets. Companies with more long term debts are considered to be high leveraged. Leverage was measured through debt ratio i.e total debts/ total assets.

Other control variables were also measured as follows:-

*Return on assets* Net income/Average total assets

*Firm Size* Natural log of total assets

*Sale growth* percentage change in sales

Finally, the following regression model is employed to test the relationship of leverage along with control variables on earning management.

$$DACC_{it} = \alpha_0 + \beta_1 Lev_{it} + \beta_2 sales\ growth_{it} + \beta_3 Size_{it} + \beta_4 ROA_{it} + \epsilon_{it}$$

## Results

Data analysis starts with descriptive statistics followed by correlation and then final regression results are shown and discussed to test the validity of hypothesis. Stata software was used for regression analysis.

### 1- Descriptive Statistics

Descriptive analysis shows the minimum, mean, maximum, and standard deviation values of variables. Highest value of discretionary accruals of 2.7475 show positive discretionary accrual also called abnormal accruals which indicate that sample firms are engaged in income increasing accrual management. Average value of leverage (0.42) show a significant level of debt financing in capital structure with standard deviation of 0.30 which means that financial leverage represent about 42% of total assets from sampled firms.

**Table 1: Descriptive Statistics**

Descriptive Statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
DACC	1133	0.0094535	0.3126321	-2.4063	2.7475
Leverage	1133	0.4216679	0.309455	0.000	3.5667
Roa	1133	0.0296482	0.1563653	-1.6431	3.1953
Growth	1133	0.1830255	1.54675	-4.5356	36.1123
Firm Size	1133	8.510105	0.7118137	6.6127	11.5626

**Note:** DACC represents the discretionary accruals; Leverage represents the debt ratio i.e. .total debt/total assets; Roa represents the return on total assets; Growth represents the percentage change in growth; firm size represents the natural log of total assets.

## 2- Correlation Analysis

Correlation analysis is most common and useful tool to test the strength of connection between dependent and independent variables. It also helps to check the multi collinearity problem in the dataset. Pearson Correlation is the most common measure of correlation in statistics. It explains the linear relationship and degree of correlation between independent variables (Pearson, 1895). Its value ranges between +1 and -1, where +1 means high positive correlation and -1 means total negative linear correlations. Pearson's correlation less than 0.80 between independent variables prove no multi collinearity between variables (Bassiouny, Soliman, & Ragab, 2016; Soliman, 2013). Table 2 gives the correlation matrix results between independent variables. According to the results no multi collinearity exist among all independent variables as all the coefficients are less than 0.80. Highest correlation can be seen between return on assets and discretionary accruals.

**Table 2: Correlation Matrix**

Correlation Analysis					
	DACC	Leverage	Roa	Growth	Firm size
DACC	1				
leverage	.0600	1			
ROA	.2936	-.1551	1		
Growth	.0676	-.0277	.0628	1	
Firm Size	.1373	-.2293	.0922	.0385	1

**Note:** DACC represents the discretionary accruals; Leverage represents the debt ratio i.e. .total debt/total assets; Roa represents the return on total assets; Growth represents the percentage change in growth; firm size represents the natural log of total assets.

## Final Regression

Hausman test was carried out for the sampled data which suggest random effect model to be used instead of fixed effect model. Diagnostic test have also been applied which shows that dataset has hetroskedasticity and autocorrelation problem but free from multi collinearity. To ensure the reliability and validity and of statistical results, this study has used the panel data regression to adjust the standard errors to adjust the standard errors of coefficients against possible dependence in the residuals. Robust standard errors are widely accepted and common to rely in case of any violation to get the valid statistical regression results (Hoechle, 2007). Table 3 gives the results of random effect model with cluster id.

**Table 3: GLS Random Effect Regression Results with Robust standard errors**

DACC	Coef.	Std. Error	z	P>z
Leverage	.145738	.0384978	3.79	0.000
Roa	.6157207	.0716696	8.59	0.000
Growth	.0103945	.0102269	1.02	0.309
firm size	-.0622892	.0197205	3.16	0.002
cons	-.602245	.164567	-3.66	0.000
<b>No. of observations</b>	<b>1113</b>			
<b>No. Of groups</b>	<b>159</b>			
<b>R-squared</b>	<b>37.47%</b>			
<b>Wald chi2(4)</b>	<b>102.30</b>			
<b>Prob &gt; chi2</b>	<b>0.000</b>			

**Note:** DACC represents the discretionary accruals; Leverage represents the debt ratio i.e. .total debt/total assets; Roa represents the return on total assets; Growth represents the percentage change in growth; firm size represents the natural log of total assets

The regression model was resulted to be highly significant because significance level is at 0.000. R-square

of the study is 37.47% which is good enough and it is also consistent with the previous studies such as Aman, Pourjalali, and Teruya (2006) Zamri, Rahman, and Isa (2013), Abbadi, Hijazi, and Al-Rahahleh (2016) and Briamonte, Addeo, Fiano, and Sorrentino (2017).

Results show that leverage is positively and significantly effect the accrual based earning management which means that increased leverage induce the managers to manipulate the earnings in upward directions. The results are also consistent with previous studies i.e. (Bassiouny et al., 2016; Ujah & Brusa, 2014; Uwuigbe, Uwuigbe, & Bernard, 2015; Vakilifard & Mortazavi, 2016). From control variables, return on assets and firm size are also found significant and positively related with accrual based earning management similar to the studies of (Moradi, Salehi, & Najari, 2012; Nassir Zadeh, Salehi, & Alaei, 2012). However, growth was not found to be significant enough to have any relationship with accrual based earning management similar to the results of Collins, Pungaliya, and Vjih (2016).

Another approach to deal with hetroskedasticity and autocorrelation in panel data is Park's Generalized Least Squares (FGLS) estimators. Though, it can be employed only when number the number of cross sections (N) is less than or equal to of time periods (T). So, Beck and Katz (1995) reported the customized version of inefficient least squares (OLS) which is known as "Panel Correlated Standard Errors (PCSE). PCSE estimator significantly performs better than FGLS estimators in many conditions (Reed & Ye, 2011). In STATA pooled OLS regression with panel correlated standard errors can be calculated with `xtpcse` command. `Xtpcse` command computes the panel correlated standard error for the data of cross sectional time series models where the parameters are estimated by OLS or Paris –Winston regression. In calculating the robust standard errors estimates, `xtpcse` command supposes that disturbance are by default hetroskedastic and correlated across panels (Hoechle, 2007). So, PCSE estimators have been widely adopted. Application of these estimators can be found in many past studies (Bitzer & Stephan, 2007; Lago-Peñas, 2006; Marques, 2005; Mosca 1, 2007). The results of PCSE has been reported in annexure I as table 4.

### **Conclusion**

This study has inspected the effect of leverage on accrual based earning management in 159 non –financial firms listed on PSX (Pakistan Stock Exchange) for the period from 2009 to 2015. Earning management is taken as dependent variable and leverage as independent variable along with three control variables i.e. growth, firm size, and return on asset. Based on regression results it was found that debt ratios i.e. leverage has positive association with accrual based earning management which means that high level motivates the managers to involve in earning management either to report desired profit level or to gain certain organizational goals. This gives the signals to the firms to control the debt level to avoid manipulations in earnings. The findings of this research will be helpful for future researchers who wish conduct further research in the area of earning management.

### **Limitations & Recommendations**

This study also lacks some limitations which can be considered by future researchers. First, this study has used only one model i.e. Modified Jones Model 1995 as a proxy to earning management. Other models in literature can also used to find the trade off between two. Secondly, this used overall analysis of different sectors from non-financial firms; sector wise analysis can also be a major contribution in the area of earning management. Further, more control variables may also be added to extend the scope of study to get better results.

Based on the study results, it would be recommended to the firms to control their debt level to reduce the manipulation in accrual management. Higher debt level increases the monitoring of financial analysts and other stakeholders could also be subject to scrutinized earning management activities. Results of the study also have an inference for investors, auditors, investors and regulators. High debt level of firms can be a signal to the investors for having manipulated earnings. So, it is recommended to examine the financial statement carefully before making any investment decision. Auditors and regulators can also increase regulations to control accrual based earning management.



**Annexure 1:**

**Table 4: Winston regression, correlated panels corrected standard errors (PCSEs)**

DACC	Coef.	panel correlated standards error	z	P>z
Leverage	.1464567	.0567281	2.58	0.010
Roa	.6053671	.0653652	9.26	0.000
Growth	.0097178	.0054599	1.78	0.075
Firm size	.0603637	.0183989	3.28	0.001
_cons	-.5852528	.159319	-3.67	0.000
rho	.0763303			
No. of observations	1113			
No. of groups	159			
R-Squared	37.47			
Wald chi2(4)	102.21			
Prob > chi2	0.000			

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