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The Moderating Role of Firm Size on the Relationship between Financial Distress and Earnings Management

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Abstract

This research aims to examine the moderating role of firm size on the relationship between Financial Distress (FD) and Earnings Management (EM). In this research, a sample of 101 Egyptian firms listed in the Egyptian stock Exchange is used for a period of six years from 2014 to 2019. The results revealed that there is a significant positive relationship between FD and EM. Moreover, it is found that there is a significant negative relationship between firm size and EM. Additionally, there is a significant positive relationship between firm size and FD. Finally, the results indicated that the firm size moderates the relationship between FD and EM, implying that firm size reduces the negative impact of Z-score on EM. Thus**,** government, public investors, shareholders, banks, insurance companies and creditors should consider firm size while assessing the relationship between FD and EM.

Keywords

Financial Distress; Earnings Management; Firm Size; Firm Characteristics

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1. Introduction

Reported earnings are an important measure in any business since it is the primary source of information for evaluating a firm's performance. As a result, it is required to report accurate earnings. However, earnings management (EM) behaviour, which takes place during the preparation of financial statements when management manipulates the earnings by using discretionary provisions permitted by specific accounting standards, may have an impact on the reported earnings quality (Wan Ismail et al., 2015).

EM has drawn a lot of attention in the accounting discipline and has been a significant and ongoing concern for practitioners and regulators across the world. There are several motives and methods for managing earnings, most of which are managerial objectives. Additionally, earnings management and manipulation continued to be a major concern for the accuracy and reliability of financial statements (Bassiouny, 2016).

Nowadays, with the world economy globalization, competition has turned out to be one of the essential market mechanisms. In a competitive environment full of uncertainty, firms with a lack of innovation and management deficiency may fail to compete. Thus, a firm could experience multiple crises that could ultimately cause financial distress (FD) and possibly bankruptcy (Sun & Li, 2009).

FD has always been a matter of concern for governments and public investors for a long time, and due to the recent decade's economic crisis, stockholders, financial institutions, insurance providers, creditors and investors are willing to evaluate the companies' abilities to pay their debts and financial commitments as well. Financial managers, therefore, required accountants to utilize optimal bankruptcy prediction, models and high reliability processes, as many firms in the event of bankruptcy attempt to cover their real situation (Wan Ismail et al., 2015). Regarding the consequences of the FD, the quality of financial reporting for distressed companies becomes poorer than non-distressed companies, because the management of distressed companies uses different EM techniques. The rising of EM emerges from applying the accrual base rather than the cash base. This facilitates management's manipulation of financial information as accruals are less observed.

A substantial amount of research has investigated certain financial characteristics and their possible relation with EM practises. Firms with poor financial characteristics are inclined to engage in EM activities to enhance their market image. Furthermore, significant financial measures like size, profitability and growth may provide strong evidence of EM activity (Sun & Rath, 2008).

The main objective of this research is to examine the moderating role of firm size on the relationship between FD and EM, employing data from listed Egyptian firms. The objective is divided into the following subobjectives. First, investigating the relationship between financial distress and earnings management. Second, investigating the relationship between firm size and earnings management. Third, investigating the relationship between firm size and financial distress. Fourth,

investigating the moderating effect of firm size on the relationship between financial distress and earnings management.

The remainder of this research proceeds as follows. Section 2 reviews the relevant prior literature on earnings management, financial distress and firm size and develops the research hypotheses. Section 3 discusses the data and methodology undertaken in the research, the descriptive statistics, and empirical regression results. Section 4 provides conclusions regarding the main research results. Section 5 presents research contributions. Section 6 provides future research suggestions.

2. Literature Review and Hypotheses Development

This section can be divided into three main groups. The first group reviews some studies concerning the relationship between FD and EM to develop the first research hypothesis. The second group reviews some studies concerning the relationship between firm size and EM to develop the second research hypothesis. The third group reviews some studies concentrated on the relationship between firm size and FD to develop the third research hypothesis. Based on the developed hypotheses, the researcher develops the hypothesis regarding the moderating effect of firm size on the relation between FD and EM.

2.1 Financial Distress and Earnings Management

As several studies have examined different aspects of EM by firms, the literature provided mixed evidence regarding the EM behaviour of firms in FD and the different reasons behind this behaviour. Some studies like Chen et al. (2010), Charitou et al. (2011), Bisogno and De Luca (2015) and Jacoby et al. (2016) found that managers of financially distressed firms adjust earnings upwards to meet their debt covenants, ensure ongoing debt financing and avoid the threat of delisting and special monitoring by the government.

On the contrary other studies like Saleh and Ahmed (2005), Charitou et al. (2007), Habib et al. (2013), Rakshit and Paul (2020) and Gaetano et al. (2020) concluded that managers of financially distressed firms adjust earnings downwards to highlight the challenges by lowering their reported earnings in order to gain better conditions during renegotiations, perhaps in hopes of benefiting from government support or borrowing terms.

While other studies like Jaggi and Lee (2002), Agrawal and Chatterjee (2015) and Ghazali et al. (2015) argued that management response depends on the severity of FD. Firms managed their earnings upwards several years before the violations, and therefore exhausted their tools to manage earnings upward. Consequently, they are forced to rely on income decreasing EM to manage their reported earnings. Based on the previous discussion, the first hypothesis can be formulated as follows:

H_1: There is a significant relationship between financial distress and earnings management.

2.2 Firm Size and Earnings Management

Studies like Ahmad et al. (2014), Kuo et al. (2014), Hessayri and Saihi (2015) and Abbadi et al. (2016) concluded that there is a significant negative relationship between firm size and EM for different reasons. First, the presence of better internal control mechanisms and more experienced internal auditors in large-sized firms compared to smaller ones help in disclosing accurate financial information to the public. Second, larger firms have higher reputation cost compared to smaller ones. Third, larger firms are often getting their audit conducted by one of the big four auditing firms and due to the effective and efficient audit performed by those firms, they are more likely to decrease earnings manipulation.

On the contrary, some studies like Nalarreason and Mardiati (2019), Ruwanti et al., (2019) and Rakshit and Paul (2020) concluded that there is a significant positive relationship between firm size and EM for different reasons. First, depending on the agency theory, the larger the firm size, the greater the information asymmetry and agency conflict faced by the firm. Larger firms tend to do EM since they are under big pressure to fulfil the expectations of financial analysts. Second, large firms are prone to higher political costs that enforce them to participate in income increasing practices to maintain the firm's reputation in the community. Third, investors and financial analysts put more pressure on larger firms, hence, the management of those firms engages in managing their reported results. Thus, the hypothesis concerning the relationship between firm size and EM can be formulated as follows:

H_2: There is a significant relationship between firm size and earnings management.

2.3 Firm Size and Financial Distress

The most widely used measure for firm size in the studies which addressed the relationship between firm size and FD was the natural logarithm of total assets and the results of those studies are mixed. Oktasari (2020) concluded that there is a significant positive relationship between firm size and FD because the smaller the firm, the higher the growth opportunities and therefore, firms can get short-term debt financing at a lower interest rate, lowering the chances of incurring FD.

On the contrary, some studies like Waqas et al. (2018) and Ikpesu and Eboiyehi (2018) concluded that there is a significant negative relationship between firm size and FD, implying that larger firms would experience a lower level of FD compared to smaller firms.

From another perspective, Rianti and Yadiati (2018) and Yazdanfar and Öhman (2020) concluded that firm size doesn't have a significant impact on FD. This indicates that it is critical to assess if the assets were utilized efficiently to enhance the company's financial condition. Moreover, once a company reaches a certain size and starts to go beyond, this may result in bureaucracy and scale inefficiencies. The ability to employ resources efficiently, especially innovative technology, is also more crucial than

business size. Thus, the hypothesis concerning the relationship between firm size and FD can be formulated as follows:

H_3: There is a significant relationship between firm size and financial distress.

Finally, based on the developed hypotheses, the researcher formulates the hypothesis regarding the moderating effect of firm size on the relation between FD and EM as follows:

H_4: Firm size moderates the relationship between financial distress and earnings management.

3. Research Methodology

This section introduces the sample selection, the sample period and data collection sources, followed by the different variables of the research and their measurements, and finally testing research hypotheses through different research models.

3.1 Sample Selection and Data Collection

The sample of the research is comprised of EGX non-financial companies. Annual reports are gathered due to their availability. The empirical study covers the period from 2014 to 2019. Notably, the year 2020 is excluded due to the impact of the COVID-19 pandemic on the reported financial statements that causes inconsistency among the selected period under study. Banks and financial companies are also excluded from the sample due to their unique specifications and regulations. Secondary data are employed to conduct the data analysis and the Thomson Reuters database was used to gather the financial statements of the firms.

3.2 Measurement of Variables

This section is divided into three main parts: measurement of EM (dependent variable), measurement of FD (independent variable), and measurement of moderating variable (firm size) and other control variables (firm growth opportunities, firm financial leverage, and firm profitability).

3.2.1 Measurement of EM (Dependent Variable)

Most of the contemporary EM literature depended on discretionary accruals (DA) as a proxy for EM employing modified Jones' model (1995) which is the best measurement and popular technique in estimating the DA (Dechow et al., 1995; Saleh & Ahmed, 2005; Atieh & Hussain, 2012; Walker, 2013; Uwuigbe et al., 2014; Ipino & Parbonetti, 2016). As a result, this research uses the DA as a proxy for EM employing the modified Jones' model (1995).

Most academics choose to employ the cash flow statement approach. It is a more practical approach because of its more consistent pattern that outperforms the balance

sheet approach, in terms of its significance (Shah et al., 2009, Soliman & Ragab, 2014, Acar & Coskun, 2020). Consequently, this research uses the cash flow statement approach to compute the total accruals (TA) as follows:

TA = Operating Income - Cash Flows from Operating Activities

TA consists of DA and non-discretionary accruals (NDA). To compute the DA, NDA are subtracted from TA (Shah et al., 2009).

TA = DA + NDA

Consequently, based on the modified Jones' model (1995), NDA is computed as follows:

$$TA_t/A_{t-1} = \alpha_1 (1/A_{t-1}) + \alpha_2 (\Delta REV_t - \Delta REC_t)/A_{t-1} + \alpha_3 (PPE_t/A_{t-1}) + \varepsilon \quad (1)$$

Where:

TA_t = total accruals in year *t*

A_{t-1} = total assets in year t–1

ΔREV_t = change in revenues from year t−1 to year t

ΔREC_t = change in receivables from year t−1 to year t

PPE_t = property, plant, and equipment in year *t*

The coefficients in Equation (1) (α1, α2 and α3) are then used to compute NDA in Equation (2) as follows:

$$ND_{A_t} = \alpha_1 (1/A_{t-1}) + \alpha_2 (\Delta REV_t - \Delta REC_t)/A_{t-1} + \alpha_3 (PPE_t/A_{t-1}) \quad (2)$$

DA are then computed as follows:

$$D_{A_t} = T_{A_t} - ND_{A_t}$$

3.2.2 Measurement of Financial Distress (Independent Variable)

In order to measure FD, the Altman's Z-score is used in this research. Z-score is the most common technique to measure the financial situation of the firm (Maina & Sakwa, 2012). Although the Z-score model was established in 1968 and there are numerous alternative failure forecast models, Z-score remains a main worldwide tool for the prediction and analysis of bankruptcy or financial problems, both in academic research and in practice. The likelihood that a firm will go bankrupt increases with decreasing Z-scores. If a firm's Z-score is less than 1.8, it is in financial distress and faces a significant risk of bankruptcy. As opposed to this, if a firm's Z-score is greater than or equal to 3, the firm is in a safe area. The firm is in the grey zone if its score lies between 1.8 and less than 3 and has a lower possibility to go bankrupt (Altman et al., 2017).

The original model of the *Z*-score was presented by Altman as a good bankruptcy predictor, and the Z- score can be calculated as follows:

$$\textbf{Z - Score} = 1.2\,X_1 + 1.4\,X_2 + 3.3\,X_3 + 0.6\,X_4 + 1.0\,X_5$$

Where:

X_1 = working capital (which is: current assets – current liabilities) / total assets.

$\mathbf{X_2}$ = retained earnings / total assets.
$\mathbf{X_3}$ = earnings before interest and taxes / total assets.
$\mathbf{X_4}$ = market value of equity / book value of total debt.
$\mathbf{X_5}$ = sales / total assets.

Altman et al. (1995) developed a new version of its model for firms operating in emerging markets. The new model which is called "Emerging Markets Scoring" (EMS) eliminates X_5 (sales /total assets) to remove any potential distortion associated with the industry and/or country from the formula. Also, the 3.25 constant is added to standardize the scores with a score of zero equated to a D rated bond. Thus, the weighted coefficients are presented as follows:

$$\mathbf{EMS = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4 + 3.25}$$

3.2.3 Moderating Variable and Control Variables

Firm size is measured in terms of the natural logarithm of total assets (Ruwanti et al., 2019), firm growth opportunities are measured by the ratio of the market value of equity over the book value of assets (Rakshit & Paul, 2020), firm financial leverage is measured by dividing long-term debt over total assets (Kalbuana et al., 2021) and firm profitability is measured by return on assets (Oktasari, 2020).

3.3 Research Models

To test the validity of the developed hypotheses, an ordinary least square (OLS) regression will be applied for three multiple regression models using the STATA 16 software.

Following, Agrawal and Chatterjee (2015), the first multiple regression model is developed in order to examine the H_1 hypothesis concerned with the association between FD and EM and the H_2 hypothesis concerned with the association between firm size and EM:

$$\boldsymbol{EM_{i,t} = \propto_0 + \beta_1\ Z\_SCORE_{i,t} + \beta_2\ SIZE_{i,t} + \beta_3\ FGO_{i,t} + \beta_4\ ROA_{i,t} + \beta_5\ LEV_{i,t}}$$

Following Ikpesu (2019), the second multiple regression model is developed in order to examine the $\mathbf{H_3}$ hypothesis concerned with the association between firm size and FD:

$$\boldsymbol{Z\_SCORE_{i,t} = \propto_0 + \beta_1\ SIZE_{i,t} + \beta_2\ FGO_{i,t} + \beta_3\ ROA_{i,t} + \beta_4\ LEV_{i,t}}$$

Following Abdioğlu (2019), the third multiple regression model is developed in order to examine the $\mathbf{H_4}$ hypothesis concerned with the moderating effect of firm size on the association between FD and EM:

$$\boldsymbol{EM_{i,t} = \propto_0 + \beta_1\ Z\_SCORE_{i,t} + \beta_2\ SIZE_{i,t} + \beta_3\ FGO_{i,t} + \beta_4\ ROA_{i,t} + \beta_5\ LEV_{i,t} + \beta_6\ ZS * SIZE_{i,t}}$$

3.4 Descriptive Statistics

The importance of descriptive statistics stems from the simplicity in presenting the basic properties of a large set of observations. The main statistical features of variables used to test the moderating effect of firm size on the relationship between FD and EM are shown in Table (1):

Table (1)
Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
EM	overall	0.097093	0.084877	0.000227	0.28869	N = 606
	between		0.042228	0.015045	0.217034	n = 101
	within		0.073727	-0.09762	0.311332	T = 6
Z_SCORE	overall	6.8845	3.02189	-0.06673	13.41732	N = 606
	between		2.777133	0.709997	13.41732	n = 101
	within		1.217822	-0.0037	11.26412	T = 6
SIZE	overall	9.09239	0.703307	7.500099	10.65613	N = 606
	between		0.695875	7.541555	10.65613	n = 101
	within		0.120004	8.606327	9.505807	T = 6
FGO	overall	1.571301	1.058321	-0.75652	3.620283	N = 606
	between		0.914693	0.185164	3.620283	n = 101
	within		0.53879	-1.34657	3.856365	T = 6
ROA	overall	0.071012	0.092208	-0.14339	0.275772	N = 606
	between		0.078532	-0.10494	0.258759	n = 101
	within		0.048846	-0.09324	0.255554	T = 6
LEV	overall	0.179168	0.176356	0	0.611834	N = 606
	Between		0.16851	0	0.569692	n = 101
	Within		0.054227	-0.13453	0.580257	T = 6

Table (1) shows that EM exhibits large changes through time and across firms as shown in the overall standard deviation (0.084877), which represents around (87%) of the overall mean (0.097093). EM varies widely in every single firm over the investigated time horizon as represented by the within a level of its standard deviation (0.073727). Moreover, there is a considerable variation among the sampled firms, as shown by the between the level of the standard deviation (0.042228).

Z_SCORE shows a reasonable overall deviation of (3.02189) around the overall mean (6.8845). The fluctuations among panels (2.777133) and through time (1.217822) represent around (40%) and (18%) of the overall mean, respectively.

The use of logarithm caused smoothing in firm size, and thus, the size shows an overall deviation of (0.703307), which is very small relative to the overall mean (9.09239). Moreover, the between (0.695875) and within (0.120004) levels of deviation indicate high concentration around the overall mean by representing around (8%) and (1%) of the overall mean, respectively.

Firm growth opportunities show a relatively high deviation of (1.058321), which represents around (67%) of the overall mean. The variation among panels (0.914693) is the primary driver of the overall deviations since it represents around (58%) of the

overall mean. While the fluctuations through time (0.53879) show a modest deviation which represents around (34%) of the overall mean.

The return on assets shows an overall standard deviation of (0.092208), which represents around (130%) of its overall mean (0.071012). Indicating that the return on assets varies significantly among the 101 firms included in the research as presented by the between level of the standard deviation (0.078532), which represents around (111%) of the overall mean. Similarly, the return on assets of every single firm shows high variances over the investigated time horizon as shown by the within level of standard deviation (0.048846), which represents around (69%) of the overall mean.

The firm's leverage shows around (98%) overall deviation around the overall mean (0.179168). That overall deviation (0.176356) is derived mainly from the changes among the sample firms (0.16851) in using debt financing, which represents around (94%) of the overall mean. It implies that some firms depend heavily on debt to finance their assets, while other firms show a minor dependence on debt to finance their assets. However, the debt financing strategies of every single firm during the sample period show a moderate deviation (0.054227), representing around (30%) of the overall mean.

3.5 Regression Results

Table (2) reports the initial pooled OLS regression model concerning the impact of financial distress and firm size on earnings management:

Table (2)
The Initial Pooled OLS Model (Model 1)

Variables	Coef.	p-value
Z_SCORE	-.003**	.047
SIZE	-.02***	0
FGO	.008**	.023
ROA	.084**	.049
LEV	.06***	.004
Constant	.268***	0
Dependent variable	EM	
R-squared	0.060	
Prob > F	0.000	
Number of obs	606	
*** p<.01, ** p<.05, * p<.1		

The model can explain 6% of EM. It reveals that Z-score has a significant negative impact of (-.003) on EM, indicating that less financially distressed firms with high Z-score values mitigate the motives for EM.

Firm size has a significant negative impact of (-.02) on EM at the 1% significance level, indicating that large firms disincline managers from engaging in EM activities. Firm growth opportunities, return on assets and leverage show significant positive regression coefficients of (.008), (.084) and (.06) on EM, respectively. This implies that highly leveraged, profitable firms with many potential growth opportunities

encourage managers to exercise EM activities. However, the results of the initial pooled OLS model cannot be considered reliable and valid until the model's goodness of fit is evidenced.

The Goodness of Fit Tests

Before accepting the initial pooled OLS model as a reliable model, there is some goodness of fit tests that should be conducted to ensure the validity of statistical techniques applied in the current study. These tests are multicollinearity, heteroskedasticity, omitted variables and auto-correlation. If any of the beforementioned problems (multicollinearity, heteroskedasticity, omitted variables and auto-correlation) are evidenced, they should be addressed while estimating the fitted pooled OLS model. Thus, the model's goodness of fit should be proved first before accepting the final pooled OLS model.

Table (3) presents the OLS Goodness of Fit Tests for model (1):

Table (3)
OLS Goodness of Fit Tests (Model 1)

Variable	VIF	1/VIF
Z SCORE	1.477	.677
ROA	1.36	.736
FGO	1.28	.781
LEV	1.217	.822
SIZE	1.175	.851
Mean VIF	1.302	.
Heteroskedasticity	Stat,	3.22
	p-value	0.0728
Omitted Variables	Stat,	1.94
	p-value	0.1222
Autocorrelation	Stat,	1.677651

Table (3) shows a number of the goodness of fit tests to assess the validity of the initial pooled OLS regression results. Table (3) reveals that there is no multicollinearity among the regressors of the pooled OLS model. According to Landau and Everitt (2004) and Field (2005), multicollinearity exists when the variance inflation factor (VIF) of any independent variable exceeds 10, and when the tolerance factor (1/VIF) is less than 0.10. Therefore, there is no multicollinearity among the explanatory variables included in the pooled OLS model because all explanatory variables show a VIF coefficient of less than 10, and a tolerance coefficient greater than 0.10.

Moreover, Table (3) reveals the absence of heteroskedasticity because the p-value (0.0728) is greater than 5%. Therefore, the null hypothesis is accepted, stating that the variances of errors are constant across observations.

Concerning the specifications of the pooled OLS model, Gujarati (2015) stated that model specification errors may arise from the omission of essential explanatory variables from the model, the inclusion of irrelevant explanatory variables or the incorrect functional form of independent and dependent variables. As shown in table (3), the p-value of the omitted variables test (0.1222) is greater than 5%. Therefore,

the null hypothesis is accepted which states that the functional form is correct and has no omitted variables in the pooled OLS model.

Table (3) also illustrates the statistic of the Durbin-Watson test that is used to test the presence of autocorrelation in the residuals. The Durbin-Watson statistic ranges between 0 and 4. A statistic value near 2 reflects that there is no autocorrelation detected in the sample. A value approaching zero reflects positive autocorrelation, while values toward 4 indicate negative autocorrelation. Table (3) shows that the value of Durbin-Watson is (1.677651), which is close to 2, suggesting that there is no serial correlation in the residuals of the model. Therefore, the null hypothesis is accepted.

The results of the goodness of fit tests assured that the initial pooled OLS regression model presented in Table (2) is fitted and can be accepted as a reliable model. As shown in Table (2), the model's p-value is less than 5%, and this model's reliability is confirmed. The regression results presented in Table (2) support H_1 which states that there is a significant relationship between FD and EM since Z-score has a significant negative regression coefficient of (-.003) on EM. This indicates that firms in FD will tend to manage their reported earnings, and as FD increases, management's participation in EM increases. The findings presented in Table (2) reveal that all firm characteristics show a significant impact on EM. Thus, the findings support H_2 which states that there is a significant relationship between firm size and EM since firm size has a significant negative regression coefficient of (-.02) on EM. Therefore, the larger the size of the firm, the lower its tendency to manage reported earnings because of better internal control mechanisms, the reputation costs in large firms and large firms are often audited by one of the big four auditing firms.

The findings also show that firm growth has a significant positive regression coefficient of (.008) on EM. Managers of growing firms are encouraged to engage in EM behaviour to attract more investors or lenders during growing periods. Additionally, leverage has a significant positive regression coefficient of (.06) on EM. Highly leveraged firms are motivated to use DA and restate their financial statements to show creditors a margin of safety and a positive image of the firm and reduce the commitments associated with debt covenants. Moreover**,** the return on assets has a significant positive regression coefficient of (.084) on EM. Managers of profitable firms are encouraged to utilise DA to manipulate reported information to achieve their desired level of earnings and gain the trust of investors.

Table (4) presents the initial pooled OLS regression model concerning the impact of firm size on financial distress:

Table (4)
The Initial Pooled OLS Model (Model 2)

Variables	Coef.	p-value
SIZE	-1.081***	0
FGO	-.73***	0
ROA	11.211***	0
LEV	-5.276***	0
Constant	18.011***	0
Dependent variable	Z_SCORE	

R-squared	0.323
Prob > F	0.000
Number of observations	606
*** p<.01, ** p<.05, * p<.1	

Table (4) presents the results of the initial pooled OLS regression model. However, the results of the initial model cannot be considered reliable and valid until the model's goodness of fit is evidenced.

The Goodness of Fit Tests

Before accepting the initial pooled OLS model as a reliable model, there is some goodness of fit tests that should be conducted to confirm that the statistical techniques applied in the current study are valid.

Table (5) presents the OLS Goodness of Fit Tests for model (2):

Table (5)
OLS Goodness of Fit Tests (Model 2)

Variable	VIF	1/VIF
ROA	1.187	.843
FGO	1.183	.845
SIZE	1.081	.925
LEV	1.077	.929
Mean VIF	1.132	.
Heteroskedasticity	Stat,	5.98
	p-value	0.0145
Omitted Variables	Stat,	8.42
	p-value	0.0000
Autocorrelation	Stat,	.2471649

Table (5) shows a number of the goodness of fit tests to assess the validity of the pooled OLS regression results. Table (5) reveals that there is no multicollinearity among the regressors of the pooled OLS model because all explanatory variables show a VIF coefficient less than 10, and a tolerance coefficient greater than 0.10.

Moreover, Table (5) reveals the existence of heteroskedasticity, which means that the error variances are not constant. Therefore, the null hypothesis is rejected because the p-value (0.0145) is less than 5%. Reflecting, the acceptance of the alternative hypothesis, stating that the variances of errors are non-constant across observations.

Regarding the model specification test, as shown in Table (5), the p-value of the omitted variables test is less than 5%. Therefore, the alternative hypothesis is accepted, stating that the functional form is not correct or there are omitted variables in the model.

Table (5) also illustrates the statistic of the Durbin-Watson test that is used to test the presence of autocorrelation in the residuals. Table (5) shows that there is a positive autocorrelation because the value of Durbin-Watson is (.2471649).

The Fitted Pooled Ordinary Least Squares Model

Table (6) presents the results of the fitted pooled OLS regression model concerning the research hypothesis which examines the impact of firm size on FD. The fitted pooled OLS regression model takes into consideration the autocorrelation, heteroscedasticity and misspecifications found in the initial pooled OLS regression model.

Table (6)
The Fitted Pooled OLS Model (Model 2)

Variables	Coef.	p-value
SIZE	-1.081***	0
FGO	-.73***	0
ROA	11.211***	0
LEV	-5.276***	0
Constant	18.011***	0
Dependent variable	Z_SCORE	
R-squared	0.323	
Prob > F	0.000	
Number of obs	606	
*** *p<.01*, ** *p<.05*, * *p<.1*		

Table (6) shows the results of the fitted pooled OLS regression model. The results show that the overall model is reliable because the p-value is less than 5%. Moreover, the model can explain 32.3% of a firm's FD.

The results reveal that the firm size shows a significant negative impact of (-1.081) on Z-score, indicating that small firms are financially stable with high Z-score values. Thus, H_3 is accepted, stating that there is a significant relationship between firm size and FD. The smaller the firm, the higher the growth opportunities and therefore, firms are likely to be able to get short-term debt financing at a lower interest rate, which in turn can lower the chances of incurring FD.

The firm growth opportunities show a significant negative regression coefficient of (-.73) on the Z-score. It implies that firms with many growth opportunities tend to be financially distressed firms with low Z-score values.

Firm financial leverage shows a significant negative regression coefficient of (-5.276) on Z-score, indicating that highly leveraged firms with low Z-score values are more prone to FD**.** Leverage has a significant discriminating power, consistent with the premise that one of the main causes of business failure is the inability to meet substantial debt obligations.

The return on assets has a significant positive impact of (11.211) on the Z-score, suggesting that profitable firms tend to be financially stable with high Z-score values. Lower profitability will lead to a higher level of FD, which may increase the chances of bankruptcy.

Table (7) presents the initial pooled OLS regression model concerning the impact of the interaction effect of firm size and FD on EM:

Table (7) **The Initial Pooled OLS Model (3)**		
variable	Coef.	p-value
Z_SCORE	-.003**	.016
SIZE	-.016***	.002
FGO	.007*	.064
ROA	.095**	.027
LEV	--	--
ZS* SIZE	.004*	.094
Constant	.254***	0
Dependent variable	EM	
R-squared	0.052	
Number of obs	606	
Prob > F	0.000	
*** p<.01, ** p<.05, * p<.1		

The Goodness of Fit Tests

Before accepting the initial pooled OLS model as a reliable model, there is some goodness of fit tests that should be conducted to confirm that the statistical techniques applied in the current study are valid.

Table (8) presents the OLS Goodness of Fit Tests for model (3):

Table (8) **OLS Goodness of Fit Tests Model (3)**		
Variable	**VIF**	**1/VIF**
Z_SCORE	1.46	.685
SIZE	1.185	.844
FGO	1.298	.771
ROA	1.359	.736
LEV	--	--
ZS* SIZE	1.186	.843
Mean VIF	1.298	.
Heteroskedasticity	Stat,	3.37
	p-value	0.0664
Omitted Variables	Stat,	0.20
	p-value	0.8946
Autocorrelation	Stat,	1.667194

Table (8) shows a number of the goodness of fit tests to assess the validity of the initial pooled OLS regression results. Table (8) reveals that there is no multicollinearity among the regressors of each pooled OLS model because all explanatory variables show a VIF coefficient less than 10, and a tolerance coefficient greater than 0.10.

Moreover, Table (8) reveals the absence of heteroskedasticity because the p-value (0.0664**)** is greater than 5%. Therefore, the null hypothesis is accepted, stating that the variances of errors are constant across observations.

Concerning the specifications of the pooled OLS models, the p-value of the omitted variables test (0.8946**)** is greater than 5%. Therefore, the null hypothesis is accepted, stating that the functional form is correct and no omitted variables in the pooled OLS models. Hence, it can be concluded that the pooled OLS model is well-specified.

Table (8) also shows that the value of Durbin-Watson is (1.667194) close to 2, indicating that there is no serial correlation in the residuals of the model. Therefore, the null hypothesis is accepted, stating that the residuals from the regression are not auto-correlated.

The results of the goodness of fit tests assured that the initial pooled OLS regression model presented in Table (7) is fitted and can be considered a reliable model as the model's p-value is less than 5%.

As shown in Table (7), the interaction term of firm size and Z-score shows a significant positive impact of (.004) on EM at a 10% significance level. Thus, H_4 is accepted, stating that the firm size moderates the relationship between FD and EM. It implies that firm size reduces the negative impact of Z-score on EM.

Table (7) also reveals that the firm size has a significant negative impact on EM at a 1% significance level, indicating that large firms disincline managers from engaging in EM activities. Firm growth opportunities and return on assets show significant positive regression coefficients on EM. This suggests that profitable firms with many potential growth opportunities encourage managers to exercise EM activities.

4. Conclusion

This research aimed to examine the relationship between FD and EM, investigate the relationship between firm size and FD, examine the relationship between firm size and EM and finally investigate the moderating role of firm size on the relationship between FD and EM.

Using a sample of the listed EGX non-financial companies covering the period from 2014 to 2019, the research provides evidence that there is a significant positive association between FD and EM, in line with the findings of (Jaggi & Lee, 2002; Saleh & Ahmed, 2005; Charitou et al., 2007; Chen et al., 2010; Charitou et al., 2011; Habib et al., 2013; Bisogno & De Luca, 2015; Agrawal & Chatterjee, 2015; Ghazali et al., 2015; Jacoby et al., 2016; Rakshit & Paul, 2020; Gaetano et al., 2020). The previously mentioned studies agreed with the positive association between FD and EM. This result implies that less financially distressed firms with high Z-score values constrain the motives to EM. While financially distressed firms with low Z-score values are motivated to manage their earnings.

Additionally, the results show that firm size has a significant negative impact on EM, indicating that large firms disincline managers from engaging in EM activities.

Such result supports the studies of Ahmad et al., (2014), Kuo et al., (2014), Hessayri and Saihi (2015) and Abbadi et al., (2016).

In line with the study of Oktasari (2020), the findings show that firm size shows a significant negative impact on Z-score, indicating that the larger the firm, the lower Z-score values. This indicates that small firms are more financially stable.

Furthermore, the results reveal that the interaction between firm size and Z-score shows a significant positive impact on EM, suggesting that the firm size moderates the relationship between FD and EM. The final results indicate that the firm size moderates the relationship between FD and EM, implying that firm size reduces the negative impact of Z-score on EM. Large firms face more examination from auditors and regulators than smaller firms and fast-growing firms' business activities cannot be easily observed. In addition to the presence of better internal control mechanisms and more experienced internal auditors in large firms compared to smaller ones, and those effective internal control mechanisms would help in disclosing more accurate financial information to the public.

5. Research Contribution

The current research contributes to academics, regulators and standard-setters in several ways. First, shedding the light on the presence and use of accrual-based EM in listed Egyptian distressed firms. Second, this research fills the gap in the literature concerning the relationship between firm size and FD and the relationship between firm size and EM in Egypt, because the majority of prior literature had been performed in developed countries and little has been performed in emerging markets. Third, to the best of the researcher's knowledge, this is the first research conducted in Egypt addressing the moderating effect of firm size on the relationship between FD and EM. The findings revealed that the firm size reduces the negative impact of the Z-score on EM. Thus, government, public investors, shareholders, banks, insurance companies and creditors should take into consideration firm size while assessing the relationship between FD and EM.

6. Future Research

Based on the previous findings and conclusion, the following suggestions can be given for future research: First; since the sample is restricted to the non-financial firms, future research could be extended to include the associations of the current research among banks and financial service firms. Second; the sample period is not too long, thus, future research could extend the sample period. Third; this research is concerned with accrual-based EM, hence, future research could examine the effect of FD on real EM. Fourth; future research could add more firm characteristics concerned with auditing like audit quality.

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