The Impact of liquidity on the profitability of banks listed on Casablanca Stock Exchange

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Abstract

The study aims to describe the relationship between liquidity and profitability of banks listed on the Casablanca Stock Exchange (CSE) between 2010-2018. Six banks were involved in the study. The annual and financial reports of the six listed banks were used to compute relevant liquidity and profitability ratios. The relationship is measured by current ratio, cash ratio, return on equity, and return on assets. Quantitative research design is used for the study. To find the relationship and the strength of it, correlation and regression analysis were used. The findings of this study suggest that there is a significant positive relationship between the current ratio and profitability, and insignificant negative relationship between cash ratio and profitability. The results of the study are discussed in the findings and analysis section.

Key words: **bank, profitability, liquidity, regression, correlation**

Introduction

After the global financial crisis (2007-2008), liquidity has received tremendous attention in the business world, especially in the banking sector, and has become one of the main concerns for bank stakeholders. The concept of liquidity is "the ability to fund increases in assets and meet obligations as they fall due" (Lartey, et al. 2013, p.1). A liquidity measure plays a significant role in telling whether a company is effectively managing its "short-term liabilities". After the mentioned crisis, world's attention has been focused on the risks involved and the ability of financial institutions to survive potential shocks and crises. The crisis has proven that liquidity matters. For this reason, it has gotten bank regulators' special care. therefore, new regulatory requirements (Basel III) have taken place, as these standards require banks to maintain a reasonable amount of "cash on hand" and "highly liquid assets" to avoid any potential instability.

"Finance theory" assumes an inverse relationship between liquidity and profitability, despite the results of numerous studies that suggest different outcomes. Indeed, after the

mentioned crisis numerous studies investigated the relationship between profitability and liquidity, and each have supported their claims with evidence.

The theory of risk and return posits that, "the higher the risk, the higher the return and the lower the risk, the lower the return" (Modigliani & Pogue, 1974, p.80). This implies that a positive relationship exists between risk and return. If we think about it, we will find numerous similarities between the risk and return theory and the type of relation between liquidity and profitability. Meaning if the company is liquid, it will most likely be able to meet its short-term liabilities to avoid going bankrupt and gain some profit. However, there are conflicting views on the subject. It should be noted that the primary goal of any company is to maximize shareholders wealth. Panigrahi (2013, p.49) suggests that, for a firm, to maximize shareholders wealth, it must maintain adequate liquidity and invest in productive assets. Meaning that the company must be efficient at managing its liquidity. As this can make a significant impact on the likelihood of a firm to succeed or fail. Indeed, liquidity ensures the firm's survival as it enables it to meet its short-term debts, however, liquidity can also mean that the funds of the firm are "confined" to its liquid assets which makes it impossible to employ the funds in activities that generate profit or for long-term investments. As Shin and Soeren (1998, p.38) suggest that, there should always be a balance between liquidity and profitability to ensure the company's survival as well as provide "the optimal" return for shareholders.

Numerous researchers conducted a study on the subject and have suggested that there is a significant relationship between a bank liquidity and profitability. While others suggest that there is a positive relationship between bank liquidity and profitability. While some others, propose that there is a negative relationship between the two variables.

This study aims to examine the relationship between liquidity and profitability of banks listed on Casablanca Stock Exchange (CSE) over a period of nine years from 2010 to 2018.

Literature review

Most modern studies discussed the importance of the banking sector and how it is a significant source of financing in every economy in the world. According to Freixas et al., (2010, p.3) banks are "the providers of liquidity and financial intermediaries in a financial system". He also adds, through loans as well as investments, the system works in a way that "mobilizes" funds in an economy from segments that have a "surplus" in other words lenders to some other segments that have a "deficit" or borrowers. Moreover, Crockett (2008, p.14) defines financial institutions as "suppliers of liquidity, issuing liquid liabilities in order to hold less liquid assets, using its capital to cover liquidity risk and making a turn on the provision of liquidity services that justifies the cost of the capital involved". Meaning, banks are the "providers" of liquidity in a society and this allows them to perform their "intermediation" functions. However, as banks perform such activities, they have to face several risks; significant among these is liquidity risk. At times they may face financial issues such as shortages of liquid assets which could be caused by a decline in the deposits available. For this reason, there should be an effective risk management structure to avoid any potential risks.

Numerous financial theories have agreed that banks exist because of two activities they perform in the economy: "liquidity creation" and "risk transformation" (Berger & Bouwman, 2009, p.2). Of course, banks perform a significant function of converting liquid liabilities or "deposits" into illiquid assets "loans" (Bonfim & Kim, 2012; Athanasoglou et al., 2008; Dietrich et al., 2014, Cited in, Golubeva et al., 2019, p.458). In addition to that, banks utilize only a limited amount of their equity to grant loans to their clients. (Hartlage, 2012, p.456). Furthermore, a bank should well manage its assets and liabilities to be able to meet any withdrawals or additions from the different accounts. For this exact reason, banks are somehow continuously exposed to the risk of lack of liquidity as they may not have an adequate amount of liquid assets to meet the clients' demands on a random basis.

The concept of Liquidity

Crockett (2015, p.1) states that liquidity is a tricky concept and adds that "it is easier to recognize than to define", the topic however, is not quite recent yet there hasn't been a generally accepted definition for the concept. The term liquidity is perceived to be ambiguous because of the so many definitions that exist, for this reason. The following paragraphs include the relevant definitions related to the concept. According to Adebayo et al. (2011, p.28) bank liquidity can be defined as the amount of capital that is "readily" available to banks for any potential investments.

Liquidity is a financial concept that can be defined as the available amount of capital that can be invested (Ibe, 2013, p.38). Ibe further argues that most of the capital that is utilized today is not cash but credit. He also adds that bank liquidity refers to "the ability of the bank to maintain sufficient funds to pay for its maturing obligations" (Ibe, 2013, p.38). Moreover, Nwaezeaku defines the term of liquidity as the level of convertibility to cash or in other words the ease an asset can be converted to cash (Nwaezeaku, 2008, Cited in, Ibe, 2013, p.38).

According to Caruana and Kodres (2008, p.67), liquidity is of "paramount significance being a core matter" when it comes to banking. Therefore, the efficiency of banks can be highly affected by the availability of enough liquid assets at any time. Furthermore, banks have obligations to meet and must make payments at due dates, if they fail to do so then, they face the risk of being declared "illiquid" (Crockett, 2008, p.15). Which may eventually ruin a bank's reputation and impact its credibility.

According to the Basel Committee on Banking (BCB) (2008, p.2), liquidity is "the ability to fund increases in assets and meet obligations as they come due". This definition assumes that obligations could be met "at a reasonable cost". BCB additionally adds that liquidity risk management attempts to make sure that banks will continuously be able to meet "uncertain cash flow obligations", as these are dependent on some agents' behavior as well as other external

factors. Moreover, BCB has made recommendations to the banking sector to limit liquidity risks and meet its monetary obligations by holding adequate money to be prepared for any unforeseen demand from depositors. Also, the minimum capital requirement was increased by the committee through an extra buffer with the goal of protecting depositors.

According to the European Central Bank (ECB) the role of banks is to transform short-term liquid obligations into long-term illiquid assets. Moreover, banks enable clients to smooth out their "consumption" as well as their investment patterns which improves common welfare level of society. In offering this significant financial capacity, banks help their clients to limit the struggles of liquidity problems. By doing so, they become "exposed" to such risks. As in worst case scenarios, even if a bank is sound, liquidity issues can take place in runs when clients pull back their deposits at the same time. ECB also adds, an individual liquidity can quickly affect the whole sector which causes a bank run and panic among the depositors. The principle of "first come, first served" as well as "informational asymmetries" in the repayment of deposits are significant in such extreme cases (ECB, 2002, p.7)

Structural factors affecting bank liquidity

There are numerous factors that may influence a bank's liquidity. According to ECB (2002, p.9) the degree to which a banking system or credit institution can be viewed more or less liquid will be impacted by various internal as well as external factors, for instance, the structure of "the financial system, the regulatory environment, or the business model" adopted by the bank. Over the past few years, there have been various significant changes in these components, which have eventually influenced banks' liquidity. The environment where banks manage their liquidity has witnessed significant changes and those that cannot adapt to these changes are exposed to more risk.

The Concept of Profitability

Bank profitability can be referred to as the ability of a bank to generate profits. In other words, the "revenues" of its operations have to be higher than the "costs" incurred. A profitable banking sector should be able to overcome any potential negative shocks and should contribute into improving the stability of the financial system (Athanasoglou, Brissimis, & Delis, 2005, p.5). Moreover, profitability can be of great help when taking important decisions and constructing policies (Osiegbu & Nwakanma, 2008, Cited in Johny, 2017, p. 1518). According to Knight and Roth (2003, Cited in, Johny, 2017, p.1518) profitability measures the financial performance of a financial institution over a time period (yearly basis), based on the decisions taken that involve the use of all the resources in the entity. Additionally, the financial performance of a company can be highly influenced by how well it's managing its liquidity, as Bardia (2007) states that performance of any type of business is "judged" by its liquidity management (Cited in Johny, 2017, p.1518).

Liquidity-Profitability Trade-off theory

The Liquidity-Profitability Trade-off theory suggests that there is a trade-off between the liquidity and the profitability of a business entity. According to Panigrahi et al. (2018, p.44) the theory posits that a bank cannot be profitable and liquid at the same time as one has a significant impact on the other. The regulations of banks are necessary to maintain stability and safety in the financial system, to the degree, which allows banks to successfully meet their liabilities without any struggles. Furthermore, during financial crises, liquidity has proven itself to be as highly as important as capital requirements to the bank stability (Bagyenda et al, 2011, p.11). Additionally, Cecchetti (2010) argued that the increase in capital adequacy requirements was a sane decision by the Basel III. He adds that the losses bared by the banks worldwide during the 2007-2008 financial crisis were around "5 percent" of their risk-weighted asset. Therefore, if the institutions were to keep an "equity capital" of "7 percent" of their risk-weighted asset, the banks

would be safe from bearing any losses in case the crisis repeats itself (Cecchetti, 2010, Cited in, Bagyenda et al. 2011, p.11). This has encouraged the concerned authorities to "demand" higher solvency and liquidity on banks rather than just make it optional.

Commercial Loan theory

The commercial loan theory is also referred as "real bills doctrine theory". This theory was created by Smith in 1776. It suggests that the liquidity of a bank is realized through self-liquidation of "productive" loans, that are granted for short periods. Moreover, this theory also suggests that banks should not lend money to clients for the following purposes such as buying real estate or consumer goods and investing in stocks or bonds because of the duration of the "payback period" of such investments. It additionally recommends that for each short-term self-liquidating loan, the national bank ought to lend cash to the bank on the security of such advances. So, the level of liquidity for the bank is guaranteed. This theory is more toward serving traders in need of financing of "training transactions" and for "short periods" (Emmanuel, 1997, Cited in Akinwumi et al. 2017, p.90).

Shiftability theory

This theory was first created by Moulton in 1915. According to this theory, banks could secure their liquidity positions by holding commercial papers as well as treasury bills. As these instruments could be effortlessly sold in secondary markets without any misfortunes of capital. The major downside of this theory is that it disregards the possibility of a serious crisis where all banks need to sell their assets causing a market loss (Casu et al, 2006, Cited in, Chaarani, 2018, p.65).

Anticipated Income theory

This theory was first introduced by Prochnow in 1949. This theory suggests that preserving "cash" and "Cash Equivalents" increases liquidity, however, it results in forgoing several income opportunities. In fact, it uncovers that the liquidation of a long-term credit is

accomplished through the instalments of regularly scheduled payments. These instalments are determined depending on the assessment of the "creditworthiness" of the client and on an expectation on his future income.

According to Chaarani (2018, p.65) the theory suggests that the liquidity of a bank can be managed effectively if the bank properly structures the "loan commitments" to its clients. The theory focuses on two things. These include "earning potential" and "credit worthiness" as these assure to the bank to have an adequate level of liquidity. He further argues that this theory rules the above-mentioned ones since it guarantees a high level of liquidity as well as safety.

Business Models

Banks' business models have changed significantly over the recent decades. As they have moved from "traditional banking" to, getting progressively dynamic in non-traditional activities. These include "investment banking" and "proprietary trading". While these non-traditional activities have made new opens doors for banks to realize profits, however, it has also caused higher income fluctuations and made them much more "complex" states Kohler (2014, p.2).

According to Kohler (2014, p.2) This reality got obvious during the 2007-2008 financial crisis which impacted mainly large banks that operate in investments. These institutions' size and systemic significance make them face more riskiness compared to other institutions. Basel III standards and regulations are meant to diminish their potential riskiness. The mentioned regulations involve more liquidity and capital requirements and they both have a negative impact on profitability, since their ability to generate profits relies much upon the degree to which they can "leverage their balance sheet and engage in short-term funding". Based on a research he conducted, he further adds that, these large institutions should change their business models for the following reason; as before the mentioned-above crisis, several business areas used to generate profit and assure high return however after the crisis, they have turned to be

unprofitable. Evidence suggests that those banks must emphasize on "core competencies" as well as "core markets" due to their comparative advantage. Without neglecting of course, corporate and investment banking. These banks will also have to be more dynamic in "retail banking" to ensure better diversification of their income structure and to abide by the regulatory requirements. He also states that, even though smaller, "retail-oriented" banks were not much affect by the mentioned-above crisis. However, they should also reconsider their business models by "increasing their share of non-interest income by cross-selling additional services or products to their customers" to ensure more profitability (Kohler, 2014, p.15)

Relationship between liquidity and profitability

There have been numerous researches that investigated the determinants of bank profitability and most of them share the same opinion based on their findings and agree that liquidity is one of the determinants. These researches comprise Bourke (1989), Karasulu (2001), Guru et al. (2002), Staikouras and Wood (2003) and many others. Moreover, many researches have examined the relationship between bank liquidity and profitability and have had varying reports. Some researchers propose, based on the results of their research, that financial institutions that hold more liquid assets have an advantage when it comes to having a "superior perception" in funding markets, as they can diminish financing costs and increase profitability. For instance, Bourke (1998), found that there is a positive relationship between bank liquidity and profitability for 90 banks in different countries and continents, these included, Europe, North America, and Australia over a period of nine years 1972-1981. Bourke further argues that holding enough liquidity is highly recommended if the bank wants to minimize the liquidity risk and any potential financial crisis. If the bank holds liquid assets at an adequate amount, it contributes in enhancing its profitability. Whereas, some other researchers claim that, holding liquid assets can be seen as, "an opportunity cost" as the financial institution misses out on other opportunities such as investments etc. which eventually causes the profitability to go down.

Similarly, a study conducted by Lartey, Antwi, and Boadi (2013, p.55) over the period of 2005 to 2010. Results show that there is a weak positive relationship between liquidity and profitability of the selected listed banks. Moreover, another study conducted by Rafiq (2016, p.5) in Pakistan suggests, a weak positive relationship between bank liquidity and profitability. Rafiq used three independent variables such as quick ratio, current ratio, and net-working capital. And three dependent variables such as net profit, return on assets, and return on equity. To describe the relation between liquidity and profitability, he used a correlation and a regression analysis.

Ghurtskaia and Lemonjava (2018, p. 1613) suggest that there is a positive relationship between liquidity and profitability for the National Bank of Georgia in the United States over a period of nineteen years from 1998 to 2017. They used correlation and regression analysis to examine the relationship between the variables. Dependent variables included ROA and ROE, while the independent variable included liquid asset to total assets ratio.

A study conducted by Charmler et al. (2018, p.88) examined the impact of bank liquidity and profitability of commercial banks in Ghana of 21 commercial banks over a period of 2007 to 2016. The collected data was analyzed using quantitative research methods. These include descriptive statistics, correlation, and regression analysis. The study included two dependent variables- ROA and ROE and two independent variables- ratio of liquid assets to total assets (LIQ1) and liquid assets to total bearing assets (LIQ2). The findings of the study indicate a positive relationship between ROA and the independent variables. Whereas it was found that ROE has a weak positive relationship with LIQ1 and a statistically insignificant negative relationship with LIQ2.

On the other hand, a study conducted by Bace (2016, p.330) between 2014 and 2015 with a sample of 13,000 world's largest deposit banks showed that there is negative correlation between profitability (ROAA) and the level of liquid assets to deposits (LADR). He states that holding excess liquidity has indeed a negative impact of profitability of banks.

Meanwhile, Molyneux and Thornton (1992), conducted a study on European banks for a period of four years 1987-1989 and found a weak negative relationship between liquidity and profitability. Similarly, Goddard, Molyneux, and Wilson (2004), conducted a research from five European countries during the mid-1990s and found evidence that banks that maintain high liquidity ratios tend to have low profitability, in other words, a negative relationship was found between the two variables.

In addition to that, Bordeleau and Graham (2010, p.14), analyzed the impact of liquid asset holdings on bank profitability for American and Canadian banks over the period of 1997 to 2009. Findings propose that bank profitability increases for banks that keep a certain level of liquid assets, but if liquidity goes beyond a certain level, profitability eventually decreases, everything else equal. Furthermore, findings also suggest that the type of relationship between the two variables depends on the business model of each bank as well as the state of the economy. as Bordeleau and Graham (2010, p.14) state that "adopting a deposit and loan-based business model allows a bank to optimize profits with a lower level of liquid assets, likewise, when the likelihood of funding market difficulties is low (proxied by economic growth), banks need to hold less liquid assets to optimize profits". Lastly, evidence suggest that profitability increases for banks with some liquid assets. In short, evidence propose that a non-linear relationship exists between the two variables.

Similarly, Samsuri (2017, p.8) conducted a study in Malaysia on Affin Bank over a period of five years 2011-2015. Evidence suggests that liquidity has a significant negative relationship with profitability. Data was evaluated by a correlation and regression analyss. Moreover, ROA (profitability measure) was used as a dependent variable while current ratio was used as an independent variable (liquidity measure).

Additionally, another study conducted in Jordan, by Nimer, Warrad, Omari, (2015, p.232) suggests that there is a significant relationship between liquidity and profitability of 15

banks listed on Amman Stock Exchange over a period of six years from 2005 to 2011. The study used one dependent variable which is ROA and another independent variable which is quick ratio. The only difference between quick and current ratio is that it excludes inventory. However, one of the limitations of this study is that they did not describe the nature of the relationship between the variables.

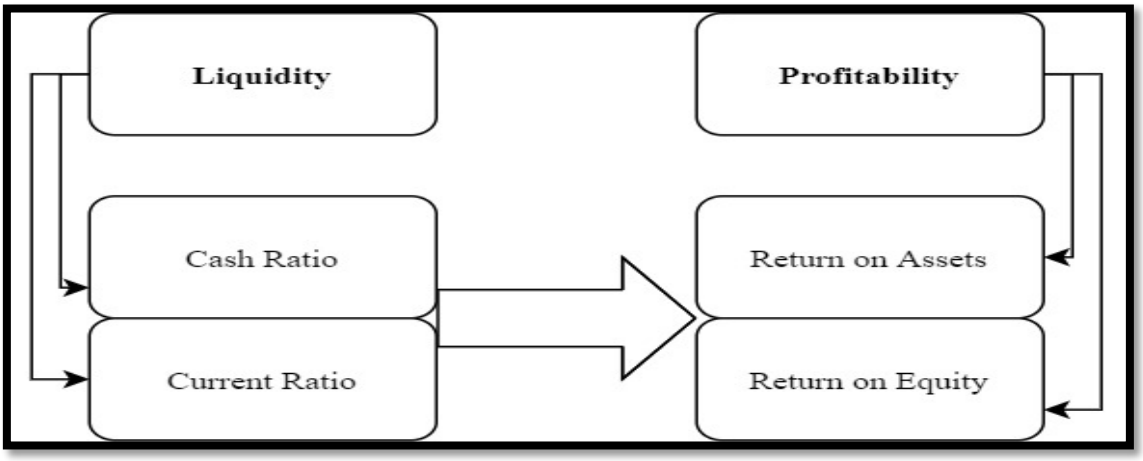
Similarly, Abdullah and Jahan (2014, p.21) conducted a study in Bangladesh on the relationship between bank liquidity and profitability over a period of five years from 2009 to 2013. The sample included five banks, selected on a random basis. Liquidity measures included "loan deposit ratio, deposit asset ratio and cash deposit ratio". While the profitability measures included ROA and ROE. Findings indicate that there is an insignificant relationship between bank liquidity and profitability, however, the study failed to study the association between the mentioned variables.

Akinwumi et al. (2017, p.97), research that was carried out over a period of ten years from 2007 to 2016, using Pearson's correlation which showed that there is a significant relationship between a bank liquidity (current Ratio) and its profitability (return on Assets, return on Equity) and the study further states that, an excess in liquidity negatively affects profit which leads to its reduction and an excess in profitability risks "exposure", as striving to maximize profitability may result in insolvency of the bank. The research further discusses that the relationship between the two variables is "highly cyclical", that is to say that, the relationship can be positive during distress periods as liquidity increase which enhances the profitability of banks (Osborne et al., 2012, Cited in, Akinwumi et al. p96). Furthermore, the research also reveals that the higher the liquidity, the more chances a bank has to survive and be able to enhance its profitability in the long-term. Indeed, other factors may have an impact on the profitability of a financial institution such as the business model and the economy of the country.

According to Agbada and Osuji (2013, Cited in Akinwumi et al, 2017, p.97) the relationship between liquidity and profitability is inverse, that is to say, if a bank wants to reach liquidity, it must hold an amount of cash that is greater than its deposit. However, this situation will not be beneficial for banks in terms of profit. Moreover, if the bank wants to maximize its profitability by focusing on short-term investments, it will face liquidity problems in case clients demand for cash increases on a specific short-term period.

Ferrouhi (2014) conducted a study about the relationship between liquidity risk and other determinants including profitability of Moroccan banks over a period of twelve years 2001-2012. Evidence suggest that "profitability depends positively on the size of banks, on foreign direct investments, while the relationship between profitability and liquidity ratios depends on the model used" (Ferrouhi, 2014, p.360). He further adds that bank performance is negatively affected by the 2007 financial crisis.

Conceptual Framework



Methodology

Research design

This study aims to describe the relationship between the profitability and the liquidity of banks listed in CSE through an empirical research. The reason behind choosing CSE listed banks only rather than other banks is because of the availability of data over the covered time frame

and the credibility of the data available. The data used for the study is panel. According to

Variables	Formulas	Type of Variable
Return on Assets (ROA)	"Net Income/Average Total Assets"	Dependent Variable
Return on Equity (ROE)	"Net Income/Average Total Equity"	Dependent Variable
Current Ratio (CRR)	"Current Assets/Current Liabilities"	Independent Variable
Cash Ratio (CR)	"Cash &Cash Equivalents/Current Liabilities"	Independent Variable

Neuman (2007), panel data is "an effective type of longitudinal research" in which researchers observe the same population over a time period. The population of this study was made up of all the banks listed in CSE. These included Banque Marocaine pour le Commerce et l'Industrie (BMCI), Banque Marocaine du Commerce Extérieur (BMCE), Crédit du Maroc (CDM), Attijari WafaBank (ATW), Banque Populaire (BCP), Crédit Immobilier et Hôtelier Bank (CIH). In this study, the listed banks were examined in terms of their liquidity and profitability over a period of nine years 2010-2018. The reason behind excluding the year 2019 from the study is due to the unavailability of some information as there were missing reports of some of the listed banks.

Data collection

The data used for this study was collected from primary sources such as annual reports and financial reports. As the study is based on historical financial data, the information was extracted directly from CSE banks' financial statements since they are publicly available, in order to ensure the credibility and accuracy of the information collected. The following tables presents the four ratios used in the study, and the type of each variable as well as their formulas.

Variables table:

Return on assets measures a firm's "overall effectiveness in generating profits with its available assets, the higher the firm's return on total assets, the better, the return on total assets" (Gitman & Zutter 2015, p.130). Additionally, Robinson et al. (2015) add that this measure refers to the relation between net profit and total assets. If the ratio is high, it implies and reflects the effectiveness of the firm in utilizing its assets. When it comes to return on equity, this ratio measures a firm's effectiveness in using its stockholders' equity to generate return (Gitman, Zutter, 2012, 130). Regarding liquidity measures, current ratio is a measure of liquidity, the ratio measures the ability of a company to meet its short-term debt using its short-term liabilities (Gitman & Zutter, 2015, 119). Moreover, cash ratio is a liquidity ratio that measures a firm's liquidity by depending only on the most liquid assets such as cash and cash equivalents, it indicates "the immediate liquidity of the firm", furthermore, a high ratio implies that the company "has not been using its cash to its best advantages .(Gibson, 2011, p.231).

Analysis of Data

For analysis, quantitative analysis was adopted to conduct the study. These included different techniques such as descriptive statistics, correlation, regression analysis and time series analysis. Moreover, the hypotheses have been tested by applying a linear regression, correlation on SPSS which is a statistical software used to analyse data. It must be noted that, the profitability ratios used in the study are the dependent variables whereas the independent variables are the liquidity ratios.

The ratios were computed, analysed, and compared in order to observe the trend within a time frame 2010-2018. Moreover, a correlation was applied to identify the correlation coefficients to be able to describe the strength of the relationship between the dependent and independent variables. For the study, five hypotheses have been formulated such as:

Ho: No relation exists between the liquidity and profitability.

H1: There is significant relationship between liquidity and profitability

H2: There is a positive relation between current ratio (CRR) and profitability

H3: There is a negative relation between current ratio (CRR) and profitability.

H4: There is a positive relation between cash ratio (CR) and profitability.

H5: There is a negative relation between cash ratio (CR) and profitability.

Findings and Analysis

Descriptive Statistics

Table 1: Descriptive Statistics of the Variables

Descriptive Statistics			
	N	**Mean**	**Std. Deviation**
ROE	54	8.4750	2.69228
ROA	54	0.8546	0.28108
CRR	54	1.0715	0.09203
CR	54	0.04846	0.029439
Valid N (listwise)	54		

- It should be noted that "N" represents the number of valid observations for each of the variables. Therefore, the total number of observations is the sum of "N" which is 216.

Table 1 represents descriptive statistics findings of all the variables used in the study. from the table above, it can be concluded that the mean of all the variables is positive because all the ratios are positive. On the other hand, the standard deviation of ROA, ROE CRR, and CR is low due to the less variation in the ratios.

Correlation

Table 2: Correlation

Graphical representation of the correlation is in Appendix C.

Correlations				
	ROE	**ROA**	**CRR**	**CR**

ROE	**Pearson Correlation**	1	0.863**	0.344*	-0.121
	Sig. (2-tailed)		0.000	0.011	0.385
	N	54	54	54	54
ROA	**Pearson Correlation**	0.863**	1	0.429**	-0.213
	Sig. (2-tailed)	0.000		0.001	0.122
	N	54	54	54	54
CRR	**Pearson Correlation**	0.344*	0.429**	1	-0.247
	Sig. (2-tailed)	0.011	0.001		0.071
	N	54	54	54	54
CR	**Pearson Correlation**	-0.121	-0.213	-0.247	1
	Sig. (2-tailed)	0.385	0.122	0.071	
	N	54	54	54	54
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Table 2 represents the findings of the different correlations between the dependent and independent variables. As shown in the table, the correlation between the dependent variables and the independent variables is only significant for one variable which is CRR. The results show that there is a significant positive relationship between ROA and CRR with a moderate correlation of 0.429 at the 0.01 level.

Additionally, there is a significant positive relationship between ROE and CRR with a weak correlation of 0.344 at the 0.05 level. Moreover, the table also reports another significant relationship between the dependent variables ROA and ROE as there is a significant strong positive correlation of 0.863 at the 0.01 level. Moreover, we conclude that the relationship between ROE and CR is very weak negative with a correlation of -0.121 and statistically insignificant. Therefore, we can conclude that profitability has a positive relationship with only one of the liquidity ratios which is CRR.

Linear Regression

Furthermore, in order to test the research hypotheses, SPSS software is used to apply a linear regression o n both of the dependent variables (ROA, ROE)and independent variables CRR, CR.

the results of table 3 are explained in the upcoming paragraphs. (f*or a graphical representation for ROE, see Appendix A, and for graphical representation for ROA see Appendix B.)*

Table 3.1 Model Summary (ROE)

Model Summary				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.346[a]	0.120	0.085	2.57517
a. Predictors: (Constant), CR, CRR				

The table above provides R, R^2, and adjusted R^2, as well as the standard of error of the estimate. R^2 indicates the amount of variance in ROE that is accounted or explained by CRR and CR. Therefore, since R^2= 0.12 we can say that, taken as a set, the predictors CR and CRR account for 12% of the variance in ROE. While "R" is the same as the Pearson correlation, the value of R is of 0.346. When it comes to the adjusted R square, we conclude that the independent variables can explain 8.5% of the variability of ROE. This result does not provide us with much explanatory power. The adjusted R square is "modified version" of R square and is usually lower because it only takes into consideration the number of predictors in the model.

Table 3.2 Analysis of Variance (ANOVA) - ROE

ANOVA[a]						
Model		Sum of Squares	Degrees of freedom	Mean Square	F score	Significance (Sig)
1	Regression	45.955	2	22.977	3.465	0.039[b]
	Residual	338.208	51	6.632		
	Total	384.162	53			
a. Dependent Variable: ROE						
b. Predictors: (Constant), CR, CRR						

Based on the results in the ANOVA table, we can conclude that the overall regression model is a good fit (significant) for the data since F (2,51) = 3.465, $p<0.05$, $R^2=0.12$. The significance level is 0.039 which is lower than 0.05 (test using alpha = 0.05). So, it means that the test and regression are significant, and the R square is significantly greater than 0. It also means that the predictors are able account for a significant amount of variance in ROE.

Table 3.3: Coefficients (ROE)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Significance (Sig)
		B	Standard Error	Beta		
1	(Constant)	-1.845	4.451		-0.415	0.680
	CRR	9.788	3.967	.335	2.467	0.017
	CR	-3.456	12.401	-0.038	-0.279	0.782
a. Dependent Variable: ROE						

Based on the results of the coefficients table, we can say that CRR explains a significant amount of unique variance in ROE since p=0.017 which is less than 0.05 (test at alpha =0.05, p). It should be noted that a “p-value” less than 0.05 represents statistical significance. Meaning that CRR explains uniquely a significant amount of variance in ROE. Additionally, CR is not significant since its p=0.78. Based on the unstandardized coefficients, we can conclude that for each increase in CRR, there is an increase in ROE of 9.788. on the other hand, we can say that for each increase in CR, there is a decrease in ROE of -3.456.

Table 3.4: Model Summary (ROA)

Model Summary				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.443[a]	0.196	0.165	0.25685
a. Predictors: (Constant), CR, CRR				

The table above provides R, R^2, and adjusted R^2, as well as the standard of error of the estimate. R^2 indicates the amount of variance in ROE that is accounted or explained by CRR and CR. Therefore, since R^2= 0.196 we can say that, taken as a set, the predictors CR and CRR account for 19.6% of the variance in ROA. While R is a measure of the quality of the prediction. The value of R is of 0.443 which indicates a fair level of prediction despite the limited data. When it comes to the adjusted R square, we conclude that the independent variables can explain 16.5% of the variability of ROA. This result does not provide us with much explanatory power however, the adjusted R square of ROA with the predictors is higher than the adjusted R square of ROE with the predictors. The adjusted R square is "modified version" of R square and is usually lower because it only takes into consideration the number of predictors in the model.

Table 3.5: Analysis of Variance (ANOVA) -ROA

ANOVA[a]						
Model		Sum of Squares	Degrees of Freedom	Mean Square	F score	Significance (sig)
1	Regression	0.823	2	.411	6.235	0.004[b]
	Residual	3.365	51	0.066		
	Total	4.187	53			
a. Dependent Variable: ROA						
b. Predictors: (Constant), CR, CRR						

Based on the results in the ANOVA table, we can conclude that the overall regression model is a good fit (significant) for the data since F (2,51) = 6.235, $p<0.05$, R^2=0.196. The significance level is 0.004 which is less than 0.05 (test using alpha = 0.05). So, it means that the test and

regression are significant, and the R square is significantly greater than 0. It also means that the predictors are able to account for a significant amount of variance in ROA. As the independent variables statistically significantly predict ROA.

Table 3.6: Coefficients (ROA)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.405	0.444		-0.913	0.366
	CRR	1.225	0.396	0.401	3.096	0.003
	CR	-1.088	1.237	-0.114	-0.880	0.383
a. Dependent Variable: ROA						

The table above reports on the results of the linear regression. Based on the unstandardized coefficients, we can conclude that for each increase in CRR, there is an increase of 1.22 in ROA. On the other hand, we can conclude that for each increase in CR, there is a decrease in ROA of -1.088.

Based on the results of the coefficients table, we can say that CRR explains a significant amount of unique variance in ROA since p=0.003 which is less than 0.05 (test at alpha =0.05). It should be noted that a "p-value" less than 0.05 represents statistical significance. Meaning that CRR explains uniquely a significant amount of variance in ROA. Additionally, CR is not significant since its p=0.383.

Therefore, based on the data available, this study could only measure one significant impact of liquidity ratios (CRR) on profitability (ROA, ROE).

Conclusion

The purpose of this research was to describe the relationship between bank liquidity and bank profitability of listed banks in CSE over a period of nine years from 2010 to 2018. Based on the findings of the study, we conclude that there is a significant positive relationship between

profitability and liquidity, so the null hypothesis (Ho) is rejected, and the alternate hypothesis (H1) is accepted. Moreover, there is a positive relationship between current ratio and profitability, therefore, hypothesis 2 (H2) is accepted and hypothesis 3 (H3) is rejected. Additionally, there is a negative relationship between cash ratio and profitability, therefore, hypothesis 5 (H5) is accepted and hypothesis 4 (H4) is rejected. It should be noted that, all banks are required and advised to maintain adequate liquidity to meet short-term liabilities, meaning that they should find the right balance to avoid any potential risks while keeping in mind shareholders' wealth as it is the primary goal of any business. Moreover, a bank cannot afford to have too high liquidity ratios as having an excess in liquidity implies that the bank is holding excessive cash on hand and investing only in short-term assets which only bring low returns. By doing so, the bank misses out on different long-term investment opportunities that may generate higher returns. Furthermore, current banking standards hinder profitability as they emphasize on a certain level of liquidity for a short-term period (30days). Therefore, banks cannot invest in long-term opportunities. Lastly, based on the results, CSE banks are complying with the current liquidity regulations and their financial performance has been improving over the years (2010-2018).

The conducted study is important as it covers one of the main concerns of numerous corporations, banks, and individuals nowadays. The new Covid-19 crisis has shuttered many firms while others are facing serious liquidity issues.

Limitations

Due to the lack of available information, the study focuses on the six banks listed on CSE, therefore, it covers only the data of those banks over a period of 9 years. For that reason, the study cannot be generalized to other banks or companies from other sectors and industries.

Current liquidity regulations

Regarding the regulations (e.g. Basel III) for CSE banks, Bank Al-Maghrib (BAM), which is the central bank of Morocco revealed in 2014 that "the Basel III standards on capital and liquidity entered into force and transitional provisions were laid down to support their implementation by the banking sector" (2014, p.95). As a matter of fact, the liquidity coverage ratio (LCR) became effective in "July 1st 2015", after that date banks were required to comply with the regulations of the new Basel III standards and respect a minimum ratio of "60 percent in 2015, 70 percent in 2016, 80 percent in 2017, 90 percent in 2018, and gradually progressing to 100% in 2019". Additionally, BAM also paid special attention to the implementation of the Basel III standards for capital, as CSE banks are required to comply with the regulations on consolidated as well as individual basis with a "core-capital ratio of no less than 8.0% (including a conservation buffer of 2.5%), a Tier 1 capital ratio of no less than 9.0%, and a Tier 1 and Tier 2 capital ratio of no less than 12.0%".

Future Research Implications

- The conducted study may be generalized only if it covered other banks from other countries or continents as the findings of the study would cover a larger population and would be more accurate and reliable.
- The conducted study may be more accurate if it also covered other banks that are not listed, however, due to the constraint of lack of information, they were excluded.
- An unpredictable event like Covid-19 may further shed light on the advantages of utilizing liquidity to ensure long-term profitability.

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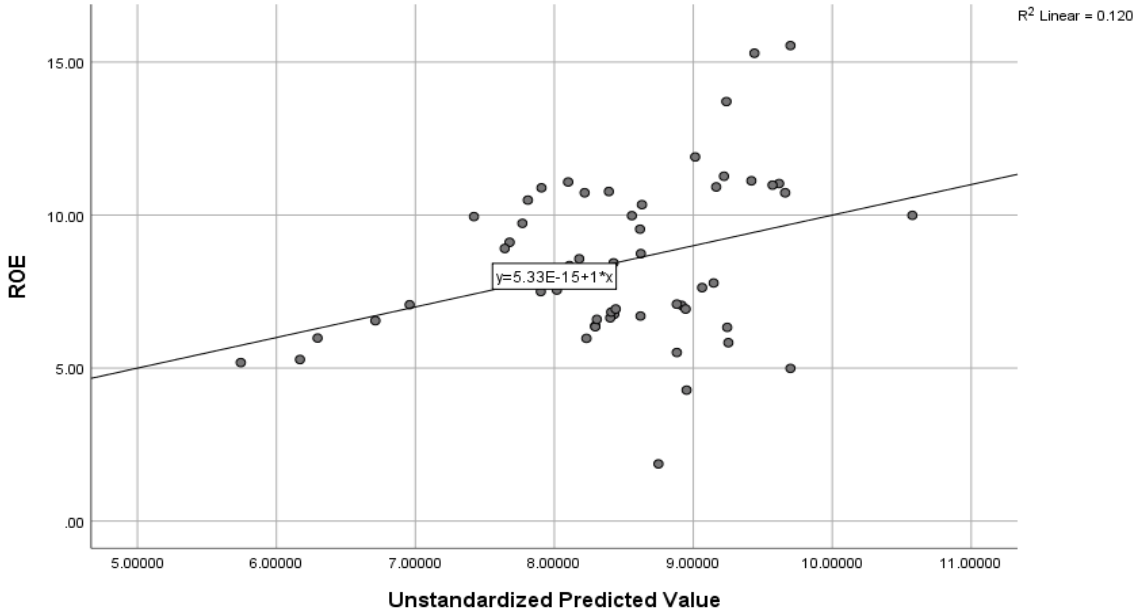
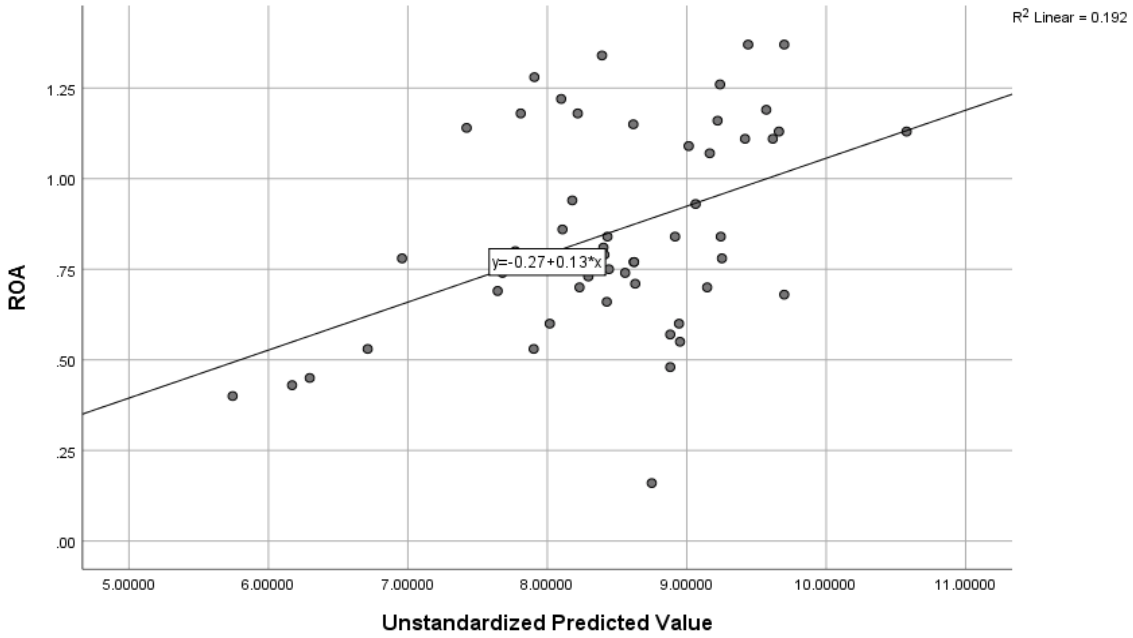
Appendices

Appendix A



The above graph is a representation of the multiple regression between ROE and independent variables.

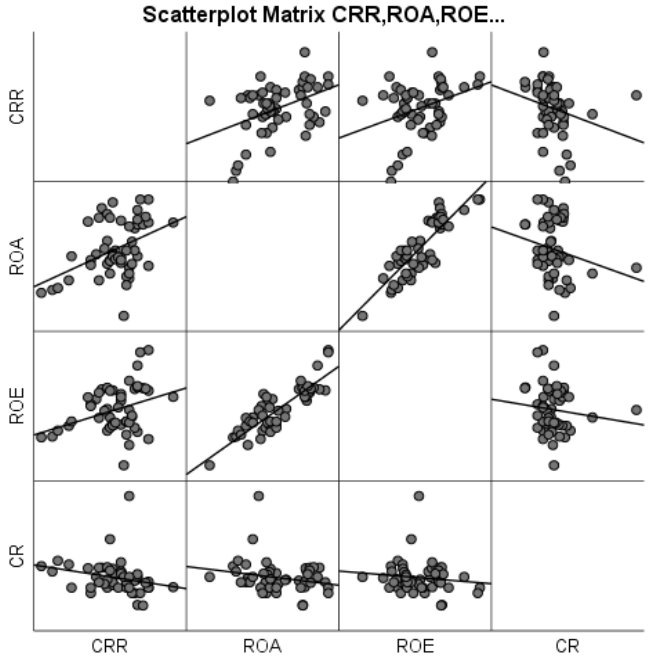
Appendix B



The above graph is a representation of the multiple regression between ROA and independent variables.

Appendix C

Correlation Matrix



Appendix D

The data used in the study is as the following:

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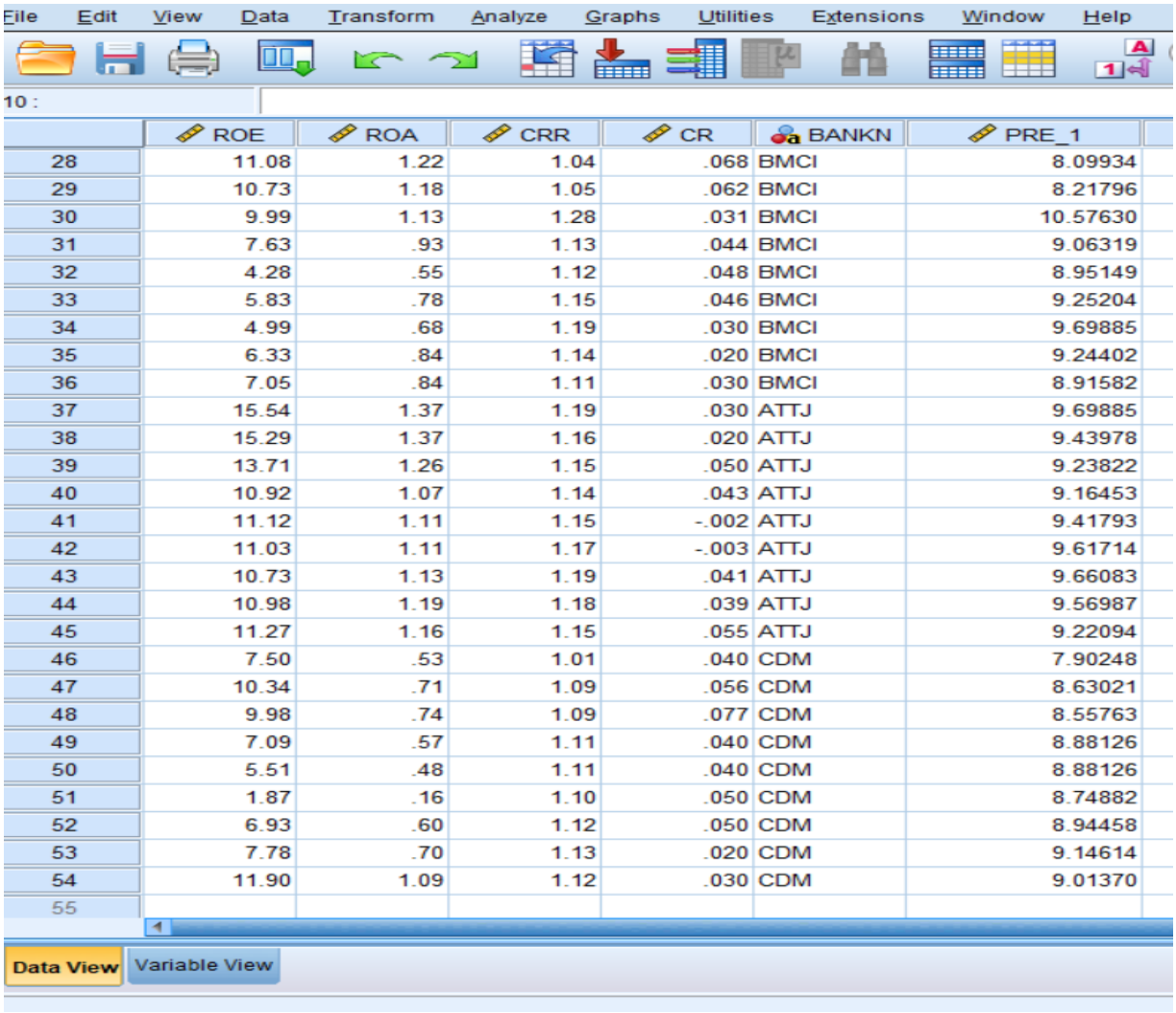
	ROE	ROA	CRR	CR	BANKN	PRE_1
1	5.18	.40	.80	.070	BMCE	5.74335
2	5.28	.43	.84	.060	BMCE	6.16942
3	5.98	.45	.86	.080	BMCE	6.29606
4	6.55	.53	.90	.073	BMCE	6.71176
5	9.73	.80	1.00	.050	BMCE	7.77004
6	9.11	.74	.98	.020	BMCE	7.67796
7	8.91	.69	.98	.030	BMCE	7.64340
8	8.44	.66	1.12	.200	BMCE	8.42618
9	7.55	.60	1.05	.120	BMCE	8.01751
10	6.76	.84	1.07	.057	BP	8.43100
11	6.64	.81	1.06	.037	BP	8.40224
12	6.38	.74	1.05	.040	BP	8.29399
13	5.97	.70	1.04	.030	BP	8.23067
14	6.35	.73	1.05	.040	BP	8.29399
15	6.83	.79	1.06	.035	BP	8.40915
16	6.59	.78	1.06	.065	BP	8.30547
17	6.70	.77	1.09	.059	BP	8.61984
18	6.93	.75	1.07	.054	BP	8.44136
19	7.07	.78	.91	.030	CIH	6.95825
20	9.54	1.15	1.09	.060	CIH	8.61638
21	10.77	1.34	1.06	.040	CIH	8.39187
22	10.89	1.28	1.02	.067	CIH	7.90704
23	9.95	1.14	.97	.066	CIH	7.42111
24	10.49	1.18	1.01	.067	CIH	7.80916
25	8.57	.94	1.04	.045	CIH	8.17883
26	8.35	.86	1.03	.037	CIH	8.10860
27	8.74	.77	1.08	.030	CIH	8.62219
28	11.08	1.22	1.04	.068	BMCI	8.09934

Data View Variable View



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10 :

	ROE	ROA	CRR	CR	BANKN	PRE_1
28	11.08	1.22	1.04	.068	BMCI	8.09934
29	10.73	1.18	1.05	.062	BMCI	8.21796
30	9.99	1.13	1.28	.031	BMCI	10.57630
31	7.63	.93	1.13	.044	BMCI	9.06319
32	4.28	.55	1.12	.048	BMCI	8.95149
33	5.83	.78	1.15	.046	BMCI	9.25204
34	4.99	.68	1.19	.030	BMCI	9.69885
35	6.33	.84	1.14	.020	BMCI	9.24402
36	7.05	.84	1.11	.030	BMCI	8.91582
37	15.54	1.37	1.19	.030	ATTJ	9.69885
38	15.29	1.37	1.16	.020	ATTJ	9.43978
39	13.71	1.26	1.15	.050	ATTJ	9.23822
40	10.92	1.07	1.14	.043	ATTJ	9.16453
41	11.12	1.11	1.15	-.002	ATTJ	9.41793
42	11.03	1.11	1.17	-.003	ATTJ	9.61714
43	10.73	1.13	1.19	.041	ATTJ	9.66083
44	10.98	1.19	1.18	.039	ATTJ	9.56987
45	11.27	1.16	1.15	.055	ATTJ	9.22094
46	7.50	.53	1.01	.040	CDM	7.90248
47	10.34	.71	1.09	.056	CDM	8.63021
48	9.98	.74	1.09	.077	CDM	8.55763
49	7.09	.57	1.11	.040	CDM	8.88126
50	5.51	.48	1.11	.040	CDM	8.88126
51	1.87	.16	1.10	.050	CDM	8.74882
52	6.93	.60	1.12	.050	CDM	8.94458
53	7.78	.70	1.13	.020	CDM	9.14614
54	11.90	1.09	1.12	.030	CDM	9.01370
55						

Data View Variable View

Appendix E

The following table presents the minimum required LCR under Basel III standards:

	2015	2016	2017	2018	2019
Minimum LCR	60%	70%	80%	90%	100%

Appendix F

The following graph presents the LCR of CSE banks over the past few years 2015-2018