SUDDEN LOSS, CORPORATE GOVERNANCE STRUCTURE, AND BIG BATH BEHAVIOR: EVIDENCE FROM EGYPT

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Abstract

This study investigates the effect of sudden loss on corporate governance structure (CGS), and its implications on earnings management technique "big bath" in the Egyptian context. A matched sample of 208 firm-year observations in the Egyptian Stock Exchange (EGX) has been examined. Using the same methodology as in Mulcahy and Donnelly (2015) and Cheng, Park, Pierce, and Zhang (2019), the difference-in-differences (DID) approach is applied to measure the response of CGS to sudden loss versus profit incident, while binary logistic regression is used to investigate big bath following. Results indicate a significant association of sudden loss on changes in the loss firms' CGS following the loss, although these changes do not significantly differ from those made by profit firms. This indicates that sudden loss may trigger changes in corporate governance (CG), but other conditions also play a role in evoking such changes. Results also show a significant positive association of sudden loss on increasing the likelihood of engaging in a big bath behavior. The findings of this study are expected to help Egyptian firms' managers to improve firms' performance and governance structure that lead to high-quality earnings and provide financial reports that rationalize investors' decisions. This study is the first to test the influence of sudden loss on CGS and link it to big bath in Egyptian setting.

Keywords: Sudden Loss, Corporate Governance, Big Bath, DID Approach, Board of Director's Composition, Ownership Structure, Egypt

1. INTRODUCTION

The 2008 economic crisis revealed major instability and vulnerability of the financial systems and markets globally, exposing firms to the risk of corporate financial failure. Studies on corporate failure have flourished after the crisis, with several studies addressing different forms of financial

struggles and difficulties ranging from short-term negative earnings to more severe financial conditions (Purves, Niblock, & Sloan, 2016). One form of corporate failure that firms might encounter is incurring a loss. An accounting loss is one of the most influential events in the life of the firm that needs to be interpreted and disclosed to the financial statements' users, in order to provide them with a clear image of the true financial position of the firm. Losses can either be transitory, recurring or permanent and are usually the outcome of a variety of factors, such as the current economic conditions, corporate financial distress or corporate fraud (Leung & Veenman, 2018).

Losses are not expected to persist, but if it happens for several consecutive years, shareholders may prefer to liquidate the firm. Moreover, loss-reporting firms are associated with increased uncertainty about future earnings than profit-making firms, thus leading investors to demand additional information. Therefore, managers are mandated to disclose whether the loss is temporary and should convince their investors that this situation is being remedied (Leung & Veenman, 2018). Suffering a loss is revealing a case that requires corrective action or it will lead to a crisis (Mulcahy & Donnelly, 2015, p. 392). During sudden loss, the firm likely attempts to present the loss as a short-lived phenomenon and not perpetual while striving to work toward profitability. The firm's management likely convinces investors that the firm is well-governed and can withstand any potential future losses or fix any deficiencies within the firm's preexisting corporate governance structure (CGS).

After the series of worldwide corporate breakdowns due to fraud and other scandals, corporate governance (CG) literature emerged and became one of the key research topics in the business discipline, and its importance increased even more in the recent decade, in response to the huge bankruptcies following the economic crisis that put shareholders into doubt. As a result, "the response of Congress and regulators to this crisis of confidence was to impose new CG ance requirements on public companies such as the Sarbanes-Oxley Act of 2002" (Baker & Powell, 2009, p. 83).

The CGS of any firm plays a role in creating a balance between the existing conflict of interests between principals (shareholders) and agents (managers). This conflict arises because corporate managers will try to act in their own best interest, regardless of their principals' benefit. In addition, as indicated by L'Huillier (2014), CG mechanisms contribute to the overall CGS of firms by "keeping agents in check" and controlling their use of accounting discretion.

On the other hand, managers tend to manage earnings in order to achieve higher performance targets and maximize their benefit (Sun, Salama, Hussainey, & Habbash, 2010), or they manage earnings to avoid incurring losses (Hansen, 2010). However, since loss-making firms couldn't avoid or defer the loss occurrence, the management of these firms might take advantage of the loss situation through an earnings management technique called big bath behavior.

Big bath behavior is a downward earnings management technique. Firms take a "big bath" during periods of bad performance, by recognizing more expenses and under-reporting the current period's earnings which are already bad, thereby shifting those earnings to future periods and achieving higher performance targets in the subsequent years (Kirschenheiter & Melumad, 2002). Big bath practice might be present during several situations; the most common one is during CEO turnovers. Newly appointed CEOs tend to overstate any losses during the first year of their appointment while blaming it on their predecessor CEO and taking credit for the subsequent improved financial performance (Bornemann, Kick, Pfingsten, & Schertler, 2015). Another situation is during periods of bad performance. When a firm is already performing poorly, it won't be so harmful for the firm to maximize its losses and expenses in the current period, so that the following periods would indicate higher-than-usual performance levels when these expenses are reversed (Zemánková, 2015).

This study examines the impact of an unexpected net financial loss on the possibility of firms changing their CG in response to the loss. According to Kosnik (1987), the effectiveness of a CGS is best revealed when the firm is suffering from an underperformance such as corporate scandals, financial fraud, and financial restatements (Marcel & Cowen, 2014; Eshagniya & Salehi, 2017; Okhmatovskiy & Shin, 2019). This study differs in that it takes underperformance events and examines one of its extreme cases, the occurrence of a sudden loss that is preceded and followed by at least two consecutive years of the firm reporting net profits.

This study also aims to examine the likelihood of loss firms to engage in a big bath behavior. There is a possibility that the management of the loss-making firm will attempt to turn the loss situation to their advantage by manipulating earnings through big bath since loss firms couldn't avoid incurring the loss, then it is necessary to investigate whether these firms would resort to managing earnings downwards through big bath to benefit from the bad situation and report higher earnings in the following periods.

Therefore, we collect a sample of loss-making firms and build another matched sample of profit firms listed in the Egyptian Stock Exchange (EGX) from 2014 to 2017 to test whether the sudden loss initiates a change in the loss-making firms' CGS and whether loss firms are more likely to engage in a big bath behavior compared to the profit firms. Using confirmatory factor analysis (CFA), two CG constructs are developed: board and ownership, followed by difference-in-differences (DID) analysis to compare between the pre-loss and post-loss periods in both samples. Abnormal accruals are also used as a proxy for big bath through binary logistic regression. We find that firms make significant changes to their board and ownership after the loss than before. However, these changes do not significantly differ from the changes made by profit-making firms during the same periods. These results indicate that sudden loss is not the only factor that triggers changes in the CGS, as profit-making firms that did not incur losses also make similar changes to their board and ownership. Findings also show that firms that report sudden loss have an increased likelihood to engage in a big bath behavior compared to profitable firms, which indicates that

firms can resort to earnings management techniques to take advantage of the loss situation.

The rest of this paper is organized as follows: Section 2 introduces the related literature and develops hypotheses; Section 3 describes the research methodology, sample selection and research design; Section 4 presents the empirical results. Finally, a discussion of the results and suggestions for future research are provided in Section 5.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The following section summarizes the literature review on sudden loss, CG and big bath.

2.1. Sudden loss and CG

Empirical studies have focused on the association between CG and firm performance for a long time (Mardnly, Mouselli, & Abdulraouf, 2018), with most literature considering CG as the predictor variable, and on its influence on a firm's performance from various perspectives (Choi, Kim, & Lee, 2020).

On one hand, regarding financial crises, several studies (Kowalewski, 2016; Orazalin, Mahmood, & Jung Lee, 2016; Orazalin & Mahmood, 2019; Hanafi, Setiyono, & Sanjaya, 2018; Ayadi, Ayadi, & Trabelsi, 2019) have examined the importance of strong, preexisting CGS and the impact they have on financially distressed firms or during corporate crisis periods. On the other hand, there are few studies and evidence regarding the response of CG mechanisms at the firm level as an outcome variable to different forms of underperformance and shock event occurrences.

For transitory loss-making firms, the loss event can be sudden and could lead to a period of deviation from profitability, negative earnings, and poor financial performance (Lawrence, Sloan, & Sun, 2018). The term "sudden" is an indication that the loss situation is unexpected, more likely to be a result of a corporate shock event or an economic crisis, in which the firm has been profitable for at least a year or several years before the occurrence of the loss. Therefore, the loss event is described as "sudden" to differentiate between it and other types of recurring losses.

A "shock event" as a concept, as described by Ferretti, Profumo, and Tutore (2015), indicates a condition that challenges the profitability and survival of any firm. Any corporate shock event is characterized by unpredictability and instant. These features make it easier to pinpoint the exact day on which the shock situation happened. In contrast, a "crisis" usually follows several subsequent stages, starting from the pre-crisis to the post-crisis stage.

Limited research has been conducted on the response of CG mechanisms to different forms of underperformance and accounting shocks including negative corporate scandals (Okhmatovskiy & Shin, 2019), financial fraud (Marcel & Cowen, 2014), and financial restatements (Eshagniya & Salehi, 2017). These studies showed evidence of changes occurring to the CGS of underperforming firms. According to Balkrishna, Coulton, and Taylor (2007), a loss is usually "associated with more bad news than profits"

(p. 385), which means that corporations have stronger incentives to recognize news of bad earnings because investors of any corporation are naturally averse to loss and would like to be informed about losses sooner than about profits. Moreover, due to the lack of the investors' ability to comprehend the dimensions of the loss event, managers disclose the circumstances of the loss to help shareholders better understand the firm's current situation (Leung & Veenman, 2018).

Following the shock events, the firm's response strategies to the crisis become significant (Ferretti et al., 2015). Given that CG is expected to be altered in response, it is important to understand which aspects of the firms' CGS the management would alter in response to the different forms of financial shocks and, specifically, the case of a sudden loss. The firm might improve its board composition or ownership structure after suffering loss (Bebchuk & Weisbach, 2010).

2.2. Sudden loss and big bath

Managers tend to manage earnings in order to achieve performance targets and maximize their benefit (Sun et al., 2010), or they manage earnings to avoid incurring losses (Hansen, 2010). Earnings management literature has been long focused on income-increasing or smoothing behavior in financially healthy firms (Kumari & Pattanayak, 2017; Mostafa, 2017; Ujah, Brusa, & Okafor, 2017; Mahrani & Soewarno, 2018; Lakhal & Dedaj, 2020), since a firm's profitability determines its future and survival (Sial, Chunmei, Khan, & Nguyen, 2018).

Moreover, the existing literature on earnings management during crisis situations pertained to investigating the presence of income-increasing earnings management prior to the occurrence of an accounting shock or underperformance, as the focus is always on avoiding or deferring the occurrence of negative material events through managing earnings upwards. The reason behind this is that it is harder for firms to meet expected targets during crisis periods, and, therefore, they have greater incentives to manage earnings upwards to avoid or defer its occurrence (Assenso-Okofo, Ali, & Ahmed, 2020).

Some of the crises and shocking events included in earnings management literature are related to financial fraud (Nasir, Ali, Razzaque, & Ahmed, 2018), the global financial crisis (Assenso-Okofo et al., 2020), and financial loss (Hansen, 2010). However, according to Nagar and Sen (2017), fewer empirical studies examine the possibility that managers might practice managing earnings downwards during the crisis period when the firm is already suffering.

For sudden loss firms, the loss event is shocking and unavoidable; resulting in a period of deviation from profitability, negative earnings and poor financial performance (Lawrence et al., 2018). Firms that suffered from sudden financial losses couldn't do much to alter or avoid the occurrence of the loss situation in the period preceding the loss. However, Johnstone, Li, and Rupley (2011) stated that firms that suffered from negative material events are more likely to manage earnings downwards.

Earnings management can also be used to convert from loss to profit. With regard to the case of a sudden loss firm, a "big bath" behavior might be present. Big bath behavior practice is naturally prevalent (Hope & Wang, 2018), and is usually found after periods of CEO turnover, as newly-appointed CEOs tend to manage earnings and blame it on their predecessor CEO (Breuer, Follonier, & Knetsch, 2021; Pierk, 2021). Big bath is also used to manage earnings downwards when a firm's income is already poor, further worsening the financial position of the company (Jordan, Clark, & Vann, 2007), and as aforementioned, big bath is usually present during bad financial periods or during transitory loss periods.

2.3. Hypotheses development

Studies have associated CG mechanisms with firms' overall financial performance. However, empirical studies addressing the response of CG to different forms of underperformance and negative shock events are rare. During times of corporate financial struggles, a firm's CG becomes critical, as firms act according to the current situation and address deficiencies in the existing CGS (Okhmatovskiy & Shin, 2019). Furthermore, according to Olsen and Tamm (2017), in case of bankruptcy, firms work on building a more effective CG to compensate for the perpetual losses and attract additional capital from investors and creditors to avoid future losses. Therefore, the CGS of a firm is susceptible to changes following major negative events in the company's life cycle.

Regarding the specific characteristics of CG, research has examined the changes in its internal mechanisms, explaining that the internal aspect of CG defines the quality of the governance structure as a whole, whereas the external mechanisms are dynamic and difficult to control (Orazalin et al., 2016). Besides, governance studies on internal governance mechanisms are usually directed toward the characteristics of the firm's board of directors and its ownership structure (Bebchuk & Weisbach, 2010). Following the occurrence of shock events, the firm's response strategies to crises gain importance (Ferretti et al., 2015). A sudden loss is an extreme case of underperformance; therefore, the response of the internal CG mechanisms and modification after reporting a sudden loss should be examined. Accordingly, owing to the lack of empirical results linking sudden loss and CG, the following null hypotheses can be constructed:

H1$_0$: There is no association of the reporting of a sudden loss on post-changes occurring in the board of directors' composition of the firm.

H2$_0$: There is no association of the reporting of a sudden loss on post-changes occurring in the ownership structure of the firm.

The already existing literature on earnings management during the periods of financial struggles or material negative shocks is mostly concerned with examining the presence of income-increasing earnings management prior to the occurrence of the negative event, as the focus is usually on how to avoid or defer the occurrence of the financial loss through managing earnings upwards. Big bath is a downward earnings management approach that can be practiced as

a remedy when the company is facing larger than expected losses (Caruso, Ferrari, & Pisano, 2016). The motive behind this practice lies in the notion that maximizing the current losses and making the loss situation even worse will not cause any greater harm, since investors' reactions to loss news are not proportionated with the intensity of the loss (Ahmed, 2005). Therefore, since firms that suffered from a sudden loss couldn't avoid or defer the loss, the management of these firms might be tempted to practice big bath during the loss period in order to take advantage of the bad situation and achieve higher performance targets in the following year. Accordingly, and to fill the gap in the literature, the third null hypothesis can be constructed as follows:

H3$_0$: There is no association of the reporting of a sudden loss on the likelihood of the firm to engage in a big bath behavior.

3. RESEARCH METHODOLOGY

This section provides the research design, sources of data, the study population and sample selection, constructing the research variables and the statistical methods used.

3.1. Data sources and sample selection

Several sources have been used for data collection to measure the study variables. Two sets of data are gathered: financial data (sudden loss and big bath) and non-financial data (CG). Sudden loss data have been obtained from the published financial statements of the sample studies, whereas CG data have been obtained from the managements' annual and disclosure reports. To test the developed hypotheses, two separate but matched data samples, that is, sudden loss and matched profit are collected for the empirical analysis.

The first sample consists of the companies that have reported a sudden loss, where sudden loss refers to the fiscal year wherein a firm unexpectedly reports a net loss that is preceded and followed by at least two consecutive years of reported profits, that is, 2 years of reported profits before and after the loss year that contribute to the "sudden" aspect of the loss event. The second sample is a matched control sample of profitable firms. The second sample is considered because the collection of the first loss sample showed some clustering in specific industries; therefore, to account and control for any industrial characteristics that might have impacted the occurrence of the sudden loss, a matched control sample of profit firms is collected according to the firm industry and size. A profit company is defined as any company that continues to report consecutive profits during the investigation period.

The matching process is conducted as follows: first, classifying each loss firm by industry according to the industry classification on the EGX website; second, classifying each loss firm based on its firm size, measured by the firm's total assets; and third, matching each profit firm to its respective loss firm in the same industry and with the closest size to the loss firm. The study period for the combined sample covers from 2014 to 2017. This investigation period is chosen because most of

the loss firms that meet the "sudden loss" criteria are clustered around those 4 years. Financial service companies and banks are excluded due to their specialized accounting measurement methods. All companies should be actively traded at EGX during the investigation period and should have fiscal year-ends in December to avoid the overlapping of observations. Therefore, the final combined sample of the study consists of 52 listed companies in the EGX, divided into 26 loss firms matched against 26 profit firms from 2014 to 2017, resulting in 208 firm-year observations.

3.2. Variables construction and measurement

3.2.1. Sudden loss

The proxy used for sudden loss is reported negative net income after tax which is preceded and followed by reporting positive earnings for at least two consecutive years. The selection criteria for sudden loss are classifying the loss situation as "transitory" and "sudden", distinguishing it from other types of losses (recurring or permanent losses).

3.2.2. Corporate governance

Following CG studies (Alfraih, 2017; Utama, Utama, & Amarullah, 2017; Karim, Manab, & Ismail, 2020; Zhou, 2019), this study focuses on two CG internal mechanisms; composition of the board of directors and ownership structure. The study excludes external CG mechanisms that are outside the control of the management. The variables outlined in both panels of Table 1 are combined to construct the company's overall CGS. Independent non-executive chairman is excluded as descriptive statistics showed that no board chairman in both loss and profit samples were independent.

Table 1. Description of CGS variables

Proxy	Description
Panel A: Board composition proxies	
Board size (*Bsize*)	The number of board members.
% Non-executive directors (*%NEDs*)	The proportion of non-executive directors on the board, calculated by dividing the number of non-executive directors by the overall board size.
% Independent non-executive directors (*%INDs*)	The proportion of independent, non-executive directors on the board, calculated by dividing the number of independent non-executive directors by the overall board size.
Non-executive chairman (*NEC*)	If the chairman of the board is non-executive, the *NEC* takes the value of 1, 0 otherwise.
Independent non-executive chairman (*INEC*)	If the chairman of the board is independent and non-executive, the variable takes the value of 1, 0 otherwise.
% Female directors (*%FEM*)	The proportion of female directors on the board, calculated by dividing the number of female directors by the overall board size.
Panel B: Ownership structure proxies	
% Shares held by all directors (*%TotD*)	The proportion of firm shares held by all directors.
% Shares held by top director (*%TopD*)	The proportion of firm shares held by the top director (by number of shares owned).
% Shares held by all institutional investors (*%TotInv*)	The proportion of shares held by all firm's institutional investors.
% Shares held by top institutional investor (*%TopInv*)	The proportion of firm shares held by the top institutional investor (by number of shares owned).
% Shares held by all shareholders with shares of 5% or more (*%TotBlock*)	The proportion of shares held by all firm's shareholders in amounts > 5%.

Using each proxy individually to measure the constructs will not explain how these variables are combined to form the board composition and ownership structure of the firm and, eventually, the overall CGS. Moreover, the use of individual CG variables might lead to multi-collinearity among the variables. Therefore, consistent with CG literature that applies governance indices, factor analysis is used to combine the variables of each construct into two factors: board and ownership. Factor analysis is a statistical method used when a set of interrelated variables can be used as a measuring aspect of the same dimension. These interrelated variables, called observed variables or indicators, can be combined and reduced to fewer latent variables called factors.

This study applies CFA to verify the existence of a relationship between the observed CG variables and their underlying latent constructs: board and ownership, based on the hypothesis that Panel A variables of Table 1 combine to form the firm's board composition (with the exception of an independent chairman, which is excluded), whereas Panel B variables combine to form the ownership structure as used in literature.

The sample used for CFA is the combined sudden loss and profit sample.

Table 2. Confirmatory factor analysis results

Factor	Variable	Factor loading	Standard error	*t*-value
Board	*Bsize*	0.45	0.12	3.87
	%NEDs	1.08	0.22	4.81
	%INDs	-0.15	0.077	-1.91
	NEC	0.26	0.090	2.89
	%FEM	0.15	0.077	1.98
Ownership	*%TotD*	0.93	0.058	16.11
	%TopD	0.89	0.060	14.71
	%TotInv	0.74	0.066	11.26
	%TopInv	0.81	0.063	12.85
	%TotBlock	0.81	0.063	12.74

Table 2 reports the results of the CFA conducted on each CG variable. The robust weighted average least square method is used. The factor loadings in CFA are regression coefficients that estimate the causal effect between the factors and indicators and do not need a specific cutoff (acceptable) value provided that they are significant. To accept the factor loadings, the t-value should have a cutoff score ≥ 1.96 at an alpha level of 5%.

Table 2 shows that the factor loading values are statistically significant on both "board" and "ownership" factors. All CG variables report significant t-values of 1.96 or higher, except for *%INDs* with a t-value of −1.91; therefore, it should be separately analyzed. The rest of the variables, *Bsize*, *%NEDs*, *NEC*, and *%FEM*, significantly load on the first factor, *board*, whereas *%TotD*, *%TopD*, *%TotInv*, *%TopInv*, and *%TotBlock* significantly load on the second factor, *ownership*. Therefore, the results support the existence of significant relationships between the observed and latent variables.

There are several indices to assess the fit of the CFA measurement model, and multiple guidelines are available to indicate the "acceptable" or good model fit. We follow the guidelines recommended by Brown (2006) widely used indices in literature (Field, 2005) alongside Hu and Bentler (1999). We apply the following indices: root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and standardized root mean residual (SRMR). Table 3 summarizes the acceptable values for model fit indices and the conducted CFA model results.

Table 3. Model fit indices for the CFA

Index	Perfect fit	Acceptable fit	Model results
RMSEA	0 < RMSEA < 0.05	0.05 < RMSEA < 0.08	0.021
GFI	0.95 < GFI < 1	0.90 < GFI < 0.95	0.95
AGFI	0.90 < AGFI < 0.95	0.85 < AGFI < 0.90	0.86
SRMR	SRMR = 0	SRMR < 0.08	0.07

Source: SPSS, perfect and acceptable fit are adopted from Brown (2006) and Hu and Bentler (1999).

Table 3 shows that the model has an overall good fit. First, RMSEA is a perfect fit of 0.021, which means that the model fits well with its degree of freedom (df = 34). Second, GFI is also a perfect fit of 0.95, which indicates a good fit between the hypothesized model and the observed covariance matrix. Third, AGFI is an acceptable fit of 0.86, and it represents a correction of the GFI. Finally, SRMR is an acceptable fit with a value of 0.07, which means that the model captures the data well.

3.2.3. Big bath behavior

The second dependent variable of this study is big bath behavior. Big bath is an income-decreasing earnings management technique. There is a number of empirical methods and models that are commonly used in literature to measure earnings management. The most commonly used measure is discretionary accruals, rather than real earnings management, given the difficulty of its detection compared to accruals earnings management (Nasir et al., 2018).

Based on Sun and Rath (2009), positive discretionary accruals (also known as abnormal accruals) are indicators of income-increasing earnings management, while negative discretionary accruals are indicators of income-decreasing (big bath) earnings management. Therefore, negative-signed abnormal accruals are used as a proxy for the practice of big bath.

Alternative methods have been used by the literature such as Modified Jones' (1991) Model to calculate discretionary accruals (abnormal accruals) and detect earnings management because it has proven to be better and provide more accurate results than previously used models (Dechow, Sloan, & Sweeney, 1995). However, the Modified Jones' (1991) Model faced several criticisms, including that the model doesn't perform well on smaller samples (Moers, Meuwissen, Peek, & Vanstraelen, 2003), in addition to the model not being suitable for poorly performing companies (Reynolds & Francis, 2000). Therefore, the Modified Jones' (1991) Model is not suitable to use in this research due to the relatively small sample (52 companies) and due to the existence of an underperformance case (sudden loss).

Another more convenient model to be used in this study to measure abnormal accruals is the model constructed by Defond and Park (2001). The model focuses on measuring abnormal working capital accruals because it is more likely to be managed than non-working capital accruals and is not only limited to large-sized samples. The model measures abnormal accruals as the difference between actual working capital and the market's estimation of what the current period's working capital should be (based on the level of working capital needed to support current sales) as follows:

$$AWCA_t = WC_t - \left[\frac{WC_{t-1}}{S_{t-1}} \times S_t\right] \tag{1}$$

where,
- $AWCA_t$ is abnormal working capital accruals in year *t*;
- WC_t is the actual working capital in year *t* calculated as (current assets – cash – short-term investments) – (current liabilities – short-term debt);
- S_t is sales in year *t*;
- $[WC_{t-1}/S_{t-1}]$ is expected working capital as a prior year ratio of current accruals to sales.

3.3. The models used

3.3.1. Sudden loss and CGS

Following Mulcahy and Donnelly (2015), the following DID equation model is used to test the impact of sudden loss on firms' CGS:

$$\Delta GOV = \beta + \delta D_{LOSS,t} + \theta LEV_t + \varepsilon \tag{2}$$

where,
- ΔGOV is the change in each CG variable, board and ownership separately during the test period;
- β is the change in the CGS for the profit sample;
- δ is the change in the CGS between the loss and control samples;
- $(\beta + \delta)$ is the change in the CGS for the loss sample;
- $D_{LOSS,t}$ is the sudden loss, a dummy variable that takes the value of 1 for the loss sample, 0 for control sample;
- LEV_t is the firm leverage, measured by total debt divided by total equity;
- ε is the error term.

Consistent with Okhmatovskiy and Shin (2019), besides matching the samples based on industry and firm size to control for governance changes, leverage is also used as a control variable, as firms' CGS might be affected if the firm heavily relies on debt; therefore, leverage is used as the firm's debt-to-equity ratio.

3.3.2. Sudden loss and big bath behavior

Similar to Cheng, Park, Pierce, and Zhang (2019), to test the sudden loss implications for big bath behavior ($H3_0$), the following logistic regression model is used:

$$D_{BATH} = \beta_0 + \beta_1 D_{LOSS} + \beta_2 ROA + \beta_3 CFO + \beta_4 LEV + \varepsilon \qquad (3)$$

where,
- D_{BATH} is big bath, a dependent dummy variable that takes the value of 1 if the firm engages in big bath (abnormal accruals are negative), 0 otherwise;
- D_{LOSS} is sudden loss, a dummy variable that takes the value of 1 for loss sample, 0 for control sample;

- *ROA* is return on assets, calculated as net income after tax divided by total assets;
- *CFO* is cash flow from operations, scaled by total assets;
- *LEV* is firm leverage, measured by total debt divided by total equity;
- ε is error term.

The logistic regression model is based on a cross-sectional analysis between the loss firms and profit firms in the same year of the loss. Given that big bath, as an earnings management technique, could be affected by other variables besides sudden loss, therefore, several control variables are included as proxies for having proven to influence big bath in the extant literature. These control variables are represented in return on assets, cash flow from operations and leverage.

4. DISCUSSION OF THE RESULTS

First, descriptive statistics have been introduced to give a summary of the statistical data of the research variables to help give a general understanding of each variable analyzed. It includes the mean, median, standard deviation, maximum, minimum, skewness and kurtosis. Table 4 outlines the descriptive statistics for each CG variable.

Table 4. Descriptive statistics

Variable	Mean	Median	Std. deviation	Max.	Min.	Skewness	Kurtosis
Bsize	7.922	7.000	3.030	17.000	4.000	1.048	0.797
%NEDs	0.683	0.714	0.204	1.000	0.000	-0.996	1.146
%INDs	0.096	0.000	0.142	0.545	0.000	1.280	0.596
NEC	0.183	0.000	0.387	0.714	0.000	1.656	0.752
INEC	0.000	0.000	0.000	0.000	0.000	0.000	0.000
%FEM	0.117	0.100	0.138	0.971	0.000	1.280	1.739
%TotD	0.492	0.469	0.274	0.912	0.018	0.037	-1.190
%TopD	0.343	0.258	0.245	0.971	0.018	0.978	-0.002
%TotInv	0.417	0.379	0.324	0.971	0.000	0.234	-1.464
%TopInv	0.298	0.242	0.259	0.912	0.000	0.984	0.008
%TotBlock	0.618	0.643	0.229	1.000	0.249	-0.357	-0.650

Second, to capture changes in the CGS of the firm, DID method is applied. DID method is an econometric measure based on having a treatment group and a comparison (control) group over two periods. The treatment group is subject to a specific event in a specific period, whereas the control group is not subject to none. Both groups are then examined to compare the changes that occurred eventually for each group in response to the event. Finally, the total difference between the groups is subtracted to obtain the difference in differences.

This method is applied to test the hypotheses. The loss event occurs in the year (t), whereas pre-loss represents (t - 1) and post-loss represents (t + 1). To report any changes occurring in the firm's CGS, CG data must be collected in the year before the reporting of loss and compared against the year following the loss event in both the loss and control (profit) samples to test for the separate impact of the loss event. Therefore, DID analysis is used for both samples to compare the pre-loss year (t - 1) with the post-loss year (t + 1) in both time-series and cross-sectional analyses. A multiple DID regression analysis of the CG model is conducted and the results are included in Table 5.

Table 5. Multiple regression analysis of CGS

Independent variables	Board (t-value)	Ownership (t-value)	%INDs (t-value)
Intercept	9.053 (1.439)	2.025 (5.042)	6.437 (1.085)
D_{LOSS}	0.051 (-0.097)	0.272 (1.435)	0.032 (-0.099)
LEV	-0.003 (-0.883)	0.001 (0.656)	-0.004 (-0.997)
N	52	52	52
R²	0.5%	1.80%	0.3%

Two-tailed p-values for tests of significance (Wald Test):
- Intercept + $D_{LOSS,t}$ = 0.04 (Board);
- Intercept + $D_{LOSS,t}$ = 0.02 (Ownership);
- Intercept + $D_{LOSS,t}$ = 0.04 (%INDs).

Table 5 reports the results of the multiple regression analysis of the changes in CG in the combined sample of 52 firms during the test period. The results of the multiple regression show that firms facing sudden loss make significant changes to their CGS following the reporting of loss, as observed in the results of the two-tailed test of significance (Wald test) of Intercept + $D_{LOSS,t}$ (changes of CG in the loss sample), with p-values of 0.04, 0.02, and 0.04 for board, ownership, and

%INDs, respectively, implying significant changes in all constructs. This is consistent with the literature showing evidence of CG changes following shock events.

The intercept values (changes of CG in profit sample) also indicate that profit firms apply significant changes to their ownership structure, with a positive t-value of 5.042, whereas board and *%INDs* are positive but insignificant (coefficient = 9.053, t-value = 1.439; coefficient = 6.437, t-value = 1.085, respectively).

However, this study investigates the difference in the CG changes made in the loss sample and those in the profit sample; therefore, the coefficient of the dummy variable $D_{LOSS,t}$ (DID of CG between loss and profit samples) represents the primary interest of the model analysis. The results indicate that the changes that occur in the board, ownership, and *%INDs* of loss firms are not significantly different from the changes of the profit firms, with t-values for board, ownership, and *%INDs* being -0.097, 1.435, and -0.099, respectively. The values of R^2 indicate that both sudden loss and leverage account for only 0.5%, 1.8%, and 0.3% of the changes in board, ownership, and *%INDs*, respectively.

These results show that although firms facing sudden loss modified their board composition and ownership structures, these modifications were positive but not significant compared with the profit-making firms. In other words, firms that reported a sudden loss had changes in their CGS that were not significantly different from those made in firms that did not incur a loss. These results show that CG changes were limited not only to the reporting of sudden loss but also to other mutual conditions between both samples.

The reason behind including a control sample as a benchmark to the sudden loss sample was to isolate the loss event and control for industry characteristics and firm size. Therefore, other non-controlled-for factors might have played a role in triggering CG changes, such as the overall situation of the economy or other more specific firm characteristics. The preexisting quality of CGS in each firm could influence the change. It is possible that firms with weak CG pre-loss were more prone to applying changes in their structure as opposed to firms with an already-strong CGS. Therefore, the study fails to conclusively reject the null hypotheses $H1_0$ and $H2_0$.

In order to test the relationship between the reporting of a sudden loss and firms practicing big bath behavior, a logistic regression model (logit model) is used. Logistic regression is similar to linear regression, with the difference that its dependent (outcome) variable is a categorical variable, and one or more of its independent (predictor) variables are categorical or continuous. Logistic regression is used to predict the probability of an event occurring based on the values of one or more predictor variables. In this case, logistic regression is used to predict the probability of the existence of big bath behavior in a cross-sectional analysis between loss firms and profit firms during the year of the loss. The dependent variable is big bath, which is a categorical or dummy variable that holds the values of 1 (when a big bath exists) or 0 (when no big bath exists). The independent variable is sudden loss, which is

also categorical and has the value of 1 for the loss sample and 0 for the profit sample. Since there are only two categorical outcomes (0 & 1), binary logistic regression is conducted.

The classification table helps in evaluating the predictive accuracy of the regression model by summarizing the observed response categories with the predicted response categories. The classification results are as shown in Table 6:

Table 6. The classification

Observed		Predicted		
		Bath		Percentage correct
		0 (no bath)	1 (bath)	
Bath	0	18	8	69.2
	1	10	16	61.5
Overall percentage				65.4

Note: The cut-off value is 0.5.

Based on the results of the classification table, the current model correctly classifies 18 firms that had no big bath and misclassifies 8 others (it correctly classifies 69.2% of these cases). The model also correctly classifies 16 firms that had big bath and misclassifies 10 others (it correctly classifies 61.5% of the cases). Therefore, the overall accuracy of the classification is 65.4%, which means that the logistic regression model classifies the dependent variable correctly by 65.4% of all cases.

To assess how the logistic regression model fits the data, several options exist, including Pseudo-R^2 (Cox & Snell's R^2, Nagelkerke's R^2), the Chi-square model, Wald statistic and the odds ratio Exp(B). All of these indicators are used to assess the fit of the logistic regression model as shown in Table 7 Panels A and B.

Table 7. Logistic regression model fit assessment

Panel A: Pseudo R² test results		
-2 log likelihood	Cox & Snell's R square	Nagelkerke's R square
65.031	0.127	0.169

Panel B: Chi-square test results				
		Chi-square	df	Significance
Step 1	Step	7.056	4	0.013
	Block	7.056	4	0.013
	Model	7.056	4	0.013

The results of Table 7 Panel A indicate that the logit model explains 16.9% of the variability in the dependent variable, big bath. The rest of the variation could be due to random error in the regression model. The -2 Log-Likelihood (-2LL) is equal to 65.031, which is lower than the -2LL of the baseline model (72.087), indicating improved accuracy in predicting big bath. The results in Panel B show a value of chi-square of 7.056 and a significant p-value of 0.013, which means that the model is better at predicting big bath with the independent variables included than without them (i.e., initial baseline model). Also, the variance inflation factor (VIF) has been used to ensure that the model is free of the problem of multi-collinearity.

Results of the binary logistic regression analysis, as well as the Wald statistic and odds ratio Exp(B), are included in Table 8 as follows:

Table 8. Binary logistic regression results

Independent Variables	Coefficient	Standard error	Wald statistic	df	Significance	Exp(B)
Intercept	-0.820	0.562	2.132	1	0.044	0.270
D_{LOSS}	1.176	0.744	2.502	1	0.014	3.080
ROA	3.421	3.525	0.942	1	0.332	30.602
CFO	-2.020	3.487	0.336	1	0.046	0.133
LEV	-0.084	0.126	0.437	1	0.009	0.920

Table 8 reports the results of the binary logistic regression for a combined sample of 52 firms, divided into 26 loss firms and 26 profit firms during the loss year. The main independent variable is the dummy variable, sudden loss D_{LOSS} which takes the value of 1 for loss firms and 0 for profit firms. The outcome or dependent variable is the dummy variable, big bath D_{BATH} which takes the value of 1 if a firm engages in a big bath behavior (has negative abnormal accruals), and the value of 0 if a firm doesn't engage in a big bath behavior (has positive abnormal accruals). The control variables are represented in return on assets (ROA), cash flow from operations (CFO), and firm leverage (LEV).

The independent variable, D_{LOSS} has a positive-signed coefficient equal to 1.176 and is statistically significant with a Wald-statistic of 2.502 (p = 0.014). Thus, these results indicate a significant and positive relationship between sudden loss and big bath, and that the reporting of a sudden loss increases the likelihood of firms to engage in big bath behavior compared to profit firms that suffered no losses. The value of Exp(B) = 3.08, which is greater than 1, thus supporting the positive-signed coefficient and indicating an increased likelihood of big bath occurring due to sudden loss. Therefore, $H3_0$ is rejected and the alternative hypothesis is accepted.

The first control variable, ROA is positively (β_1 = 3.421) but insignificantly (p = 0.332) associated with big bath and inconsistent with Cheng et al.'s (2019) notion that higher returns represent more incentives for the management to manage earnings downwards to save up for future periods. The insignificance might be interpreted due to loss firms suffering on average from negative return on assets (with a mean of -0.011), which didn't contribute to the management's incentives to manage earnings downwards to save up for future periods because they were already generating losses.

The second control variable, CFO is negatively ($\beta2$ = -2.020) and significantly (p= 0.046) associated with big bath, which is consistent with literature arguing that negative CFOs are associated with an increased likelihood of managing earnings since it means having higher accruals.

The last control variable, LEV is negatively (β_2 = -0.084) and significantly (p = 0.009) associated with big bath, which is consistent with literature finding leverage to be a motivation for income-increasing earnings management rather than with downward earnings manipulation (Campa & Donnelly, 2014), which is logical since a firm suffering a loss with high debt likely resort to attempts to increase its earnings in order to repay its obligations, rather than to decline earnings even more.

5. CONCLUSION

Following major accounting scandals in the USA, regulators set stricter rules and requirements for CG in firms, which initiated a chain of improvements in the firms' governance structure to ensure the transparency and integrity of the financial statements quality and disclosure. While extant literature has heavily investigated the impact of the quality of CGS on firm performance, very few studies explored the other way around. Therefore, this study considers how poor performance is expected to affect the CGS of firms.

This study examines the occurrence of a sudden loss, as a major form of firm underperformance, on changes incurred in firms' CGS following the reporting of the loss. It also examines the implications of sudden loss for the likelihood of the firms' management taking advantage of the situation through big bath, by worsening the loss situation to achieve higher performance targets in the following year through the unwinding of accruals.

Studies have provided evidence on changes occurring to the firms' CGS following economic crises and major accounting shocks such as fraud or financial restatements. The analysis is based on a sample of sudden loss firms listed in the EGX from 2014 to 2017.

The sudden loss firms are those that unexpectedly report a net loss in a year that is preceded and followed by at least two consecutive years of reporting profits. A matched sample of profit firms, which incurred no losses, based on industry and size is collected to isolate the sudden loss event and control for other industry and firm-size characteristics. CFA is conducted to combine CG proxies into two general constructs: board composition and ownership structure. The analysis is then followed by a multiple DID regression analysis to test the response of CG constructs to the sudden loss situation in the loss sample with respect to the profit sample. The study also uses binary logistic regression to examine the likelihood of big bath.

On the one hand, results indicate that sudden loss has a significant positive impact on changes occurring in the board composition and ownership structure of loss firms, but those changes are not significantly different from the changes made to the CGS of profit firms, which shows that although sudden loss was indeed a factor in applying modifications to the CGS of loss firms, it appears that it was not the only factor. Other factors could have contributed as well, such as the quality of the existing CGS of firms before the loss period and other individual firm characteristics. Furthermore,

the last release of the 2016 Egyptian Code of CG could have had a significant impact on the changes occurring in the CGS of Egyptian firms to comply with the recommendations of the CG Code.

On the other hand, sudden loss is also found to have a significant positive impact on the probability of firms to engage in big bath behavior. This means that firms that reported a sudden loss had more incentives to manage earnings downwards, compared to the profit firms which didn't suffer losses. These findings are consistent with the literature (Agrawal & Chatterjee, 2015; Cheng et al., 2019) which found big bath to be present in firms that suffered from other forms of underperformances and shock events.

This research is limited to internal CG mechanisms including the board of director's composition and ownership structure, due to the difficulty of obtaining data related to external governance mechanisms, since these mechanisms include government regulations and labor market over which the firm's management and shareholders have little control. Moreover, the research sample investigated is limited to 52 firms, due to the lack of EGX 100 listed firms that meet the criteria of sudden loss during the considered period.

Therefore, future research may be extended to broaden the years of study. Furthermore, the potential impact of COVID-19 pandemic on the relationship between sudden loss and earnings management should be examined. Moreover, the effect of sudden loss on other aspects and mechanisms of CG can be explored in different contexts.

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