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The Role of Liquidity in Enhancing Profitability: An Empirical Study on the Egyptian Banking Sector for the Period 2008 to 2018

Sanaa Awad, Ashraf Saleh and Rasha Al-Moslemany
Arab Academy for Science, Technology and Maritime Transport

Abstract

The current research aims to investigate the relationship between liquidity and profitability of public sector banks in the Egyptian context and maintain the balance between the liquidity structure and the required profitability levels. To achieve this aim, literature had been reviewed and hence the research hypotheses were developed. The liquidity indicators identified from previous studies were Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio. On the other hand, the profitability indicators considered according to previous studies were ROA, ROE, and ROD. Therefore, the deductive approach had been followed in which, the research hypotheses are developed and examined using statistical techniques. The research attempts to examine three main hypotheses, which are related to the relationship between Liquidity indicators and each of the profitability indicators; ROA, ROE, and ROD. Secondary data was used to examine the research hypotheses. Data was collected from the official websites of the central bank of Egypt as well as the public banking sector, which are National Bank of Egypt, Banque Misr and Banque du Caire for the period 2008 to 2018. Data was then analyzed using SPSS and the research results and findings are concluded. It was found that there is an insignificant relation between all liquidity indicators and ROA (H1 is not supported). However, it was observed that there is a significant relationship between the liquidity indicators; Net credit facilities/total assets and Capital ratio and ROE, while there is an insignificant relationship between the liquidity indicators; Investment ratio, Liquid ratio and Quick ratio and ROE (H2 is partially supported). Moreover, it was noticed that there is a significant relationship between the liquidity indicators; Net credit facilities/total assets and Liquid ratio and ROD, while there is an insignificant relationship between the liquidity indicators; Investment ratio, Capital ratio and Quick ratio and ROD. This research contributes to research by understanding how liquidity indicators can enhance profitability through ROA, ROE and ROD, so that banks managers can manipulate liquidity indicators in order to enhance the bank's profitability.

Keywords: Liquidity, profitability, liquidity Indicators, Return on Assets, Return on Equity, Return on Deposits.

Introduction

Banks have an important role in economy all over the world; this leads project management to study the liquidity and the profitability assessment of the financial state of banks (Niresh, 2012). Egypt is considered as one of the developing countries that faces economic growth problems, so the government focuses on development of economy and one of the factors that can help in achieving this aim is to increase the profitability of the banks.

Besides the main objective of this paper is to examine the relationship between liquidity indicators and profitability of public sector banks in the Egyptian context, also identify the significant indicators of liquidity with respect to profitability. To reach recommendations to achieve the desired balance between liquidity and profitability of public sector banks in the Egyptian context.

This paper is divided into five sections, which are Section 1 provides the introduction and include background information of liquidity and profitability of public sector banks. Section 2 investigates the literature review, which discuss the liquidity, profitability and the relation between them. Section 3 represents the research methodology, which represent discusses the research strategy (quantitative research based) and data collection techniques (the secondary data from governmental and public banks in Egypt) to be adopted in the empirical collection of data for this study. Section 4 includes the analysis of the secondary data and the finding of this analysis. Section 5 discusses the recommendation of this research.

Literature Review

This section discusses the previous studies related to the liquidity management, liquidity as a factor of profitability, profitability management and the relation between liquidity and profitability.

Many theories have discussed liquidity management, Shiftability theory that is created by (Moulton, 1918). This theory saw that shiftability, marketability or transferability of a bank's deposits and assets is a reason for guaranteeing liquidity, by that the bank can increase its liquidity if the bank owned assets for sell, and gave the central bank and the discount market assets to buy (Ibe, 2013). In addition, the financial framework of the banking system under the shiftability try to keep away from liquidity crises by empowering banks to consistently sell at great costs and prices (Alshatti, 2015). In addition, liquidity hypothesis assumed that all bank should have these assets, which can be moved to the central bank (Gweyi et al., 2016).

Anticipated Income Theory, which is created between 1940 and 1950, assumed that the liquidity of the bank depend on booked credit installments and scheduled loan payments that depend on the borrower's future income at a certain point of time (Adegboye et al., 2013). Liquidity of the bank depend on the ability of the bank management to gather these loans and reduce the probability of delay of repayment, and by that the bank can give medium and long run loans (Alshatti, 2015).

Liquidity Management Theory saw that there is no reason for banks to store liquidity on the benefit side of the balance report (Ibe, 2013). According to Agwu (2018), banks can get save cash and reserve money from the money market as a short-term debt at any time the bank suffer from insufficiency and experiences reserve deficiency.

Commercial Loan Theory saw that liquidity of the bank came from self-liquidation of the loan for a short time, so this theory preferred the short term loans as they would be reimbursed with income that come from the business exchange financed by the loans (Maaka, 2013).

Liquidity management in small firms can be defined as the way firm managers' use to plan and control the cash flow in order to meet day-to-day commitments. However, the small firms differ from the large ones in two aspects, which are the way of management and the limited resource of finance and management in small firms (Ekanem, 2010). Liquidity of banks can be defined as the ability of the bank to control the maturing loan and liabilities and the ability to withdraw the deposits, In developing countries the banks aimed to control liquidity through captivating in financial liabilities that can be drained on demand, liquidity can also gained from short-term yield and securities (Akhtar et al., 2011).

Liquidity management also helps in financial management decisions; moreover, the banks that have high liquidity may face low risk and low profitability (Bhunia et al., 2011). Liquidity management could face many problems, first, if the bank had low amount of reserves and receive large withdrawals of deposits this leads the bank to indebt from other banks or from the central bank. Second, the liquidity management problem into dynamic equilibrium model of industry dynamics, as the bank system have schedule of loans and deposits, by that the bank can determine the return on deposit, loans and price level. Finally, the problem that occurred because of the central bank that has impact on the demand of reserves and the open-market operations (OMO) as a tool that includes the exchange process between the liquid and non-liquid assets (Bianchi and Bigio, 2014).

Liquidity in commercial banks can be defined as the ability of the bank to back the entirety of its legally obligations and contractual binding commitments that includes loaning, lending, investment, speculation and withdrawal of deposits and due date of liabilities when their due date come (Alshatti, 2015). The researcher also saw that Investment Ratio, Net credit facilities / Total assets, Capital Ratio, Liquid Ratio, and Quick Ratio, could measure liquidity.

About profitability, profit refers to the difference between the revenue generated and the full opportunity cost including the costs. Moreover, the profitability is the way that banks use to strength their position and face any problem in market (Ibe, 2013). Profitability could be defined as the effort that the bank do in order to increase its revenue to exceed the financial cost, and also help in facing any problem to keep the system stable. Bank profitability could be internal profit or external profit, the internal profit are the bank specific determinants that could classified into the

financial statement variables that included bank profitability as expense management, loan composition and bank credit, composition of bank deposits, market interest rates, bank earning and operating efficiency, changes in capital and liquidity management. In addition, non-financial statement variables include number of bank branches, bank size and bank location (Lartey et al., 2013).

The external profit represented in economic and legal environment which includes market structure, regulation, inflation, interest rates, market growth, and the general conditions of the economic, such as economic booms or recessions (Onuonga, 2014). Also External determinants are the variables that do not have relation with the management although it affect the financial performance of the bank, and they include the financial regulation, competitive condition, concentration, market share, market growth and ownership (Lartey et al., 2013).

Profitability could be measured by Return on assets (ROA) which estimated by dividing net income (profit) after tax on total assets, Return on Equity (ROE) which estimated by dividing net income (profit) after tax on the owed capital, and Return on deposits (ROD) which estimated by the percentage of dividing the net income on total deposits (Alshatti, 2015).

Many researches have studied the relation between liquidity and profitability, the relation between liquidity and profitability was tried to be proven. To reach the aim of this study a secondary data was collected from 55 banks in United States of America and 10 banks in Canada during 1997 until 2009. The collected data included measurement of liquidity and profitability through this period, and the results showed that there is a significant relation between liquidity and profitability so profitability should be improved to balance liquidity (Bordeleau and Graham, 2010).

In addition, the impact of liquidity management on commercial banks in Nigeria and the relation between liquidity and profitability was examined. To achieve the aim of this study a primary and secondary data were collected, the primary data was collected by a questionnaire from the commercial banks in Nigeria. The results of this study proved a positive relation between liquidity and profitability, and proved that the improvement in liquidity and profitability refers to effective performance of the commercial banks. Also showed that liquidity position is important for the bank as the depositor measure the ability of the bank to apply their withdrawals requirements and the time taken by the bank to respond their requirements. Finally, the researcher saw that increasing in profitability level is a fable because the produced liquidity would lead to technical and legal insolvency (Adebayo and Krettli, 2011).

Bank profitability is the main factor that can industries use as indicator of a financial crises, so profitability dimensions are very useful for banks to recognize the current conditions in the bank industry, also bank liquidity is one of the most important dimensions that affect the profitability. Therefore, in this study the researcher tried to examine the relation between liquidity and profitability by collecting data about income statement and balance sheet from commercial banks in Malaysia and China during 2001 until 2007. The results showed a negative relation

between liquidity and profitability, also liquidity have a negative relation with the rate of return, and the liquidity risk is resulted when the bank is not able to control the reduction in liabilities or the increases of funds in the balance sheet (Said and Tumin, 2011).

There are many factors that affect profitability of commercial banks in Kenya, one of which is the liquidity, which is considered as one of the internal factors of banks. This relationship was proved by (Olweny and Shipho, 2011) using data from financial statements of 38 Kenyan commercial banks from 2002 to 2008. The result showed that all the internal factors (including liquidity) have a positive effect on profitability. The banks should manage liquidity, diversify assets, and reduce operational cost to achieve good profitability levels. It was found that some dimensions have an impact on profitability, such as liquidity, credit risk, and capitalization, which have positive effects on the profitability of the commercial banks, and the overhead cost has a negative effect on profitability.

It was found that there are many factors that could add value to the profitability of the banks such as the liquidity. The liquidity is considered as an important factor, and the lack of liquidity may be a result of a systematic decrease of the bank profitability and performance, but when the bank is holding a high level of liquidity instead of some investments' cost, it will result in creating more returns. The existence of the trade-offs between return and liquidity risk are demonstrated by observing that a shift from short term securities to long term securities or loans raises a bank return but also increases its liquidity risks, so the higher liquidity ratio, the less risk, and the less profitability. Thus, there is a plight between liquidity and profitability and management have to face it (Olweny and Shipho, 2011).

The effect of liquid assets on profitability on Liberia was studied, to reach the aim of this study a survey was done among eight commercial banks in Liberia from 2006 until 2011, by analyzing data using the regression. The result showed that there is a positive relation between liquid assets and profitability, and if the current assets and liabilities are managed well, this leads to high profitability (Botoe, 2012).

The relation between liquidity and bank profitability in Islamic banks was investigated. To reach the aim of this study a sample of 25 Islamic banks from 12 countries were selected and data were collected from those banks from the period between 2006 and 2010, where the profitability is measured by the return on assets (ROA) and return on equity (ROE) and liquidity is measured by dividing the liquid assets to total assets. By analyzing data, the results showed that less in liquidity might lead to bank failure. On the other hand the bank, on the other hand the deposits such as saving, investment, the total expenses and liquid assets have an effect on the profit level of Islamic sector, so there is a positive relation between liquidity and bank profitability (Masood and Ashraf, 2012).

On the other hand, the impact of liquidity on the profitability of banks in Amman was measured during the period 2012 and 2014. Quick ratio and debt ratio were used to measure liquidity, while ROA and ROE were used to measure

profitability. The result showed that there is a negative relationship between liquidity and profitability (Dahiyat, 2016).

Liquidity and profitability were considered as the most important issues in the bank to evaluate the financial issues. Liquidity is considered as the loan deposit ratio, deposit assets ratio and cash deposit ratio, while the profitability includes return on assets (ROA). The impact of liquidity on the profitability was investigated in the commercial banks in Iraq during 2005 to 2013 and a positive relationship between liquidity ratios and return on assets was observed (Ibrahim, 2017).

The relationship between liquidity and profitability was measured where six private banks in Bangladesh were chosen during the period 2007-2012. The results found a strong positive relationship between total liquidity and profitability was noticed especially ROA and ROE (Mustafa and Datta, 2017). Moreover, the relationship between liquidity management and profitability is further investigated by (Khan and Mutahhar, 2016) who found that the relationship assigned (using secondary data from commercial banks in Pakistan during 2008 until 2014) was found to be positive significant. Moreover, the impact of liquidity on the profitability in bank sector located in Pakistan was investigated using secondary data collection method from financial statements from 2004 to 2013. By using current ratio, quick ratio and net working capital and the findings showed that there is a weak positive relation between liquidity and profitability; so, the banks need to focus more on liquidity to make a progress and achieve high profitability (Ahmed, 2016).

Liquidity was measured by current ratio, quick ratio, and cash ratio while the profitability was measured by return on assets and return on equity specified the dimensions for liquidity. In some banks in Ghana during the period 2010 to 2015, the quick ratio and current debt ratio have negative impact on profitability and cash ratio has positive impact on profitability. In addition, bank size, foreign ownership and age of bank have positive impact on banks profitability. In addition, customers' deposits have a negative impact on profitability (Musah, 2018). Accordingly, it was recommended to make a mixture between long term and short-term debts to achieve high profit. The relationship between liquidity and profitability was determined. Return on equity was used to represent profitability, which was found in the balance sheet. Depending on the survey conducted on four biggest Polish commercial banks during the period 2009-2016. It was claimed that when liquidity in central bank increases, the return on equity decrease, so there is a negative significant relationship between liquidity and ROE. While, this relationship was not proved when liquid assets are measured with total assets (Wójcik-Mazur, 2017).

On the other hand, the relation between return on assets and return on equity with total non-current loans and leases was examined. The data collected from annual reports of 10 selected banks for the period from 2007 to 2016. The result showed that there is a negative relationship ROA and ROE with total noncurrent loans and leases (Sivalingam and Kengatharan, 2018). The result proved by the above-mentioned studies was further studied and analyzed the most factor affected financial issues, which is the liquidity management and determined its role of effect on the

profitability. According to the financial global crisis happened in 2007 and 2008. There is some changes in financial issues especially in bank sector. Therefore, collected data from 50 banks in Asia, Europe, and North America between the period of 2008 and 2017. The result showed that the liquidity management did not affect profitability (Bwacha and Xi, 2018).

From the previous studies, the first and the second hypothesis could be developed as following:

H1: There is a significant relationship between Liquidity indicators and ROA

H2: There is a significant relationship between Liquidity indicators and ROE

The relation between liquidity management and profitability of banks in Nigeria was examined. To examine this relation, a secondary data was collected from the Nigerian stock exchange about three commercial banks were chosen randomly, data were collected about cash fund, bank balance, treasury bills and certificates. After analyzing this data the result showed that there is a positive relation between liquidity management and profitability, and showed that Nigerian bank industry have a significant problem in liquidity management (Ibe, 2013).

The factors affecting the profitability of commercial banks located in Jordan specially Amman Stock of Exchange (ASE) were determined. While, the bank-specific variables are derived from the income statements and the balance sheets of commercial banks published in ASE especially from thirteen Jordanian commercial banks listed in ASE since 2000 were selected (91 observations) between 2005-2011. Using ROA to measure profitability, the result showed that the cost income ratio is the most important factor with respect to profitability. In addition, it was found that the increase in liquidity lead to a decrease in profitability, which implies a negative relationship between liquidity and profitability (Almumani, 2013). According to the results obtained, the banks should manage between liquidity and profitability and diversify between using assets to achieve higher profitability. In addition, it was claimed that there is a positive impact of cash reserve ratio, liquidity ratio, and corporate income tax. It also has a negative impact of bank credits to the domestic economy, saving deposit rate, gross national saving, and balances with the central bank, inflation rate and foreign private investments.

The effect of liquidity on profitability was investigated. To reach the aim of this study a secondary data was collected from Ghana Stock exchange of seven banks in Ghana from 2005 until 2010. The result of this study proved that there is a positive relation between liquidity and profitability, as the more liquid assets hold by the bank, the more protection from risks, which lead to decrease in financial cost and increase in profitability (Lartey et al., 2013). On the other hand, it may lead to negative impact if the bank hold more liquid assets this required to happen an opportunity cost of the bank and this would lead to decrease profitability of banks. Therefore, hold fewer liquid assets, the prices increase and profitability will increase.

There is a general acceptance among researchers that quality management of liquidity had a significant effect towards profitability (Rasul, 2013). A positive effect of liquidity on profitability was determined, but on the other hand, they saw that there is a certain point in higher liquidity leads to demolishing the banks' benefits and profits (Aziz et al., 2017). Therefore, the relation between liquidity and profitability is not linear and there is no liquidity level that could prompt higher benefits and profits regardless of other factors (Rasul, 2013).

Profit is the main aim of any commercial bank, as the banks depend on profitability to maintain the sustainability. The researcher also saw that profitability is affected by many elements as liquidity that has an impact on profitability and return on assets (ROA). In this study, the researcher aimed to study the factors that affect profitability and examine the effect of liquidity on profitability and ROA in developing countries. so secondary data was collected from Malawi stock Exchange (MSE) of 12 commercial banks during the period from 2009 till 2012. The results of this study showed that liquidity had a statistically significant impact on ROA (Lipunga, 2014).

With the rising of interest rate, the savings and investment are decreased and the bank lending is increased. Therefore, the impact of change in liquidity management on the profitability in banks located in Pakistan was measured using financial statement from four major banks during 2008 and 2012. The result showed that there is a significant and positive relationship between interest rate and profitability in commercial banks, which means that when the interest rate increase, the profitability increase (Khan and Sattar, 2014). Furthermore, the impact of external and internal factors on profitability of banks in Jordan was determined and increase performance in those 11 domestic commercial banks in Jordan during 2007 to 2012. The external factors are macroeconomic and financial market structures, while internal factors are capital adequacy, the cost to income ratio and liquidity. The result showed that the internal and external factors have positive impact on profitability (Jaber and Al-khawaldeh, 2014).

In Nigeria, the relation between liquidity and monetary policies on profitability of commercial banks was investigated. To achieve the aim of this study a secondary data was collected about the financial reports of Zenith Bank and Central bank of Nigeria from 2005 until 2012. The results of this study showed that there is no effect of liquidity on profitability and most of liquidity instrument have no impact on profitability and banks should enhance liquidity to make higher profit (UDEH, 2015).

The relation between liquidity and profitability in South Africa banks was investigated. Secondary data was collected from McGregor database, the central bank of South Africa (SARB) and Bloomberg for South African banks from the period 1998 until 2014. The results proved that there is a negative relation between profitability and funding liquidity risk and this showed that banks need to investigate more in liquidity (Marozva, 2015).

In the same way, the impact of liquidity on profitability and how to balance between them was investigated. Data was collected from balance sheet and income statement of Nib International Bank during 1999-2015 and a positive impact of the liquidity ratio and inflation rate on profitability had been found. In addition, loan deposit ratio and deposit interest rate have negative impact on profitability but in general, there is a positive impact of liquidity on profitability (Zeru, 2019).

In addition, the relation between liquidity management and profitability for Islamic investment and finance in Kurdistan Region of Iraq was investigated. To reach the aim of this study a secondary data were collected from Cihan bank's annual financial reports from 2009 to 2015. The result of this study showed that there is a negative relation between liquidity and profitability, also a negative relation was noticed between ROD and quick ratio, and there is no significant relation between capital ratio and return on deposits (ROD), return on assets (ROA), and return on equity (ROE) (Aziz et al., 2017).

The co-integration among liquidity variables and profitability variables was found in five Islamic banks have been selected from United Kingdom. They stated that there is negative significant relation between liquidity variables and profitability in the long run and short run (Dabiri and Yusof, 2017).

The relation between liquidity and validity of Islamic banks in Bahrain was examined, a secondary data was collected from Bahrainian Islamic bank annual reports from 2010 until 2015, after analyzing the data the results showed that there is a statistical and significant relation between liquidity and return on deposits (ROD) (Khasharmeh, 2018).

In Indonesia, a hypothesis to examine the relation between the Capital Ratio and ROD in Islamic banking or sharia banking in Indonesia was developed. The investigation has been made on a sample of 11 sharia banks operating in Indonesia. They discovered that Capital Ratio has a significant negative effect on ROD of Islamic banks in Indonesia (Wahyudi et al., 2018).

From the previous studies, the third hypothesis could be concluded as following:

H3: There is a significant relationship between Liquidity indicators and ROD.

Research Methodology

In this section, the researcher represents the data collection and sample selection, variables and measurements and framework of the study.

Variables and Measurements:

Independent variables: Liquidity indicators; Investment Ratio, Net credit facilities / Total assets, Capital Ratio, Liquidity Ratio, and Quick Ratio.

Dependent variables: Profitability indicators; Return on Deposits, Return on Assets, and Return on Equity.

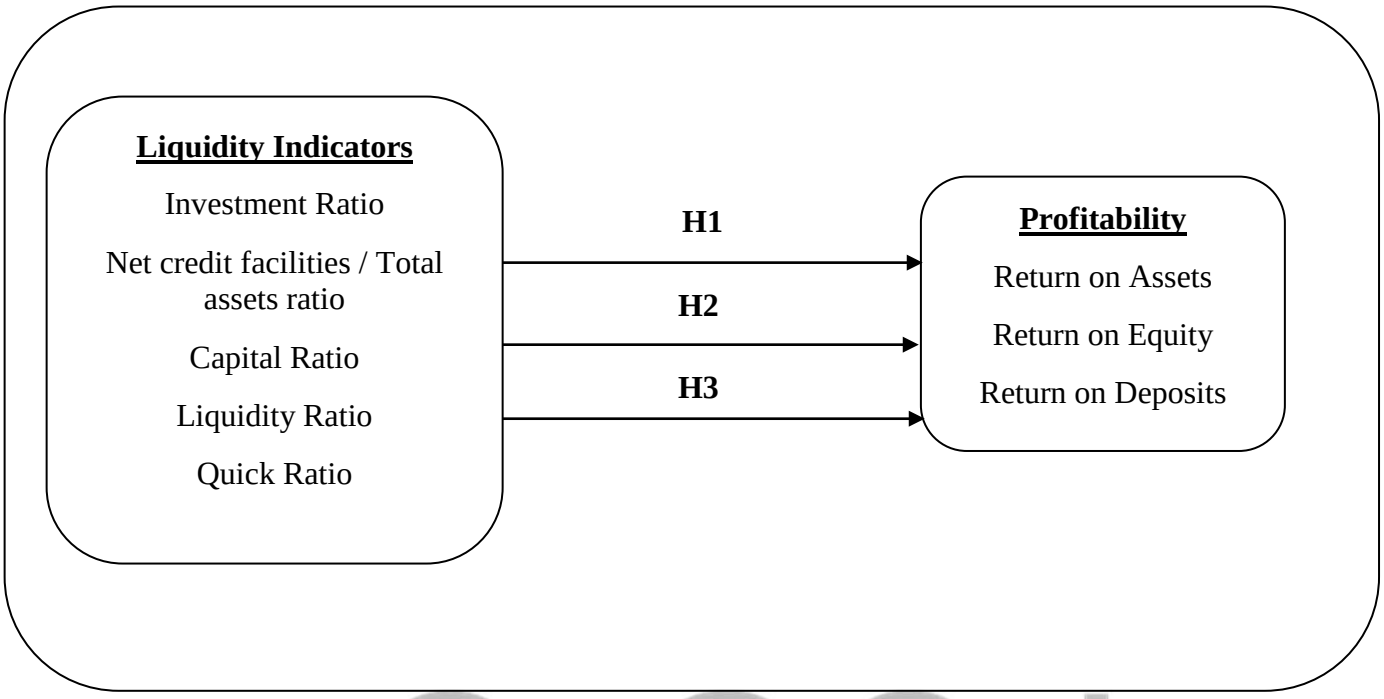

Figure 1: Research Framework

RESULTS AND FINDINGS

This section introduces the empirical study with the main findings and results after running the data analysis.

Descriptive Analysis and Normality Testing for the Research Variables

Descriptive analyses give a list statistic including the mean, median, maximum and minimum values for each research variable which are the 5 dimensions of Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and the 3 dimensions of profitability (return on assets, return on equity and return on deposits). The descriptive analyses in this research is classified into descriptive analyses which is performed for each bank of the public sector in Egypt (Banque Misr, Banque du Caire and National Bank of Egypt) as well as a descriptive analysis for the whole data of the three banks. The following sub-sections show these descriptive tables.

This section shows the descriptive analyses for the public sector banks in Egypt which are Banque Misr, Banque du Caire and National Bank of Egypt altogether throughout the years from (2008-2018) simultaneously. The research variables included are Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and Profitability (Return on Assets, Return on Equity and Return on Deposits). Table 1 shows the mean, median, standard deviation, range, minimum and maximum values for the research variables. The

mean values as indicated in the table are 1.1859, 0.3152, 0.0377, 0.405, 5.4121, 0.0113, 0.1489 and 0.0315 respectively. The standard deviations, which means how far the data is away from its mean, are 0.7483, 0.2777, 0.0221, 0.3573, 1.0635, 0.0063, 0.1253 and 0.0246 respectively.

Table 1: Descriptive Analyses for Research Variables

Research Variables	Mean	Median	Std. Deviation	Range	Minimum	Maximum
Investment ratio	1.1859	0.7483	1.21854	5.55	0	5.55
Net credit facilities/total assets	0.3152	0.2777	0.30749	1.93	0	1.93
Capital ratio	0.0377	0.0221	0.07535	0.45	0.01	0.45
liquid ratio	0.405	0.3573	0.40294	2.49	0.11	2.59
Quick ratio	5.4121	1.0635	22.078	127.7	0.01	127.71
Return on assets	0.0113	0.0063	0.0215	0.13	0	0.13
Return on equity	0.1489	0.1253	0.12226	0.53	0	0.53
Return on deposits	0.0315	0.0246	0.02854	0.14	0	0.14

Descriptive Analyses for Banks

This section includes the descriptive analyses for each of the public sector banks in Egypt, which are Banque Misr, Banque du Caire and National Bank of Egypt. It describes the bank's mean, median, maximum and minimum values in Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and Profitability (Return on Assets, Return on Equity and Return on Deposits) throughout the years (2008-2018).

1. **Banque Misr**

Table 2 shows the descriptive analyses of Banque Misr for the research variables; Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and Profitability (Return on Assets, Return on Equity and Return on Deposits). The table shows the mean, median, maximum and minimum values. The mean values of the research variables are 0.7817, 0.3776, 0.0684, 0.5139, 0.8823, 0.0162, 0.0790 and 0.0376 respectively. The minimum value for the bank's investment ratio between the years (2008-2018) is 0.10 while the maximum value is 1.47. The minimum value for the bank's net credit facilities/total assets between the years (2008-2018) is 0.03 while the maximum value is 1.93.

The minimum value for the bank's capital ratio between the years (2008-2018) is 0.02 while the maximum value is 0.45. The minimum value for the bank's liquid ratio between the years (2008-2018) is 0.11 while the maximum value is 2.59. The minimum value for the bank's quick ratio between the years (2008-2018) is 0.01 while the maximum value is 1.09. The minimum value for the return on asset between the years (2008-2018) is 0.00 while the maximum value is 0.13. The minimum value for the return on equity between the years (2008-2018) is 0.02 while the maximum value is 0.21. The minimum value for the return on deposits between the years (2008-2018) is 0.00 while the maximum value is 0.14.

Table 2: Descriptive Analyses for Research Variables for Banque Misr

Variables	Mean	Median	Minimum	Maximum
Investment ratio	.7817	.7280	.10	1.47
Net credit facilities/total assets	.3776	.2538	.03	1.93
Capital ratio	.0684	.0282	.02	.45
liquid ratio	.5139	.3325	.11	2.59
Quick ratio	.8823	1.0672	.01	1.09
Return on assets	.0162	.0038	.00	.13
Return on equity	.0790	.0732	.02	.21
Return on deposits	.0376	.0235	.00	.14

2. Banque du Caire

Table 3 shows the descriptive analyses of Banque du Caire for the research variables; Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and Profitability (Return on Assets, Return on Equity and Return on Deposits). The table shows the mean, median, maximum and minimum values. The mean values of the research variables are 1.25, 0.27, 0.03, 0.36, 14.31, 0.011, 0.19 and 0.03 respectively. The minimum value for the bank's investment ratio between the years (2008-2018) is 0.00 while the maximum value is 2.96. The minimum value for the bank's net credit facilities/total assets between the years (2008-2018) is 0.00 while the maximum value is 0.40.

The minimum value for the bank's capital ratio between the years (2008-2018) is 0.01 while the maximum value is 0.04. The minimum value for the bank's liquid ratio between the years (2008-2018) is 0.11 while the maximum value is 0.48. The minimum value for the bank's quick ratio between the years (2008-2018) is 1.05 while the maximum value is 127.71. The minimum value for the return on asset between the years (2008-2018) is 0.00 while the maximum value is 0.02. The minimum value for the return on equity between the years (2008-2018) is 0.00 while the maximum value is 0.38. The minimum value for the return on deposits between the years (2008-2018) is 0.00 while the maximum value is 0.07.

Table 3: Descriptive Analyses for Research Variables for Banque du Caire

Variables	Mean	Median	Minimum	Maximum
Investment ratio	1.25	1.1734	0.00	2.96
Net credit facilities/total assets	.27	.3229	0.00	.40
Capital ratio	.03	.0246	.01	.04
liquid ratio	.36	.3865	.11	.48
Quick ratio	14.31	1.0679	1.05	127.71
Return on assets	.011	.0148	0.00	.02
Return on equity	.19	.2281	0.00	.38
Return on deposits	.03	.0426	0.00	.07

3. National Bank of Egypt

Table 4 shows the descriptive analyses of National Bank of Egypt for the research variables; Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and Profitability (Return on Assets, Return on Equity and Return on Deposits). The table shows the mean, median, maximum and minimum values. The mean values of the research

variables are 1.53, 0.30, 0.02, 0.34, 1.05, 0.01, 0.18 and 0.03 respectively. The minimum value for the bank's investment ratio between the years (2008-2018) is 0.49 while the maximum value is 5.55. The minimum value for the bank's net credit facilities/total assets between the years (2008-2018) is 0.25 while the maximum value is 0.42.

The minimum value for the bank's capital ratio between the years (2008-2018) is 0.01 while the maximum value is 0.03. The minimum value for the bank's liquid ratio between the years (2008-2018) is 0.29 while the maximum value is 0.43. The minimum value for the bank's quick ratio between the years (2008-2018) is 1.03 while the maximum value is 1.06. The minimum value for the return on asset between the years (2008-2018) is 0.00 while the maximum value is 0.02. The minimum value for the return on equity between the years (2008-2018) is 0.00 while the maximum value is 0.53. The minimum value for the return on deposits between the years (2008-2018) is 0.00 while the maximum value is 0.06.

Table 4: Descriptive Analyses for Research Variables for National Bank of Egypt

	Mean	Median	Minimum	Maximum
Investment ratio	1.53	.72	.49	5.55
Net credit facilities/total assets	.30	.28	.25	.42
Capital ratio	.02	.02	.01	.03
liquid ratio	.34	.33	.29	.43
Quick ratio	1.05	1.05	1.03	1.06
Return on assets	.01	.01	.00	.02
Return on equity	.18	.15	0.00	.53
Return on deposits	.03	.02	.00	.06

Figure 1 illustrates the mean values of the research variables; investment ratio, net credit facilities / total assets, capital ratio, liquid ratio, quick ratio, ROA, ROE and ROD for the three public-sector banks: Banque Misr, Banque du Caire and National Bank of Egypt. The mean values are represented in percentage on the left.

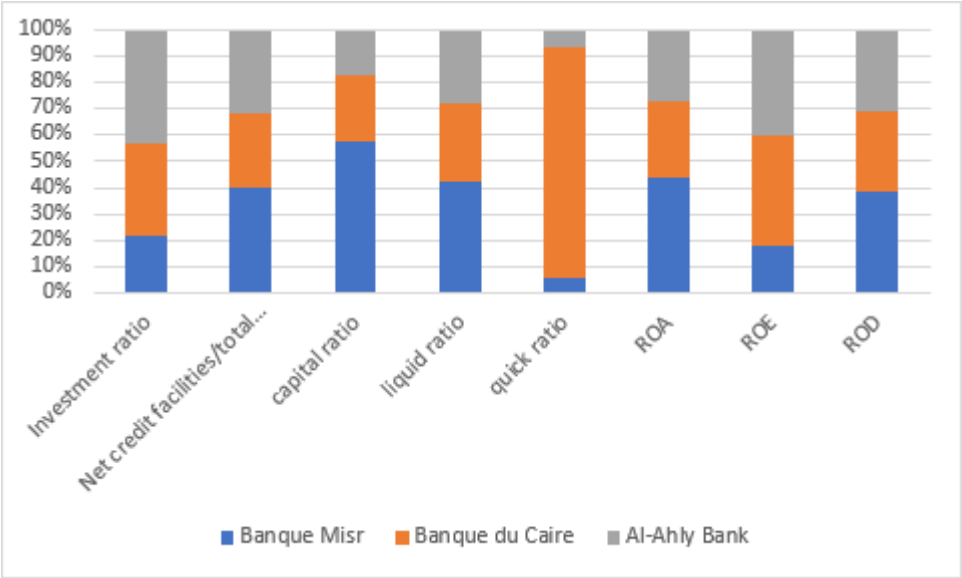

Figure 2: Mean Values of Research Variables for Each Bank

Testing Research Hypotheses

After building the research model and checking its normality and assumptions, it is time to test the research hypotheses. The research objective is to examine the relationship between Liquidity Indicators dimensions and ROA, ROE and ROD. This objective is covered by the research hypothesis; there is a significant relationship between Liquidity Indicators and ROA, there is a significant relationship between Liquidity Indicators on ROE, there is a significant relationship between Liquidity Indicators on ROD. The current research is testing these relationships using correlation and regression analyses. It is noted that the model is not normally distributed so spearman correlation will be used.

1. Testing the Relationship between Liquidity Indicators and ROA

Table 5 shows the correlation matrix for the relationship between Liquidity indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROA. The corresponding P-values are shown to be 0.451, 0.469, 0.549, 0.568 and 0.589 respectively, as well the correlation coefficients are 0.136, 0.131, 0.108, 0.103 and -0.098 respectively. This means that there is an insignificant relationship between Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio, Quick ratio and ROA as the corresponding P-values are all greater than 0.05.

Table 5: Correlation between Liquidity Indicators and ROA

		1.	2.	3.	4.	5.	6.
1. Investment ratio	**r**	1.000					
	P-value						
	n	33					
2. Net credit facilities/total assets	**r**	.361*	1.000				
	P-value	.039					
	n	33	33				
3. Capital ratio	**r**	.052	-.168	1.000			
	P-value	.775	.350				
	n	33	33	33			
4. liquid ratio	**r**	.507**	.586**	-.305	1.000		
	P-value	.003	.000	.084			
	n	33	33	33	33		
5. Quick ratio	**r**	-.177	.147	.337	-.197	1.000	
	P-value	.325	.413	.055	.272		
	n	33	33	33	33	33	
6. Return on equity	**r**	.136	.131	.108	.103	-.098	1.000
	P-value	.451	.469	.549	.568	.589	
	n	33	33	33	33	33	33

The effect of Liquidity indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) on ROA is illustrated in Table 6. The regression analysis is conducted, where the independent variables; Liquidity indicators, and the dependent variable; ROA. It was found that there is an insignificant effect between Investment ratio, Net credit facilities/total assets,

Capital ratio, Liquid ratio and Quick ratio and ROA, as the regression coefficients are -.178, .778, .456, -1.435 and -.301 respectively and P-values are .777, .373, .484, .194 and .382 respectively. This means that all P-values are greater than 0.05. Moreover, the R- Square is 0.80, which means that Liquidity Indicators can explain 80% of the variation in ROA.

Table 6: Regression Model for the effect of Liquidity Indicators on ROA

Model		Unstandardized Coefficients		Standardized Coefficients	t	P-value	R Square
		B	Std. Error	Beta			
1	(Constant)	-.462	.978		-.473	.640	0.80
	Investment ratio	-.178	.621	-.060	-.286	.777	
	Net credit facilities/total assets	.778	.859	.227	.905	.373	
	Capital ratio	.456	.642	.143	.710	.484	
	liquid ratio	-1.435	1.076	-.329	-1.333	.194	
	Quick ratio	-.301	.339	-.190	-.888	.382	

Therefore, the first hypothesis testing the relationship between Liquidity indicators and ROA is not supported.

2. Testing the Relationship between Liquidity Indicators and ROE

Table 7 shows the correlation matrix for the relationship between Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROE. Their P-values are .692, .014, .150, .565 and .547 respectively, as well the correlation coefficients are .072, .424, -.257, -.104 and .109 respectively. However, there is as insignificant relationship between Investment ratio, Capital ratio, Liquid ratio, Quick ratio and ROE as the corresponding P-values are greater than 0.05. While there is a significant moderate correlation between Net credit facilities/total assets and ROE.

Table 7: Correlation between Liquidity Indicators and ROE

			1.	2.	3.	4.	5.	6.
Spearman's rho	1. Investment ratio	r	1.000					
		P-value						
		N	33					
	2. Net credit facilities/total assets	R	.361*	1.000				
		P-value	.039					
		N	33	33				
	3. Capital ratio	R	.052	-.168	1.000			
		P-value	.775	.350				
		N	33	33	33			
	4. liquid ratio	R	.507**	.586**	-.305	1.000		
		P-value	.003	.000	.084			
		N	33	33	33	33		
	5. Quick ratio	R	-.177	.147	.337	-.197	1.000	

			1.	2.	3.	4.	5.	6.
		P-value	.325	.413	.055	.272		
		N	33	33	33	33	33	
	6. Return on equity	**R**	.072	.424*	-.257	-.104	.109	1.000
		P-value	.692	.014	.150	.565	.547	
		n	33	33	33	33	33	33

The research objective is to examine the effect of Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) on ROE. Accordingly, the dependent variable is ROE and the independent variable is Liquidity Indicators. Table 8 shows the regression between Liquidity Indicators and ROE. It shows that there is a significant effect between Net credit facilities/total assets, capital ratio and ROE as the regression coefficients are .760 and -.602 respectively and P-values are 0.024 and 0.017 respectively. While there is insignificant relationship between Investment ratio, liquid ratio, and Quick ratio on ROE as the regression coefficients are -.157, 0.755, and 0.124 respectively and P-values are 0.501, 0.069 and 0.334. Moreover, the R Square is 0.419, which means that Liquidity Indicators can explain 41.9% of the variation in ROE.

Table 8: Regression Model for the effect of Liquidity Indicators on ROE

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**P-value**	**R-Square**
		B	**Std. Error**	**Beta**			
1	**(Constant)**	-1.826	.362		-5.041	.000	.419
	Investment ratio	-.157	.230	-.113	-.681	.501	
	Net credit facilities/total assets	.760	.318	.476	2.387	.024	
	Capital ratio	-.602	.238	-.406	-2.531	.017	
	liquid ratio	-.755	.399	-.372	-1.895	.069	
	Quick ratio	.124	.126	.167	.983	.334	

Therefore, the second hypothesis testing the relationship between liquidity indicators and ROE is partially supported.

3. Testing the Relationship between Liquidity Indicators and ROD

Table 9 shows the correlation matrix for the relationship between Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROE. Their P-values are .499, .099, .148, .868 and .117 respectively, as well the correlation coefficients are .122, .292, .258, .030 and .278 respectively. However, there is as insignificant relationship between Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio, Quick ratio and ROE as the corresponding P-values are greater than 0.05.

Table 9: Correlation between Liquidity Indicators and ROD

		1.	2.	3.	4.	5.	6.
1. Investment ratio	**r**	1.000					
	P-value						
	n	33					
2. Net credit facilities/total assets	**r**	.361*	1.000				
	P-value	.039					
	n	33	33				
3. Capital ratio	**r**	.052	-.168	1.000			
	P-value	.775	.350				
	n	33	33	33			
4. liquid ratio	**r**	.507**	.586**	-.305	1.000		
	P-value	.003	.000	.084			
	n	33	33	33	33		
5. Quick ratio	**r**	-.177	.147	.337	-.197	1.000	
	P-value	.325	.413	.055	.272		
	n	33	33	33	33	33	
6. Return on equity	**r**	.122	.292	.258	.030	.278	1.000
	P-value	.499	.099	.148	.868	.117	
	n	33	33	33	33	33	33

The research objective is to examine the effect of Liquidity Indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) on ROD. Accordingly, the dependent variable is ROD and the independent variable is Liquidity Indicators. Table 10 shows the regression between Liquidity Indicators and ROD. It shows that there is a significant effect between Net credit facilities/total assets, liquid ratio and ROD as the regression coefficients are 1.204 and -1.630 respectively and P-values are 0.036 and 0.025 respectively. While there is insignificant relationship between Investment ratio, Capital ratio, and Quick ratio on ROD as the regression coefficients are 0.135, 0.476, and -0.297 respectively and P-values are 0.735, 0.254 and 0.181. Moreover, the R Square is 0.233, which means that Liquidity Indicators can explain 23.3% of the variation in ROD.

Table 10: Regression Model for the effect of Liquidity Indicators on ROD

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**P-value**	**R-Square**
		B	**Std. Error**	**Beta**			
1	**(Constant)**	-.601	.622		-.966	.343	.233
	Investment ratio	.135	.395	.065	.342	.735	
	Net credit facilities/total assets	1.204	.547	.505	2.204	.036	
	Capital ratio	.476	.408	.215	1.166	.254	
	liquid ratio	-1.630	.685	-.537	-2.380	.025	
	Quick ratio	-.297	.216	-.268	-1.374	.181	

Therefore, the third hypothesis testing the relationship between liquidity indicators and ROD is partially supported.

DISCUSSION AND CONCLUSION

The data is analyzed empirically to test the research hypotheses by measuring the variables concluded from the literature review through a descriptive and regression analysis using SPSS – version 25. Testing the first research hypothesis for the relationship between liquidity indicators; (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROA, it was found that the first main hypothesis, which states that there is a significant relationship between Liquidity Indicators and ROA, is not supported. As there is an insignificant relationship between liquidity indicators (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROA. This is consistent with (UDEH, 2015); (Rasul, 2013); and (Bwacha and Xi, 2018).

Testing the second research hypothesis for the relationship between liquidity indicators; (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROE, it was found that the second main hypothesis, which states that there is a significant relationship between Liquidity Indicators and ROE, is partially supported. As there is an insignificant relationship between investment ratio, liquidity ratio and quick ratio with ROE. This is consistent with (UDEH, 2015); (Rasul, 2013); and (Bwacha and Xi, 2018). While, there is a significant relationship between net credit facilities/total assets and capital ratio with ROE. This is consistent with (Bordeleau and Graham, 2010); (Adebayo and Krettli, 2011); (Olweny and Shipho, 2011); (Masood and Ashraf, 2012); (Botoe, 2012); (Ibe, 2013); (Lartey et al., 2013); (Khan and Sattar, 2014); (Lipunga, 2014); (Khan and Mutahhar, 2016); (Ahmed, 2016); (Mustafa and Datta, 2017); (Ibrahim, 2017); (Khasharmeh, 2018); and (Zeru, 2019).

Testing the third research hypothesis for the relationship between liquidity indicators; (Investment ratio, Net credit facilities/total assets, Capital ratio, Liquid ratio and Quick ratio) and ROD, it was found that the third main hypothesis, which states that there is a significant relationship between Liquidity Indicators and ROD, is partially supported. As there is an insignificant relationship between investment ratio, capital ratio and quick ratio with ROD. This is consistent with (UDEH, 2015); (Rasul, 2013); and (Bwacha and Xi, 2018). While, there is a significant relationship between net credit facilities/total assets and liquidity ratio with ROD. This is consistent with (Bordeleau and Graham, 2010); (Adebayo and Krettli, 2011); (Olweny and Shipho, 2011); (Masood and Ashraf, 2012); (Botoe, 2012); (Ibe, 2013); (Lartey et al., 2013); (Khan and Sattar, 2014); (Lipunga, 2014); (Khan and Mutahhar, 2016); (Ahmed, 2016); (Mustafa and Datta, 2017); (Ibrahim, 2017); (Khasharmeh, 2018); and (Zeru, 2019).

Table 11: Summary of Research Hypotheses

Hypothesis	Description	Results
H1	There is a significant relationship between Liquidity indicators and ROA.	Not Supported
H2	There is a significant relationship between Liquidity indicators and ROE.	Partially Supported
H3	There is a significant relationship between Liquidity indicators and ROD.	Partially Supported

RECOMMENDATIONS AND RESEARCH LIMITATIONS

This research investigates the relationship between liquidity Indicators and the profitability of public sector banks in Egypt. Therefore, recommendations for the current research are that decision makers and banks' managers should consider liquidity as one of the factors that influence banks' profitability. Additionally, researches should focus on other factors that may affect profitability in order to enhance the banks' profitability and hence the economy as a whole. Therefore, programs of enhancing the liquidity and other factors have to be applied to improve these factors, which in turn can affect and enhance the bank‘s profitability.

As all researches, this research has several limitations through the study. First, the research was limited to study the relationship between Liquidity Indicators and profitability in Egypt only. Second limitation for this research is the time limitation to finish the research, which was a constraint for collecting larger sample size to represent the data under study as the total number of 11 years were used. The research studied the years from 2008 – 2018, because before this time, there is shortage of available data and after this time Banquet du Cairo had stocks on stock exchange market so it cannot considered as a public bank. A third limitation was the small number of sample size, which is only 3 banks in the public sector (Banque Misr, Banque du Caire and National Bank of Egypt).

Therefore, the future researcher can make a comparative study between results in Egypt and another country in order to compare between the two countries or to compare between developing and developed countries and have conclusions that are more reliable. In addition, if time and data are available, it is recommended to include more years in the study so research would be able to have better period to be able to collect larger sample. Moreover, it can be suggested to include more banks (private banks) and compare between banks in the public and private sector. Future research would be able to have better period to be able to collect larger sample.

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