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

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Abstract

The current study examines the impact of leverage on earning management in the manufacturing sector of Pakistan. It selects a list of 159 non-financial firms listed at Pakistan Stock Exchange (PSE) for a period of 7 years. The study has used Modified Jones Model 1995 as proxy of earning management. Independent variable is leverage while the three control variables are growth, firm size and Return on Assets (ROA). The findings reveal that a significant positive relationship exists between leverage and earning management activities while other variables ROA and firm size are also found to be significant. However, no significant relationship is found between growth and earning management activities. Moreover, this study has discussed the relationship between earning management and discretionary accruals. The implications of the study for different stakeholders have been discussed also.

***Keywords*:** Earning management, discretionary accruals, leverage, non-discretionary accruals

JEL Classification: M41

Introduction

Accounting system offers some gaps/opportunities to interfere in financial statements in order to show the anticipated profit to the stakeholders. Therefore, in order to meet shareholder's expectations and management pressure from inside and outside the organizational entity respectively, managers may modify the financial statements to get the desired level of profit that is commonly referred to as earning management. Earning management was initiated recently due to large corporate scandals in Europe and U.S., such as Enron, Xerox and WorldCom. The central feature of these scandals were found due to the phenomenon of earning management (Goncharov, 2005). Therefore, in

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the last few years, earning management has gained an increased attention of scholars and significant research has been conducted to examine the causes and consequences of earning management.

Investors and stakeholders appreciate high quality earning reporting as it offers users the most valuable information in taking effective decisions and also helps to lessen agency problems as described in the Agency theory by Jensen and Meckling (1976). Leverage is one of the important variables that helps stakeholders to recognize the firm's ability to repay liabilities, so most of the time companies are involved in earning management practices in order to inflate their income level (Ardison, Martinez, & Galdi, 2012). Many prior studies have highlighted that leverage is one of the variables that has an important relationship with earning management and can help stakeholders detect earning management. Managers, in order to lessen debt covenant cost, may adopt some specific accounting policies to report favorable financial statements in terms of credit worthiness (Waweru & Riro, 2013). However, the results vary in relation to the country's financial policies. Significant research on earning management has been done in Pakistan from different perspectives (Ali, Noor, Khurshid, & Mahmood, 2015; Saleem & Alifiah, 2017). This research has produced mixed results and the effect of debt financing on earning management still needs to be investigated. This study aims to explore the impact of leverage on earning management in the manufacturing sector of Pakistan. The results of this study may help the manufacturing sector to examine the effect of debt on earning manipulation in order to improve the quality of earning management. The study is also beneficial for practitioners and academicians who may find new ways to extend it in the field of earning management.

1.1. Research Objectives

The motivation of this research is to find evidence for the proposition that leverage might influence a manager's decisions to manage earnings. This research argues that the managers of firms with high debts are involved in manipulation of earning to portray a better picture of their financial position. According to Beatty and Weber (2003), when a company relies on debt the managers are inclined towards income increasing accounting accruals to abide by the debt covenant cost imposed by banks and other financial institutions.

2. Literature Review and Hypothesis Development

Earning management has been defined in many ways. According to Schipper (1989), it is an intentional interference in financial statements in order to gain some personal or organizational benefits. Bloom, Sadun, and Reenen (2015) defined earning management as a process of manipulation in financial reporting to gain some potential benefits for the organization. In simple words, earning management is the manipulation of financial statements to show the desired level of earnings in order to meet shareholders' expectations or to attain some organizational benefits. However, it is not always linked with the manipulation of accounting data but is more associated with selecting an accounting procedure from Generally Accepted Accounting Principles (GAAP) (Veronica, 2015).

2.1. Earning Management Proxies

Earning management has a long history which highlights the circumstances in which it has been practiced and also its consequences. Some earlier studies focused on selecting accounting methods and choice of accounting tools as proxies of earning management (Badertscher, 2011; Dechow, & Schrand, 2010; Zang, 2011).

There are two techniques of earning management, that is, Accrual-based Earning Management (AEM) and Real Earning Management (REM). AEM constitutes the manipulation in financial reporting procedures within Generally Accepted Accounting Principles (GAAP), whereas REM comprises the deviation in real transactions during normal business practices (Roychowdhury, 2006).

Most of the studies in literature have used accruals to calculate earning management. However, there are some studies which are based on REM. Graham, Harvey, and Rajgopal (2005) identified that managers are more involved in REM rather than AEM because real earning management is not easy to detect as it involves manipulation in real transactions. But according to Zang (2011), AEM is the most important tool in earning management. Previous studies have used different methods to determine AEM. However, the most powerful tool to measure earning management has been the use of discretionary accruals, that is, modified ones model (Dechow, Sloan, & Sweeney, 1995). In 1991, Jones introduced a model to measure earning

management through discretionary accruals that was further modified by Dechow et al. (1995) to remove the conjecture propensity of Jones' 1991 Model and to calculate the discretionary accruals accounting for the error when managers use their judgment over revenues.

2.2. Empirical Evidence Supporting Leverage and Earning Management Relation

Significant research exists about the relationship between financial leverage and earning management using AEM and REM techniques. There are two different aspects of elucidating the connection between leverage and earning management. Some previous studies suggest that leverage increases the possibility of earning management to evade debt covenant cost. Sweeney (1994) provides direct proof to support the hypothesis that high debt levels induce managers to choose income increasing accounting measures. Literature also reveals that managers manipulate income in order to portray a strong financial position and firms with high debt level are more involved in earning management activities in order to avoid reporting loss (Ardison et al., 2012; Waweru & Riro, 2013).

Positive association between leverage and earning management can also be evidenced with the financial distress theory explained by Fung and Goodwin (2013). This study inspected the impact of debt on earning management in financially distressed firms; results found a positive link between earning management activities and short term debt in case of firms which were financially distressed. Ujah and Brusa (2011) also investigated the impact of cash flow volatility and financial leverage and on AEM 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.

2.3. Empirical Evidences Opposing Leverage and Earning Management Relation

Although literature reveals the positive link between financial leverage and earning management, still there is also evidence to the contrary provided by some studies. Iturriaga and Hoffmann (2005) identified the negative link between leverage and AEM on the basis that managers of high leveraged firms are less involved in earning manipulation because

creditors are more interested in debt services than any other accounting information.

Although extended literature has been found about earning management in Pakistan, (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 to the ongoing debate about the link between leverage and AEM in the manufacturing sector of Pakistan.

3. Hypothesis Development

Based on the arguments presented in the literature review, the following hypotheses were developed.

H_o: Financial leverage has no significant effect on AEM.

H_i: Financial leverage has a significant effect on AEM.

4. Research Methodology

This study selected 159 non-financial firms listed on Pakistan Stock Exchange (PSX) from major four sectors, including textiles, cement, chemical and pharma for the period spanning 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 the official websites and from ‘‘financial statement analysis of non-financial firms listed on PSX’’ published by the State Bank of Pakistan. Data was collected based on its availability for the variables of the study. Modified Jones Model (Dechow et al., 1995) was used as a measure of AEM and panel data analysis technique was used with the help of Stata software.

This study employs earning management as a dependent variable and leverage as an independent variable along with three control variables, including Return on Assets (ROA), firm growth (growth) and firm size. Based on literature review, the theoretical framework of this study is as follows,

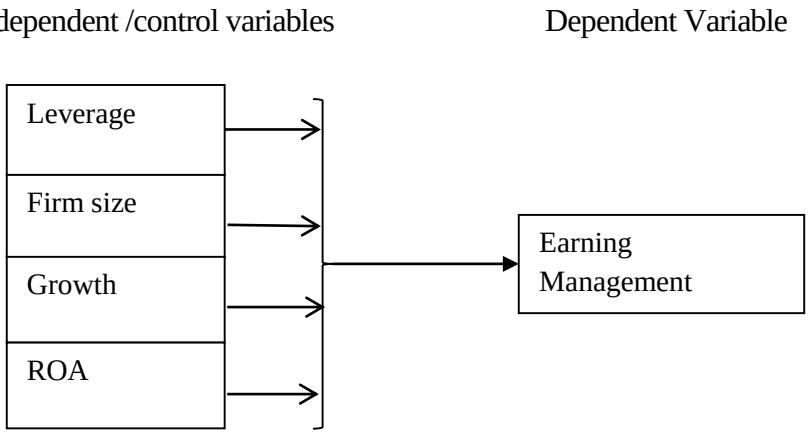

Figure 1. Theoretical Framework

4.1. Measuring Dependent Variable

4.1.1. Earning Management. Based on the literature, this study measures earning management using AEM technique. Modified Jones Model (Dechow et al., 1995) was used to measure discretionary accruals.

The Modified Jones Model for calculating the non-discretionary part of accruals is as follows,

$$NDACC / Ai_{t-1} = \beta 1j\,[1/Ai_{t-1}] + \beta 2j\,(\Delta REV/ Ai_{t-1} - \Delta REC\,it) / TA\,it\,-1 + \beta 3j\,(PPE\,it / Ai_{t-1}) \quad (1)$$

where

NDACC= Non-discretionary accruals

A*t-1*= Total assets for the period t-1

ΔREV = Percentage change in sales revenue from last year sales revenue
ΔREC= Change in the values of account receivables from the previous year

TA= Total amount of assets over period of one year

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

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

$$TACCt/Ait\text{-}1 = \beta 1j\,[1/Ait\text{-}1] + \beta 2j\,[(\Delta REVit - \Delta ARit)]/\,Ait\text{-}1 + \beta 3j\,[PPEit/\,Ait\text{-}1] + \varepsilon i_t \quad (2)$$

where in $\Delta ARit$ *is change in accounts receivables,* and total accruals (TACC) can be calculated through balance sheet approach, that is,

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

where;

TACC	total accruals
ΔCA	change in current assets
ΔCL	change in current liabilities
ΔCASH	change in cash in hand
ΔSTDEBT	change in short term debt
DEPN	depreciation

To measure the non-discretional accrual amount, specific amounts of firm for each independent variable are employed for each period industry wise, since each variable (TAC/Ait-1, ΔREVit – ΔARit, PPEit/ Ait-1) is coming from the same firm, with each dataset from a different time period. Once β1j, β2j, β3j have been measured for the cross-section of the firms for the period spanning from 2009 to 2015 through the regression equation *(Eq 2)* given above, these coefficients are added in eq (1) to calculate the non-discretionary accrual part of firms.

Discretionary Accruals (DACC) are then calculated by measuring the difference of Total Accruals (TACC) and Non-Discretionary Accruals (NDACC), which is the proxy of AEM.

$$DACC = TACC\text{-}NDACC$$

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

4.2. Measurement of Independent Variables

The chief independent variable in this study is leverage. Leverage is defined as the use of long term finance scaled by firm's assets. Companies with more long-term debts are considered to be highly

leveraged. Leverage is measured through debt ratio, that is, total debts/total assets.

Other control variables are 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, to test the correlation of leverage with control variables for earning management the following regression model is developed,

$$DACC_{it} = \alpha_0 + \beta_1 Lev_{it} + \beta_2 \text{ Sales growth}_{it} + \beta_3 Size_{it} + \beta_4 ROA_{it} + \varepsilon_{it}$$

5. Results

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

5.1. Descriptive Statistics

Descriptive analysis shows the minimum, mean, maximum, and standard deviation values of the variables. Results from descriptive statistics (Table 1) provide mean discretionary accruals (DACC) of about 0.0094535 with standard deviation of 0.3126321. The value of standard deviation is large for growth, that is, 1.54675. Whereas, Return on Asset (ROA) has the lowest value of 0.156 as compared to other variables. The results imply that on average selected firms are engaged in downward earning management activities. The maximum value of DACC (2.7475) indicates positive abnormal accruals among sample firms that may suggest that accruals are being managed upward to avoid earning loss. However, the minimum negative value (-2.4063) suggests that accruals are managed downwards to avoid earning increases. Low values of earning management indicate a high level of earning quality in selected firms. The results are consistent with Uwuigbe, Uwuigbe, and Bernard (2015) and Waseemullah, Safi and Shehzadi (2015). Mean values of ROA and growth are 0.0296482 and 0.1830255, respectively with standard deviations of 0.1563653 and 1.54675, respectively.

Table 1
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
DACC	1133	0.0095	0.3126	-2.4063	2.7475
Leverage	1133	0.4217	0.3095	0.000	3.5667
ROA	1133	0.0296	0.1564	-1.6431	3.1953
Growth	1133	0.1831	1.5468	-4.5356	36.1123
Firm Size	1133	8.5101	0.7119	6.6127	11.5626

Note: DACC represents the discretionary accruals. Leverage represents the debt ratio, that is, 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 relationship between dependent and independent variables can be observed from the following graphs. These line graphs show the trend of variables over a period of seven years. Significant correlation in the trend of discretionary accruals (DACC) with debt ratio, firm size and ROA can be observed, whereas the growth variable shows a different trend.

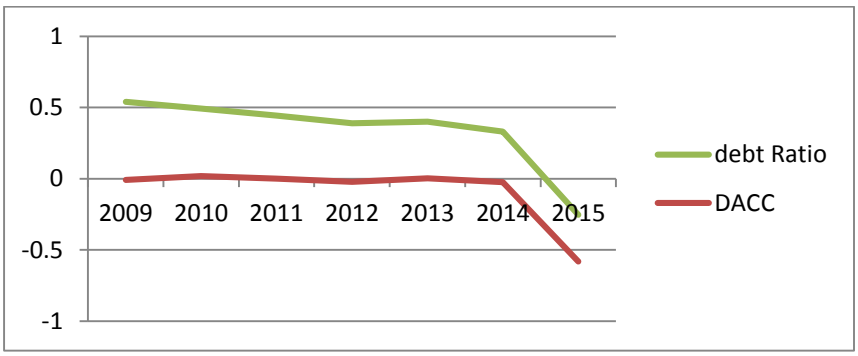

Figure 2. Relationship between DACC and Debt Ratio

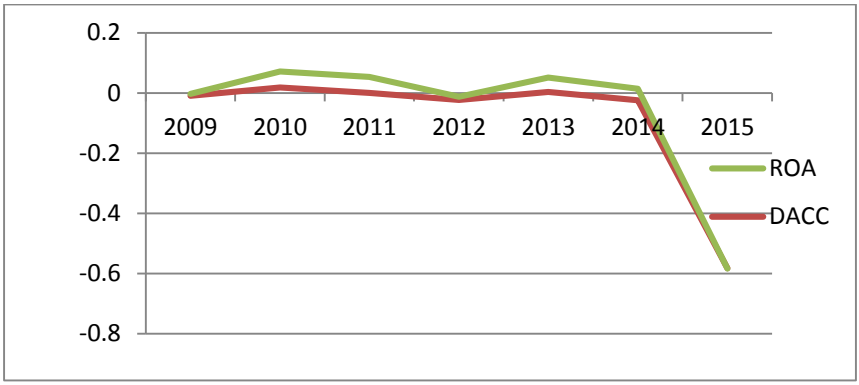

Figure 3. Relationship between DACC and ROA

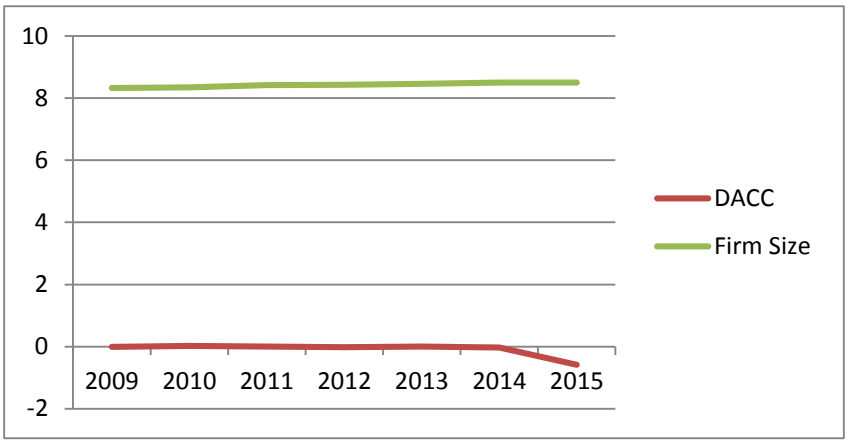

Figure 4. Relationship between DACC and Firm Size

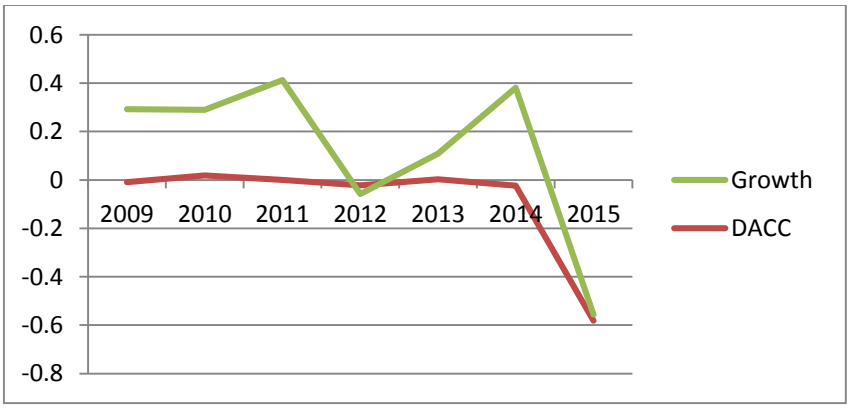

Figure 5. Relationship between DACC and growth

5.2. Correlation Analysis

Correlation analysis is the most common type of analysis and is a 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 correlation measure 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 indicates a high positive correlation and -1 indicates a totally negative linear correlation. Pearson's correlation is less than 0.80 between independent variables, which proves the absence of multi-collinearity between them (Bassiouny, Soliman, & Ragab, 2016; Soliman, 2013). Table 2 gives the correlation matrix results between independent variables. According to the results, all independent variables are free of multi-collinearity problem as the value of all coefficients is less than 0.80. The highest correlation can be seen between ROA and DACC.

Table 2
Correlation Matrix

	DACC	Leverage	ROA	Growth	Firm size
DACC	1				
Leverage	0.0600	1			
ROA	0.2936	-0.1551	1		
Growth	0.0676	-0.0277	0.0628	1	
Firm Size	0.1373	-0.2293	0.0922	0.0385	1

Note: DACC represents the discretionary accruals. Leverage represents the debt ratio, that is, 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.

5.3. Final Regression

Hausman test was carried out for the sampled data which suggests the use of random-effect model instead of fixed-effect model. Diagnostic test has been applied also which shows that dataset has hetroskedasticity and autocorrelation problem but is free from multi-collinearity. To ensure the reliability and validity of statistical results, this study has used panel data regression to adjust the standard errors of coefficients against possible dependence in the residuals. Robust standard errors are widely accepted and commonly relied on 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	0.1457	0.0385	3.79	0.000
ROA	0.6157	0.0717	8.59	0.000
Growth	0.0103	0.0102	1.02	0.309
Firm size	0.0623	0.0197	3.16	0.002
_cons	-0.6022	0.1646	-3.66	0.000
No. of observations				1113
No. Of groups				159
R-squared				37.47%
Wald chi2(4)				102.30
Prob > chi2				0.000

Note: DACC represents the discretionary accruals. Leverage represents the debt ratio, that is, 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 is shown to be highly significant because the significance level is 0.000. R-square of the study is 37.47% which is good enough and it is also consistent with 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 obtained after testing the first hypothesis show that financial leverage has a significant positive impact on AEM activities which means that when financial leverage increases, then managers are more involved in AEM. When the firms have a high debt level, they face the pressure of debt covenant cost and the managers adopt accounting policies to manipulate earnings in order to report a favorable financial statement. So, they are also involved in increasing AEM to report favorable earnings in order to attract the investors. The results are also consistent with previous studies such as (Bassiouny et al., 2016; Ujah & Brusa, 2014; Uwuigbe et al., 2015; Vakilifard & Mortazavi, 2016). With reference to control variables, ROA and firm size are found to be significant and positively related to AEM, similarly to the previous studies of (Moradi, Salehi, & Najari, 2012; Zadeh, Salehi, & Alaei,

2012). As the size of firm increases, incentive for the manager to indulge in AEM also increases.

One reason for this positive relationship could be that large firms have to show positive and increased earnings because they face more pressure from financial analysts and stakeholders. So, they are involved in income increasing accrual management. Another reason could be that large firms have strong management powers which give them the bargaining power to deal with auditors and investors and it also makes it easy for them to manipulate earnings. ROA is a sign of profitability which shows how profitable the firm is with reference to its assets. High profitability increases the opportunistic behavior of the managers which motivates them to manipulate earnings for certain purposes. However, growth is not found to be significant enough to have any relationship with AEM, which is similar to the findings of Collins, Pungaliya, and Vijh (2017). This may be due to the reason that high growth firms have a strong financial position and they are in a better position to deal with auditors. Since these firms also attracte investors due to their high growth potential, so they don't need to manipulate earnings.

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 the number of cross-sections (N) is less than or equal to the time periods (T). Hence, Beck and Katz (1995) extended the customized version of ordinary least squares (OLS) which is also known as "Panel Correlated Standard Errors" (PCSE). PCSE estimators performs better significantly as compared to FGLS estimators in many conditions (Reed & Ye, 2011). In STATA pooled OLS regression, panel correlated standard errors are calculated with xtpcse command. This command computes the panel correlated standard error for the data of cross-sectional time series models, where the parameters are estimated by OLS or Prais–Winston regression. In calculating the robust standard errors estimates, xtpcse command pre-supposes that disturbances are by default hetroskedastic and correlated across panels (Hoechle, 2007). So, PCSE estimators have been widely adopted. The application of these estimators can be observed in many previous studies (Bitzer & Stephan, 2007; Lago-Peñas, 2006; Marques, 2005; Mosca, 2007). The results of PCSE have been reported in Annexure I as Table 4.

6. Conclusions

This study investigated the influence of leverage on AEM in 159 non-financial firms listed at Pakistan Stock Exchange for the period of 7 years. Earning management was taken as the dependent variable and leverage as independent variable along with three control variables, including growth, firm size, and ROA. Based on regression results, it is concluded that debt ratios, that is, leverage has a positive association with AEM which means that high debt level motivates the managers to be involve in earning management either to report the desired profit level or to gain certain organizational goals. The research indicates that the need to control their debt level in order to avoid manipulations in their earnings.

This study contributes in the literature which examines the impact of debt level on earning management. Moreover, the main findings of this study suggest that there are negative consequences of debt on the performance of firms. Due to the increased debt level, managers are more worried about their financial position towards investors, therefore they tend to engage in accrual manipulation. The findings of this research will be helpful for future researchers who wish to conduct further research in the area of earning management.

7. Limitations and Recommendations

This study has some limitations which can be overcome by future researchers. Firstly, this study has used only one model, that is, Modified Jones Model 1995, as a proxy for earning management. Other models in literature can also be used to find the tradeoff between the two. Secondly, this study has used the overall analysis of non-financial firms from different sectors; sector-wise analysis can also be a major contribution in the area of earning management. Furthermore, other control variables may be added to extend the scope of the study to get better results.

Based on the results of this study, it is recommended that firms control their debt level in order 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. The results of this study also have an inference for investors, auditors, investors and regulators. High debt level of a firm can be a signal to investors to check for 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 AEM.

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List of Abbreviations

DACC	Discretionary Accruals
TACC	Total Accruals
NDACC	Non- Discretionary Accruals
GAAP	Generally accepted accounting principals
IFRS	International Financial Reporting Standards
ROA	Return on assets
EBIT	Earnings before interest and tax
AEM	Accrual based earning management
REM	Real earning management
REV	Revenue
REC	Account receivables
PPE	Property, plant and equipment
STDEBT	Short term debt
Lev	Leverage

Annexure 1

Table 4

Winston regression, correlated panels corrected standard errors (PCSEs)

DACC	Coef.	Panel Correlated Standards Error	z-Static	P>z
Leverage	0.1465	0.0567	2.58	0.010
ROA	0.6054	0.0654	9.26	0.000
Growth	0.0097	0.0055	1.78	0.075
Firm Size	0.0604	0.0184	3.28	0.001
_cons	-0.5853	0.1593	-3.67	0.000
rho .0763303				
No. of observations				1113.00
No. of groups				0159.00
R-Squared				0037.47
Wald chi2(4)				0102.21
Prob > chi2				0000.00

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