The Impact of Financial Distress

on Earnings Management

Prepared by

Ibrahim Mohamed Ali

Assistant Professor of Accounting

Faculty of Commerce Zagazig University

ibrahimali2531@gmail.com

Mona Elsaied Mansour

Teaching Assistant in the Accounting Department

Faculty of Commerce, Zagazig University

mona758386@gmail.com

Abstract

This study investigates the impact of financial distress on earnings management approaches (real and accruals earnings management). Using a sample of 80 firms listed in Egypt during the period of 2014-2019. Four proxies for measuring accruals and real earnings management, namely discretionary accruals, abnormal cash flows from operations, abnormal production cost, and abnormal discretionary expenses, are employed. Four empirical models are developed in which earnings management proxies are the dependent variables and the independent variable (financial distress) is the same in four models. The results show that distressed Egyptian firms tend to manipulate earnings management using real earnings management (abnormal production costs, abnormal cash flow from operations and abnormal discretionary expenses) rather than accruals earnings management which means that managers of financially distressed firms don't manipulate earnings management using accruals earnings management because accruals earnings management is more likely to be discovered by auditors and investors. And managers of distressed firms have lower accounting flexibility.

Keywords: financial distress; accruals earnings management; real earnings management

Introduction:

Going concern (GC) is one of the fundamental assumptions in accounting, GC means the firm will continue in its operations in the future and use its assets effectively, and it can pay off its obligation normally. The importance of that assumption is that the evaluation basis of the company's financial statements will differ on whether the firm will continue in its operations in the future or it is on its way to insolvency and bankruptcy. The firms are not able to pay their obligations to creditors, dividends to stockholders, and wages to workers and there have been continuous losses from operations for a number of periods, which are signs of the inability to continue its operations in the future. Hence, the firms are on their way to financial distress. (Abul-EZZ, 2013).

Financial distress has become an important issue in all markets in the world, as the past two decades have witnessed many cases of distress and financial failure in firms with a global reputation. There are many concepts of financial distress in literature, Chen et al. (1995, p. 4) said that "*financial distress occurs when the value of the firm's liquidation of total assets is less than the total value of its liabilities*". Economic crises, increasing competition, the depreciation of the currency, and high price of interest are the external causes of financial distress and bad management strategies are the internal causes of financial distress (Habib, 2013). Ignoring the signs of financial distress before it gets out of control can be devastating. There may come a time when severe financial distress can no longer be remedied because the firm's or individual's obligations have grown too high and cannot be repaid. If this happens, bankruptcy may be the only option. As a result, predicting firm financial distress is an important tool that assists decision

makers in making investment and financing decisions as well as assessing future risks.

Financial distress has great importance to investors, and creditors because it exposes them to large financial losses and the loss of their investments in the firm due to the continuous financial difficulties faced by the firm (Habib, 2013).

Financial distress can be overpriced for stockholders and creditors because it creates an incentive for managers to harm them to stay the firm's survival in the short run. Financial distress is also overpriced for firms because it creates an incentive for competitors to take advantage of the firm's weak financial position to capture the firm's market share, (Opler and Titamn, 1994). Financial distress can cause harmful things to firms such as increasing the cost of financing, decreasing productivity and sales, losing future job opportunities, delisting from the stock exchange, having a negative impact on the firm's reputation, deterioration the firm's financial condition, failing to meet the expectations of financial analysts, losing valuable investment opportunities and not being able to take loans from banks.

Financial distress exposes managers to being replaced, losing their bonuses, and losing their reputation (Liberty and Zimmerman, 1986). Financial distress generates problems for firms related to labor, suppliers, customers, and creditors.

From the previous discussion, Financial distress put managers under challenges and pressures so, the managers of distressed firms have the incentive to manage earnings to conceal adverse financial performance and to obtain financing from banks (Rosner, 2003) to decrease the probability of bankruptcy, hostile takeover or acquisition (Frost, 1997) and to avoid violation

of debt covenants (Defund and Jiambalvo, 1994). Hence, managers may resort to earnings management strategies to cover the weak financial ability of the company, achieve their motives and develop the firm's performance in the short term without upsetting the future. There are many concepts of earnings management, Schipper (1989, P.92) defined earnings management as *" purposeful intervention in the external financial reporting process with the intent of obtaining some private gain"*. And Healy and Wahlen (1999, P.368) referred to earnings management occurrence as *"when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the firm or to influence contractual outcomes that depend on reporting accounting numbers"*.

The literature on earnings management suggests that managers use accruals earnings management or real activities earnings management to deviate from optimal business operations. In accruals earnings management, managers intervene in financial reporting by changing accounting methods or using opportunistic estimates to inflate earnings. Such manipulation doesn't have any impact on cash flow. In real activities earnings management, managers deviate from optimal business operation. Managers aim to use those earnings management practices to change current year's earnings to achieve temporary goals, even if it may adversely affect the value of the firm in the future (Kothari et al., 2015).

Accruals earnings management and real earnings management are the main tools to manipulate earnings (Roychowhury, 2006; Cohen et al. 2010; Gunny, 2010 Dinh et al. 2016). The state of financial distress determines which of the earnings management tools will be applied: the real activities earnings management strategy or accruals earnings management strategies.

Many financially distressed firms shift from the real activities earnings management strategy, which is difficult to make known by the auditors and supervisory authorities but is costly, to the accruals earnings management strategy which is easy to disclose by the auditors and supervisory authorities but is less expensive.

The research problem can be expressed in the following questions:

1- What is the impact of financial distress on accruals earnings management?

2- What is the impact of financial distress on real earnings management?

Study Importance:

1- Investigating the impact of financial distress on accruals earnings management and real earnings management.

2- Provide awareness to investors, lenders, and stakeholders, and not be deceived by companies because they may be involved in applying earnings management practices when they are financially distressed, so that auditors and financial oversight bodies are required to provide effective control over these practices.

3- The expected results of this study may help users understand how firms behave during financial distress.

Literature Review and Hypotheses Development:

Managers decisions are affected by financial distress because it creates direct costs such as administrative, advisory, and legal costs and indirect costs such as increasing the cost of financing, decreasing the productivity and sales, losing the valuable investment opportunity and the firms can't take loans from banks (Altman, 1984). Financial distress puts the managers under pressure, so managers have the incentives to manipulate earnings through

accruals earnings management and real earnings management for a number of different reasons.

Bisogno and De Luca (2015) results support the previous arguments, as their results showed positive association between financial distress and the use of income increasing accruals, to keep obtaining credit from their main financial sources. Also, Chen et al. (2010) find that firms, to avoid continued special treatment status and the risk of being delisted, adopt income-increasing accruals earnings management. On the other hands, Charitou et al. (2007) find that distressed firms experience a large decrease in total accruals earnings management as bankruptcy filing approaches due to new managers' earnings bath choices and qualified audit opinions, which may induce managers to be more conservative in their financial reporting choices. Habib (2013) finds that mangers of distressed firms engage more in income decreasing-accruals earnings management practices compared to healthy firms. Chanchal Chatterjee (2015) finds that less distressed firms are engaged in higher accruals earnings management. In contrast, more distressed firms use lower accruals earnings management.

Because previous studies has yielded conflicting results regarding the relationship between financial distress and accruals earnings management, the following hypothesis is proposed:

H_1: There is no relationship between financial distress and accruals earnings management.

On the other side, the impact of financial distress on real earnings management has conflicting views. For instance, Kim et al. (2011) find that firms use real earnings management to avoid debt covenant in the future. Moreover, find that real earnings management is higher for borrowers that experienced increased bankruptcy risk in the previous year. This view is

supported by Campa&Camacho-Minano (2015) finding that there is a positive relationship between financial distress and real earnings management. Since firms with a higher level of financial distress show more signs of upwards earnings management through real earnings management rather than accruals, and vice versa, accordingly, real activities earnings management is preferred over accruals when managers are under significant levels of pressure, such as being close to face a bankruptcy procedure. However, other researchers find the opposite. For instance, Zang (2012) shows that there is a negative relationship between financial distress and real earnings management since healthier firms conduct a higher level of real earnings management than accruals earnings management. Since accruals earnings managements manipulates earnings through changing accounting polices, accounting estimates, and or methods of asset impairment, and it doesn't influence corporate cash flows or economic activities, it is relatively easy to implement and incurs a lower cost. In contrast, real earnings management manipulates earnings through changing firms' economic activities, such as cutting research and development expenditures or the provision of slack credit policies. It usually requires an adjustment to business strategies or operations, which incurs at higher costs. So, for firms in financial distress, their managers wouldn't have many resources to carry out real management. So, managers of financially distressed firms shift from real to accruals earnings management. This view is supported by Neerav Nagar and Kaustav Sen (2019), whosuggest that firms in the initial stages of distress engage in real earnings management, and When distress becomes severe, firms engage in income-increasing accruals management. Yuanhui Li, Xiao Li, Erwei Xiang, Hadrian Geri, (2020) find that more financially

distressed firm tend to undertake more accruals earnings management and less real earnings management.

Since previous studies indicate mixed results concerning the association between financial distress and real earnings management, our hypotheses are as follows:

H_2: There is no relationship between financial distress and sales manipulation.

H_3: There is no relationship between financial distress and abnormal production costs manipulation.

H_4: There is no relationship between financial distress and abnormal discretionary expenses manipulation.

Study Design and Methodology

1. sample selection

The population of the study includes all Egyptian firms listed on the Egyptian stock exchange, distributed over 15 economic sectors except for banks and financial institutions because of their special nature.

A convenient sample of 80 firms is drawn from this qualified population for a period from 2014 to 2019 to obtain 480 firm-year observations for each variable in the study. Appendix(1) shows the sample firms and the sectors they belong to. Table (1) shows a summary of the qualified population and the sample composition.

No.	Sector	Firms in the sector	Firms selected in the sample	selected to all firms in the sample	selected to all firms in the sector
1.	**Basic resources**	7	5	.0625	.714
2.	**Chemicals**	7	5	.0625	.714
3.	**Constructions and materials**	19	10	.125	.526
4.	**Food and beverage**	19	10	.125	.526
5.	**Industrial goods and services and automobiles**	15	8	.1	.533
6.	**Media**	1	1	.0125	1
7.	**Personal and household products**	10	6	.075	.6
8.	**Real estate**	19	10	.125	.526
9.	**Telecommunications**	4	4	.05	1
10.	**Travel and lesiure**	13	7	.0875	.538
11.	**Utilities**	1	1	.0125	1
12.	**Technology**	3	3	.0375	1
13.	**Healthcare and pharmaceutical**	13	7	.0875	.538
14.	**Oil and gas**	3	3	.0375	1
Total		**134**	**80**	**1**	**10.689**

According to Athanasakou et al. (2011), each sector should include at least six firms in order to measure the REM proxies and AEM using a cross-section. Therefore, the researcher combined the media, technology, and telecommunications sectors and treated them as one sector. Also, the utilities and oil and gas sectors are combined with the basic resources sector. The retail sector is excluded because it includes only four firms.

2. Empirical Study Models

Model 1 examines the impact of financial distress on accruals earnings management. After controlling for the known determinants of accruals earnings management:

$$DA_{i.t} = \alpha_0 + \alpha_1 \ FD_{i.t} + \alpha_2 SIZE_{i.t} + \alpha_3 \ LEV_{i.t} + \alpha_4 OCF_{i.t} + \alpha_5 AUD_{i.t} +$$
$$\alpha_6 GROWTH_{i.t} + \alpha_7 ROA_{i.t} + \alpha_8 CYCLE_{i.t} + \alpha_9 Y_{i.t} + \varepsilon_{i.t} \ ......(1)$$

$DA_{i.t}$ is discretionary accruals for firm i in year t, as a proxy for accruals earnings management(dependent variable), $FD_{i,t}$ is financial distress for firm i in year t (independent variable), $SIZE_{i.t}$ is Firm size for firm i in year t, $LEV_{i.t}$ is Financial leverage for firm i in year t, $OCF_{i.t}$ is Operating cash flow for firm i in year t, $AUD_{i.t}$ is Audit quality for firm i in year t, $GROWTH_{i.t}$ is Growth opportunity for firm i in year t, $ROA_{i.t}$ is profitability for firm i in year t, $CYCLE_{i.t}$ is Cash cycle for firm i in year t and $Y_{i.t}$ is year effect for firm i in year t.

Model 2 examines the impact of financial distress on sales manipulation. After controlling for the known determinants of real earnings management:

$$ABCFO_{i.t} = \beta_0 + \beta_1 \ FD_{i.t} + \beta_2 SIZE_{i.t} + \beta_3 \ LEV_{i.t} + \beta_4 OCF_{i.t} + \beta_5 AUD_{i.t} +$$
$$\beta_6 GROWTH_{i.t} + \quad \beta_7 ROA_{i.t} \quad + \quad \beta_8 MS_{i.t} + \quad \beta_9 Y_{i.t} \quad + \quad \varepsilon_{i.t}$$
$$...................(2)$$

$ABCFO_{i.t}$ is the Abnormal cash flow from operations as a proxy for real earnings management for firm i in year t (dependent variable), Roychowdhury (2006) estimates the normal level of CFO as a linear function of sales, $FD_{i,t}$ is financial distress for firm i in year t(independent variable), $SIZE_{i.t}$ is Firm size for firm i in year t, $LEV_{i.t}$ is Financial leverage for firm i in year t, $OCF_{i.t}$ is Operating cash flow for firm i in year t, $AUD_{i.t}$ is Audit quality for firm i in year t, $GROWTH_{i.t}$ is Growth opportunity for firm i in year t, $ROA_{i.t}$ is profitability for firm i in year t, $MS_{i.t}$ is market share for firm i in year t and $Y_{i.t}$ is year effect for firm i in year t.

Model 3 examines the impact of financial distress on abnormal production cost manipulation. After controlling for the known determinants of real earnings management:

$$ABPROD_{i.t} = B_0 + B_1\,FD_{i.t} + B_2 SIZE_{i.t} + B_3\,LEV_{i.t} + B_4 OCF_{i.t} + B_5 AUD_{i.t} +$$
$$B_6 GROWTH_{i.t} + B_7 ROA_{i.t} + B_8 MS_{i.t} + \beta_9 Y_{i.t} +$$
$$\varepsilon_{i.t}\ldots\ldots\ldots(3)$$

$ABPROD_{i.t}$ is the Abnormal production cost for firm i in year t as proxy for measuring real earnings management (dependent variable), $FD_{i,t}$ is financial distress for firm i in year t (independent variable) , $SIZE_{i.t}$ is Firm size for firm i in year t, $LEV_{i.t}$ is Financial leverage for firm i in year t, $OCF_{i.t}$ is Operating cash flow for firm i in year t, $AUD_{i.t}$ is Audit quality for firm i in year t, $GROWTH_{i.t}$ is Growth opportunity for firm i in year t, $ROA_{i.t}$ is profitability for firm i in year t, $MS_{i.t}$ is market share for firm i in year t and $Y_{i.t}$ is year effect for firm i in year t.

Model 4 examines the impact of financial distress on abnormal discretionary expenses manipulation. After controlling for the known determinants of real earnings management:

$$ABDISEXP_{i.t} = B_0 + B_1 FD_{i.t} + B_2 SIZE_{i.t} + B_3 LEV_{i.t} + B_4 OCF_{i.t} + B_5 AUD_{i.t} +$$
$$B_6 GROWTH_{i.t} + B_7 ROA_{i.t} + B_8 MS_{i.t} + \beta_9 Y_{i.t} + \varepsilon_{i.t}\ \ldots\ldots\ \textbf{(4)}$$

$ABDISEXP_{i.t}$ is the Abnormal discretionary expenses for firm i in year t as a proxy for measuring real earnings management(dependent variable) , $FD_{i,t}$ is financial distress for firm i in year t (independent variable) , $SIZE_{i.t}$ is Firm size for firm i in year t, $LEV_{i.t}$ is Financial leverage for firm i in year t, $OCF_{i.t}$ is Operating cash flow for firm i in year t, $AUD_{i.t}$ is Audit quality for firm i in year t, $GROWTH_{i.t}$ is Growth

opportunity for firm i in year t, $ROA_{i.t}$ is profitability for firm i in year t, $MS_{i.t}$ is market share for firm i in year t and $Y_{i.t}$ is year effect for firm i in year t.

3. Measurement of the Dependent, Independent, and Control Variables:

3.1. Measurement of the Dependent Variables:

3.1.1. Accruals Earnings Management Measurement :

This study is going to be based on the absolute value of discretionary accruals as a proxy for accrual earnings management, so that we can avoid the offset impact of the positive and negative numbers of earnings management. Therefore, the degree of earnings management can be reflected more precisely. Discretionary accruals is the difference between the firm's actual accruals and the normal level of accruals. Non-Discretionary accruals is estimated using the modified jones model by Dechow et al. (1995).

This study uses the following regression model to estimate regression parameters β_0 β_1 β_2

$$TAC_{it}/A_{it-1} = \beta_0 \ (1/A_{it-1}) + \beta_1 \ [\ (\Delta REV_{it} - \Delta REC_{it})/A_{it-1}] + \beta_2$$
$$(\ PPE_{it}/A_{it-1}) + \varepsilon_t \ \dots\dots\dots\dots\dots\dots\dots\dots\text{(5)}$$

Where, $TAC_{i.t}$ is total accruals for firm i in year t. where Accruals is the difference between earnings before extraordinary items and operating cash flow, $ASSETS_{i.t-1}$ is total assets for firm i in year t-1, $\Delta REV_{i.t}$ is annual change in revenues for firm i in year t, $\Delta REc_{i.t}$ is annual change in receivable for firm i in year t, $PPE_{i.t}$ is the gross property, plant, and equipment for firm i in year t,

$\varepsilon_{i.t}$ is the residuals, express about discretionary accruals and β_0 β_1 β_2 is the model's parameters that are estimated using the least squares method.

3.1.2. Real Earnings Management

(Measurement of abnormal cash flow from operations, abnormal production costs and abnormal discretionary expenses):

Following Cohen et al. (2008) and Roychowdhury (2006), This study is going to be based on the absolute value of abnormal cash flow from operations(ABCFO), the absolute value of abnormal production cost (ABPROD), and the absolute value of abnormal discretionary expenses(ABDISEXP) to measure real earnings management. So that we can avoid the offset impact of the positive and negative numbers of earnings management. Therefore, the degree of earnings management can be reflected more precisely. First, this study will calculate the normal level of cash flow from operations, the normal production costs, and the normal discretionary expenses. Then, this study obtains the residuals by running the regressions to estimate the abnormal cash flow from operations(ABCFO), the abnormal production costs (ABPROD), and the abnormal discretionary expenses(ABDISEXP)

1- Sales Manipulation Measurement Model:

The following model expresses the normal level of CFO as a linear function of sales:

$$CFO_{i.t}\big/_{A_{i.t-1}} =\alpha_1(1/A_{i.t-1}) +\alpha_2(S_{i.t}/A_{i.t-1})+\alpha_3(\varDelta S_{i.t}/A_{i.t-1})+\varepsilon_{i.t}\ldots\ldots(8)$$

Where,

$CFO_{i.t}$ is the normal cash flow from operations of firm i in year t., $A_{i.t-1}$ is the total assets of firm i in year t-1, $S_{i.t}$ is the sales of firm i in year t,

$\Delta S_{i.t}$ is the change in sales between year t-1 and t and $\varepsilon_{i.t}$ is the residuals express the abnormal operating cash flow.

2- Production Manipulation Measurement Model:

The following model expresses the normal level of production costs:

$$PROD_{i.t}/A_{i.t-1} = \alpha_1\ (1/A_{i.t-1})\ + \alpha_2\ (S_{i.t}/A_{i.t-1}) + \alpha_3\ (\Delta S_{\ i.t}/A_{i.t-1}) + \alpha_4\ (\Delta S_{\ i.t-1}/A_{i.t-1})\ + \varepsilon_{i.t}\ \ldots\ldots\ldots\ldots\ldots\ (9)$$

Where, $PROD_{i.t}$ is total cost of production year t, which is calculated by this equation: the cost of goods sold + Δ inventory $A_{i.t-1}$ is the total assets of firm i in year t-1, $S_{i.t}$ is the sales of firm i in year t, $\Delta S_{i.t}$ is the change in sales between year t-1 and t, and $\varepsilon_{i.t}$ is the residuals express the abnormal production costs.

3- Discretionary Expenditure Manipulation Measurement Model:

The following model expresses the normal level of discretionary expenditure:

$$DISEXP_{i.t}/A_{i.t-1}\ =\ \alpha_1\ (1/A_{i.t-1})\ + \alpha_2\ (S_{i.t}/A_{i.t-1}) + \varepsilon_{i.t}\ .\quad (10)$$

Where,

$DISEXP_{i.t}$ is the discretionary expenditure (i.e., the sum of research and development, advertising, and selling, administrative, and general expenditures of firm i in year t), $A_{i.t-1}$ is the total assets of firm i in year t-1, $S_{i.t}$ is the sales of firm i in year t and $\varepsilon_{i.t}$ is the residuals express the abnormal discretionary expenditures.

Following prior studies on REM (e.g., Cohen et al. (2010); Sohn (2016); Alhadab and Nguyen (2018); Domenico campa (2015), ABCFO, ABPROD, and ABDISEXP would be used as individual proxies for measuring real earnings management.

3.2. Measurement of the Independent Variable:

Financial Distress

This study adopts the distress \ non-distress classification of Mckeown et al. (1991), Mutchler et al. (1997), and Hopwood et al. (1994). The presence of financial distress is measured by "1" if there is at least one of the following financial distress signals within three consecutive years:

- Negative working capital in the most recent years;
- A net loss in the most recent years;
- Negative net operating cash flow;
- Both negative working capital and net loss and negative net operating cash flow experienced in the most recent years. And zero otherwise.

3.3. Measurement of the Control Variables:

Firm size (Size) is measured as the log of total assets, financial leverage (LEV) is measured as the ratio of total debts to total assets, audit quality (AUD) is measured as audit quality coded 1 if the firm observations are audited by big4 auditors, zero otherwise, growth opportunity (Growth) is measured as the annual change in net sales, operating cash flow (OCF) is measured as cash flow from operations divided by totals assets, profitability (ROA) is measured as net income divided by total assets, market share (MS) is measured as firm sales divided by industry sales, cash cycle (Cycle) is measured as account receivable days plus inventory days minus account payable days.

Account receivable days= (average account receivable divided by net sales) * 365, inventory days= (average inventory divided by cogs) * 365, account payable days= (average account payable divided by cogs) *365, and

Year effect is measured as dummy variables coded 1 if the observations belong to the year and zero otherwise.

Empirical Findings

This chapter presents the design of the empirical study. The aim of this chapter is to test the research hypotheses concerning the impact of financial distress and earnings management tools.

1- Descriptive statistics:

Table (1): Descriptive statistics:

Variable	Mean	Std. Dev.	Max.	Min.
AEM	.0668676882	.0751362173	.4985879609	.000000000
ABCFO	.0644941918	.0802887433	.5887329845	.000000000
ABPROD	.0524715690	.0659642121	.4679172784	.000000000
ABDISEXP	.0276052829	.0357400565	.2233782050	.000000000
SIZE	20.67055151	1.598830980	24.90216274	14.38556922
LEV	.5434695358	.6570800469	7.188728405	.000518042
ROA	.0328901801	.1512156620	.482837578	-1.16674125
OCF	.0346868731	.1461593137	.562382310	-1.20146535
GROWTH	2.171823572	29.52822699	606.2676218	-1.00000000
CYCLE	370.5216846	4029.038401	66564.92924	-42379.1581
MS	1.131354513	1.366448555	8.6054017	.0000000000

Dummy variable:

Table (2): Dummy variable:

	FD	Audit
The proportion of 0	61.5	62.5
The proportion of 1	38.5	37.5

2- Correlation Matrix:

Pearson correlation is used to test the correlation among all variables in the study models. The correlation results are mainly used to get some preliminary insights into the dataset and provide a first indication of the multi-collinearity problem. Correlation coefficients are calculated for the models as presented in table 3.

The correlation matrix in table 3 reveals that there is a significant and positive correlation between (ABCFO, ABPROD, and ABDISEP), suggesting that firms use three methods of real earnings management. With regard to discretionary accruals earnings management (AEM), there is a significant and positive correlation between accruals earnings management (AE) and each of abnormal cash flow from operations (ABCFO), abnormal production cost (ABPROD), and abnormal discretionary expenditure (ABDISEX), suggesting that firms use both types of earnings management.

Also, there is a positive and significant correlation between financial distress and abnormal cash flow from operations, and abnormal production costs. And there is a positive correlation between financial distress and abnormal discretionary expenditure, which is statically significant at the 10% level. However, there is a positive and insignificant correlation between financial distress and accruals earnings management (AEM), suggesting that distressed firms use real earnings management in managing earnings management.

There is a positive and significant correlation between financial distress and leverage level, growth opportunity, and audit. However, there is a negative and significant correlation between financial distress and the size of the firm, cash flow from operations scaled by total assets, return on assets, and market share.

Pearson correlation or full sample													
Correlation	AEM	ABCFO	ABPROD	ABDIS	FD	Audit	Size	Lev	ROA	CFO	Growth	MS	cycle
AEM	1												
ABCFO	.391***	1											
ABPROD	.156***	.455***	1										
ABDIS	.183***	.384***	.161***	1									
FD	-.006	.161***	.190***	.078*	1								
Audit	-.021	-.013	.142***	-.207***	.088*	1							
Size	-.016	-.170***	-.070	-.179***	-.167***	.236***	1						
Lev	-.029	.012	.048	-.104**	.245***	-.048	-.105**	1					
ROA	.027	-.054	-.135***	.058	-.436***	.023	.242***	-.586***	1				
CFO	.020	-.155**	-.166***	-.008	-.356***	-.032	.263***	.529***	.719***	1			
Growth	.014	.199***	.219***	-.028	.081*	.076*	.054	.014	-.045	-.025	1		
MS	.011	-.101**	-.045	-.112**	-.159***	.195***	.504***	-.058	.321***	.316***	-.045	1	
Cycle	-.014	.039	.018	.006	.016	.033	.016	.044	-.032	.001	-.084*	-.029	1

Correlation is significant at the .01 level (2-tailed). *
Correlation is significant at the .05 level (2-tailed). *
Correlation is significant at the .10 level (2-tailed). *

3. Models Validation:

3.1. Normality:

The residuals are tested for normality. Table (4) presents the results of the Shapiro-Wilk w test for normal data, which indicate that the residuals of DA, ABPRPOD, ABCFO, and ABDISEXP are not normally distributed. to overcome the violation of the normality assumption and the influence of outliers, winsorzing at the 1% is used.

Table (4): Shapiro-Wilk W test for normal data

Models	Shapiro-Wilk W test for normal data	
	Z	Prob>z
DA model	10.278	0.00000
ABPROD model	9.600	0.00000
ABCFO model	10.110	0.00000
ABDISEXP model	9.758	0.00000

3.2. Multicollinearity:

A significant high correlation (generally more than 0.90) is the first indicator of a multicollinearity problem (Hair et al., 2006). In addition to the correlation values, the variance inflation factor (VIF) is performed to test multicollinearity. A VIF value greater than 30 indicates a multicollinearity problem. The previously displayed correlation matrix shows that no high significant correlation between the control and independent variables, and VIF values for all variables are less than 30 which means that there is no multicollinearity problem for the study models.

Table (5): Variance Inflation Factor:

Variable	DA model	ABPROD model	ABCFO model	ABDISEXP model
	VIF	VIF	VIF	VIF
ROAW1	2.13	2.13	2.13	2.13
OCFW1	1.82	1.82	1.82	1.82
MSW1	1.62	1.62	1.62	1.62
SizeW1	1.48	1.48	1.48	1.48
LEVW1	1.39	1.39	1.39	1.39
FD	1.35	1.35	1.35	1.35
AUDIT	1.14	1.14	1.14	1.14
Growthopportunityw1	1.05	1.05	1.05	1.05
Cash cyclew1	1.03	1.03	1.03	1.03

3.3. Heteroscedasticity:

Heteroscedasticity occurs when the residuals have an inconsistency of variance to test for heteroscedasticity the white test is used.

White test: the null hypothesis is that the variance of the residuals is consistent in the four models. If the null hypothesis is rejected, this means the heteroscedasticity problem exists. Table (6) shows the results of this test which show the existence of the heteroscedasticity problem in ABPROD, ABCFO, and ABDISEXP models but not in the DA model. To overcome this problem, robust standard errors are used (Holzhacker et al., 2015).

Table (6): results for Heteroscedasticity diagnostic test:

Models	White's test		Decision	Heteroscedasticity
	Chi-Sq-Statistic	Prob>chi2		
DA model	25.22	0.9994	H_0 accepted	No
ABPROD model	153.86	0.0000	H_0 rejected	Yes
ABCFO model	126.49	0.0000	H_0 rejected	Yes
ABDISEXP	73.48	0.0265	H_0 rejected	Yes

3.4. Autocorrelation:

The Wooldridge test is used to check for autocorrelation using the STATA program. H_0 in this test states that no first-order correlation exists. If H_0 is rejected, this means the autocorrelation problem exists. Table (7) shows the results of this test, which show the existence of an autocorrelation problem exists in the DA model and ABCFO model. Clustered robust standard errors are used to overcome this problem.

Table (7) Results of autocorrelation tests

Models	Wooldridge		Decision	Autocorrelation
	F(1,78)	Prob > F		
DA model	1.873	0.1750	H_0 is accepted	No
ABPROD model	23.866	0.0000	H_0 is rejected	Yes
ABCFO model	3.838	0.0537	H_0 is accepted	No
ABDISEXP model	8.962	0.0037	H_0 is rejected	Yes

Results and Discussion of Regression Models:

In order to test the research hypotheses concerning the impact of financial distress on earnings management tools, four empirical regression models are estimated for each dependent variable (i.e. DA, ABCFO, ABPROD, and ABDISEXP).

Discretionary Accruals Model (DA):

Table 8 shows the results of the AEM model (as a proxy for accruals earnings management) using the pooled model after adding the effect of the year where dummy variables were added to each year of the study, these variables take the value of one if the observations belong to the year and zero otherwise.

Table (8): Results of the DA model

Dependent variable	AEM	
Independent variable	Coefficient	Significance
Constant	.0954	0.131
FD	.0072	0.363
Audit	-.0009	0.900
Size	-.0012	0.695
Lev	-.0065	0.264
Growth opportunity	-.0026	0.039
OCF	.0090	0.804
ROA	.0164	0.674
Cash cycle	-2.97e-06	0.023
N	472[*]	
R-square	0.0406	
Adjusted R-square	2.0152	
F statistics	1.83	
Prob > F	0.0324	

The model is significant as the F equals 1.83 with a probability is less than 0.05, and the explanatory power of the model (R^2) equals 0.0406, which means that 4.06% of the variation in the dependent variable (AEM) is explained by the independent along with the control variables. The model

shows that financial distress does not affect accruals earnings management, as shown in table 4 (β = .0072, p-value= 0.363). This means that managers of financially distressed firms don't manipulate earnings management using accruals earnings management because accrual earnings management is more likely to be discovered by auditors and investors. Because distressed firms are more likely to be monitored by external parties such as auditors, investors, and creditors. And managers of distressed firms have lower accounting flexibility. Therefore, these firms practice more conservative accounting policies.

Regarding the control variables, our regression results show that Big4, firm size and leverage are negatively but insignificantly related to accruals earnings management. Growth opportunity is negatively and significantly related to accruals earnings management consistent with the study (campa Camacho, 2015). Suggest that firms with faster growth rates tend to engage in lower accrual earnings management because they are subjected to more monitoring by stakeholders. Cash flow from operations and return on assets are positively and insignificantly associated with accruals earnings management. The cash cycle is negatively and significantly related to accruals earnings management, which means that firms with longer cash cycles have less incentive to manage accruals as they enjoy less accounting flexibility to manage accruals earnings management.

4.2. Abnormal Production Costs Model:

Table 9 shows the results of multiple regression analysis using the pooled model after adding the effect of the year where dummy variables were added to each year of the study, these variables take the value of one if the

observations belong to the year and zero otherwise for the abnormal production costs model as a proxy for earnings management.

Table (9): Results of the ABPROD model

Dependent variable	ABPROD	
Independent variable	Coefficient	Significance
Constant	.1023	0.082
FD	.0154	0.025
Audit	.0160	0.011
Size	-.0031	0.273
Lev	-.0037	0.481
Growth opportunity	.0018	0.455
OCF	-.0710	0.030
ROA	-.0161	0.625
MS	.0024	0.370
N	472[*]	
R-square	0.0893	
Adjusted R-square	.0736	
F statistics	2.43	
Prob > F	0.0026	

The model is significant as the F equals 2.43with a probability is less than 0.05, and the explanatory power of the model (R^2) equals 0.0893, which means that 8.93% of the variation in the dependent variable (ABPROD) is explained by the independent along with the control variables. The model shows that financial distress positively affects abnormal production costs, as shown in table 5 (β = .0154, p-value= 0.025). This means that managers of distressed firms tend to manage earnings using production costs because managers of distressed firms are aware that disclosing the financial problems of the firms puts them under the control of stakeholders, and then these managers tend to use a strategy that is easy to implement, more effective and less detective, i.e. (real earnings management).

Regarding the control variables, Big4 is positively and significantly related to production cost manipulation, and Consistence with (Domenico Campa, 2019). This means that real earnings management is less detectable

by auditors. The size of the firms, leverage, and return on assets (the firm's performance) are negatively and insignificantly associated with production cost manipulation. Growth opportunity and market share are positively and insignificantly related to production cost manipulation. Cash flows from operations are negatively and significantly related to production costs manipulation, which suggests that firms with high cash flows from operations have less incentive to manage production costs, consistently (Campa and Camacho-Minano, 2015).

4.3. Abnormal Cash Flow from Operations Models:

Table 10 shows the results of multiple regression analysis using the pooled model after adding the effect of the year where dummy variables were added to each year of the study, these variables take the value of one if the observations belong to the year and zero otherwise for the abnormal cash flow from operations model as a proxy for the sales manipulation method of real activities earnings management.

Table (10): Results of the ABCFO model

Dependent variable	ABCFO	
Independent variable	Coefficient	Significance
Constant	.2590	0.000
FD	.0256	0.003
Audit	.0022	0.780
Size	-.0092	0.007
Lev	-.0046	0.572
Growth opportunity	.0023	0.491
OCF	-.0568	0.130
ROA	.0684	0.092
MS	-.0001	0.968
N	472[*]	
R-square	0.0779	
Adjusted R-square	0.0620	
F statistics	1.75	
Prob > F	0.0438	

The model is significant as the F equals 1.75with a probability is less than 0.05, and the explanatory power of the model (R^2) equals 0.0779, which means that 7.79% of the variation in the dependent variable (ABCFO) is explained by the independent along with the control variables. The model shows that financial distress is positively affects abnormal cash flows from operations, as shown in table 10 (β = .0256, p-value= 0.003).

Regarding the control variables, Big4 and growth opportunity are positively and insignificantly related to sales manipulation. The size of the firms is negatively and significantly associated with sales manipulation, consistent with the studies (Danella and Kim, 2019) which suggest that bigger firms have slighter motivations to manage earnings up because they already have benefited from economies of scale. Leverage and market share are negatively and insignificantly associated with sales manipulation. Cash flows from operations are negatively and insignificantly related to sales manipulation, which suggests that firms with high cash flows from operations have less incentive to manage production costs, consistent with (Danella and Kim, 2019). Returns on assets (firm's performance) are positively and significantly related to sales manipulation, consistency with the studies (Danella and Kim, 2019), which means that firms with high performance have the capacity to deviate from optimal business operation to meet short-term targets.

4.4. Abnormal Discretionary Expenses Model:

Table 11 shows the results of multiple regression analysis using the pooled model after adding the effect of the year where dummy variables were added to each year of the study, these variables take the value of one if the

observations belong to the year and zero otherwise for the abnormal discretionary expenses as a proxy for earnings management.

Table (11): Results of the ABDISEXP model

Dependent variable	ABDISEXP	
Independent variable	Coefficient	Significance
Constant	.1229	0.000
FD	.0119	0.002
Audit	-.0133	0.000
Size	-.0042	0.002
Lev	-.0104	0.001
Growth opportunity	-.0006	0.435
OCF	-.0284	0.096
ROA	.0431	0.013
MS	.0001	0.913
N	472[*]	
R-square	0.1303	
Adjusted R-square	0.1153	
F statistics	3.48	
Prob > F	0.0000	

The model is significant as the F equals 3.48with a probability is less than 0.01, and the explanatory power of the model (R^2) equals 0.1303, which means that 13.03% of the variation in the dependent variable (ABSDISEXP) is explained by the independent along with the control variables. The model shows that financial distress is positively affects abnormal discretionary expenses, as shown in table 7 (β= .0119, p-value= 0.002).

Regarding the control variables, Big4 is negatively and significantly related to discretionary expenses manipulation, which indicates that auditing in Egypt restricts firms from managing earnings with discretionary expenditures. The size of the firms is negatively and significantly associated with discretionary expenses manipulation. Leverage is negatively and significantly associated with discretionary expenses manipulation, which means that highly leveraged firms don't tend to manipulate earnings through

discretionary expenditures. Growth opportunity is negatively and insignificantly related to discretionary expenses manipulation. Cash flows from operations are negatively and significantly related to discretionary expenses; this suggests that firms with high cash flows from operations have less incentive to manage earnings through discretionary expenses. Returns on assets (firm's performance) are positively and significantly related to discretionary expenses manipulation. Market share is positively and insignificantly associated with discretionary expenses manipulation.

*Number of observation is reduced from 480 in each model due to the existence of outliers. These outlier observations were identified using the STATA command extreme, hence being excluded from the analysis.

Discussion of Results:

The Relationship between Financial Distress and Accruals Earnings Management:

The results indicate that financial distress does not affect accruals earnings management, thus hypothesis (H_1), stating that "There is no relationship between financial distress and accruals earnings management", cannot be rejected. Hence, it could be concluded that financial distressed firms managers are not necessarily involved in accruals earnings management.

This result is consistent with the findings of (Kim, 2011; Campa and Camacho-Minano, 2015; Domenico Campa, 2019) who reported that financial distress does not affect accruals earnings management, but it is inconsistent with the findings of Yuanhui et al. (2020), who also reported that firms with an upper level of financial distress are likely to be involved in additional accruals earnings management.

The Relationship between Financial Distress and Abnormal Production Costs:

The results indicate that financial distress positively affects abnormal production costs, indicating a rejection of hypothesis (H_3), stating that "There is no relationship between financial distress and abnormal production costs manipulation". So it could be concluded that financially distressed firms' managers are more likely to be involved in upward real activities earnings management through abnormal production costs.

This result is consistent with the findings of (Kim, 2011; Campa and Camacho-Minano, 2015; Domenico Campa, 2019) who reported a positive impact of financial distress on abnormal production costs. However, this study result is inconsistent with the findings of Yuanhui et al. (2020), who reported that firms with an upper level of financial distress are unlikely to be involved in real earnings management through abnormal production costs.

The Relationship between Financial Distress and Abnormal Cash Flow from Operations:

The results indicate that financial distress positively affects abnormal cash flow from operations, indicating a rejection of hypothesis (H_2), stating that "There is no relationship between financial distress and sales manipulation". So it could be concluded that financially distressed firms' managers are more likely to be involved in upward real activities earnings management through abnormal cash flows from operations.

This result is consistent with the findings of (Kim, 2011; Campa and Camacho-Minano, 2015; Domenico Campa, 2019) who reported a positive effect of financial distress on abnormal cash flow from operations. However, this study result is inconsistent with the findings of Yuanhui et al. (2020),

who reported that firms with an upper level of financial distress are unlikely to be involved in real earnings management through abnormal cash flow from operations.

The Relationship between Financial Distress and Abnormal Discretionary Expenses:

The results indicate that financial distress positively affects abnormal discretionary expenses, indicating a rejection of hypothesis (H_4), stating that "There is no relationship between financial distress and abnormal discretionary expenses manipulation". So it could be concluded that financially distressed firms' managers are more likely to be involved in upward real activities earnings management through abnormal discretionary expenses.

This result is consistent with the findings of (Kim, 2011; Campa and Camacho-Minano, 2015; Domenico Campa, 2019) who reported a positive effect of financial distress on abnormal discretionary expenses. However, this study result is inconsistent with the findings of Yuanhui et al. (2020), who reported that firms with an upper level of financial distress are unlikely to be involved in real earnings management through abnormal discretionary expenses.

Limitations:

The findings and interpretations of the current study results are subject to certain limitations. **The first limitations**, which is commonly recognized in the literature, is that accruals models lack power because of the probability of misclassifying the discretionary and non-discretionary accruals. So, the results of this study are likely to be conditional on these models' ability to appropriately detach the discretionary accruals components. **The second**

limitation of this study is that it is limited to firms listed on the Egyptian stock exchange that are related to fifteen sector after excluding firms belonging to other sectors because of the following reasons:

1- Excluding banks and financial institutions because of their special nature.

2- According to Athanasakou et al. (2011), each sector should include at least 6 firms in order to measure the earnings management using a cross-section. Some sectors were combined, and others were excluded due to this requirement.

The third limitation concerns the explanatory power of the empirical models, suggesting that there are still other variables that might affect earnings management that were not included in these models.

Implications of Results:

The results of the study have many implications for a variety of interested parties (i.e. stakeholders, investors and creditors, regulators and policy-makers, researchers, and auditors):

Stakeholders:

Study results partially answer a question about why firms behave the way they do? Helping many stakeholders understand a part of firms' behavior.

Investors and creditors:

Investors and creditors, who are the primary users of financial reporting, are concerned with assessing the quality of financial reporting and its accounting information and management's abilityto manipulate earnings;

therefore, the results of this study may help them assess the quality of reported information and rationalize their investment decisions.

Regulators and policy-makers:

Regulators and policy-makers are concerned with enhancing investors' protection and creating good economic conditions. Therefore, they need to be aware of the types of earnings management (i.e. accruals earnings management and real activities earnings management) and carry out additional mechanisms to enhance investor protection and constrain the practice of both types of earnings management. Also, to address the importance of financial distress, as one of these mechanisms.

Researchers:

This study provides new empirical evidence on the impact of financial distress on earnings management types (i.e. accruals earnings management and real activities earnings management). Moreover, the results show that managers in Egyptian distressed firms engage in real earnings management and do not engage in accruals earnings management.

Auditors:

The results of this study may help auditors get a better understanding of the client and some of the manager's attributes that might affect the accounting numbers being audited.

Future research:

The results of this study provide opportunities for future research. First, further studies can examine the relationship between financial distress and earnings management types through mediator variables such as corporate governance mechanisms. Second, one possible avenue of future research is to

investigate the impact of financial distress on earnings management types through banks and financial institutions. Finally further evidence on the constraints of accruals and real activities manipulations and the joint use of them in Egypt is needed.

Conclusion:

This study explores the impact of financial distress on earnings management tools (real and accruals earnings management). Using a sample of 80 firms listed firms in Egypt distributed over14 sectors during the period of 2014-2019 with 480 firm-year observations.

The results show that there is a positive and significant relationship between financial distress and abnormal production cost, abnormal cash flows from operations, and abnormal discretionary expenses, which means that managers tend to use a strategy that is easy to implement, more effective and less detective, i.e. (real earnings management). Also, the results show financial distress is insignificantly related to accruals earnings management, which means that managers of financially distressed firms don't manipulate earnings management using accruals earnings management because accruals earnings management is more likely to be discovered by auditors and investors.

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ملخص

استهدف هذا البحث اختبار أثر التعثر المالي علي إدارة الارباح (إدارة الأرباح بالأنشطة الحقيقية وإدارة الأرباح بالاستحقاقات)، باستخدام عينه من الشركات المدرجة بالبورصة المصرية خلال الفترة من عام 2014 وحتي عام 2019، واعتمد هذا البحث علي استخدام اربعه مقاييس لقياس إدارة الارباح بالاستحقاقات و الأنشطة الحقيقية وهم الاستحقاقات الاختيارية، التدفقات النقدية التشغيلية غير العادية، وتكاليف الانتاج غير العادية، والنفقات الاختيارية غير العادية، تم تطوير أربعه نماذج تكون فيها مقاييس إدارة الأرباح متغير تابع والتعثر المالي متغير مستقل في الأربعة نماذج، وأظهرت نتائج البحث أن الشركات المصرية المتعثرة تميل إلي التلاعب بإدارة الارباح باستخدام إدارة الأرباح بالأنشطة الحقيقية (تكاليف الإنتاج غير العادية، التدفقات النقدية التشغيلية غير العادية، والنفقات الاختيارية غير العادية) بدلا من إدارة الأرباح بالاستحقاقات، مما يعني أن مديري الشركات المتعثرة ماليا لا يفضلوا إدارة الأرباح بالاستحقاقات لإن إدارة الأرباح بالاستحقاقات من المرجح أن يتم اكتشافها بواسطه المراجعين والمستثمرين، ولإن مديري الشركات المتعثرة لديهم مرونة محاسبيه أقل.