



**THE IMPACT OF BANK SIZE ON THE RELATIONSHIP
BETWEEN CASH FLOW AND LIQUIDITY: EVIDENCE
FROM EGYPTIAN LISTED BANKS**


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Abstract

There is a scarcity in previous studies on the impact of liquidity and size on cash flows. To address this, in this paper we examine the relationship between liquidity and various types of cash flow, including NOFC, INF, and FCF, while taking into account the impact of size by using the 11 Egyptian banks included in the stock market in the period 2009–2019. The study variables can be divided into the independent variable, which is liquidity; the dependent variables, which are NOFC, INF, and FCF; the intermediate variable, which is the size; and the regulatory variables, which are net margin loans, receivables, earning asset, and enterprise value. For the data analysis, we rely on descriptive analysis, the group unit root test, the cointegrating equation model, and the ARDL regression model for hypothesis testing. We obtain secondary data from financial statements and reports. We reach the following conclusions: There is a statistically significant positive or negative relationship between liquidity and (operating cash flows during the second slowdown period—investment cash flows before the first slowdown period and during the first slowdown period—financial cash flows during the first slowdown period). During the initial slowdown period, there is a significant negative relationship between financial cash flows and liquidity multiplied by size, which means that size has an impact on the relationship between liquidity and financial cash flows.

Keywords: Liquidity, Bank size, Operating cash flow, Investing cash flow, financial cash flow

Introduction

Both borrowers and investors worry about liquidity. Since they don't know when they'll want to sell their investments in financial assets. Investors look for liquidity, Borrowers are concerned about liquidity because they are uncertain of their capacity to continue attracting or retaining funding. The need for a premium or substantial control rights will be felt by investors when making direct loans to the borrowers in order to make up for the illiquidity investors will experience because borrowers typically cannot repay investors on demand. We contend that banks are capable of handling the liquidity issues brought on by direct lending. Banks provide depositors with low-cost withdrawal options and act as a buffer between businesses and their investors' liquidity demands. We demonstrate that the bank's capital structure must be precarious. (Alzorqan,S,T 2014).

A bank's decision to fund illiquid loans with volatile demand deposits is justified in light of the duties it fulfills and is far from being an anomaly to be regulated away. Investigating significant issues such as restricted banking and bank capital requirements can be done using this model. Commercial banks only act expeditiously in the course of their business when they attract and accumulate liabilities, as well as when they issue loans and credits, and this very activity encourages the redistribution of cash flows in the business environment. Indicators of a bank's liquidity are typically linked to its financial stability, but in this article we will focus on a commercial bank's liquidity to carry out its duties as a cash flow regulator. Methods for influencing cash flows in a business environment are known as liquidity management techniques, activities for commercial banks' liquidity management affect cash flows. Margasova, V. et.al (2019)

An essential aspect of asset liability management is liquidity management, which is also a key banking task. Most of a bank's business is reliant on its capacity to give its clients access to liquidity. Most financial agreements or transactions affect a bank's liquidity. On a systemic and market level, as well as specifically for banks, banks are particularly susceptible to liquidity issues. The origin of the deposits (the person who is responsible for funding) increases the fluctuation of financial markets because certain creditors are more susceptible than others to credit and market events. A bank can avoid the vulnerability brought on by

concentrating its funding from one source by diversifying its funding sources and maturities. A funding strategy, a liquidity management system, a risk management (decision-making) framework, a set of guidelines, and a set of procedures should all be included in bank liquidity management policies (Alzorqan, 2014).

A bank's liquidity is its ability to fund asset growth and satisfy both anticipated and unexpected financial and security obligations at a fair price without suffering undesirable losses. Liquidity, or the capacity to pay for increases in assets and fulfill obligations as they become due, is essential to the continued viability of the banking institution. Given the close relationship between bank liquidity and solvency, prudent liquidity management lowers the likelihood that banks will become insolvent, thereby reducing the likelihood of bankruptcies and bank runs. A sound and stable banking sector is ultimately ensured by prudent liquidity management, which is a component of the banking institutions' overall risk management. A bank's ability to fulfill its obligations is ensured by effective liquidity risk management (Kumar & Yadav, 2013).

Therefore, effective cash management is crucial because it involves more than just ensuring survival or liquidity; it also entails making the best use of available cash resources. Therefore, a statement of cash flows must be prepared. Operating, investing, and financing activities are three categories under which an entity's cash flows can be categorized by IAS7. Its main function is to provide details about a company's cash inflows and outflows, complementing the income statement and statement of financial position as a financial report. The cash flow statement appropriately provides answers to queries such as "Where did the money come from?" and "What was it used for?" (Nangih et al., 2020).

Many banks experienced a liquidity crisis during the most recent financial crisis. To meet the high demand for urgent cash, some raised funds at a significant discount. Markets for liquidation were frozen. To account for market and liquidity risk exposures, many institutions, both financial and nonfinancial, were required to review their corporate governance guidelines. Equity prices, foreign exchange rates, commodity prices, interest rates, and credit spread had a negative effect on bank performance as returns on investment and net value of the companies dropped precipitously. Many assets lost value, and some banks

struggled to meet their obligations on time or only did so at exorbitant costs. This had an impact on the banks' capacity to boost the multiplicative economy, as indicated by the gradual decline in real Gross Domestic Multiplied. Because no area of the economy can prosper without sufficient funding, liquidity issues have always been of concern to all parties involved in the country's affairs (Edem, 2017). This article aims to study the impact of the bank's size on the relationship between liquidity and cash flows, by applying it to the Egyptian market, and the study relied on secondary data and obtained from financial statements and reports, using 11 banks listed on the stock exchange in the period from 2009-2019, and therefore this article will be divided as follows: Part One literature Studies, Part II: Research methodology, Part III, Part IV: Empirical study.

Literature reviews

Wagner (2007) investigated the connection between bank asset liquidity and banking stability. This study demonstrates how increased bank asset liquidity paradoxically increases banking instability and the side effects of bank failures. In spite of the fact that greater asset liquidity directly promotes stability by incentivizing banks to reduce risks on their balance sheets and by making it simpler to liquidate assets during crises, it also reduces costs for banks. To balance the positive direct effect on stability, banks are motivated to take on sufficient additional risk.

Kirkham (2012) compared cash flow ratios with conventional liquidity ratios. The indicators used in the analysis are (interest coverage ratio – current ratio (CR), quick ratio – cash flow ratio – critical needs cash flow ratio – cash interest coverage ratio), and the research sample was represented by 37 companies; 12 companies were deleted because it was not possible to obtain data to become the study sample, leaving 25 companies limited to the Australian telecommunications sector. The investigation's findings were:

- Analysis using conventional liquidity ratios is better than that using cash flow ratios if the financial liquidity situation is not taken into account.

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- There is a difference between standard liquidity ratios and cash flow ratios if traditional ratios only are used, which may lead to an improper decision for many companies.
 - The company can have liquidity despite the presence of cash flow problems.
 - The company can suffer from liquidity on, although there are sufficient cash flow resources.
 - The cash flow ratios chosen in the analysis are simple ratios that were used for comparison purposes.

Mazloom et al. (2013) pointed to the relationship between the different measures used to evaluate the company's performance, and therefore performance measures can be divided into two groups—financial and nonfinancial measures—which can be used together and, accordingly, the research variables are represented in (operating profit – net operating profit plus depreciations – net profit after tax ratio – net cash flow from operating, investing, and financing – stock returns – accruals). The study period is 9 years from 2003–2011, and the study community is all companies included in the Tehran Stock Exchange for the exchange of shares. The authors took a sample from companies with the following characteristics (companies were restricted to the trading market during the years of study, banks and investment companies were excluded, and the shares of companies were dealt with without a time interval). The researchers also used the following statistical methods: Pearson's correlation, Kolmogorov Smirnov, Durbon Wuston -run test, and multiple regression). The researchers concluded the following most important results:

- Companies can be divided into five different types to facilitate the study of the relationship between different metrics based on income statement, cash flow statement, and stock returns.
- Increased maturity items result in a strong correlation between performance measures obtained from the income statement and stock returns compared to performance measures obtained from the statement of cash flows and stock returns.

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- In companies with low financial receivables, the company's performance cannot be properly evaluated, whether the income statement or the cash flow statement is used.

In their study, Vodová (2013) excluded the Hungarian Development Bank and all sectors of the construction industry from the sample, which included banks in the Hungarian market. They used panel data regression analysis to investigate the factors that influenced liquidity in commercial banks between the years of 2001 and 2010. The study's variables were size, profitability, capital adequacy, return on equity (ROE), a dummy variable for the financial crisis, the gross domestic product (GDP) multiplied by inflation, the interest rate on loans, the interest rate of interbank transactions, the difference between the interest rates on loans, the monetary policy, and the unemployment rate. They reached the following results:

- The banks' profitability, interest rate on loans, capital adequacy, and liquidity are all positively correlated with each other.
- The "too big to fail" theory is fully supported by small and medium-sized banks, whereas large banks are dependent on the interbank market or the lender of last resort for liquidity support.
- Bank liquidity is negatively impacted by the rate of interest on interbank transactions.
- Bank liquidity, bank size, interest margin, and interest rate monetary policy all have a negative relationship with one another.
- There is no clear correlation between bank liquidity and GDP growth rate.
- Banks' incentives to hold liquidity in the form of interbank deposits are not primarily influenced by the level of the interest rate.
- As we have already mentioned, the profitability of many banks declined significantly during the financial crisis, whereas liquidity remained essentially unchanged or slightly decreased.
- Unemployment, the share of nonperforming loans, and the financial crisis have no statistically significant impact on the liquidity of Hungarian commercial banks.

Kumar and Yadav (2013), by applying the Basel Committee and Reserve Bank of India's recommendations for managing liquidity risks to the State of India, aimed to investigate the best practices for managing liquidity risk in banks.

Through the study's theoretical framework, which focused on the definitions of liquidity and liquidity risk management, they made the following conclusions to help develop a proper system for managing liquidity risks:

- A bank's liquidity management procedure must be adequate to meet its funding requirements and account for both anticipated and unanticipated deviations from routine business.
- For all significant business activities, a bank should take liquidity into account when setting internal pricing, performance metrics, and newly expanded approval procedures. Liquidity has costs, benefits, and risks.
- A bank should actively monitor and manage its intra-day liquidity positions and risks, taking into account the operational, legal, and regulatory constraints on the transferability of liquidity, as well as the funding needs within and across legal entities, business lines, and currencies.
- A bank should identify additional funding sources that will increase its ability to withstand a range of severe market- and bank-specific liquidity shocks.

Jabbari et al. (2013) aimed to investigate how well operating cash flow could identify and forecast the risk of stock price crashes as well as how operating cash flow affected the transparency of corporate earnings. Operating cash flow with opaque earnings – SIZE. The researchers used a survey-exploratory correlation design, and the library method was used to gather the data. Businesses admitted to the Tehran Stock Exchange from 2006–2010 made up the statistical population. The 71 companies in the study sample had to meet the following criteria: 1. Financial statements for the companies must be accessible for 5 years in a row, from 2006–2010. 2. The 20th of March should be the end of their fiscal year. 3. During the time of the research, the financial years of the cited companies should not change. 4. They had to be approved for the stock prior to 2006. 5. At least once every 3 months, their stock should be traded on the stock exchange. Further, the authors applied the following statistical techniques to determine the degree of correlation and the direction of the relationships between the variables: descriptive statistics, Spearman's correlation test, and regression modeling. The study's findings showed that:

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- Operating cash flow and stock price crash risk are significantly inversely related.
 - Earnings and operating cash flow have a strong inverse relationship. Financial managers and senior stock executives should consider this study when implementing financial reporting methodologies.
 - Managers should have used transparency and disclosure to raise prices and the stock value of their companies in a highly competitive market.
 - The reported earnings' opacities can be determined by cash flow and accruals in the absence of a transparent earnings report. As a result, a transparent earnings report based on the cash flow statement and financial reporting principles could demonstrate better company performance as well as help boost and improve stock value and price. opacity, meaning that the earning opacity is inversely correlated with operating cash flow.

Disatnik et.al (2014) studied the challenges that commercial banks may encounter when estimating liquidity, which ensures the fulfillment of obligations and ensures maximizing investments and profits and pointed to testing the relationship between liquidity risks in banks and performance, which encapsulates the study's problem. Applying to Jordanian commercial banks will accomplish this. The study population comprised 23 banks, two of which were chosen because they provide facilities in Jordan and are among the largest banks. According to the study model, the study variables were divided into independent variables and dependent variables. As a result, the dependent variable was performance, which could be explained through a set of indicators such as rate of return on investment (ROI) and rate of ROE, and the independent variable was liquidity, which could be explained through a set of indicators such as CR and loans to deposits rate. The author explained the relationship between the variables they used to arrive at the following results using a regression analysis model:

- In Jordanian banks, the loan–deposit ratio (LTD) has a statistically significant effect on the rate of ROE, and there is a direct correlation between LTD and ROI.
- In Jordanian banks, the LTD has a statistically significant effect on the rate of ROI, and there is a direct correlation between the two.

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- The CR has a statistically significant impact on the rate of ROE in Jordanian banks.
 - We discovered that cash flow hedging lessens the company's need for cash as a precaution and enables it to depend more on bank lines of credit. Furthermore, where previous evidence is conflicting, we found a significant positive impact of cash flow hedging on firm value.

According to Edem (2017)., a banking system's ability to survive, expand, sustain itself, and perform well is largely dependent on liquidity and bank performance. Planning and implementing liquidity correctly can prevent mistakes from impacting banking operations and the economy in the long run. Finding empirical proof of the effect of liquidity management on deposit money banks' performance was the main goal of this study. Between 1986 and 2011, the author surveyed the Nigerian deposit money banking sector, which consists of 24 banks. They used SPSS to gather and analyze secondary data. Descriptive, correlational, and inferential statistics were used in the study. The ROE of a bank serves as a measure of its profitability. Using multiple linear regression analysis, the author developed three hypotheses and statistically tested them at a 5% level of significance. The results of the empirical analysis demonstrate a significant correlation between deposit money banks' performance in Nigeria and their liquidity management. The correlation findings demonstrate a favorable relationship between ROE and the liquidity management indicators of liquidity and cash reserve ratios, whereas a negative relationship exists between these metrics and the LTD. The main findings, however, show that only the banks with the best liquidity were able to maximize returns. The research reveals that:

- The management of banks is hampered by illiquidity and excess liquidity, and it is advised that banks adopt the best model for managing their liquidity to operate efficiently and effectively.

In a study aimed at helping banks control liquidity, Margasova, V. et.al (2019) identified three fundamental indicators to measure liquidity, namely instant, current, and long-term liquidity ratio. They aimed to study liquidity in commercial banks and its impact on cash flows, and they obtained their data through the financial statements of commercial banks during the years 2017, 2018, and They obtained the following outcomes by using:

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- The primary consideration for developing the bank's financial strategy is to take into account potential changes in the settlement and current accounts, which prompts the bank to develop measures to maintain repayment periods.
 - The analysis of the bank's assets and liabilities as well as liquidity indicators revealed a decrease in the share of assets that enjoy high liquidity, indicating that the bank is not exposed to the risk of excess liquidity.
 - Because the activities of banks are characterized by constant change, the structure of assets and liabilities also changes over time. As a result, a strategy for controlling cash flows and examining liquidity indicators must be developed.
 - The development of new tools that forecast how to redistribute financial flows, whether at the level of each industry separately or at the level of the economy as a whole, is facilitated by the application of the comparative analysis approach to the structure of assets and liabilities and liquidity indicators.

Nangih et. al. (2020) stated that statements of cash flows, including corporate financial statements, are self-reports of management meant to be used as tools of accountability. Users of financial statements can assess an entity's capacity to produce and use cash and cash equivalents on the basis of information about the cash flows. In this study, the authors investigated the relationship between cash flow management and conducted empirical research on the financial performance of a select few oil and gas companies listed on the Nigerian Stock Exchange. The stakeholder's theory provided the framework for the project. The authors used the judgmental research design. They used five selected listed companies' annual reports for the 5-year period of 2013–2018 to collect the data, which they then analyzed using multiple regression and correlation techniques. The findings demonstrated that:

- The performance of the firm was positively and significantly impacted by cash flow from financing activities in the oil and gas sector, whereas profitability was negatively and insignificantly impacted by cash flow from operating and investing activities.

- It was suggested that businesses reassess their approaches to managing cash flow so they can operate more profitably and produce cash flows sufficiently large to cover their day-to-day cash requirements as they become due.

Elahi et.al (2021) showed the effects of operating cash flow on financial stability. All Pakistani banks that were in operation made up the population. Twenty commercial banks that had been listed on the Pakistan Stock Exchange for 9 years, from 2011– 2019, made up the panel data used for the study. From banks' annual reports, the researcher gathered information on independent and control variables. The secondary data used in this study. The author downloaded annual reports from bank websites and verified their data against these State Bank of Pakistan-issued annual reports. The researcher used Finbox to gather information on the dependent variable, free cash flow yield. Because information on banks is readily available on these sources and because officials are willing to share information, these sources were chosen. The author divided the study's variables into three groups: independent variables (cash flow ratio), dependent variables (and control variables), and third-type variables (asset quality, financial leverage, income diversification size, cash flow ratio, capital ratio, financial performance, advance net of provisions to total assets ratio, breakup value per share). To enumerate the key features of the data used in the study, they used descriptive analysis. One of the modeling methods used to analyze panel data was ordinary least squares. The author employed "a random constant term in regression analysis." Because they did not account for omitted variables, while they were estimating the effects of time-invariant variables, random effects models had the potential for biased estimates. To determine multicollinearity among independent variables, they used correlation analysis. The study's main findings can be summed up as follows:

- Net interest margin and operating cash flows had a significant and positive impact on the financial stability of banks.
- There is a strong and negative correlation between the financial stability of banks and the cost to income ratio and the advance net of provisions to total assets ratio.

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- Banks should reduce lending activities to increase their liquidity levels and become more cost effective to increase financial stability. In the future, it would be beneficial to compare conventional and Islamic banks as well as commercial and investment banks within the same research setting.

According to Emmanuel and Benson & Odey (2022), although scholars have emphasized the value of the cash flow position to the financial performance of banks and other corporate entities, they have rarely looked at how bank funds management has impacted liquidity. Due to the nature of banking institutions as financial intermediaries, the impact that cash flow can have on their liquidity is not minimized. These researchers set out to determine the impact of cash flow from operating activities on First Bank of Nigeria's liquidity positions based on this. They used time series data, covering the years 2009–2020. As a method of data analysis for secondary source data, they used simple regression. According to the explanation, the LTD served as a proximate for bank liquidity.

- In conclusion, First Bank of Nigeria's liquidity position is significantly impacted by its net cash flow from operating activities. The authors thus made the suggestion that the cash flow ratio be used to assess First Bank of Nigeria's liquidity position.
- First Bank of Nigeria's liquidity position has been significantly impacted by net cash flow from operating activities.

To investigate the impact of cash flow on predicting bank failure, Adeyemi et al. (2022) used a correlational research design. The sample included all 12 deposit money banks that were traded on the Nigerian stock exchange as of the end of 2020. Due to the availability of sufficient financial reports, the researchers chose a sample size of 11 banks. They used secondary data from sampled deposit money banks' financial statements for the years 2011–2020. on research from the past. The dependent variable Z-Score measure was bank failure prediction. The authors used three categories of net cash flow—net cash flow from investing activities, net cash flow from operating activities, and net cash flow from financing activities—to collect the independent variable known as cash flow. They also used leverage, liquidity, and profitability as control variables and conducted statistical analysis, correlation matrix, and Hausman tests. According to the study's findings,

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- Operating activities such as cash flow have a negative impact on the likelihood of predicting bank distress, whereas net cash flows from financing and investing activities have a positive and significant influence on bank failure predictions. Additionally, the authors noted that the net cash flows from investing and financing activities are important cash flow factors that forecast the possibility of bank failure, and the cash flow model is a reliable predictor of bank failure in the Nigerian banking sector.
 - The researchers advised the management of Nigeria's deposit money banks to keep track of their cash flows and maintain or boost their current net cash flow from financial and investment activities, because these cash flow elements are crucial to their survival.

Research methodology

Data and Sample: To analyze the study variables, we used secondary data, which are liquidity ratio, operating cash flow, investing cash flow, financing cash flow, size, net margin, loans and receivables, and earning assets, as obtained from the financial statements and reports, and we relied the time series to obtain the results of the study in the period 2009–2019, which is the period for which the data were available. The research sample comprised 11 banks listed on the stock exchange.

Model Specification: We used ARDL regression model to study economic phenomena that are subject to dynamic movement. Because this is a model that takes the current and previous time situation into account in different slow periods, the hypothesis of the study could be formulated as follows:

- H1: There is no statically significant relationship between liquidity and operating cash flow.
- H2: There is no statically significant relationship between liquidity and investing cash flow.
- H3: There is no statically significant relationship between liquidity and financing cash flow.
- H4: There is no statically significant relationship between liquidity*size and operating cash flow.
- H5: There is no statically significant relationship between liquidity*size and investing cash flow.

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H6: There is no statically significant relationship between liquidity*size and financing cash flow.

The equation of the ARDL can be formulated as follows:

$$NOFC = \alpha + \beta_0 LIQ + \beta_1 LIQ * LNSIZE + \beta_2 LNSIZE + \beta_3 NETMARGIN + \beta_4 LNLOAN_REC + \beta_5 LN_EASS + \beta_6 EV + Error_{i,t}$$

$$ICF = \alpha + \beta_0 LIQ + \beta_1 LIQ * LNSIZE + \beta_2 LNSIZE + \beta_3 NETMARGIN + \beta_4 LNLOAN_REC + \beta_5 LN_EASS + \beta_6 EV + Error_{i,t}$$

$$FCF = \alpha + \beta_0 LIQ + \beta_1 LIQ * LNSIZE + \beta_2 LNSIZE + \beta_3 NETMARGIN + \beta_4 LNLOAN_REC + \beta_5 LN_EASS + \beta_6 EV + Error_{i,t}$$

Table (1)

Independent variable	Abbreviations	measurement
1- Liquidity ratio	LIQ	Liquid Assets / total assets
Dependent variable	Abbreviations	measurement
1- Operating cash flow	OFC	Operating cash flow/total assets
2- Investing cash flow	ICF	Investing cash flow/total assets
3- Financing cash flow	FCF	Financing cash flow/total assets
Moderated variable		
1- Bank Size		Log of total assets
Control variable		
1- Net margin		Net profit / sales
2- Loans and receivables	LNLOAN_REC	Loans+ receivables/total assets
3- Earning assets	LN_EASS	Av.g of earning/av.g of total assets
4- Enterprise value	EV	Number of stocks *price stocks

Empirical study:

Table (2) Descriptive statistics

Variable	NOCF	ICF	FCF	LIQ	LNSIZE	NETMARGIN	LNLOAN_RE C	LN_EASS	EV
Mean	248885.1	-147411.2	-35971.98	1.590495	17.24497	35.30737	16.06693	17.13737	-4110764.
Median	225740.9	-111325.8	-26431.09	1.445320	17.22681	35.24250	15.95276	17.13653	-3639889.
Maximum	1129609.	361681.8	94228.11	2.463437	19.72488	74.86000	18.81429	19.69167	10623072
Minimum	-622701.9	-643243.3	-161818.9	0.398591	14.68503	-2.750000	13.34666	14.46352	-17339416
Std. Dev.	411576.2	208221.4	53523.87	0.479410	1.026110	15.60144	1.199759	1.074110	5388292.
Skewness	0.162367	-0.379741	-0.207940	-0.075417	0.011419	-0.232859	0.004086	0.007199	-0.335940
Kurtosis	2.472773	2.934854	2.737999	2.395709	2.902344	2.960304	2.894587	2.822411	2.879771
Jarque-Bera	1.933078	2.929497	1.218073	1.955756	0.050710	1.101452	0.056359	0.160048	2.348807
Probability	0.380397	0.231136	0.543875	0.376108	0.974964	0.576531	0.972214	0.923094	0.309003
Observations	121	121	121	121	121	121	121	121	121

From the previous statistical analysis table (2), we can see that the arithmetic mean of operating cash flows is 248,885.1, the arithmetic mean of investment cash flows is -147,411.2, the arithmetic mean of financing cash flows is 35,971.98, the arithmetic mean of liquidity is 1.590495, and the arithmetic average of size is 17.24497. The standard deviation of operating cash flow is 411,576.2, and the standard deviation of investing cash flow is. Operating cash flows must be at least -622,701.9, investment cash flows must be at least -643,243.3, financing cash flows must be at least 0.398591, and liquidity must be at least 14.68503. There are 1,129,609 total operating cash flows, in addition to 361,681.8 for investment cash flows, 94,228.11 for financing cash flows, and 2.463437 for liquidity. The Jarque-Bera test can be utilized to determine it. At a significance level greater than 0.05, every variable represented in NOCF, ICF, FCF, LIQ, and LNSIZE is normally distributed.

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Table (3) Group unit root test for NOCF, ICF, FCF, LIQ, LNSIZE, NETMARGIN, LNLOAN_REC, LN_EASS, EV

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.85620	0.0000	9	1065
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-8.85558	0.0000	9	1065
ADF - Fisher Chi-square	122.130	0.0000	9	1065
PP - Fisher Chi-square	133.079	0.0000	9	1080

In accordance with the constant level, Table 3 demonstrates that the time series for the NOCF, ICF, FCF, LIQ, and LNSIZE are stationary at level 1 (0) and satisfy the following requirements: LLC, PP, IPSW, and ADF at a significance level less than 0.05.

Table (4) Cointegrating equation deterministic for NOCF ICF FCF LIQ LNSIZE NETMARGIN LNLOAN_REC LN_EASS EV

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
NOCF	-8.750271	0.0000	-105.1898	0.0000
ICF	-7.712289	0.0001	-69.81671	0.0011
FCF	-6.509193	0.0058	-55.13712	0.0234
LIQ	-2.970518	0.9622	-16.05902	0.9741
LNSIZE	-5.005170	0.1947	-38.75326	0.2657
NETMARGIN	-6.931426	0.0016	-74.68206	0.0003
LNLOAN_REC	-6.478940	0.0063	-65.19234	0.0031
LN_EASS	-5.985221	0.0243	-53.16712	0.0332
EV	-6.181773	0.0145	-58.99938	0.0113

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Table 4 demonstrates that from 2009–2019, there were no long-term equilibrium relationships between the dependent and independent variables based on the z-statistic and Tau-statistic at a significant level greater than 0.05.

1. There are significant positive linear relationships between the independent variable (LIQ) and the dependent variables (FCF, NOF, ICF) at a significance level less than 0.01. This implies that the cash flow increases as liquidity increases regardless of FCF, NOF, and ICF.

2. At a significance level less than 0.01, size and LIQ exhibit a strong negative linear relationship that must be less than 0.01 for the independent variables (FCF, NOF, and ICF) to be significant. Accordingly, the size decreases as liquidity increases, and increases as liquidity decreases.

From Table 5, the following results can be concluded:

Correlation Probability	FCF	LIQ	LNSIZE	NETMARGIN	LNLOAN_RE	LN_EASS	EV
FCF	1.000000						
NOCF	1.000000						
ICF	1.000000						
LIQ	0.509690	1.000000					
LNSIZE	-0.511205	0.131177	1.000000				
NETMARGIN	-0.463047	-0.231063	0.472930	1.000000			
LNLOAN_REC	-0.401557	0.104161	0.826370	0.450251	1.000000		
LN_EASS	-0.508113	0.167486	0.974422	0.425491	0.871318	1.000000	
EV	0.179157	-0.121643	-0.301351	0.016109	-0.184728	-0.336489	1.000000

1. There are significant positive linear relationships between the independent variable (LIQ) and the dependent variable (FCF, NOF, ICF) at a significant level less than (0.01). This implies that the cash flow increases as liquidity increases. Regardless of (FCF, NOF, ICF).
2. At a significant level less than (0.01), Size and (LIQ) exhibit a strong negative linear relationship. less than (0.01) for the independent variable (FCF, NOF, and ICF) to be significant. Accordingly, the size decreases as liquidity increases, and increases as liquidity decreases.

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Table (5) Dynamic regressors (4 lags, automatic): LIQ LNSIZE
LIQ*LNSIZE NETMARGIN LNLOAN_REC LN_EASS EV

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	VIF
NOCF (-1)	0.251128	0.146191	1.717803	0.0887	5.613124
NOCF (-2)	0.314352	0.136310	2.306148	0.0230	6.379362
LIQ	714407.9	302219	2.363874	0.0198	8.8768
LIQ (-1)	-265719.0	125598.1	-2.115629	0.0367	.258657
LNSIZE	-304625.2	123949.2	-2.457662	0.0161	9.8527
LIQ*LNSIZE	55897.55	73791.50	0.757507	0.4504	8.6594
NETMARGIN	-1502.283	2364.882	-0.635246	0.5266	3.351732
LNLOAN_REC	-85493.44	82176.32	-1.040366	0.3005	3.74618
LN_EASS	295779.8	177272.5	1.668504	0.0981	8.96371
EV	-0.009899	0.009953	-0.994556	0.3222	4.788937
EV (-1)	0.024372	0.014138	1.723844	0.0876	7.963619
C	1801695.	2537302.	0.710083	0.4792	NA

$R^2=37\%$ F-test= 5.696 sig=0.000*** AIC =28.43 SC= 28.71
HQC= 28.55 RMSE= 3268 U= 0.39 DW=1.93 JB= 7.64 sig=
0.02 BGSC0.= 0.50 sig= 0.61 Heteroskedasticity Test:ARCH =
1.88 sig= 0.05 Ramsey RESET=1.26 sig= 0.26 ARDL Bounds
Test= 2.64 CVB 1%= 2.73

$D(\text{NOCF}) = -0.434519875526 * (\text{NOCF} (-1)) - (-2255654.92480429 * \text{LIQ} (-1)) -$
 $701061.50530644 * \text{LNSIZE} + 128642.10338276 * \text{LIQ} * \text{LNSIZE} -$
 $3457.34055218 * \text{NETMARGIN} - 196753.80607090 * \text{LNLOAN_REC} +$
 $680704.99335480 * \text{LN_EASS} + 0.03330915 * \text{EV} (-1) + 4146404.11898678))$

From table (5) the following results can be concluded:

- The ARDL (2, 0, 0, 4) model was accepted for the R2 parameter, and the independent variable (liquidity) explains 37% of the total variation of the dependent variable (NOCF (-2)).
- F test: The value of the F test is 5.696 at a significance level at less than 0.001, and we infer that this indicates that the independent variable

(liquidity), which was included in the model, has an impact on the magnitude of operating cash flows.

- To verify a hypothesis, T-test is used, and the results show that there is a statistically significant relationship between liquidity and operating cash flows during the second slowdown period at a significant level of less than 0.05, a statistically significant relationship between size and operating cash flows, and a nonsignificant relationship between the liquidity multiplied by size and operating cash flows. This means that when the size is introduced, the relationship between liquidity and operating cash flows does not change. Additionally, we observe a negligible correlation between operating results and the regulatory variables represented in net margin-loans and receivables-earning assets.
- The variance inflation factors are helpful indicators of multicollinearity. As the preceding table shows, the model does not have a multicollinearity issue because the VIP value is less than 10.
- Jarque-Bera test: Because the test statistic's significance level is less than 0.05, residuals are not normally distributed, which would contradict the null hypothesis (H₀). The data are not significantly skewed, however, because the Pearson skewness coefficient (28.71) is greater than -1.
- We evaluated the accuracy of the ARDL estimates using U Theil's inequality (2, 0, 0, 4). It is situated between 0 and 1, where 0 denotes a perfect fit. Because a value decreases until it reaches zero (0.39), the model's goodness of fit is at least 99.61% accurate.
- Because between the calculated ARDL bounds F-statistic (5.55) test value is higher than the tabulated value at a significant level (1%) (2.73), the null hypothesis that there really are no long-term relationship variables of ARDL (2, 0, 2) model is rejected. The alternative hypothesis, however, that there are long-term relationships between independent variables and financial cash flow is accepted.
- Test results for the Durbin-Watson statistic (DWS) are 1.93. Given that the value of DWS ranges from 0.4–1, this suggests that there is no autocorrelation.

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- Because the BGSC test statistic's significance value is less than 0.05 and greater than 0.61, we would not rule out the null hypothesis (H0) that there is no serial correlation among regression model errors.
- Heteroskedasticity test results: According to ARCH, the test's F-statistic, Obs * R-squared, and 0.05 each have a level of significance that indicates that the null hypothesis, which accounts for the homoscedasticity of the error term, is rejected.

Table (6) Dynamic regressors (4 lags, automatic): LIQ LNSIZE
LIQ*LNSIZE NETMARGIN LNLOAN_REC LN_EASS EV

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	VIF
ICF (-1)	0.445926	0.089549	4.979673	0.0000	2.429710
LIQ	462523.8	141838.7	3.260914	0.0003	5.2258
LIQ (-1)	186888.9	76666.68	2.437681	0.0164	11.66784
LNSIZE	-6160.339	93264.59	-0.066052	0.9475	7.74654
LIQ*LNSIZE	16887.64	32078.39	0.526449	0.5996	6.7879
NETMARGIN	2234.453	1259.540	1.774022	0.0788	2.614279
LNLOAN_REC	2102.967	19672.89	0.106897	0.9151	8.818322
LN_EASS	-81742.79	46780.14	-1.747382	0.0834	3.03791
EV	-0.010682	0.002776	-3.848128	0.0002	3.243593
C	1242809.	1224831.	1.014678	0.3125	NA

R²= 40.8% F-test=8.42 sig= 0.00*** AIC =26.97 SC=27.20 HQC= 27.06
RMSE= 159885U= 0.35 DW= 1.99 JB= 3.95 sig=0.14 BGSC= 0.009 sig=
0.99 Heteroskedasticity Test:ARCH =1.16 sig= 0.28 Ramsey RESET=0.18
sig= 0.67 ARDL Bounds Test= 5.55 CVB 1%=(2.73)

ICF = 0.445925577278*ICF (-1) - 462523.784433*LIQ + 186888.892261*LIQ
(-1) - 6160.33924184*LNSIZE + 16887.6412467*LIQ*LNSIZE +
2234.45250738*NETMARGIN + 2102.96705471*LNLOAN_REC -
81742.7862604*LN_EASS - 0.0106818021431*EV + 1242809.10471

From Table 6, the following results are concluded:

- The dependent variable's total variation (NOCF) is explained by the independent variable (liquidity), which was included in the ARDL (2, 0, 0, 4) model, by 41%, and the remaining 31% is attributable to random error in the regression model or other independent variables that were not included in the regression model.
- F test: We conclude that because the F test value is 8.42 at a significance level below 0.001, the independent variable (liquidity) that was included in the model has an impact on the volume of investment cash flows.
- T-Test was used to test the following hypotheses and produced the following findings: Before the first slowdown period and during the first period, there is a statistically significant correlation between liquidity and investment cash flows. However, there is a statistically nonsignificant correlation between size and investment cash flows, as well as between the liquidity multiplied by size and investment cash flows. There is a statistically significant nonsignificant relationship between the control variables (net margin, loans and receivables, and earning assets) and investment cash flows, indicating that size has no impact on the relationship between liquidity and investment cash flows.
- The model does not suffer from the multicollinearity problem, with the exception of the variable of liquidity, because the variance inflation factors are used to detect the intensity of linearity where the linear relationship leads to amplification of variance and error of the second type. In the initial slowdown phase
- Jarque-Bera test: Given that the test statistic's significance level was 0.05, the residuals' normal distribution would be accepted as the null hypothesis. The data are not significantly skewed, however, because the Pearson skewness coefficient (27.20) is greater than or equal to (-1).
- The accuracy of the ARDL estimates was evaluated using U Theil's inequality (2, 0, 0, 4). It is situated between 0 and 1, where 0 denotes a perfect fit. Because a value decreases until it reaches zero (0.35), the model's goodness of fit is at least 99.65%.
- Because the calculated value of the ARDL bounds F-statistic (4.95) test is greater than the tabulated value at a significant level (1%) (2.54), the alternative

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hypothesis that there are long-term relationships between both the independent variables and financial cash flow is accepted. The null hypothesis, that there are no long-term relationships the variables of the ARDL (2, 0, 2) model, is rejected.

- The test statistic for the Durbin-Watson test is 1.99. Given that the value of DWS ranges from 0.4–1, this suggests that there is no autocorrelation.
- Given that the BGSC test statistic has a significance value of 0.05 and 0.99, we would not rule out the null hypothesis (H0) that there is no serial correlation among the errors in a regression model.
- Heteroskedasticity test results: According to ARCH, the test’s F-statistic, Obs * R-squared, and 0.05 each have a level of significance that indicates that the null hypothesis, which accounts for the homoscedasticity of the error term, is rejected.

Table (7) Dynamic regressors (4 lags, automatic): LIQ LNSIZE
LIQ*LNSIZE NETMARGIN LNLOAN_REC LN_EASS EV

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	VIF
FCF(-1)	0.541889	0.081453	6.652735	0.0000	1.804078
LIQ	60315.72	29183.33	2.066786	0.0343	5.8410
LNSIZE	35073.56	17782.21	1.972396	0.0513	6.74199
LIQ*LNSIZE	-3046.177	1299.900	-2.343393	0.0189	7.13922
NETMARGIN	157.3271	363.2019	0.433167	0.6658	3.498840
NETMARGIN (-1)	-723.9566	404.3320	-1.790500	0.0764	4.234010
NETMARGIN (-2)	643.4824	410.6831	1.566859	0.1203	4.392084
NETMARGIN (-3)	382.1523	394.2765	0.969249	0.3348	4.048554
NETMARGIN (-4)	-829.7521	339.9777	-2.440608	0.0164	3.007137
LNLOAN_REC	3253.750	6333.304	0.513752	0.6086	6.424756
LN_EASS	-45324.31	18609.39	-2.435561	0.0166	4.93653
LN_EASS (-1)	23021.32	8816.328	2.611215	0.0104	9.352152
LN_EASS (-2)	-16598.27	6420.195	-2.585323	0.0112	5.255378
EV	-0.000531	0.000970	-0.547763	0.5851	2.865353
EV (-1)	0.000593	0.001183	0.501592	0.6171	4.363364
EV (-2)	2.96E-05	0.001198	0.024696	0.9803	4.366344
EV (-3)	0.001893	0.001081	1.751257	0.0830	3.548852

$R^2=62.2\%$ F-test= 10.15 sig=0.001*** AIC =-2.95 SC=24.21
HQC=23.96 RMSE=30913 U=0.26 DW= 1.9347 JB= 12.18
sig= 0.00 BGSC0.=104275 sig= 0.9011 Heteroskedasticity
Test:ARCH =1.614572 sig= 0.0745 Ramsey RESET=3.01
sig= 0.0857 ARDL Bounds Test= 4.95 CVB 1%=(2.54)

Cointegrating Equation:

$D(\text{FCF}) = -0.458111494053*(\text{FCF} (-1) - (131661.67017023*\text{LIQ} + 76561.18325522*\text{LNSIZE} - 6649.42298967*\text{LIQ}*\text{LNSIZE} - 809.29420672*\text{NETMARGIN} (-1) + 7102.52829581*\text{LNLOAN_REC} - 84916.58232498*\text{LN_EASS} (-1) + 0.00433198*\text{EV}(-1)))$

From Table 7, the following conclusions can be reached:

- The coefficient of determination: R^2 (Liquidity, one of the independent variables in the ARDL (2, 0, 0, 4) model, explains 62% of the total variation of the dependent variable (NOCF), with the remaining 35% being explained by random error in the regression model or other independent variables that were not included in the regression model.
- The value of the F test is 5.696 at a significance level less than 0.001, which leads us to the conclusion that the independent variables related to liquidity were included in the model and had an effect on the level of FCF.
- The most significant independent variables accepted in the model are at a significance level less than 0.05, and the t-test is used to test the validity of the hypothesis. During the first slowdown period, there is a statistically significant correlation between liquidity and financial cash flows, as well as a correlation between size and financial cash flows. During the first slowdown period, there is a negative significant relationship between the liquidity multiplied by size and the financial cash flows, indicating that size affects this relationship.
- The severity of the multicollinearity increases with larger variance inflation factors. According to some authors, multicollinearity is a problem if any variance inflation factors are greater than 10, so the model is not suffering from this issue.
- In accordance with the Jarque-Bera Test, the null hypothesis (H_0) would be rejected because the test statistic's significance level was less than 0.05;

however, because the Pearson skewness coefficient (24.21) is greater than or equal to -1, and the residuals are normally distributed, it can be said that the data are not significantly skewed.

- The accuracy of the ARDL estimates was evaluated using U Theil's inequality (2, 0, 0, 4). It is situated between 0 and 1, where 0 denotes a perfect fit. Because a value decreases until it reaches zero (0.26), the model's goodness of fit is at least 99.74% accurate.
- Because the calculated value of the ARDL bounds F-statistic (4.95) test is greater than the tabulated value at a significant level (1%) (2.54), the null hypothesis that there are no long-term relationships between the variables of the ARDL (2, 0, 2) model is rejected.
- Test results for the DWS are 1.93. Given that the value of DWS ranges from 0.4–1, this suggests that there is no autocorrelation.
- Because the BGSC test statistic's significance value is 0.05 and 0.9011, we would not rule out the null hypothesis (H0) that there is no serial correlation among the errors in a regression model.
- According to the heteroskedasticity test: ARCH, the null hypothesis, which allows for homoskedasticity of the error term, was accepted because the level of significance for the tests, F-statistic and Obs * R-squared, is greater than 0.05 and 0.07.
- If the significance value of the t-statistic, F-statistic, and likelihood ratio test statistic is less than 0.05 or equal to 0.0857, we would not reject the null hypothesis (H0): No variables were omitted from the functional form, and additional terms are not statistically significant.

Conclusion

The goal of this article was to examine liquidity through the calculation of long-term liquidity ratios for Egyptian banks that are listed on the stock exchange because they play a significant role in controlling cash flows. We also considered how size affects this relationship because liquidity management can influence the occurrence of changes. Understanding of operational, investment, and financial cash flow is one of the three types of cash flows.

A lack of liquidity is related to the institution's inability to meet its financial obligations. This may result in forced asset sales and, in the worst cases, the financial institution's bankruptcy. Financial managers have thus realized the significance of company liquidity ratios, such as current ratios and net working capital, in determining the appropriate level of cash capital for satisfying

obligations. According to pertinent literature, it is evident that more research needs to be done on cash flow from operating, investing, and financing perspectives. This represents a research gap for this study. and are insufficient because they focused on the banking industry's financial performance. These researcher s did not focus on liquidity banks at all. Neither from the review literature. The regression analysis demonstrates that the most significant independent variables were accepted in the model at a significance level less than 0.05 for testing the hypothesis using the t-test.

- Operating cash flows during the second slowdown period, investment cash flows prior to and during the first slowdown period, and financial cash flows during the first slowdown period all have a statistically significant relationship with liquidity.

-Size and (operating cash flows – financial cash flows) have a statistically significant relationship.

-Size and investment cash flows have a statistically significant but not significant relationship.

-The relationship between the size times the liquidity and investment cash flows is statistically non-significant.

As for the limits of the study, the study was limited to banks listed on the stock exchange, in the period from 2012 to 2019, which is the period in which data were available and to avoid the Corona phenomenon, and was limited to using size as an intermediate variable For future studies, the research sample can be divided into large and small banks in measuring the impact of liquidity on cash flows, and Covid-19 can be taken as an intermediate variable, Economic factors such as (inflation - GDP - currency exchange - interest rate - exchange rate) can also be used as control variables. that affects the relationship between liquidity and cash flows.

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تأثير حجم البنك على العلاقة بين التدفق النقدي والسيولة: أدلة من البنوك المصرية المدرجة

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الملخص:

هناك ندرة في الدراسات السابقة حول تأثير السيولة والحجم على التدفقات النقدية. ولكي يتم التعبير عن ذلك نتناول في هذه الورقة العلاقة بين السيولة و التدفقات النقدية بمختلف انواعها سواء كانت تدفقات نقدية تشغيلية او تدفقات نقدية استثمارية او تدفقات نقدية مالية مع الأخذ في الاعتبار تأثير الحجم وذلك باستخدام ١١ بنك مصري مقيددين في سوق الأوراق المالية في الفترة ٢٠٠٩-٢٠١٩، ويمكن تقسيم متغيرات الدراسة الى المتغيرات المستقلة والتي تتمثل في السيولة، والمتغيرات التابعة والتي تتمثل في (التدفقات النقدية التشغيلية - التدفقات النقدية الاستثمارية- التدفقات النقدية المالية)، كما تم استخدام متغيرات محفزة مثل الحجم، والمتغيرات الرقابية والمتمثلة في (هامش الربح- القروض وحسابات القبض، عوائد الأصول - قيمة المشروع) وبالنسبة لتحليل البيانات تم الاعتماد على التحليل الوصفي- اختبار مجموعة جذر الوحدة-نموذج معادلة التكامل المشترك- نموذج الانحدار الذاتي لفترات الإبطاء الموزعة وذلك لاختبار فروض الدراسة، كما تم الاعتماد على البيانات الثانوية وتم الحصول عليها من القوائم والتقارير المالية. وتوصلت الدراسة إلى النتائج التالية: هناك علاقة معنوية موجبة أو سالبة بين السيولة والتدفقات النقدية التشغيلية خلال فترة الإبطاء الثانية - والتدفقات النقدية الاستثمارية خلال فترة الإبطاء الاولى - التدفقات النقدية المالية خلال فترة الإبطاء الاولى)، كما لاحظنا أنه أثناء فترة الإبطاء المبدئية هناك علاقة معنوية سلبية بين التدفقات النقدية المالية وبين السيولة مضروبة في الحجم، وهذا يعنى أن الحجم يؤثر على العلاقة بين السيولة والتدفقات النقدية المالية .

الكلمات المفتاحية: السيولة - الحجم - التدفقات النقدية التشغيلية- التدفقات النقدية الاستثمارية- التدفقات النقدية المالية)