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The Impact of COVID-19 Spread on the Listed Egyptian Banks Stock Market Returns

Ihab Petro (ieissa@ecu.edu.eg)

Faculty of Economics and International Trade, Egyptian Chinese University ECU, Cairo, Egypt

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ABSTRACT

The purpose of this study is to investigate the impact of COVID-19 spread on banking listed stocks market return during the period December 31st, 2012, till December 31st, 2021. Stock market returns have been measured by ln(pt/pt-1), COVID-19 spread has been measured by ln of (new cases, cumulative new cases, new deaths, and cumulative deaths) / Egypt's population / one million. This has been applied on 10 listed Egyptian banks in EGX30, EGX70, Banking sector index (Commercial, and Islamic Banks). Data collected from investing .com, and World Health Organization COVID-19 database.

Results indicate that banks stock market returns in Egypt tend to be negatively affected Coronavirus new cases and Coronavirus cumulative cases. After splitting the research period into 8 quarters (Jan 1st, 2020 – Dec 31st, 2021), results support the impact of new cases and cumulative new cases in quarter 1 (Jan 1st, 2020 – Mar 31st, 2020) on banks' stock market returns. Results supported using panel analysis according to GMM technique using fixed and random effect models, for the whole research period and sub periods. Hausman-test applied and indicate that the random effect model is the appropriate regression model.

KEYWORDS

COVID-19 spread, Stock market Return, EGX Indices, Egyptian Banks, panel data, GMM Technique

1. INTRODUCTION

Over the history of the stock markets across the globe, no infectious disease outbreak had more than a minor effect on the market's volatility. (Elhini, et al., 2021). The COVID-19 pandemic spread reported on December 31st, 2019, in Wuhan, China and declared a pandemic by the World Health Organization on March 11th ,2020, developed into the most serious contagious disease around the world. To control the spread effect, countries have adopted prevention measures, including social isolation, movement restrictions and lockdowns. As an important part of the economic system, the financial market has suffered from the impact of the rapidly global spread of the COVID-19 epidemic. Egypt is not immune to this pandemic. The number of confirmed cases and deaths is increasing every day. As of

December 31st, 2021, 384,728 Cumulative COVID-19 cases and 21,727 cumulative deaths have been reported by Egypt (WHO, 2021a).

One of the sectors faced severe problems is the financial sector, as of financial institutions' credit exposure to different industries. COVID-19 had affected all financial markets across the globe, in certain share prices, trend decreased crucially and continuously. Between March 6th and 18th, 2020, all major stock market indices lost value due to the COVID-19 outbreak worldwide. The FTSE MIB index in Italy lost 27.3% of its value, while CSI 300 index in China lost 12.1% of its value during this period. (Yunus, et al., 2021), EGX-30 dropped 32.69% for the period of March 1st, 2020, to March 19th, 2020. Crisis in the financial sector, particularly in the banking industry, will cause economic disturbances and instability. After the 2008 global financial crisis, tighter capital and liquidity requirements were placed for banks with Basel III, which helped the global banking system to improve its safety to certain extent. However, banks, are still hit harder than most industries by the rapid spread of COVID-19. The negative impact on banks is expected to be higher compared to previous crises cause banks, by nature, are very vulnerable during crisis periods.

Egypt's banks were able to face the pandemic as they entered the crisis relatively well capitalized, and the number of non-performing loans remained low. The pandemic also helped in fueling significant growth in digital banking in a country where only about a third of the population use banks' services.

The research problem is to investigate whether the pandemic have impacted the banks stocks market returns or not. In this study, COVID-19 spread is measured as Coronavirus new cases, Coronavirus cumulative cases, Corona virus new deaths, and coronavirus cumulative death as an independent measure, the dependent measure is the stock market returns, mainly of the ten listed Egyptian banks in Egyptian stock exchange indices.

Therefore, this paper tries to address the following questions:

1- Do COVID-19 new cases affect banks' stocks market return?
2- Do COVID-19 new deaths affect banks' stocks market return?
3- Do COVID-19 cumulative cases affect banks' stocks market return?
4- Do COVID-19 cumulative deaths affect banks' stocks market return?

Data of Coronavirus spread from the World Health Organization (WHO) daily report for the period of January 1st, 2020, till December 31st, 2021. Data of 10 listed Egyptian banks stock market return formulated from EGX30, EGX70, and Banking sector indices for the period of 2012 till 2021 closing prices, 2012-2019 as of December 31st closing prices, 2020-2021 daily closing prices, periods of research have been split into 8 sub-periods as of quarters of 2020-2021. E-views version 12 applied as a statistical software program to measure the impact of COVID-19 variables on stocks return.

1.1-The Egyptian Banking Sector Performance during COVID-19 Spread (December 2022)

Since the successful completion of the banking sector reform program that started in 2004, the Egyptian banking sector has exhibited great resilience and withstood more than one crisis.

- CBE stays abreast with the international best practices to continuously improve the quality of banking supervision on both the micro and macro levels.
- The banking system remains well-positioned to handle stress, with most recent data showing that, at an aggregate level, the banking system is liquid and well capitalized, with strong profitability and asset quality.
- All soundness indicators are reflecting very healthy signs of profitability, liquidity, and solvency.
- Banks are well aligned with Basel requirements and IFRS 9 has been introduced as of January 2019.

1.1.1-Perfomance Measures

Capital Adequacy	**June 2022**
Capital Base/Risk Weighted Assets	20.90
Tier 1 Capital / Risk-Weighted Assets[1]	17.10
Common Equity / Risk-Weighted Assets[2]	12.20

Financial Leverage[3]	6.90
Asset Quality	**June 2022**
Non-performing Loans / Total Loans	3.20
Loan Provisions / Non-performing Loans	92.10
Loans to Private Sector / Loans to Customers	58.10
Earnings	**June 2022**
Return on Assets[4]	1.20%
Return on Equity[4]	16.10%
Net Interest Margin[4]	4.20%

1.The Going concern capital including conservation buffer should not be less than 6.625%, 7.25%, 7.875% and 8.5% in 2016, 2017, 2018 & 2019, respectively.
2.Common equity including the conservation buffer should not be less than 5.125%, 5.75%, 6.375% and 7.0% in 2016, 2017, 2018 & 2019, respectively.
3.The percentage is with a lower margin stated by 3.0%.
4.As per latest approved fiscal year 2019

Source: Central Bank of Egypt (CBE)

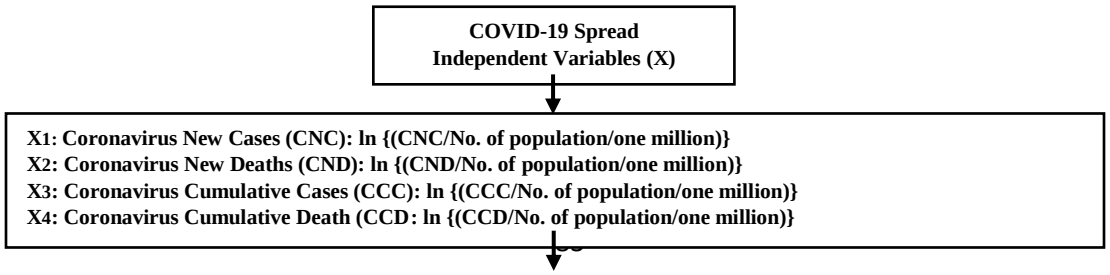
Liquidity	**June 2022**
Average Liquidity Ratio: Local Currency	44.3
Average Liquidity Ratio: Foreign Currency	78.4
LCR: Local Currency[1]	999.0
LCR: Foreign Currency[1]	197.1
NSFR: Total Local Currency & Foreign Currency[1]	231.8
NSFR: Local Currency[1]	244.8
NSFR: Foreign Currency[1]	184.5
Securities/Assets[2]	25.2
Deposits/Assets	73.4
Loans/Deposits: Total Local Currency & Foreign Currency	48.6
Loans/Deposits: Local Currency	45.5
Loans/Deposits: Foreign Currency	66.8
Net open position in foreign currencies to Capital Base[3]	-1.9

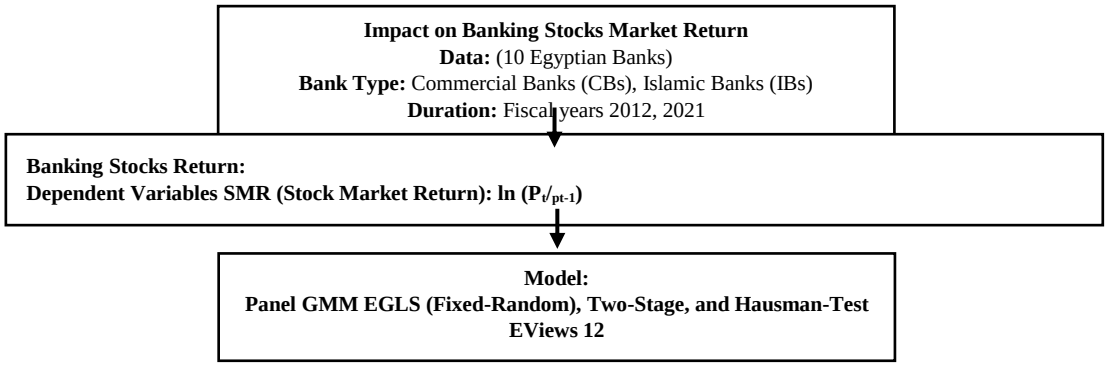
1.Both percentages are mandatory on a quarterly basis as follows:
- LCR per local currency and foreign currencies is 90% and 100% for 2018 & 2019, respectively.
- NSFR equal to at least 100% for all currencies (local currency and foreign currencies) and per local currency and foreign currencies.
2.Excluding Egyptian T-Bills
3.Total net open (short or long) positions for all foreign currencies shouldn't exceed 20% of the capital base

Source: Central Bank of Egypt (CBE)

The following figure illustrate the study structure in brief,

Fig 1: Impact of COVID-19 on Banking Performance Study Structure





Source: The researcher

2. LITERATURE REVIEW

Nader Alber, 2020, investigated the effects of Coronavirus spread on stock markets, this has been applied on the worst 6 countries (according to number of cumulative cases), over the period from March 1, 2020, till April 10, 2020. Coronavirus spread has been measured by numbers per millions of populations, while stock market return was measured by change in stock market index. Results indicated that stock market return seemed to be sensitive to Coronavirus cases more than deaths, and to Coronavirus cumulative indicators more than new ones. Robustness check confirmed the negative effect of Coronavirus spread on stock market return for China, France, Germany, and Spain. However, these effects haven't been confirmed for Italy and United States.

Nader Alber, 2020, investigated the effects of Coronavirus spread on the European stock markets; this has been applied on stock markets of Belgium, France, Germany, Italy, Netherlands Spain, and UK, on daily basis during the period from Febreuary15, 2020 till May 24, 2020. Results indicated that return of stock market seemed to be sensitive to Coronavirus cases more than deaths, and to Coronavirus cumulative indicators more than new ones.

Asli Demirguc-Kunt, Alvaro Pedraza, Claudia Ruiz-Ortega, 2020, analyzed bank stock prices around the world to assess the impact of the COVID-19 pandemic on the banking sector by using a global database of policy responses during the crisis, also examined the role of financial sector policy announcements on the performance of bank stocks. Results showed that the crisis and the countercyclical lending role that banks are expected to play have put the banking systems under significant stress, with bank stocks underperforming their domestic markets and other non-bank financial firms. The effectiveness of policy interventions has been mixed.

Dao Anh, and Christopher Gan, 2020, explored the effects of the COVID-19 outbreak and its following lockdown on daily stock returns in Vietnam, using panel-data regression models to evaluate the influence of the daily increase in the number of COVID-19 confirmed cases during pre-lockdown and lockdown on daily stock returns of 723 listed firms in Vietnam from 30 January to 30 May 2020. Results confirmed the adverse impact of the daily increasing number of COVID-19 cases on stock returns in Vietnam, also disclosed that the Vietnam stock market before and during the nationwide lockdown performed in opposing ways. Though COVID-19 pre-lockdown had a significant, negative impact on Vietnam's stock returns, the lockdown period had a significant, positive influence on stock performance of the entire market and the different business sectors in Vietnam. The financial sector was hardest hit on the Vietnam stock market during the COVID-19 outbreak.

Maha Elhini, and Rasha Hammam, 2021, examined the impact of the daily growth rate of COVID-19 cases in the USA (COVID-19), the Federal Fund Rate (FFR) and the trade-weighted US dollar index (USD_X) on S&P500 index daily returns and its 11 constituent sectors' indices for the period between January 22, 2020, until June 30, 2020. Results revealed a negative and significant relation between (COVID-19) and S&P500 index daily returns over the first sub-period and the whole study period in the following sectors, namely, communications, consumer discretionary, consumer staples, health, technology and materials. Yet, (COVID-19) showed a positive and significant

relation with S&P500 index daily returns during the second period in the following sectors, namely, communication, consumer discretionary, financial, industrial, information technology (IT) and utilities. Besides, USDX showed a negative significant effect on S&P500 index daily returns and on the daily return on each of its 11 constituent sectors over the second sub-period and the whole period. Further, FFR showed a significant effect only in the second sub-period, specifically, a negative effect on the daily return of the financial sector and a positive effect on the daily return of the technology sector index. Nevertheless, FFR had a positive significant effect on the daily return of the utilities sector index for the whole period under study.

Maretno Harjoto, and Fabrizio Rossi, 2021, examined the market reaction of COVID-19 as a global pandemic on the emerging equity markets and compares the reaction with developed markets, also compared the market reactions to the COVID-19 pandemic with the market reactions to the 2008 global financial crisis. Using the Morgan Stanley Capital International daily stock indices data and the Carhart and the GARCH models to examine the cumulative abnormal returns during 30 and 10 trading days and the extended 60 days before and after pandemic announcement., also compares the market reactions during the COVID-19 pandemic with the reactions to the Lehman Brothers' bankruptcy announcement during the 2008 global financial crisis. Results showed that the COVID-19 pandemic had a significantly greater negative impact to the stock markets in emerging countries than in the developed countries. The negative impact on the emerging markets is more pronounced for firms with small market capitalizations and for growth stocks. The negative impact of the COVID-19 pandemic is stronger in the energy and financial sectors in both emerging and developed markets. The positive impact of the COVID-19 pandemic occurred in healthcare and telecommunications for the emerging markets and information technology for the developed markets. The equity markets in both emerging and developed countries recovered faster from the COVID-19 pandemic relative to the 2008 global financial crisis.

Yunus Karaomer and Songul Acaravcı, 2021, aimed to research how the COVID-19 impacts the selected sector price indices in Borsa Istanbul (BIST), Turkey, by using the event study method of four sector price indices (Banks, Food and Beverage, telecommunication, and transportation). Results showed that selected sectors are impacted by the COVID-19 outbreak. The banking and transportation sectors, on the announcement of first death, were impacted negatively, while the telecommunication and food –beverage sectors were impacted positively. The transportation and banking sectors experience an obvious downturn after the spread of COVID-19, while the food–beverage and telecommunication sectors experience an obvious upturn after the spread of COVID-19. Besides, the most adversely impacted sector is banking.

Quang Nguyen, Dao Le Anh, and Christopher Gan, 2021, investigated the Chinese stocks' returns during different epidemic periods to assess their effects on firms' market performance, by employing an event study method on more than 3,000 firms listed on Shanghai and Shenzhen stock exchanges during periods of SARS, H5N1, H7N9 and COVID-19. Results showed that Epidemics' effect on firms' stock returns is persistent up to 10 days after the event dates, most firms experience a negative impact of the epidemics. Among the epidemics, COVID-19 has the greatest impact, especially when it grows into a pandemic. In addition, B-shares and stocks listed on Shanghai Stock Exchange are more negatively influenced by the epidemic than A-shares and those listed on Shenzhen Stock Exchange.

Cuong Nguyen, Phan Hai, and Huyen Nguyen, 2021, aimed to explore the influence of COVID-19 outbreak and the Government's disease control measures on the stock returns and liquidity of Vietnam-listed companies in the financial services sector. A panel data regression analysis using data from 50 banking, insurance and finance companies listed in Vietnam's two biggest stock exchanges (HNX and HOSE) within the period from January 30th, 2020, to May 15th, 2021. Results indicated that the daily growth in the total number of confirmed cases caused by COVID-19 has significant negative effects on the stock market returns and liquidity. Nevertheless, the Government's imposition of lockdown yields significant and positive outcomes on stock performance. In addition, the study reveals remarkable differences in returns of large-cap and small-cap stocks under the impact of the COVID-19 pandemic.

Kenneth Boateng, Williams Ohemeng, Elvis Agyapong and Ben Bribinti, 2021, aimed to examine the impact of COVID-19 on the stock returns on the Ghana stock exchange. Data from all Share Prices of the Ghana stock exchange, commonly known as the Ghana stoke exchange composite index (GSECI). The data covered the period before the outbreak of COVID-19 and during the outbreak. strategies to enable them to diversify their investments

effectively and efficiently against the high risk associated with the market in this COVID-19 era. Results showed that the Ghana stock exchange experienced better returns on the market before the outbreak of the virus. The outbreak of COVID-19 has led to wide variations in the market increasing the risk of investments. The EGARCH (1, 1) model also revealed that the outbreak of COVID-19 had a significant negative effect on stock returns in the market. The market during these periods of COVID-19 was viewed as highly volatile.

Abdulazeez Saif-Alyousfi, 2022, investigated the impact of COVID-19 and the stringency of the government policy response on stock market returns globally and at the regional level. Data and panel data techniques are used to analyze the daily data set across 88 countries in the Americas, Europe, Asia-Pacific, Middle East and Africa for the period of 1 January 2020 to 10 May 2021. Results showed that both the daily growth in confirmed cases and deaths caused by COVID-19 have significant negative effects on stock returns across all markets.

Stephan Bales and Hans-Peter Burghof, 2022, examined the impact of COVID-19 on bank stock returns over various time scales and frequencies for 36 countries, also the governments' responses to the corona crisis and examined its impact on bank stock returns by applying continuous wavelet transformation to obtain robust estimates of the co-movement (coherency) between confirmed cases and bank stock returns over time and at different time scales. Furthermore, applying fixed effects panel regression to examine the response of bank stocks to domestic COVID-19 policies. Results indicate that the number of confirmed COVID-19 cases negatively impacts bank stock returns during different waves of the pandemic in the medium-run. However, there is only little dependence in the very short run. Moreover, bank stock returns positively react to domestic COVID-19 polices. This demonstrates that governmental interventions not only reduce the spread of COVID-19 but are also able to thereby calm financial markets.

Niaz Bhutto, Shabeer Khan, Uzair Khan and Anjlee Matlani, 2022, investigated the impact of COVID-19 on conventional and Islamic stocks by using the data spanning from February 25, 2020, to February 3, 2021, and employing a panel regression approach. Results showed a negative impact between COVID-19 and stock (both Islamic and conventional). After splitting the data into 1st and 2nd waves, the relationship between COVID-19 and stock (both Islamic and conventional) remains the same (negative) in the case of the 1st wave. In contrast, in the case of the 2nd wave, the relationship turned out to be positive. The study also analyzed the aggregate influence of COVID-19 on different sectors and finds that commercial banks, oil and gas exploration and marketing companies were the most influenced sectors. At the same time, automobiles and pharma were the least affected sectors.

Redhwan Aldhamari, Ku Ismail, Haithm Al-Sabri and Mousa Saleh, 2022, examined the stock market reactions of firms and industries in Malaysia to the government's COVID-19 movement control order (MCO) announcement. Also observe if the Chinese Government's confirmation of human-to-human coronavirus transmission affects firms' stock market reactions. In addition, examined whether the Malaysian Government's ease of restrictions on economic activities affects firms' stock market reactions. Finally, analyzed the effect of COVID-19 number of confirmed cases on firms' abnormal returns, by using a sample of 924 Malaysian listed firms. Results showed that investors react negatively to the announcement of the MCO and confirmation of the human-to-human transmission of coronavirus over the event windows. However, the cumulative average abnormal returns (CAARs) started to recover when stimulus packages were introduced, and the lockdown measures were eased, allowing businesses to reopen, also finds that only firms in the health-care sector reported significant positive CAARs. Stock returns of the utilities and telecommunication firms showed no changes, while eight other sectors fell remarkably. The results also showed that the COVID-19 number of confirmed cases adversely affects firms' abnormal returns.

Zhe Liu, Chong Huang, and Benshuo Yang, 2022, investigated the impact of investor attention on the COVID-19 concept stocks in China's stock market from the perspectives of the macroeconomy, the stock market and the COVID-19 pandemic. Data selected of 69 firms publicly listed on Shanghai and Shenzhen stock exchanges to identify the COVID-19 concept stocks in China's stock market. Results showed that the attention to macroeconomy does not have a significant effect on the return, unlike the attention to stock market and COVID-19 incident. Three types of investor attention have significant positive effects on the volatility and turnover rate. During the outbreak of the domestic epidemic, the impact of investor attention was significantly higher than that during the outbreak of the epidemic overseas. A finer-grained analysis showed that the attention to stock market had significantly increased the

return of preventive type and treatment type stocks, while diagnostic-related stocks have been most affected by the attention to COVID-19 incident.

Maryam Farhang, Omid Kamran-Disfani, and Arash Zadeh, 2022, investigated the impact of brand equity (BE) on stock performance, and compare the performance of a high brand equity stocks (HBES) portfolio with that of the overall market during market downturn, market upturn and total disturbance periods of the COVID-19 pandemic in 2020, the HBES portfolio consists of 85 stocks. Results showed that BE was positively associated with stock return and negatively associated with both types of risk (volatility and beta) during the COVID-19 pandemic. Specifically, during the market downturn period, (BE) was positively related to stock return and negatively related to stock volatility; during the market upturn period, BE was negatively associated with both types of risk; and during the total disturbance period, BE was positively associated with stock return and negatively associated with both types of risk. Finally, the HBES portfolio outperformed the market (S&P 500 index).

Sabri Boubaker, Nga Nguyen, Vu Trinh, and Thanh Vu, 2022, studied the market reactions of the banking industry to the Russian–Ukraine war, to study the effect of the war on banks stock prices and analyze factors that explain the cumulative abnormal return of 2,316 commercial banks from 90 markets covering six continents: Europe, Asia, North America, South America, Oceania and Africa. Results showed a significant decline of almost 1.5% in return on the war date. Similar patterns were observed for all continents, but Europe had the most severe drop of about 4%. Second, after excluding the contemporaneous influence of the whole market using the market model, global bank equities return fell by about 1% on the war date, indicating that bank stocks were more severely impacted by the war than the average stock market. Net-of-market return approach further reveals that bank stock prices decreased 1.4% more on the event day compared to the prewar market average. Third, the impacts of the war and sanctions were persistent when the war continued. Banks stocks were most hit in Europe, Asia, and North America.

Yuanyun Yan, Bang Jeon, and Ji Wu, 2022, investigated how the COVID-19 pandemic had affected banks' contribution to systemic risk. In addition, examined whether the impact of the pandemic may vary across advanced/emerging economies, and with banks with differed characteristics, by constructing the bank-specific conditional value at risk (CoVaR) and marginal expected shortfall (MES) to measure their contribution to systemic risk and define the outbreak of the COVID-19 pandemic by the timing when countries report more than 100 confirmed cases. Sample comprises monthly panel data of around 900 listed commercial banks in 39 advanced and emerging economies. Results showed that, firstly, the COVID-19 pandemic increased banks' contribution to systemic risk significantly around the world. Secondly, the impact of the COVID-19 virus was more pronounced in developed countries than in emerging economies. Finally, banks with a larger size and higher loan-to-deposit ratio were more greatly affected by the COVID-19 pandemic, while a higher capitalization for banks was insufficient to shelter them from the adverse impact of such pandemic.

Comparing with the previous literature, it is important to point that it considers both of infection and death indicators, and both of cumulative and new ones. In addition, COVID-19 spread has measured relatively, where all measures are adjusted per million of country's populations. This study will examine a long-term duration of two annuals starting 2020-2021 COVID-19 spread, and its impact on Egyptian banks stocks market return.

3. MEASURING VARIABLES AND TESTING HYPOTHESES

The dependent variable has been measured by Egypt's listed stock market return in (EGX-30-70-100, and Banking sector index), on the other hand the independent variables have been measured by "New Coronavirus Cases", "Cumulative Coronavirus Cases", "New Coronavirus Deaths", and "Cumulative Coronavirus Deaths", in terms of Egypt's population. The data used in this study are obtained from the investing and WHO database, which includes the daily stock prices for the period of January 1st, 2020, to December 31st, 2021, and annual closing prices for the period of December 31st, 2012, to December 31st, 2019. The COVID-19 variables for the period of January 1st, 2020, to December 31st, 2021.

3.1-Research Variables

3.1.1-Independent Variables

Coronavirus spread as an independent variable has been measured by cumulative cases, new cases, cumulative deaths, and new deaths. In this study the variables of COVID-19 are illustrated as follows:

Table 1: COVID-19 Variables

Dependent Variable	Calculation	Sign
Coronavirus New Cases	Ln Coronavirus New Cases (Per million of population)	CNC
Coronavirus Cumulative Cases	Ln Coronavirus Cumulative Cases (Per million of population)	CCC
Coronavirus New Deaths	Ln Coronavirus New Deaths (Per million of population)	CND
Coronavirus Cumulative Deaths	Ln Coronavirus Cumulative Deaths (Per million of population)	CCD

3.1.2-Dependent Variable (Stock Market Return)

Bank's stock market return is measured by the following formula:
{ln (Daily closing price / Previous Closing price)} of ten commercial, and Islamic Egyptian banks daily closing prices for the period of Jan 1st, 2020, to December 31st, 2021, and yearly closing prices for the period of December 31st, 2012, to December 31st, 2019.

Table 2: 10 Egyptian Banks listed in Egyptian Stock Exchange

Name of the Bank	Reuters-Code	ISIN-Code	Consolidation Level	Listed-Index
Al-Baraka Bank Egypt	SAUD.CA	EGS60101C010	Foreign Owned Subsidiary	Banks-Index
Abu-Dhabi Islamic Bank Egypt	ADIB.CA	EGS60111C019	Foreign Owned Subsidiary	EGX-70
Qatar National Bank Al-Ahly	QNBA.CA	EGS60081C014	Foreign Owned Subsidiary	EGX-30
Housing and Development Bank	HDBK.CA	EGS60301C016	Bank Holding Company	EGX-30
Faisal Islamic Bank of Egypt	FAIT.CA	EGS60321C014	Bank Holding Company	EGX-70
Commercial International Bank	COMI.CA	EGS60121C018	Bank Holding Company	EGX-30
Egyptian Gulf Bank (EG-Bank)	EGBE.CA	EGS60182C010	Bank Holding Company	Banks-Index
Export Development Bank-Egypt	EXPA.CA	EGS60241C014	Bank Holding Company	EGX-70
Credit Agricole Egypt	CIEB.CA	EGS60041C018	Foreign Owned Subsidiary	EGX-30
Suez Canal Bank	CANA.CA	EGS60231C015	Bank Holding Company	Banks-Index

3.1.3-Control variables

Ten listed stocks in Egypt stocks indices

According to Alber (2020), thus, the following **hypotheses** were developed as follows:
H_0: There is no significant impact of COVID-19 on stock market return (SMR%)

1- There's no significant effect of "Coronavirus cases" on "stock market return".
2- There's no significant effect of "Coronavirus deaths" on "stock market return".
3- There's no significant effect of "new Coronavirus cases" on "stock market return".
4- There's no significant effect of "new Coronavirus deaths" on "stock market return".

This means that alternative hypothesis Ha: $\beta \# 0$ versus null hypothesis Hb: $\beta = 0$, where β is the regression coefficient of the following functions:

1- $SMR = a + \beta 1\ CNC + \beta 2\ CND + \beta 3\ CCC + \beta 4\ CCD + \varepsilon$
2- $SMR = \alpha + \beta 1\ CNC + \beta 2\ CND + \varepsilon$
3- $SMR = \alpha + \beta 1\ CCC + \beta 2\ CCD + \varepsilon$

4. DESCRIPTIVE AND STATISTICS ANALYSIS

Table (3) shows descriptive statistics of research variables using a sample of 10 banks, over the period of 10 years (Dec 31st, 2012 – Dec 31st, 2021).

Table 3: Descriptive statistics of research variables

	SMR	CNCX1	CNDX2	CCCX3	CCDX4
Mean	0.001151	1.151613	-1.293254	6.043482	3.522541
Median	0.000000	1.535829	-1.005167	7.116626	4.233999
Maximum	1.087184	2.812264	0.000000	8.191563	5.317582
Minimum	-0.596577	-4.668729	-4.668729	-3.059291	-4.668729
Std. Dev.	0.038565	1.122918	0.932720	2.867631	2.072236
Skewness	9.633191	-1.006946	-0.750313	-1.789531	-1.608940
Kurtosis	253.4517	4.657960	3.468145	5.025879	5.056616
Jarque-Bera	19420805	2094.396	760.5652	5205.947	4488.963
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	8.499990	8506.962	-9553.266	44643.20	26021.01
Sum Sq. Dev.	10.98483	9313.337	6425.576	60737.34	31716.67
Observations	7387	7387	7387	7387	7387

Source: Output of data processing using EViews 12

Stock market return is positive with a mean of 0.115%. regarding normality, Jarque-Bera values indicate that all variables are normally distributed at p-value of 0.00. The research period has been divided into annual period and 8 sub-periods, where every sub-period covered 3 months (Quarter). Table (4) shows the correlation coefficient between these periods, as follows:

Table 4: Correlation Coefficients between variables

Period	Variables	SMR	CNCX1	CNDX2	CCCX3	CCDX4
2012-2021 (10 years)	**SMR**	1				
	CNCX1	-0.013761	1			
	CNDX2	0.043837	0.395098	1		
	CCCX3	-0.036822	0.577980	-0.212468	1	
	CCDX4	-0.018375	0.570735	-0.047674	0.922772	1
Quarter 1 (Jan 1st 2020-Mar 31st, 2020)	**SMR**	1				
	CNCX1	0.154512	1			
	CNDX2	0.093691	0.281476	1		
	CCCX3	0.017554	-0.027396	-0.482295	1	
	CCDX4	0.141829	0.505409	0.480078	0.297222	1
Quarter 2 (Apr 1st, 2020-Jun 30th, 2020)	**SMR**	1				
	CNCX1	0.016585	1			
	CNDX2	0.040107	0.861301	1		
	CCCX3	0.009607	0.978699	0.885854	1	
	CCDX4	0.006193	0.956925	0.879948	0.993032	1
Quarter 3 (Jul 31st, 2020-Sep 30th, 2020)	**SMR**	1				
	CNCX1	-0.002149	1			
	CNDX2	0.034532	0.940363	1		
	CCCX3	-0.028209	-0.908221	-0.890994	1	
	CCDX4	-0.025813	-0.920372	-0.908882	0.995888	1
Period	**Variables**	**SMR**	**CNCX1**	**CNDX2**	**CCCX3**	**CCDX4**
Quarter 4 (Oct 31st, 2020-Dec 31st, 2020)	**SMR**	1				
	CNCX1	-0.055742	1			
	CNDX2	-0.026680	0.894897	1		
	CCCX3	-0.052896	0.984736	0.918823	1	
	CCDX4	-0.054236	0.988598	0.897825	-0.297222	1

Quarter 5 (Jan 1st 2021- Mar 31st, 2021)	**SMR**	1				
	CNCX1	0.004718	1			
	CNDX2	0.001394	0.501523	1		
	CCCX3	-0.070204	-0.705674	-0.782571	1	
	CCDX4	-0.071714	-0.690566	-0.783016	0.998032	1
Quarter 6 (Apr 1st 2021- Jun 30th, 2021)	**SMR**	1				
	CNCX1	-0.003357	1			
	CNDX2	0.030455	0.849274	1		
	CCCX3	0.030720	-0.351653	-0.326305	1	
	CCDX4	0.031049	-0.348214	-0.315714	0.999612	1
Quarter 7 (Jul 1st 2021- Sep 30th, 2021)	**SMR**	1				
	CNCX1	-0.114586	1			
	CNDX2	-0.092729	0.721286	1		
	CCCX3	-0.076826	0.812985	0.585293	1	
	CCDX4	-0.059053	0.729251	0.389140	0.960861	1
Quarter 8 (Oct 31st 2020- Dec 31st, 2020)	**SMR**	1				
	CNCX1	0.21436	1			
	CNDX2	0.008143	0.551484	1		
	CCCX3	0.041333	0.256381	-0.055143	1	
	CCDX4	0.040527	0.239303	-0.050619	0.998462	1

Source: Output of data processing using EViews 12

Table (4) indicates that the correlation coefficients between independent variables X3, X4 is high in all the research periods, a multicollinearity problem exists by applying Variance Inflation Factor Test (VIF). This is why that these variables will be used as combined two variables (X1-X2), and (X3-X4) in testing hypotheses.

5. TESTING HYPOTHESES

This section is for investigating the impact of the four independent variables on stocks market return. To investigate the effect of the annual period, and the 8 sub-periods, a panel data analysis according to the Generalized Methods of Moments technique (GMM) fixed and random effect has been conducted and provides the following results:

Table (5) Effects of COVID-19 Variables on Stocks Market Return using GMM Technique Fixed Effects

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	-0.00093 0.8764	0.46295 **0.0084**	-0.01177 0.5045	-0.21525 0.4801	1.12956 0.0088	0.03432 0.9289	0.09356 0.8313	0.29265 0.5933	0.48791 0.2678
CNCX1	-0.00134 0.0014	-0.01043 **0.1351**	-0.00324 0.3170	-0.00365 0.0523	0.00010 0.9860	-0.00587 0.0722	-0.00537 0.0714	-0.00230 0.1063	-0.00289 0.8225
CNDX2	0.001042 0.0412	-0.01923 **0.3125**	0.001812 0.1536	0.00046 0.8715	0.01052 0.0104	-0.01613 0.0169	0.00662 0.1123	0.00041 0.8473	0.00207 0.4634
CCCX3	0.001618 0.4233	-0.20591 **0.0154**	0.006686 0.3128	0.05709 0.3880	-0.34585 0.0075	0.02635 0.7812	-0.04088 0.8397	-0.20717 0.2635	-0.13595 0.3415
CCDX4	-0.001648 0.4144	0.15027 **0.0085**	-0.006535 0.2678	-0.04382 0.2623	0.31627 0.0499	-0.05113 0.4721	0.04912 0.8305	0.26660 0.2419	0.11879 0.2678
R2	0.002754	**0.45687**	0.01160	0.02267	0.01798	0.01950	0.01438	0.03150	0.01249
Durbin-Watson stat	2.190500	2.73959	2.13336	2.21116	2.23920	2.45745	2.30473	2.03110	2.27623
Obs.	5757	51	739	770	758	900	761	721	782

Source: Output of data processing using EViews 12

Table (6) Effects of COVID-19 Variables on Stocks Market Return using GMM Technique Random Effects

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	-0.00093 0.8770	0.45781 **0.0066**	-0.01136 0.5197	-0.21532 0.0490	1.12492 0.0091	0.03432 0.9289	0.08625 0.8414	0.29100 0.5939	0.50268 0.2538
CNCX1	-0.00134 0.0014	-0.00982 **0.1483**	-0.00315 0.3297	-0.00370 0.0490	0.00022 0.9718	-0.00587 0.0722	-0.00543 0.0683	-0.00238 0.0948	-0.00310 0.8099

CNDX2	0.00104 0.0414	-0.01752 **0.3443**	0.00191 0.1305	0.00064 0.8202	0.01049 0.0106	-0.01613 0.0169	0.00678 0.1022	0.00052 0.8055	0.00204 0.4700
CCCX3	0.00161 0.4236	-0.20255 **0.0131**	0.00662 0.3174	0.05687 0.3899	-0.34166 0.0083	0.02635 0.7812	-0.03759 0.8497	-0.21603 0.2390	-0.14045 0.3261
CCDX4	-0.00164 0.4143	0.14634 **0.0075**	-0.00658 0.2640	-0.04333 0.2676	0.31027 0.0542	-0.05113 0.4721	0.04545 0.8401	0.28084 0.2133	0.12302 0.3649
SMR									
R2	0.00199	**0.35338**	0.00515	0.00917	0.01544	0.01678	0.00611	0.02412	0.00552
Durbin-Watson stat	2.18884	2.30504	2.11994	2.18061	2.23340	2.45066	2.28563	2.01564	2.26025
Obs.	5757	51	739	770	758	900	761	721	782

Source: Output of data processing using EViews 12

Table (7) Hausman-Test using Cross Section Random Effect (All-Variables)

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Prob.	0.7305	0.6116	0.4840	1.0000	0.7740	1.0000	0.3873	0.7523	1.0000

Source: Output of data processing using EViews 12

Table (8): Effects of COVID-19 (X1, X2) on Stocks Market Return using GMM Technique Fixed Effects

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	0.00345 0.0045	0.06653 **0.0032**	0.00267 0.3839	0.00531 0.2809	0.00406 0.5743	0.00027 0.9707	0.01902 0.0292	-0.00291 0.3837	-0.01805 0.4726
CNCX1	-0.00128 0.0017	-0.01501 0.0263	-0.00079 0.3849	-0.00245 0.1599	-0.00160 0.4199	0.00026 0.9176	-0.00589 0.0405	-0.00203 0.0134	0.00817 0.4676
CNDX2	0.00098 0.0045	0.02563 **0.0010**	0.00085 0.440	0.00207 0.4066	0.00097 0.7301	0.00181 0.7079	0.00715 0.0469	-0.00180 0.1659	-0.00165 0.5209
SMR									
R2	0.00262	**0.21634**	0.00557	0.01669	0.00392	0.00300	0.01444	0.03248	0.00884
Durbin-Watson stat	2.19186	2.03141	2.06611	2.19501	2.23638	2.42212	2.28562	2.00918	2.27878
Obs.	5940	70	779	789	796	900	779	760	794

Source: Output of data processing using EViews 12

Table (9): Effects of COVID-19 (X1, X2) on Stocks Market Return using GMM Technique Random Effects

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	0.00344 0.0046	0.06472 **0.0034**	0.00278 0.3650	0.00559 0.2564	0.00415 0.5660	0.00027 0.9707	0.01918 0.0278	-0.00287 0.3907	-0.01781 0.4779
CNCX1	-0.00127 0.0017	-0.01407 **0.0329**	0.00090 0.4124	-0.00254 0.1452	-0.00162 0.4116	0.00026 0.9176	0.00726 0.0436	-0.00205 0.0127	0.00805 0.4731
CNDX2	0.00098 0.0447	0.02476 **0.0011**	-0.00081 0.3752	0.00222 0.3744	0.00100 0.7218	0.00181 0.7079	-0.00593 0.0393	-0.00178 0.0127	-0.00164 0.5224
SMR									
R2	0.00192	**0.15719**	0.00105	0.00526	0.00164	0.00028	0.00591	0.02727	0.00073
Durbin-Watson stat	2.19031	1.87520	2.05673	2.16958	2.23123	2.41554	2.26604	1.99837	2.26028
Obs.	5940	70	779	789	796	900	779	760	794

Source: Output of data processing using EViews 12

Table (10): Hausman-Test using Cross Section Random Effect (Two variables X1-X2)

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Prob.	0.7279	0.6709	0.5098	0.1355	0.9036	1.0000	0.3254	0.8358	0.9817

Source: Output of data processing using EViews 12

Table (11): Effects of COVID-19 (X3, X4) on Stocks Market Return using GMM Technique Fixed Effects

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	0.00095 0.1057	0.11655 0.0530	9.70E-0 0.9909	-0.06319 0.8292	0.33045 0.1059	-0.32552 0.3499	0.12694 0.6822	0.63286 0.0116	-0.06379 0.8743
CNCX3	-0.00019	-0.04627	0.00022	0.01085	-0.11672	0.09459	-0.06242	-0.22564	0.02853

	0.4609	0.0689	0.9470	0.8621	0.2084	0.2856	0.6610	0.0349	0.8250
CNDX4	0.00016 0.6542	0.03128 0.0351	-0.00057 0.8922	-0.00257 0.9403	0.11755 0.2809	-0.08262 0.2237	0.07287 0.6527	0.22774 0.1158	-0.03191 0.7956
SMR									
R2	0.00098	0.08872	0.00433	0.01150	0.00811	0.01047	0.00852	0.01413	0.00724
Durbin-Watson stat	2.15660	2.41862	2.13584	2.23388	2.20087	2.43848	2.21081	2.01399	2.22304
Obs.	6532	120	807	826	817	900	830	817	822

Source: Output of data processing using EViews 12

Table (12): Effects of COVID-19 (X3, X4) on Stocks Market Return using GMM Technique Random Effects

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	0.00096 0.1010	0.11828 0.0485	-0.00017 0.9838	-0.06652 0.8203	0.32604 0.1106	-0.32552 0.3499	0.13446 0.6661	0.63906 0.0107	-0.05135 0.8985
CNCX3	-0.00020 0.4537	-0.04702 0.0634	0.00031 0.9249	0.01159 0.8527	-0.11472 0.2162	0.09459 0.2856	-0.06577 0.6456	-0.22906 0.0322	0.02454 0.8489
CNDX4	0.00016 0.6504	0.03169 0.0319	-0.00067 0.8745	-0.00302 0.9299	0.11524 0.2902	-0.08262 0.2237	0.07663 0.6377	0.23186 0.1091	-0.02810 0.8192
SMR									
R2	0.00020	0.07033	0.00038	0.00157	0.00620	0.00775	0.00044	0.00885	0.00069
Durbin-Watson stat	2.15493	2.37169	2.12740	2.21167	2.19665	2.43180	2.19292	2.00324	2.20849
Obs.	6532	120	807	826	817	900	830	817	822

Source: Output of data processing using EViews 12

Table (13): Hausman-Test using Cross Section Random Effect (Two variables X3-X4)

Variables	2012-2021	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Prob.	0.3611	0.7965	0.3597	0.7450	0.4507	1.0000	1.0000	0.1301	0.1836

Source: Output of data processing using EViews 12

Results showed that banks' stock market return reacted to COVID-19 spread, where all the indicators seem to affect stock market return in the first quarter (Jan 1st, 2020-Mar 31st, 2020), Fixed and random effect using the COVID-19 four variables, also in the same period of the X1-X2 variables fixed and random effect. For the rest of the periods, it can be conducted that there is significant negative effect of COVID-19 on the bank's stocks market return. Hausman-Test results indicated that the random effect models are the appropriate models of regression.

6. SUMMARY AND CONCLUSION

This paper attempts to investigate the impact of COVID-19 spread on Egypt's banks stock market returns. COVID-19 has been measured by cumulative total cases, cumulative total deaths, new cases and new deaths. Banks stocks market return is measured by ln daily close market price / previous daily close market price. This has been applied on ten listed Egyptian banks in EGX30, EGX70, and banking sector index during the whole period December 31st, 2012, to December 31st, 2021. The period of Jan 1st, 2020, to Dec 31st, 2021, has been split into 8 sub-periods (8 quarters)

Results indicate that banks stock market returns in Egypt tend to be negatively affected Coronavirus new cases and Coronavirus cumulative cases. After splitting the research period into 8 quarters (Jan 1st, 2020 – Dec 31st, 2021), results support the impact of new cases and cumulative new cases in quarter 1 (Jan 1st, 2020 – Mar 31st, 2020) on banks' stock market returns. Results supported using panel analysis according to GMM technique using fixed and random effect models, for the whole research period and sub periods. Hausman-test applied and indicate that the random effect model is the appropriate regression model.

It can be concluded that the effect of COVID-19 was at it peaks in quarter 1 the beginning of the pandemic. The effect declined during the remaining periods of the pandemic.

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