

The Impact of Family Involvement on the Relationship between COVID-19 Disclosure and Stock Price Crash Risk: Evidence from Egypt

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Abstract:

This study aimed to examine the relationship between COVID-19 disclosure and stock price crash risk and the moderating role of family involvement in ownership and board. Using a sample of 114 observations for non-financial listed firms on the EGX100 EWI during the Corona pandemic 2020-2021, the results indicated that there is an insignificant relationship between COVID-19 disclosure and stock price crash risk. Concerning the moderating role of family involvement, the results indicated that family involvement in ownership and board negatively moderates the relationship between COVID-19 disclosure and stock price crash risk.

Keywords: COVID-19 disclosure, stock price crash risk, family involvement in ownership, family involvement in the board.

1. Introduction

Stock crash risk is the risk of a sudden sharp drop in the stock price (Jebran et al., 2022; Yang et al., 2024). Jin and Myers (2006) proposed a theoretical framework that indicates the key reason for stock crash risk, which is information asymmetry between insiders and investors. Insiders have a huge incentive to hoard bad information from outside investors (Kothari et al., 2009; Mamun et

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al., 2020), and when the accumulated bad information reaches an overwhelming point, it is released all at once, leading to a stock price crash (Bai et al., 2020; Fu et al., 2021; Hutton et al., 2009; Jin & Myers, 2006; Mamun et al., 2020). It is a significant concern for the capital environment and investors, attracting the interest of authorities, investors, and scholars. Therefore, defining the determinants of crash risk is vital for reducing these risks in the stock market (Defond et al., 2015; Yang et al., 2024).

Recently, the COVID-19 pandemic, which was an unexpected event, drastically altered many facets of our daily lives. Therefore, firms need to respond to this event by disclosing more information about COVID-19 (Ezat, 2022). Previous studies investigated stock crash risk during the COVID-19 pandemic, with mixed results (Duan & Lin, 2023; Hossain et al., 2023; Kong et al., 2023). Regarding the association between COVID-19 disclosure and crash risk, prior literature presented mixed results (Duan & Lin, 2022; Hao & Dong, 2022; Jin et al., 2022). Consequently, it is still unclear whether COVID-19 disclosure decreases or increases stock crash risk, which motivates us to examine this relationship in Egypt.

It is commonly acknowledged in the literature that family firms differ significantly from non-family firms regarding governance structure and agency conflicts (Biswas et al., 2022). A firm that is managed or owned by members of the founding family is called a family firm (Chen et al., 2008; Wang et al., 2020). In this firms, stock crash risk is lower due to family members having a longer-term interest, being better informed than investors in non-family firms, and holding more decision rights (Srinidhi & Liao, 2020). Also, family members accelerate the information in a timely (Chen et al., 2008). Therefore, we expect family involvement in board and ownership to moderate the relationship between COVID-19 disclosure and stock crash risk.

This study aims to examine the effect of COVID-19 disclosure on stock crash risk and the moderating role of family involvement in board and ownership. A sample of 57 non-financial firms listed on the EGX100 from 2021 to 2022 is used, we find that COVID-19 disclosure is insignificantly associated with stock crash risk. Furthermore, our results show that family involvement in board and ownership negatively moderates the association between COVID-19 disclosure and stock crash risk. Overall, our results indicate that family involvement in board and ownership increases the level of information disclosure about COVID-19, reducing information asymmetry and resulting in lower stock crash risk.

This study focuses on Egypt for several reasons. First, the lack of studies that investigate the association between COVID-19 disclosure and crash risk and the moderating role of family involvement in board and ownership. Second, Egypt has distinctive characteristics as it is one of the Middle East and North Africa's (MENA) leading emerging markets (Hassaan & Salah, 2023), and the Egyptian stock exchange is considered among the world's oldest stock exchanges (El- Dyasty & Elamer, 2021).

Our paper makes several contributions. First, the study results add to the stock crash risk literature by providing the first study that investigates the effect of COVID-19 disclosure on stock crash risk in one of the emerging economies with a secretive culture, Egypt. Second, the results of this paper contribute to the family business by showing that family involvement in ownership and board negatively moderates the association between COVID-19 disclosure and crash risk. Third, we extend the literature on COVID disclosure by showing that COVID disclosure decreases stock crash risk in the presence of family involvement in ownership and board.

The remainder of the paper is organized as follows. Section 2 discusses the literature and hypothesis development. Section 3

provides the study's design and methodology. Section 4 presents and discusses the results, while Section 5 concludes the paper.

2. Literature and hypothesis development

2.1. Related literature on Stock price crash risk.

According to Jin and Myers' (2006) agency theory framework, bad-news hoarding by insiders is the primary reason for crash risk, where the disclosure preferences of managers are different from those of outside investors, resulting in information asymmetry between them. Several incentives can encourage insiders to withhold bad news, such as compensation, promotion, and increasing employment opportunities (Kothari et al., 2009). However, insiders cannot withhold negative news for a long period; when such information reaches a threshold point, they are forced to release all of the accumulated negative news to the market, which leads to crash risk (Hutton et al., 2009; Jebran et al., 2020, 2022; Xing et al., 2023).

Stock price crash risk is an important and serious concern for investors (Au et al., 2023; Defond et al., 2015); therefore, recent literature has examined several determinants of crash risk. Following the previous literature (Xing et al., 2023; Xu et al., 2020), we classify those determinants into four groups. The first group consists of market determinants, including analyst coverage (Bouaddi et al., 2023; Kim et al., 2019; Xu et al., 2013), institutional investors (Li et al., 2023; Lu et al., 2023), investor sentiment (Alnafea & Chebbi, 2022; Fan et al., 2021; B. Wu et al., 2021), and short-sales constraints (Deng et al., 2020; Ni & Zhu, 2016). The second group focuses on social determinants, including social integrity (Liu & Liu, 2024), social trust (K. Su & Song, 2022), social capital (Jebran et al., 2022; Xing et al., 2023; Zadeh, 2023), confucianism (Bashir & Yu, 2020; Jebran et al., 2019), managerial

political orientation (Chen et al., 2022), political connections (Harymawan et al., 2019), superstition (Bai et al., 2020), and local speculative culture (Zuo et al., 2023).

The third group comprises corporate policies, such as corporate tax avoidance (Garg et al., 2022; Jeong Bon Kim et al., 2011; Thai, 2023), accounting conservatism (Kim & Zhang, 2016), corporate social responsibility (Kim et al., 2014; Wu & Hu, 2019), corporate governance (Andreou et al., 2016; Wu et al., 2020), and risk disclosure (Hao & Dong, 2022; Jin et al., 2022; Lin & Wu, 2023). Finally, the fourth group includes CEO characteristics such as CEO power (Mamun et al., 2020; Shahab et al., 2020), CEO age (Andreou et al., 2017), CEO pay (Xu & Zou, 2019), CEO overconfidence (Kim et al., 2016), and CEO duality (Chen et al., 2017).

2.2 COVID-19 disclosure and stock price crash risk

Literature on stock crash risk argues that information asymmetries between firms and market investors allow insiders to accumulate bad news, leading to crash risk (Jin & Myers, 2006; Kothari et al., 2009; Liu & Liu, 2024; Yang et al., 2024). Firms communicate with outsiders through information disclosure, which helps investors and the public make investment decisions (Duan & Lin, 2022). Information disclosure reduces information asymmetries, resulting in reduced agency problems (Rothenberg, 2009; Yu & Xiao, 2022).

Risk disclosure lessens the gap between stock prices and firm fundamentals and aids investors in understanding a company's true operating state (Yang et al., 2024). Prior studies investigated the relationship between risk disclosure and crash risk. Using a sample of US public firms, Au et al. (2023) show that mandatory risk disclosures reduce crash risk. Yang et al. (2024), based on China data, show that risk disclosure is negatively associated with crash

risk. In the same context, Su et al. (2023) find that risk disclosure reduces crash risk. Lin and Wu (2023) show that climate risk disclosure alleviates crash risk. These results show that risk disclosure is useful for investors because it reduces information asymmetry, leading to reduced stock crash risk.

Previous literature presented mixed views on the association between COVID-19 disclosure and crash risk. On the one hand, using data from the US, Jin et al. (2022) find that voluntary disclosure of pandemic exposure increases stock crash risk. Duan and Lin (2022), based on China data, show that abnormal COVID disclosure increases stock price crash risk. On the other hand, Hao and Dong (2022) show that voluntary COVID disclosure decreases crash risk. The result of this study has been explained based on the argument that voluntary disclosure reduces information asymmetry, resulting in a lower stock crash risk. We argue that increasing the level of COVID disclosure decreases information asymmetries between insiders and investors, resulting in reduced stock crash risk. This leads to the following hypothesis:

H1: There is a negative association between COVID-19 disclosure and stock price crash risk.

2.3 The moderating role of family involvement in ownership

Family involvement in ownership is considered a governance mechanism that effects firm behavior and has an influence on other governance mechanisms (Wang et al., 2020). Family firms have the power to monitor the managers, which reduces agency problems, affects disclosure practices (Aribi et al., 2018), and makes enhanced financial disclosures (Ali et al., 2007).

According to the alignment hypothesis, family involvement in ownership can align their interests with those of other investors through more effective monitoring mechanisms for management

behavior (Alshirah et al., 2022; Ghaleb et al., 2020). Family owners are more worried about their family reputation (Cordeiro et al., 2021) and maintain good relations with investors (Gusrianti et al., 2020). Agency theory indicates that there are conflicts between managers and investors, but they are less common in family firms (Lokman et al., 2014).

Previous studies investigated crash risk in family firms. Sihombing and Diyanty (2019), based on Indonesian data, show that there is no relationship between family ownership and crash risk. Using US data, Srinidhi and Liao (2020) find that family firms exhibit a lower stock crash risk than nonfamily firms. Canbaloglu et al. (2022) show that in family firms in Turkiye, the negative relationship between long-term debt and stock crash risk is more pronounced. Using a sample of firms from China, Yang et al. (2023) show that the negative relationship between corporate social responsibility and stock price crash risk is stronger for family firms. Fatima et al. (2020) report that in family firms in Pakistan, real earning management has a significant effect on crash risk. Zachro and Utama (2021) find that the negative relationship between commissioners who hold multiple positions and stock crash risk is more pronounced in family firms in Indonesia.

Family owners speed up timely information as they possess longer time horizons for investments than other shareholders (Chen et al., 2008). Aribi et al. (2018) show that family firms disclose additional information. We therefore expect that family ownership moderates the relationship between COVID-19 disclosure and stock price crash risk. Thus, we hypothesize that:

H2: Family involvement in ownership moderates the association between COVID-19 disclosure and stock price crash risk.

2.4 The moderating role of family involvement in the board

Family involvement in the board influences the firm's view and practices regarding governance, resulting in increased board skills, impacting decision-making, and monitoring firm activities (Abdelfattah & Aboud, 2020). According to the socioemotional wealth theory, family involvement in the board enhances reputational and emotional family relations with the business, as family members are more interested in the firm's reputation (Biswas et al., 2022). Family involvement in management results in reducing information asymmetry and enhanced monitoring of managers by family members (Chen et al., 2008). According to agency theory, agency problems (type 1) between managers and owners are reduced in family firms because they are the same (Alshirah et al., 2020).

Family involvement in management results in increasing information disclosure to increase their social-emotional wealth (Abdelhak et al., 2023). Based on Egypt data, Abdelfattah and Aboud (2020) show that the presence of family members increases the level of CSR disclosure. Regarding COVID-19 disclosure, Using a sample of Egyptian firms, Abdelhak et al. (2023) show no association between family involvement in management and COVID-19 disclosure. Using a sample of Chinese firms, Jiang et al. (2020), find that family-related chairman in family firms reduces crash risk. Their finding is based on the argument that family firms' motivation to preserve their reputation is a corporate governance mechanism to reduce their tendency toward bad news hoarding.

The above discussion suggests that family involvement in the board acts as a governance machine to increase information disclosure, decrease information asymmetry, and decrease bad news hoarding activities, resulting in lower stock price crash risk. This leads to the following hypotheses:

H3: Family involvement in the board moderates the association between COVID-19 disclosure and stock price crash risk.

3. Research design

3.1 Sample and data

We used a sample of non-financial firms listed on the EGX100. Our final sample includes 57 nonfinancial listed Egyptian firms during 2020-2021, with 114 firm-year observations. The financial statements were downloaded from www.mubasher.info and the firms' websites, and the reports of boards were collected from the Egyptian Exchange website. The stock price was downloaded from www.investing.com and the Egyptian Exchange website. All the continuous variables data were winsorized at 1% using Stata.

3.2 Dependent variable: Stock Price Crash Risk ($Crash_{t+1}$)

Following prior literature (Au et al., 2023; Jebran et al., 2022; Jin & Myers, 2006; Kim et al., 2011; Li et al., 2023; Zuo et al., 2023), we use down-to-up volatility (DUVOL) and negative conditional return skewness (NCSKEW) to measure stock crash risk. To obtain these two measures, first we calculate firm-specific weekly returns (W) as the natural log of one plus the residual from the following model for each firm and year using weekly stock returns:

$$R_{jt} = \alpha_j + \beta_{1j} R_{mt-2} + \beta_{2j} R_{mt-1} + \beta_{3j} R_{mt} + \beta_{4j} R_{mt+1} + \beta_{5j} R_{mt+2} + \epsilon_{jt}$$

where (R_{jt}) is the return on stock (j) in week (t), and (R_{mt}) is the return on the market index (EGX100EWI) in week (t). We included the lead and lag terms for return on the market index to allow for nonsynchronous trading. And then, firm-specific weekly returns (W_{jt}) = $\log(1 + \epsilon_{jt})$.

The first measure of stock crash risk is down-to-up volatility (DUVOL). We calculate the DUVOL for each firm (j) in year (t) as:

$$\text{DUVOL}_{jt} = \log \left[\frac{(n_u - 1) \sum_{DOWN} W_{jt}^2}{(n_d - 1) \sum_{UP} W_{jt}^2} \right]$$

where n_d and n_u are the number of weeks in the down and up, respectively. The larger value of DUVOL indicates a higher likelihood of a stock price crash.

The second measure of stock crash risk is the negative conditional return skewness (NCSKEW). We calculate the NCSKEW for each firm (j) in year (t) as:

$$\text{NCSKEW}_{jt} = - \left[\frac{n(n-1)^{\frac{3}{2}} \sum w_{jt}^3}{(n-1)(n-2) \left(\sum W_{jt}^2 \right)^{\frac{3}{2}}} \right]$$

where (n) is the number of trading weeks on stock (j) in year (t). A higher value of NSKEW indicates a higher likelihood of a stock price crash.

3.3 Independent variable: COVID-19 Disclosure

A manual content analysis technique is used to examine whether Egyptian firms disclose any information about COVID or its variations in the notes to their financial statements. Following Abdelhak et al. (2023), we use the number of sentences that contain any information about COVID-19 or its variations to measure the level of COVID-19 disclosure.

3.4. Moderating variable: Family Involvement

We measure family involvement through two proxies, namely family involvement in board and ownership (Maquieira et al., 2024). Following Ginesti et al. (2023), we measure family involvement in ownership (FAM) as a percentage of family ownership. Furthermore, we measure family involvement in the board (FAMB) as the number of family members in the board (Kotlar et al., 2013; Martínez-romero et al., 2023).

3.5 Control variables

Following previous studies (Chen et al., 2001; Defond et al., 2015; Hutton et al., 2009; Jebran et al., 2020, 2022), we include some control variables: (1) board size ($BSIZE_t$); (2) gender diversity ($FEMALE_t$); (3) CEO duality ($Duality_t$); (4) net operating cash flow divided by total assets (CFO_t); (5) firm size ($SIZE_t$); (6) financial leverage (Lev_t); (7) financial performance (ROA_t); (8) discretionary accruals (DA_t); (9) returns volatility ($SIGMA_t$); (10) stock returns (RET_t). Table 1 exhibits the measurements of all study variables.

Table (1): Variables definitions

Variables	Definitions
Dependent variable ($Crash_{t+1}$)	
$NCSKEW_{t+1}$	The negative conditional return skewness in year (t + 1).
$DUVOL_{t+1}$	The down-to-up volatility in year (t + 1).
Independent variable	
$COVID_t$	The number of sentences that contain any information regarding COVID-19 or its variations.
Moderating variable	
FAM_t	Percentage of family ownership.
$FAMB_t$	The total number of family members in the board.
Control variables	
$BSIZE_t$	The total number of directors in the board.
$FEMALE_t$	A dummy variable of 1 if the board has at least one female director, and 0 otherwise.
$Duality_t$	A binary variable of 1 if the CEO is also the chair of the board, and 0 otherwise.
$SIZE_t$	Natural logarithm of total assets.

Variables	Definitions
LEV _t	The ratio of total debt to total assets.
ROA _t	The ratio of income before extraordinary items to total assets.
DA _t	Absolute discretionary accruals estimated using the performance-adjusted Jones model (Kothari et al., 2005).
SIGMA _t	The standard deviation of firm weekly returns.
RET _t	Average firm weekly return.

3.6 Empirical model

To test H1, we use the regression model (1) as follows:

$$\text{Crash}_{(t+1)} = \beta_0 + \beta_1 \text{COVID}_t + \beta_2 \text{BSIZE}_t + \beta_3 \text{FEMALE}_t + \beta_4 \text{Duality}_t + \beta_5 \text{CFO}_t + \beta_6 \text{SIZE}_t + \beta_7 \text{LEV}_t + \beta_8 \text{ROA}_t + \beta_9 \text{DA}_t + \beta_{10} \text{SIGMA}_t + \beta_{11} \text{RET}_t + \text{Industry} + \text{Year} + \epsilon \quad (1)$$

To test H2 and H3 that family involvement has a moderating effect on the relationship between COVID-19 disclosure and stock crash risk, we included family involvement (FAM_t and FAMB_t) as an interaction-term in our main regression models. To test H2, we employ the regression model (2) as follows:

$$\text{Crash}_{(t+1)} = \beta_0 + \beta_1 \text{COVID}_t + \beta_2 \text{FAM}_t + \beta_3 \text{COVID}_t \times \text{FAM}_t + \beta_4 \text{BSIZE}_t + \beta_5 \text{FEMALE}_t + \beta_6 \text{Duality}_t + \beta_7 \text{CFO}_t + \beta_8 \text{SIZE}_t + \beta_9 \text{LEV}_t + \beta_{10} \text{ROA}_t + \beta_{11} \text{DA}_t + \beta_{12} \text{SIGMA}_t + \beta_{13} \text{RET}_t + \text{Industry} + \text{Year} + \epsilon \quad (2)$$

To test H3, we employ the regression model (3) as follows:

$$\text{Crash}_{(t+1)} = \beta_0 + \beta_1 \text{COVID}_t + \beta_2 \text{FAMB}_t + \beta_3 \text{COVID}_t \times \text{FAMB}_t + \beta_4 \text{BSIZE}_t + \beta_5 \text{FEMALE}_t + \beta_6 \text{Duality}_t + \beta_7 \text{CFO}_t + \beta_8 \text{SIZE}_t + \beta_9 \text{LEV}_t + \beta_{10} \text{ROA}_t + \beta_{11} \text{DA}_t + \beta_{12} \text{SIGMA}_t + \beta_{13} \text{RET}_t + \text{Industry} + \text{Year} + \epsilon \quad (3)$$

4. Results

4.1 Descriptive statistics

Table (2) shows descriptive statistics for all variables used in the current study. The mean values of DUVOL and NCSKEW, the two indicators of stock crash risk, are -0.103 and -0.295, respectively. The mean of our crash risk measures is close to the estimates from Egypt studies (Almaleeh & Eid, 2023; Elsayed, 2021; Hassan, 2021). The COVID-19 disclosure level has mean and standard deviation values of 1.842 and 1.670, respectively, with ranges from 0 to a maximum of 5. The mean of our COVID-19 disclosure level is comparable to that reported in the study focusing on Egypt (Abdelhak et al., 2023). Regarding family involvement, the table shows that the mean values of FAMB and FAM are 0.930 and 0.102, respectively. Concerning board gender diversity, our results show that the mean value of FEMALE is 0.719.

Table (2): Descriptive statistics.

	N	Mean	Std. Dev.	min	max
DUVOL _(t+1)	114	-0.103	0.149	-0.321	0.13
NCSKEW _(t+1)	114	-0.295	0.602	-1.958	1.097
COVID _t	114	1.842	1.670	0	5
FAMB	114	0.930	1.322	0	6
FAM _t	114	0.102	0.189	0	0.677
BSIZE _t	114	8.281	2.275	5	12
FEMALE _t	114	0.719	0.451	0	1
Duality _t	114	0.342	0.477	0	1
CFO _t	114	0.037	0.073	-0.077	0.162
SIZE _t	114	9.296	0.790	8.076	10.545
LEV _t	114	0.176	0.167	0	0.809
ROA _t	114	0.047	0.058	-0.043	0.139
DA _t	114	0.115	0.268	0	2.259
SIGMA _t	114	0.054	0.020	0.031	0.091
RET _t	114	-0.002	0.002	-0.004	0.001

4.2 Correlations

Table (3) provides the correlation between the main variables in the main analysis. COVID was found not to be significantly correlated with stock crash risk measures (DUVOL and NCSKEW). SIGMA is positively and significantly correlated with DUVOL and NCSKEW. FAMB and FAM were found to be positively and significantly correlated with DUVOL. Thus, firms with a higher number of family members in the board and a higher proportion of family ownership are associated with a higher level of COVID disclosure.

Table 3 also shows no multicollinearity concerns, as the maximum correlation specific to explanatory variables found was between SIGMA and SIZE, with a coefficient of 73%.

Table (3): Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DUVOL	1.00							
(2) NCSKEW	0.85*	1.00						
(3) COVID	0.09	0.05	1.00					
(4) FAMB	0.00	-0.05	0.21*	1.00				
(5) FAM	0.04	0.02	0.20*	0.54*	1.00			
(6) BSIZE	-0.12	-0.16	0.11	0.12	0.04	1.00		
(7) FEMALE	-0.02	-0.08	-0.13	-0.09	0.06	0.04	1.00	
(8) Duality	0.02	0.091	0.01	0.03	0.14	0.13	-0.29*	1.00
(9) CFO	0.03	-0.02	-0.02	0.00	0.05	0.20*	0.29*	-0.05
(10) SIZE	-0.16	-0.13	0.06	0.07	0.07	0.46*	0.15	-0.06
(11) LEV	-0.08	-0.08	0.08	0.01	0.09	-0.11	0.06	-0.10
(12) ROA	-0.09	-0.12	0.00	-0.01	0.15	0.24*	0.23*	0.10
(13) DA	0.06	0.05	-0.15	-0.13	-0.08	-0.21*	-0.07	0.00
(14) SIGMA	0.19*	0.19*	-0.05	-0.11	-0.07	-0.44*	-0.14	-0.04
(15) RET	0.09	0.04	-0.07	0.10	-0.01	0.21*	-0.01	0.09

Table (3): Correlation analysis (Continued)

Variables	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(9) CFO	1.00						
(10) SIZE	0.19*	1.00					
(11) LEV	0.02	0.36*	1.00				
(12) ROA	0.53*	0.30*	0.13	1.00			
(13) DA	-0.24*	-0.21*	-0.08	-0.10	1.00		
(14) SIGMA	-0.25*	-0.73*	-0.17	-0.33*	0.24*	1.00	
(15) RET	0.15	0.24*	-0.01	0.09	-0.10	-0.42*	1.00

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.3 Regression results

We employ three regression to test the study hypotheses. We include both industry and year dummies to control for the industry and year effects of stock crash risk. To control for autocorrelation and heteroscedasticity, we run the models with robust standard errors.

4.3.1 COVID-19 disclosure and stock price crash risk.

Table (4) reports the regression results of the effect of COVID-19 disclosure on stock crash risk. As shown in Table (4), contrary to our expectations, no significant relationship is found between COVID-19 disclosure (COVID) and crash risk (DUVOL and NCSKEW). This indicates that COVID-19 disclosure does not reduce stock price crash risk. Thus, H1 is not supported.

This result is not consistent with studies that indicate that there is a significant relationship between COVID-19 disclosure and crash risk (Duan & Lin, 2022; Hao & Dong, 2022; J. Jin et al., 2022). Regarding control variables, the coefficients on CFO_t, RET_t, SIZE_t, and SIGMA_t are significantly positive, but the coefficient on BSIZE_t is significantly negative.

Table (4): COVID-19 disclosure and stock price crash risk.

Dependent Variable	DUVOL _{t+1}		NCSKEW _{t+1}	
	Coef.	t-value	Coef.	t-value
COVID _t	0.004	0.38	-0.023	-0.64
BSIZE _t	-0.008	-0.94	-0.064*	-1.77
FEMALE _t	0.027	0.85	0.052	0.42
Duality _t	0.007	0.17	0.183	1.16
CFO _t	0.529*	1.94	1.559	1.39
SIZE _t	0.022	0.63	0.248*	1.87
LEV _t	-0.12	-0.90	-0.373	-0.70
ROA _t	-0.31	-0.79	-1.326	-0.81
DA _t	0.032	0.61	0.074	0.35
SIGMA _t	1.94	1.48	10.238**	2.09
RET _t	25.183**	2.26	77.349*	1.81
Constant	-0.28	-0.68	-2.462	-1.48
Industry	Yes		Yes	
Years	Yes		Yes	
N	114		114	
R-squared	0.273		0.318	
*** $p < .01$, ** $p < .05$, * $p < .1$				

4.3.2 The moderating effect of family involvement in ownership on the association between COVID-19 disclosure and stock price crash risk.

Table 5 reports the regression results of examining the moderating effect of family involvement in ownership. To examine the moderating effect, the main variable is the interaction term (COVID_t × FAM_t). Consistent with our expectations, the coefficient on COVID_t × FAM_t is significantly negative. Thus, this finding supports our second hypothesis (H2). This shows that in the presence of family involvement in ownership, the COVID-19 disclosure can decrease information asymmetry, resulting in lower stock price crash risk. Thus, the finding supports the agency theory, which indicates that conflicts between insiders and investors are

lower in family firms, leading to reduced information asymmetry, improved disclosure levels, and decreased crash risk.

Table 5: The moderating effect of family involvement in ownership on the relationship between COVID-19 disclosure and stock price crash risk.

Dependent Variable	DUVOL _{t+1}		NCSKEW _{t+1}	
	Coef.	t-value	Coef.	t-value
COVID _t	0.011	1.10	0.019	0.53
FAM _t	0.152	1.04	0.744	1.16
COVID _t × FAM _t	-0.091*	-1.85	-0.49*	-1.97
BFSIZE _t	-0.008	-0.91	-0.063*	-1.70
FEMALE _t	0.027	0.82	0.054	0.43
Duality _t	0.004	0.08	0.166	1.03
CFO _t	0.536*	1.96	1.616	1.42
SIZE _t	0.023	0.66	0.252*	1.91
LEV _t	-0.162	-1.14	-0.599	-1.07
ROA _t	-0.389	-0.98	-1.764	-1.01
DA _t	0.032	0.58	0.07	0.31
SIGMA _t	1.735	1.32	9.104*	1.86
RET _t	23.717**	2.07	70.223	1.61
Constant	-0.336	-0.88	-2.166	-1.45
Industry	Yes		Yes	
Years	Yes		Yes	
N	114		114	
R-squared	0.295		0.359	
*** $p < .01$, ** $p < .05$, * $p < .1$				

4.3.3 The moderating effect of family involvement in the board on the relationship between COVID-19 disclosure and stock price crash risk.

Table (6) shows the regression results of examining the moderating effect of family involvement in the board. To do that, the key variable is the interaction term (COVID_t × FAM_{Bt}). As expected, the coefficient on COVID_t × FAM_{Bt} is significantly negative.

Thus, this finding supports our third hypothesis (H3). This illustrates that in the presence of family involvement in the board, the COVID-19 disclosure can decrease information asymmetry, leading to less stock price crash risk. Thus, the finding supports the socioemotional wealth theory, which indicates that family involvement in the board improves reputational and emotional family relations with the business, as they are more concerned with the firm's reputation.

Table 6: The moderating effect of family involvement on board on the relationship between COVID-19 disclosure and stock price crash risk.

Dependent Variable	DUVOL _{t+1}		NCSKEW _{t+1}	
	Coef.	t-value	Coef.	t-value
COVID _t	0.016	1.43	0.044	1.07
FAM _t	0.012	0.50	0.079	0.87
COVID _t × FAMB _t	-0.013*	-1.73	-0.069**	-2.29
BFSIZE _t	-0.007	-0.83	-0.063	-1.66
FEMALE _t	0.022	0.68	0.023	0.18
Duality _t	-0.005	-0.12	0.117	0.76
CFO _t	0.522*	1.89	1.517	1.34
SIZE _t	0.02	0.57	0.234*	1.82
LEV _t	-0.171	-1.20	-0.659	-1.16
ROA _t	-0.328	-0.83	-1.39	-0.81
DA _t	0.028	0.52	0.065	0.29
SIGMA _t	1.584	1.19	8.342*	1.72
RET _t	26.028**	2.28	80.923*	1.86
Constant	-.235	-0.69	-1.973	-1.53
Industry	Yes		Yes	
Years	Yes		Yes	
N	114		114	
R-squared	0.308		0.373	
*** $p < .01$, ** $p < .05$, * $p < .1$				

5. Conclusion

We examine the association between COVID-19 disclosure and crash risk in the Egyptian context. We also examine whether this association is moderated by family involvement in board and ownership. Results show that COVID-19 disclosure is insignificantly associated with crash risk. Furthermore, the findings show that family involvement negatively moderates the association between COVID-19 disclosure and crash risk. Our study makes several contributions to the existing literature. First, the study results add to the crash risk literature through providing the first study that examines the effect of COVID-19 disclosure on crash risk in Egypt. Second, the results of this study contribute to the literature on family firms by showing that family involvement negatively moderates the relationship between COVID-19 disclosure and crash risk. Third, we extend the literature on COVID-19 disclosure by showing that COVID disclosure decreases crash risk in the presence of family involvement. Future researchers can extend this research by examining more developing countries. Further, researchers can examine the effect of other indicators of family involvement, such as the family CEO and family chair, on COVID-19 disclosure and crash risk.

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أثر مشاركة العائلة على العلاقة بين الإفصاح عن معلومات كورونا-19 ومخاطر انهيار أسعار الأسهم: دليل من مصر

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الملخص:

استهدفت هذه الدراسة اختبار العلاقة بين الإفصاح عن معلومات كورونا ومخاطر انهيار أسعار الأسهم والدور المعدل لمشاركة العائلة في الملكية ومجلس الإدارة. وباستخدام عينة مكونة من 114 مشاهدة من الشركات غير المالية المدرجة في مؤشر EGX 100 EWI خلال جائحة كورونا 2020-2021، أشارت النتائج إلى وجود علاقة غير معنوية بين الإفصاح عن معلومات كورونا ومخاطر انهيار أسعار الأسهم. وفيما يتعلق بالدور المعدل لمشاركة العائلة، أشارت النتائج إلى أن مشاركة العائلة في الملكية ومجلس الإدارة يعدل سلبيا العلاقة بين الإفصاح عن معلومات كورونا ومخاطر انهيار أسعار الأسهم.

الكلمات الدالة: الإفصاح عن معلومات كورونا-19، مخاطر انهيار أسعار الأسهم، مشاركة العائلة في الملكية، مشاركة العائلة في مجلس الإدارة.