
The Impact of COVID-19 Spread on the Egyptian Banks' Soundness

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ABSTRACT

The aim of the research is to examine the impact of COVID-19 spread on banks' performance during the period of Jan 1st, 2020, till December 31st, 2021. Banks' performances are measured using CAMEL approach quarterly data, 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 5 top Egyptian banks ranked as total assets highest value. Data collected from banks' annual, and quarter published reports, and World Health Organization COVID-19 database.

Results indicate that banks performance of top 5 Egyptian banks were negatively affected by Coronavirus new cases and Coronavirus cumulative cases shows more significant effect rather than Coronavirus new deaths, and cumulative deaths. Results supported using panel analysis according to GMM technique using normal and fixed effect models, least-square normal and fixed effect for the whole research period and sub periods.

KEYWORDS

COVID-19 spread, Bank Performance, CAMEL approach, Egyptian Banks, Panel data, GMM Technique, Least Square

1-INTRODUCTION

The surprisingly spread of COVID-19 pandemic significantly increase economic uncertainty, especially in emerging countries with limited resources to ongoing the social and economic problems. The measures introduced to control the spread of the virus led to a severe economic crisis. The contraction in economic activity was sudden and deep, and the decline in the global output was three times higher than during the last financial crisis (IMF, 2021). Additionally, the global financial markets were also affected by the COVID-19 pandemic; asset prices declined, and the volatile market conditions led to investors' flight to safety and liquidity (Tomczak, Kamila, 2023).

The recession and economic downturn caused by the global pandemic decreased the banks' profits and worsened the outlook for the banking sector. Additionally, banks vulnerabilities, such as the high level of debts of nonfinancial firms, were amplified by the COVID-19 spread, and banks' profits were affected by easing monetary policy as in many countries, very low interest rates were introduced before the pandemic, which could have contributed to a low net interest margin. The banking system acts as a stabilizer of the economy, especially during the ongoing of the

COVID-19 spread. Banks are highly exposed to the pandemic risk cause of increasing both lending and non-performing debts (Thury, Hang, et al., 2023).

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 bank size and COVID-19 pandemic have impacted the banks’ performance or not. In this study, COVID-19 spread was measured as Coronavirus new cases, Coronavirus cumulative new cases, Corona virus new deaths, and coronavirus cumulative deaths as an independent variable, the dependent variable is the banks’ performance, using CAMEL approach as a performance measure mainly for 5 Egyptian banks ranked by their total assets figures in FY ended Dec, 31st, 2021.

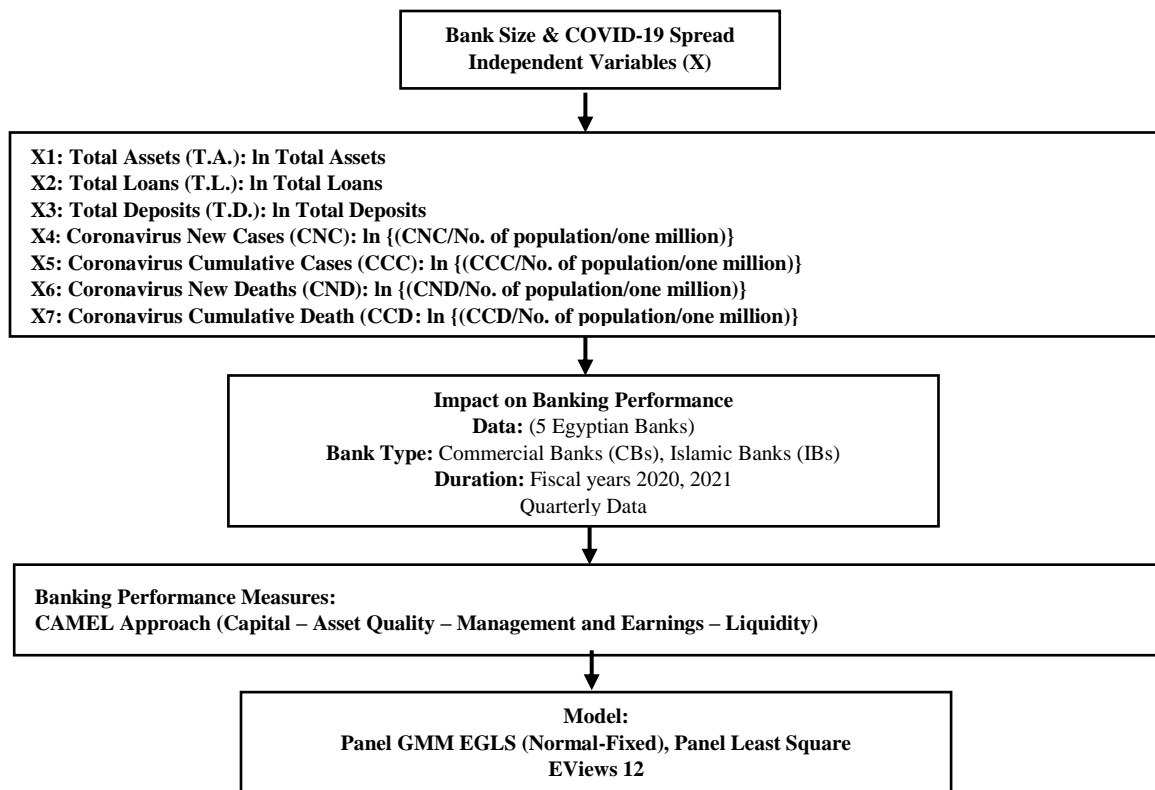
The main purpose of this study is to address the impact of bank size and COVID-19 measures on banking performance. Particularly, examine the following questions:

- 1- Do COVID-19 new cases affect banks’ performance?
- 2- Do COVID-19 cumulative new cases affect banks’ performance?
- 3- Do COVID-19 new deaths affect banks’ performance?
- 4- Do COVID-19 cumulative deaths affect banks’ performance?

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 5 Egyptian banks performance measures collected and calculated from quarterly and annual report. E-views version 12 applied as a statistical software program to measure the impact of bank size, and COVID-19 variables on banks performance using Panel GMM EGLS (Normal-Fixed), Panel Least Square.

The following figure illustrate the study structure in brief,

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



Source: The researcher

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-Performance 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)

2. LITERATURE REVIEW

Feng, Xingjian, Feng, Hongrui, Zhao, Sebastian, and Carter, David, 2021, investigated the effect of the COVID-19 pandemic on the relation between the noninterest income and bank profit and risk. Results showed that tightened credit standards reduced many types of loans, noninterest revenue sources are positively related to performance but inversely related to risk. These results were consistent with a beneficial diversification effect during the pandemic from banks expanding beyond traditional lending sources of revenue.

Demirgüç-Kunt, Asli, Pedraza, Alvaro, and Ruiz-Ortega, Claudia, 2021, examined the impact of financial sector policy announcements on bank stocks around the world during the onset of the COVID-19 crisis. Results showed that liquidity support, borrower assistance programs and monetary easing moderated the adverse impact from the crisis, but their impact varied considerably across banks and countries. By contrast, countercyclical prudential measures led to negative abnormal returns in bank stocks, suggesting that markets price the downside risks associated with these policies.

Ul-Huq, Syed, Ahmed, Kawsar – Chowdhury, Mohammad, Sohail, Hafiz, Biswas, Tanmay, and Abbas, Faisal, 2021, aimed to investigate the relationship between capital regulation and risk-taking behavior (financial stability) concerning the impacts of the recent global (COVID-19) crisis and diverse ownership structure by using an unbalanced panel data set from 32 commercial banks of Bangladesh for 2000–2020, and using the two-step system generalized method of moments and three-stage least squares to produce the study outcomes. Results revealed that the relationship between capital regulation and risk (financial stability) is negative (positive) and bi-directional. More significantly, COVID-19 makes banks fragile and demands more capital to absorb risk. However, the effect of COVID-19 is heterogeneous when the ownership structure is considered. Among the diverse ownership styles, Islamic and active shareholding show their controlling wheel on capital regulation and risk-taking aptitude (financial stability) during the global (COVID-19) crisis. In normal economic conditions, private banks and minority active shareholding can be a good determinant for capital regulation and risk (financial stability). On the other hand, state-owned and large banks have been found as less capitalized and highly risky.

Dursun-de Neef, Özlem, and Schandlbauer, Alexander, 2021, examined how European banks adjusted lending at the onset of the pandemic depending on their local exposure to the COVID-19 outbreak and capitalization by using a bank-level COVID-19 exposure measure, higher exposure to COVID-19 led to a relative increase in worse-capitalized banks' loans whereas their better-capitalized peers decreased their lending more. At the same time, only better-capitalized banks experienced a significantly larger increase in their delinquent and restructured loans. Results showed that banks with low capital have an incentive to issue more loans during contraction times to help their weaker borrowers so that they can avoid loan loss recognition and write-offs on their capital.

Abdulla, Yomna, and Ebrahim, Yousif, 2021, investigated the effects of the COVID-19 crisis on the performance of 49 listed banks in the Gulf Cooperation Council (GCC) countries, during the period from the first quarter of 2017 through the third quarter of 2020. Results revealed that GCC banks were negatively affected by the pandemic. However, Islamic banks have performed better than conventional banks, also Islamic banks which are

government linked that are large with high loan ratios were more affected by the pandemic. Results also showed that the banks in Saudi Arabia and UAE were affected more than the banks in other GCC countries.

Mohammad, Khalil, 2021, investigated bank capital structure dynamics during the Covid-19 pandemic. The role of contemporary bank-specific determinants of capital structure during this period is analyzed. An independent t-test is carried out to check the response of bank leverage to the crisis. Using fixed effect estimation and difference general method of moments (GMM), the impact of the shock was examined. An unbalanced quarterly data set from 2016 Q1 to 2020 Q3 of all commercial banks in Pakistan is used. Results showed that due to procyclicality of capital, during the Covid-19 crisis, the banks preempted a fall in capital and improved their capital positions. The role of bank specific variables in determining capital structure like profitability, size and competition weakened during this period. Evidence suggested that policy rate intervention by the central bank was a significant factor in capital structure decisions during the Covid-19 period.

Kissiwaa, Angelina, Agyemang, Andrew, and Awudu, Yakubu, 2022, Used panel data for twenty-eight listed commercial banks in China from 1990 to 2020 to explore the relationship between credit risk and business performance, by utilized the Generalized Methods of Moments (GMM) as the primary estimator while the Pooled Mean Group (PMG) was used as a robust estimator. Results showed a negative significant relationship between non-performing loan and return on equity, as well as loan loss provision and profitability of the bank. On the contrary, capital adequacy ratio revealed a positive significant relationship with bank performance. Credit growth on the other hand recorded positive but insignificant relationship with performance of banks.

Ileri, Serife, 2022, provided a quantitative assessment of the “asset ratio” rule defined in Turkey as part of measures taken to stimulate the economy amid the Covid-19 pandemic. The main objective of the new rule was to boost credit growth in the economy and provide lending for credit-constrained households and firms that are in need. A secondary aim was to shift the denomination structure of the deposits toward domestic currency. Hence, the paper focused particularly on how the policy affected the growth rate of loans and the share of domestic deposits relative to foreign ones among the commercial banks. The policy was also heavily criticized due to the possibility that it will subjugate the banking system to excessive risk. The paper explored this possible impact by measuring how much the policy affected the default risk allowances in the banking system. The paper implemented a difference-in difference methodology to assess the quantitative impacts of the asset ratio policy by taking large banks as the treatment group, and small banks as the control group. Results showed that difference-in-difference estimation suggested that the asset ratio policy resulted in a 9.6% rise in loans and an 8.4% rise in government securities. Deposits also increased, with no significant change in their composition. The policy initially generated a 7% increase in the credit risk allowances of banks in the treatment group, which vanished in the following periods.

Taylor, Daniel, Awuye, Isaac and Cudjoe, Eunice, 2022, investigated the effects of the Covid-19 pandemic on the financial reporting quality of European banks by examining the occurrence of earnings management specifically income smoothing. Using a sample of listed European banks and employ panel estimation to compare income smoothing in the pre-pandemic period (2019 Q1-2019 Q4) and the pandemic period (2020 Q1-2021 Q4). Results showed that earnings management has significantly increased during the pandemic years, evidencing how the quality of financial reporting is affected during the crisis period. Further analysis showed that though banks were inclined to manage earnings during a crisis, nevertheless, the presence of high-quality audit is a limiting factor on the incidence of earnings management in the face of crisis.

Tomczak, Kamila, 2023, aimed to examine the effect of the COVID-19 pandemic on the banking sector and to assess if COVID-19 was a trigger for the banking crisis, the beta of the banking sector was calculated and analyzed. In addition, a fixed panel regression model was applied over the period from the 30th of December 2019 until the 24th of September 2021. Results showed that the pandemic contributed to higher volatility and risk in banking sector but did not confirm a systematic banking crisis.

Boubakri, Narjess, Mirzae, Ali and Saad, Mohsen, 2023, Used a sample of 421 banks from 17 countries, and found that the lending growth of Islamic and conventional banks decreased during the initial phase of the COVID-19 crisis. However, the decrease is significant for conventional banks only. Credit growth for Islamic banks grew around 2.5% faster than that for conventional banks, especially in countries with a macroprudential framework in place in the year leading up to the crisis. Evidence remained unchanged with alternative empirical methodologies, definitions of bank lending, variations in the pre-crisis period, and proxies for the severity of COVID-19 in different countries.

3. MEASURING VARIABLES AND TESTING HYPOTHESES

The dependent variable has been measured by using CAMEL approach, as a measure of banking performance, on the other hand the independent variables have been measured by COVID-19 spread as “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 audited annual and quarter report published by the banks, for the period of 2020-2021, COVID-19 data from the World Health Organization WHO database, for the period of January 1st, 2020, to December 31st, 2021.

3.1-Research Variables

3.1.1-Independent Variables

Independent variables were classified into two groups, COVID-19 spread as an independent variable has been measured by cumulative cases, new cases, cumulative deaths, and new deaths. In this study the variables are illustrated as follows:

Table 1: Independent Variables

Dependent Variable	Calculation	Sign
Coronavirus New Cases	Ln Coronavirus New Cases (Per million of population)	X ₁ -CNC
Coronavirus Cumulative Cases	Ln Coronavirus Cumulative Cases (Per million of population)	X ₂ -CCC
Coronavirus New Deaths	Ln Coronavirus New Deaths (Per million of population)	X ₃ -CND
Coronavirus Cumulative Deaths	Ln Coronavirus Cumulative Deaths (Per million of population)	X ₄ -CCD

3.1.2-Dependent Variable (Banks Performance)

Banks performances were measured using the CAMEL approach of top five Egyptian banks ranked as the largest total assets, quarterly data for the period of 2020-2021 as follows:

Table 2: Dependent Variables Performance Measures

Performance Measure	Method of Calculation	Ys
<u>Capital Management:</u> Capital Adequacy Ratio (Tier I%) Capital Adequacy Ratio (Total%)	= (Tier I Capital/Total Risk-Weighted Assets) % = (Total Capital/Total Risk-Weighted Assets) %	Y ₁ -CI Y ₂ -CT
<u>Asset Quality:</u> Non-Performing Loans % (NPL%)	= (Non-Performing Loans/Total Gross Loans) %	Y ₃ -NPL
<u>Management and Earnings:</u> Return on Assets (ROA%) Return on Equity (ROE%)	= (Net Income/Total Assets) % = (Net Income/Total Equity) %	Y ₄ -ROA Y ₅ -ROE
<u>Liquidity:</u> Liquid Assets to Assets Ratio % Loans to Deposits Ratio%	= (Liquid Assets/Total Assets) % = (Total Gross Loans/Total Deposits) %	Y ₆ -L.A. Y ₇ -L.D.

Risk Weighted Assets Density (RWA%)	= (Risk Weighted Assets/Total Assets) %	Y ₈ -RWA
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Table 3: 5 Egyptian Banks listed in Egyptian Banking Sector

Name of the Bank	Code	Consolidation Level	Listed-Index
National Bank of Egypt	NBE	Bank Holding Company	Not Listed
Banque Misr	BM	Bank Holding Company	Not Listed
Commercial International Bank	COMI.CA	Bank Holding Company	EGX-30
Qatar National Bank Al-Ahly	QNBA.CA	Foreign Owned Subsidiary	EGX-30
Alex Bank	AB	Bank Holding Company	Not Listed

3.1.3-CAMEL Performance Measures

CAMEL Approach			Capital Adequacy		Asset Quality	Profitability		Liquidity	Risk	
No	Bank Name	Quarters	CAR (Tier 1) %	CAR (Total) %	NPL%	ROA%	ROE%	Liquid Assets to Assets Ratio %	Loans to Deposits Ratio %	RWA Density %
1	NBE	Q4-2021	15.32%	21.39%	1.06%	0.22%	3.85%	36.25%	49.12%	35.29%
1	NBE	Q3-2021	15.32%	21.39%	1.14%	0.14%	3.02%	38.68%	49.18%	40.49%
1	NBE	Q2-2021	14.05%	16.09%	1.07%	0.21%	4.21%	41.07%	51.26%	33.81%
1	NBE	Q1-2021	14.33%	16.38%	1.13%	0.15%	2.78%	37.61%	46.94%	34.07%
1	NBE	Q4-2020	14.55%	16.55%	1.07%	0.12%	2.18%	37.84%	46.84%	37.07%
1	NBE	Q3-2020	14.55%	16.55%	1.07%	0.12%	2.18%	37.84%	46.84%	37.07%
1	NBE	Q2-2020	14.61%	16.58%	1.37%	0.65%	10.70%	35.67%	45.12%	39.68%
1	NBE	Q1-2020	14.61%	17.37%	1.80%	0.74%	10.70%	32.21%	43.39%	43.20%
2	Banque Misr	Q4-2021	13.60%	20.01%	2.05%	0.34%	4.70%	39.24%	50.08%	42.38%
2	Banque Misr	Q3-2021	12.84%	15.76%	1.52%	0.73%	10.10%	39.32%	49.16%	48.15%
2	Banque Misr	Q2-2021	12.45%	15.31%	1.30%	0.27%	4.05%	40.03%	52.11%	49.07%
2	Banque Misr	Q1-2021	12.07%	14.95%	1.49%	0.17%	2.50%	36.13%	48.04%	50.27%
2	Banque Misr	Q4-2020	13.44%	16.56%	1.27%	0.27%	3.76%	34.05%	44.00%	49.22%
2	Banque Misr	Q3-2020	13.44%	16.56%	1.27%	0.27%	3.76%	34.05%	44.00%	49.22%
2	Banque Misr	Q2-2020	15.65%	18.94%	1.24%	0.16%	2.30%	30.98%	40.51%	39.18%
2	Banque Misr	Q1-2020	15.65%	18.94%	1.24%	0.16%	2.30%	30.98%	40.51%	39.18%
3	CIB	Q4-2021	26.87%	29.86%	5.13%	0.68%	4.93%	32.97%	40.33%	47.04%
3	CIB	Q3-2021	28.98%	32.10%	5.43%	0.77%	5.78%	32.04%	39.08%	44.86%
3	CIB	Q2-2021	28.79%	32.00%	5.71%	0.69%	5.12%	31.91%	38.78%	45.16%
3	CIB	Q1-2021	28.22%	31.50%	4.41%	0.64%	4.83%	31.10%	38.01%	45.67%
3	CIB	Q4-2020	28.09%	31.41%	4.27%	0.68%	4.86%	32.06%	40.20%	46.88%
3	CIB	Q3-2020	27.52%	31.00%	3.97%	0.57%	4.33%	32.53%	40.59%	45.74%
3	CIB	Q2-2020	26.75%	29.50%	4.03%	0.65%	4.96%	33.73%	42.15%	47.20%
3	CIB	Q1-2020	23.67%	26.35%	4.00%	0.63%	5.20%	33.86%	41.69%	49.63%
4	QNB-Alahli	Q4-2021	22.30%	22.79%	3.81%	0.45%	3.49%	48.07%	58.49%	55.89%
4	QNB-Alahli	Q3-2021	22.28%	22.81%	3.84%	0.57%	4.26%	50.24%	61.44%	57.15%
4	QNB-Alahli	Q2-2021	21.49%	22.40%	3.76%	0.68%	4.96%	53.35%	65.67%	60.96%
4	QNB-Alahli	Q1-2021	21.34%	21.94%	3.31%	0.64%	4.82%	53.91%	66.43%	60.46%
4	QNB-Alahli	Q4-2020	20.62%	21.46%	3.00%	0.64%	4.67%	56.39%	70.13%	62.63%
4	QNB-Alahli	Q3-2020	20.32%	21.39%	2.97%	0.62%	4.74%	56.06%	70.20%	61.76%
4	QNB-Alahli	Q2-2020	19.75%	20.78%	2.90%	0.69%	5.47%	55.29%	70.82%	61.59%

4	QNB-Alahli	Q1-2020	18.92%	19.84%	2.75%	0.66%	5.50%	54.26%	71.48%	60.87%
5	Alex Bank	Q4-2021	19.36%	20.38%	4.50%	0.61%	5.11%	44.75%	53.71%	50.24%
5	Alex Bank	Q3-2021	20.22%	21.19%	5.15%	0.63%	5.23%	44.28%	53.66%	50.11%
5	Alex Bank	Q2-2021	19.48%	20.51%	4.89%	0.76%	6.51%	46.33%	55.54%	52.89%
5	Alex Bank	Q1-2021	20.25%	21.27%	4.31%	0.52%	4.58%	45.00%	54.25%	52.06%
5	Alex Bank	Q4-2020	19.90%	20.92%	3.98%	0.46%	4.07%	46.91%	56.42%	53.39%
5	Alex Bank	Q3-2020	17.55%	18.57%	3.75%	0.63%	5.86%	45.20%	55.03%	51.46%
5	Alex Bank	Q2-2020	17.83%	18.85%	3.88%	0.49%	4.87%	43.08%	51.75%	49.97%
5	Alex Bank	Q1-2020	18.46%	19.46%	4.09%	0.83%	8.70%	41.05%	49.13%	47.45%

Source: Banks Quarters Report (2020-2021)

3.1.4-Control Variables

The top five banks in Egypt ranked as the largest total assets in EGP.

The following **hypotheses** were developed as follows:

H₀: There is no significant impact of Bank Size and COVID-19 on Banks' Performance:

- 1- There is no significant effect of COVID-19 new cases on Banks Performance.
- 2- There is no significant effect of COVID-19 cumulative cases on Banks Performance.
- 3- There is no significant effect of COVID-19 new deaths on Banks Performance.
- 4- There is no significant effect of COVID-19 cumulative deaths on Banks Performance.

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

$$Y_s = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$1- Y_1 - \text{CI} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$2- Y_2 - \text{CT} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$3- Y_3 - \text{NPL} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$4- Y_4 - \text{ROA} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$5- Y_5 - \text{ROE} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$6- Y_6 - \text{L.A.} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$7- Y_7 - \text{L.D.} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

$$8- Y_8 - \text{RWA} = a + \beta_1 X_1 - \text{CNC} + \beta_2 X_2 - \text{CCC} + \beta_3 X_3 - \text{CNC} + \beta_4 X_4 - \text{CCD} + \varepsilon$$

4. DESCRIPTIVE AND STATISTICS ANALYSIS

Table (1) shows descriptive statistics of research variables using a sample of 5 banks, over the period of 2 years (Jan 1st, 2020 – Dec 31st, 2021) quarterly data.

Table1: Descriptive analysis of variables

	Y ₁ -CI	Y ₂ -CT	Y ₃ -NPL	Y ₄ -ROA	Y ₅ -ROE	Y ₆ -L.A.	Y ₇ -L.D.	Y ₈ -RWA
Mean	0.192362	0.215630	0.029953	0.004850	0.047174	0.409088	0.509818	0.482265
Median	0.194778	0.209194	0.033100	0.005676	0.047002	0.392444	0.491827	0.490739
Maximum	0.289804	0.321000	0.057100	0.008348	0.107050	0.563945	0.714813	0.626289
Minimum	0.120680	0.149499	0.010572	0.001237	0.021846	0.309825	0.380124	0.338083
Std. Dev.	0.052114	0.052200	0.015221	0.002178	0.018131	0.077667	0.093664	0.079494
Skewness	0.489235	0.869042	0.019052	-0.478590	1.645212	0.568090	0.665422	0.032298
Kurtosis	2.070627	2.615316	1.559307	1.671877	6.665437	2.171096	2.588804	2.326869
Jarque-Bera	248.8891	433.0855	283.8634	366.2809	3315.851	270.3250	265.1642	62.49476
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Sum	630.9483	707.2664	98.24683	15.90850	154.7297	1341.808	1672.202	1581.830
Sum Sq. Dev.	8.905264	8.934650	0.759673	0.015560	1.077908	19.77940	28.76641	20.72106
Observations	3280	3280	3280	3280	3280	3280	3280	3280
	X₁-CNC	X₂-CCC	X₃-CND	X₄-CCD				
Mean	1.335522	6.908125	-1.459638	4.015130				
Median	1.706565	7.361720	-1.171183	4.492615				
Maximum	2.805782	8.185239	-0.105361	5.311283				
Minimum	-2.525729	-0.713350	-4.605170	-4.605170				
Std. Dev.	0.985291	1.515520	0.851863	1.554930				
Skewness	-0.818787	-2.340711	-0.881569	-2.374164				
Kurtosis	2.842123	8.558127	3.661053	9.302661				
Jarque-Bera	369.8982	7217.160	484.5718	8510.254				
Probability	0.000000	0.000000	0.000000	0.000000				
Sum	4380.512	22658.65	-4787.614	13169.63				
Sum Sq. Dev.	3183.246	7531.210	2379.471	7927.995				
Observations	3280	3280	3280	3280				

Dependent Variable (Y₁-CI): the mean for the period from 2020 to 2021 is (0.192362) with a median of (0.194778), as the maximum value during the period is (0.289804) and the minimum value during the period is (0.120680) with a standard deviation of (0.052114). The skew coefficient is positive (0.489235) it indicates that the frequency distribution curve is skewed to the right with Kurtosis coefficient of (2.070627), As the value of the Jarque-Bera Test: P 0.000000 is less than 5%, therefore the variable does not follow the normal distribution, Observations (3280), Cross sections (5) (That is, the number of listed companies).

The following table illustrates the correlation between independent variables each other's, it can be concluded that there is strong correlation between (X₂-CCC) and (X₄-CCD) showing a positive correlation of 0.996068, weak positive correlation between (X₁-CNC) and (X₄-CCD) with a positive correlation of 0.377043.

Table 2: Correlation coefficients between independent variables

Variables	X ₁ -CNC	X ₂ -CCC	X ₃ -CND	X ₄ -CCD
X ₁ -CNC	1.000000			
X ₂ -CCC	0.400113	1.000000		
X ₃ -CND	0.874450	0.478937	1.000000	
X ₄ -CCD	0.377043	0.996068	0.460660	1.000000

5. TESTING HYPOTHESES

This section is for investigating the impact of the seven independent variables on banks' performance. To investigate the effect, a panel data analysis according to the Panel Generalized Methods of Moments (GMM) and Panel Least Square (OLS) normal and fixed effect has been conducted and provides the following results:

Table 3: Effects of COVID-19 Variables on Stocks Market Return using GMM Technique & OLS

Method: Panel Generalized Method of Moments (GMM-Fixed Effects)								
Variable	Y ₁ -CI	Y ₂ -CT	Y ₃ -NPL	Y ₄ -ROA	Y ₅ -ROE	Y ₆ -L.A.	Y ₇ -L.D.	Y ₈ -RWA
C	0.186053	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000
X ₁ -CNC	0.001988	0.0000	0.0000	0.0000	0.0000	0.3445	0.4711	0.0000
X ₂ -CCC	-0.003637	0.5029	0.0008	0.0424	0.0437	0.0051	0.0538	0.1644
X ₃ -CND	-0.003880	0.0000	0.0000	0.0000	0.0000	0.3318	0.0738	0.1850
X ₄ -CCD	0.005756	0.0059	0.0000	0.0288	0.0085	0.0001	0.0139	0.2174
R ²	0.970986	0.929258	0.939560	0.645638	0.091990	0.924323	0.903963	0.901961
Adj. R ²	0.970915	0.929085	0.939413	0.644771	0.089769	0.924138	0.903728	0.901721

Durbin-Watson	0.028801	0.027328	0.030554	0.027964	0.026113	0.008128	0.006464	0.015612
Method: Panel Generalized Method of Moments (GMM-Random Effects)								
Variable	Y1-CI	Y2-CT	Y3-NPL	Y4-ROA	Y5-ROE	Y6-L.A.	Y7-L.D.	Y8-RWA
C	0.0000	0.0000	0.0010	0.0050	0.0007	0.0000	0.0000	0.0000
X1-CNC	0.0000	0.0000	0.0000	0.0000	0.0000	0.3445	0.4711	0.0000
X2-CCC	0.0027	0.5029	0.0008	0.0424	0.0437	0.0051	0.0538	0.1644
X3-CND	0.0000	0.0000	0.0000	0.0000	0.0000	0.3318	0.0738	0.1850
X4-CCD	0.0000	0.0059	0.0000	0.0288	0.0085	0.0001	0.0139	0.2174
R2	0.116774	0.129567	0.236626	0.041433	0.054735	0.061499	0.018228	0.018723
Adj. R2	0.115696	0.128504	0.235694	0.40262	0.053580	0.060353	0.017029	0.017524
Durbin-Watson	0.028766	0.027295	0.030516	0.027930	0.026081	0.008118	0.000622	0.015593
Method: Panel Least Square (OLS)								
Variable	Y1-CI	Y2-CT	Y3-NPL	Y4-ROA	Y5-ROE	Y6-L.A.	Y7-L.D.	Y8-RWA
F-Statistic	3.156708	8.724075	15.65138	12.75155	45.49529	4.085424	1.464276	1.536281
Prob (F-Statistic)	0.013368	0.000001	0.000000	0.000000	0.000000	0.002635	0.210347	0.188846
Hausman-Test (Correlated-Random Effect)								
Variable	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
Chi-sq. Statistic	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Prob.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
No of Obs.	3280	3280	3280	3280	3280	3280	3280	3280

Source: Output of data processing using EViews 12

By reviewing the Panel Generalized Method of Moments (GMM) results of the first model Y₁-CI **Fixed Effect**, the following equation is conducted as follows:

$$Y_1-CI = 0.186053 + 0.001988X_1-CNC - 0.003637X_2-CCC - 0.003880X_3-CNC + 0.005756X_4-CCD + \varepsilon$$

Results showed that independent variables were significant. **Explanatory power** of the model or the value of coefficient of determination (R-squared **97.10%**) means that the independent variables included in the model explain almost (**19.24%**) from the variance in the dependent variable (Capital Adequacy Ratio Tier I%). **F-Test** results indicates that the effect of the independent variable on the dependent variable is significant because the level of significance = 0.013368 is less than (0.05 level of significance). According to the previously mentioned results the null hypothesis is accepted. "There is significant effect of coronavirus new cases, and coronavirus new deaths on the (Capital Adequacy Ratio Tier I%) of the Banks.

The remaining results can be conducted from reviewing the mentioned models above Panel GMM-Normal and Fixed, least-Square-Normal and Fixed for the rest of the results.

6. SUMMARY AND CONCLUSION

This paper attempts to examine the impact of bank size, and COVID-19 spread on Egypt's banks performance. COVID-19 has been measured by ln (cumulative total cases, cumulative total deaths, new cases, and new deaths) / No of population/one million. Banks performances are measured by using CAMEL approach as a measure of performance. This has been applied on 5 Egyptian banks ranked as highest total assets during the whole period January 1st, 2020, to December 31st, 2021.

Results indicate that banks performance were negatively affected by Coronavirus new cases and Coronavirus cumulative cases, Coronavirus new deaths, and Coronavirus cumulative deaths. Results supported using panel analysis according to GMM technique, and Least Squares fixed effect models, for the whole research period. Hausman-Test indicate that the appropriate model is the fixed effects model.

7. REFERENCES

- Abdulla, Yomna, et al., “Effect of COVID-19 on the performance of Islamic and conventional GCC banks”, *Journal of Financial Economics*, Rev Financ Econ. 2022;40:239–258
- Boubakri, Narjess, et al., 2023, “Bank lending during the COVID-19 pandemic: A comparison of Islamic and conventional banks”, *Journal of International Financial Markets, Institutions & Money*, <https://doi.org/10.1016/j.intfin.2023.101743>
- Demirgüç-Kunt, et al., 2021, “Banking sector performance during the COVID-19 crisis”, *Journal of Banking and Finance* 133 (2021) 106305
- Dursun-de Neef, Özlem, et al., 2021, “COVID-19 and lending responses of European banks”, *Journal of Banking and Finance* 133 (2021) 106236
- Feng, Xingjian, et al., 2021, “The effect of revenue diversification on bank profitability and risk during the COVID-19 pandemic”, *Finance Research Letters* 43 (2021) 101957, <https://doi.org/10.1016/j.frl.2021.101957>
- Ileri, Serife, 2022, “An investigation of the impacts of asset ratio policy on the banking system during the Covid-19 crisis in Turkey”, *International Journal of Emerging Markets*, DOI 10.1108/IJOEM-05-2021-0796
- Kissiwaa, Angelina, et al., 2022, “Revisiting credit risk and banks performance of China’s commercial banks before and after Covid 19 pandemic”, *The Journal of Corporate Accounting and Finance*, 2022;33:16–30.
- Mohammad, Khalil, 2021, “How bank capital structure decision-making change in recessions: Covid-19 evidence from Pakistan”, *Asian Journal of Economics and Banking* Vol. 6 No. 2, 2022 pp. 255-26
- Taylor, Daniel, et al., 2022, “Covid-19 pandemic, a catalyst for aggressive earnings management by banks?”, *Journal of Accounting and Public Policy*, Volume, Issue 1, <https://doi.org/10.1016/j.jaccpubpol.2022.107032>
- Tomczak, Kamila, 2023, “The impact of COVID-19 on the banking sector. Are we heading for the next banking crisis?”, *Qualitative Research in Financial Markets*, DOI 10.1108/QRFM-09-2021-0157
- Ul-Huq, Syed, et al., 2021, “How do banks’ capital regulation and risk-taking respond to COVID-19? Empirical insights of ownership structure”, *International Journal of Islamic and Middle Eastern Finance and Management* Vol. 15 No. 2, 2022 pp. 406-424