

The Nexus between Liquidity and Securities Market Returns among Listed Commercial Banks in Kenya

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Abstract

This study sought to determine connection between liquidity and bank stock returns of listed commercial banks at the Nairobi Securities Exchange in Kenya. The study's specific objectives were: to determine the effect of liquidity on stock returns of listed commercial banks and to establish the direction of causality effect between bank liquidity and bank stock prices in Kenya. The study targeted all the 11 commercial banks listed at the Nairobi Securities Exchange. Due to the small number of listed banks, a census was undertaken. Secondary panel data was used. The data collected ranged between 2010 and 2019. Analysis was carried out with the use of EViews, a statistical software. Descriptive and inferential statistics were analyzed. The descriptive statistics incorporated the minimum, mean, maximum and standard deviation as well as jarque berra statistics. Inferential statistics involved the correlation coefficients and regression coefficients. A pooled panel regression model was used in estimation of the significance of the impact of the variables. A pairwise granger causality test was conducted on the variables under study. All tests and inferences were made at the 0.05 significance level. The study concluded that bank liquidity had a negative and a significant relationship with stock returns of listed commercial banks. The higher the liquidity the lower the market returns and vice versa. Investors prefer to buy shares of firms with lower liquidity levels. It was also established that bank stock returns granger caused bank liquidity in a unidirectional manner. The study recommends that commercial banks should invest in active liquidity management by investing funds in appropriate projects.

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I. Background

It is necessary for all banks to maintain the recommended liquidity levels since this is key to ensuring that the banks can address their financial obligations in timely fashion. Fulfilling liquidity requirements is the bank's responsibility to its stakeholders and shareholders will assess liquidity levels before making investments in a company's stocks (Rhyne & Otero, 2006). Maintaining required liquidity levels also acts as a cushion in times of crisis. In the financial sector, liquidity management is paramount since the banks deal directly with customer's cash and cash reserves (Claessens & Lee, 2003). It is necessary to provide for efficient balance between profitability and liquidity. Banks which fail to adequately address their short-term liabilities and loan obligations have been severely impacted in the past since it could result in increased expenses which reduce money that should be shared among shareholders as dividends (Olweny & Shiphoo, 2011). Liquidity is calculated as Cash to deposit ratio; Total investment to total deposit ratio.

The stability of the banking sector within stock markets is of great importance due to the fact that an increase in stock returns indicates increased confidence in a company or sector while poor stock performance is an indication of an ineffective financial system and affects bank returns expressed in reduced dividend payouts to shareholders. Nevertheless, this has not been the case in the Kenyan stock market as a look at the stock price index of listed commercial banks at the NSE indicates continuous fluctuations in the stability of the banks. Looking at the stock price index for these banks showed that they remained fairly stable for the period between 2000 and 2002 but the index generally went up in the period between 2003 and 2008. The index appears to have dipped to their earlier trading levels immediately after 2008 and remained stable up to 2012.

The volatility of an organization's share price is an indication of the level of systemic risk faced by prospective investors. High volatility leads to reduced investment in a firm by external shareholders and this can have a negative impact on the firm's ability to meet its financial obligations not only to investors but also to the suppliers and even to government agencies. Firms, therefore, take measures to ensure that the value of their shares remains positive for long periods of time.

Koskei (2017) notes that any downward movement in stock value returns motivates employees to seek new investment options. The study argues that rising share prices is associated with increased business

investment; and is an indicator of a healthy economy. The global financial crisis prompted increased scrutiny on the impact of the structure of stock markets to enhance stability of the financial sector.

Banks with dismal performance usually erode shareholder value and put job security in stock brokerage firms and investment banks at risk (Anyanzwa, 2017). Poor stock performance affects banks, exposing investors to losses worth millions of dollars. Inconsistency in performance would result in a plummeting of the bank's share prices at the stock exchange, affecting brokers and investment bankers whose main source of income is the consultancy fees and commission income from trading in shares and bonds. On the other hand, in a thriving market, investment bankers have the advantage of diversifying their income sources.

Liquidity issues among banks have also adversely affect listed banks. In October 2015 and April 2016, the Central Bank of Kenya placed Dubai Bank, Imperial Bank and Chase Bank under receivership due to liquidity crisis that threatened the normal operations of these banks. This led to the reaction of the stock prices of other listed banks due to inter-banking issues. Even though these cases raised concerns over the effect of banks' internal environment on their stock market performance, the link between various bank specific factors and the stock returns of listed banks in Kenya was scantily explored as a large number focus on macroeconomic factors.

Greater turmoil was experienced in 2016 with the implementation of the interest capping where banks made negative gains in their stock's prices by up to between 4.94% to 50.48% (Kimunge, 2017) National Bank of Kenya experiencing the highest loss. Furthermore, with the poor performance exemplified by banks particularly Dubai Bank Kenya, Imperial Bank and Chase Bank Kenya seeing them being put under receivership and also the bad debts incurred at the National Bank Ltd., stocks of listed banks started recording declines, sending the industry into a low discouraging some investors from buying banks' stocks and bonds (Muriungi, 2016).

Stock return represents the increase or reduction in a share's value over a period of time, and it is quoted in percentage form (Barber *et al.*, 2001). It shows the investor the value of returns from the stocks they invested in. It is the difference in value of the price of the same stock overtime divided by the price with which it was purchased (Elton, *et al.*, 2009) They are the gains that investors make on their investment, meaning that all investors invest with the aim of earning from the amount they spent on a particular investment option, making it the main driver for increased investment. Jeyanthi and William (2010) define stock return as the profit resulting from increased earnings of stocks.

There are various factors which have a direct effect on the price movement of stocks from day to day, thus impacting the stock market volatility index (Qiu & Song, 2016). Firm internal factors, like favorable earnings, may improve the stock price due to increased demand (Ali, 2011) The macroeconomic environment also has factors such as social, political and legal environment in which also directly impact the firm's setup and approach (Gay, 2016). Potential investors formulate expectations about the stock market before making investment decisions based on their risk appetite by evaluating the overall climate and other firm specific factors (Peric & Đurkin, 2015)

II. Literature

Portfolio theory, a major theory on stock returns was advanced by Harry Markowitz in 1952. Until 1950s, the John Burr Williams present value model was the most appreciated guide to investors hoping to invest in individual stocks. Harry M. Markowitz was a doctoral student of economics at University of Chicago, noticed that financial literature at that time did not factor the impact of risk. He also noted a general lack of understanding of impact of risk at portfolio level. He decided to research this subject and eventually published the results in this seminal paper called Portfolio Selection. Using defensible logic (statistics, mathematical formulas and graphs), through his thesis, he introduced the mean-variance model which uses variance of past returns as a proxy for risk and mean past returns as one of the indicators of expected returns. His studies also led to the development of the notion that efficient portfolios are those which yield the highest returns while encountering the least amount of risk. He was among the first scholars to identify the and advocate for the impact of diversification (Meggison, 1996). His thesis did not change the world, however, his recognized book, Portfolio Selection: Efficient Diversification of Investments led to a change in the way investors approached risky investments. This paper and the book altogether became known as the Modern Portfolio Theory (MTP) by Harry M. Markowitz (Kamisetty, 2019).

In 1958, economist James Tobin in his essay, "Liquidity Preference as Behavior Toward Risk," in Review of Economic Studies, derived the 'Efficient Frontier' and 'Capital Market Line' concepts based on Markowitz' works. Tobin's model maintains that regardless of the level of risk that an asset exposes itself to, investors will maintain stock portfolios in the same proportions as long as they "maintain identical expectations regarding the future" (Meggison, 1996). Tobin concludes that the difference in investment portfolios will only arise from the difference in the value of proportions of stocks and bonds.

The Capital Asset Pricing Model (CAPM) was born from studies by William Sharpe, John Lintner, and Jan Mossin (1962), who expounded on Markowitz' and Tobin's works (Meggison, 1996). This model was an

important evolutionary step in the theory of capital markets equilibrium. This model advocated for the valuation of securities as a function of systematic risk. The CAPM was instrumental to Sharpe (1964) in his development of the Efficient Frontier and Capital Market Line concepts. His model was so significant that he won the Nobel prize for his contribution to the field of economics. In 1965 Lintner, (1965) used the CAPM to propose the concept of deriving company value from the quality of shares. Mossin then advanced the CAPM in 1966 by specifying quadratic utility functions (Megginson, 1996). There have been developments in the field since then, but none have had as much an impact on different MPT approaches as the works mentioned above (Mangram, 2013).

Generally, modern portfolio theory as an investment theory bases itself on the idea that risk-averse investors have the capacity to design and maintain portfolios optimized to realize the highest amount of profits at the lowest level of market risk. According to the theory, risk is one of the requirements for high forms of rewards (Persson, Lejon, & Kierkegaard, 2007). The MPT posits that investors build portfolios off of risk taking and risk averse behavior for the eventual trade off(s) (Markowitz, 1952) It assumes that it is in human nature to take a certain amount of risk with the hope of realizing a specific level of return. This results in individuals having portfolios whose assets are designed to realize the highest returns while being exposed to the least amount of risk. Such portfolios tend to have a high degree of diversification making their overall management quite simple since the individual assets are exposed to the least amount of risk in the markets.

Firm specific variables and macroeconomic variables have a significant impact on the overall performance of businesses within their operating environments (Pandey, 2009). These differences in the operating environment impact the businesses' ability to realize returns on the projects that they have made investments in, resulting in increased income fluctuations. Increased uncertainty results in increased risk that the value of certain assets may plummet. The managements should therefore have the ability to discern the difference between internal and external changes that can increase or reduce uncertainty associated with valuable stocks of the company and adapt accordingly as quickly as possible (Brueggeman *et al.*, 2011).

This theory gave investors the power to demand portfolios that fit their current demands and risk aversion or attraction, as opposed to taking any available portfolios. It attempts to explain why some investors will invest in the stocks of some banks and not in others. It allows for bullish investors to make risky bets while bearish investors make less risky bets. The Capital Asset Pricing Model is an effective tool for investors hoping to create balanced portfolios. The theory was paramount to the study since it explains the need for commercial banks to reduce or diversify their level of risk exposure according to the internal factors which impact their decisions, performance and hence the returns from their investments.

On the other hand, the importance of liquidity goes beyond the individual bank as a liquidity shortfall at an individual bank can have systemic repercussions (CBK, 2020). It is argued that when banks hold high liquidity, they do so at the opportunity cost of some investment, which could generate high returns (Kamau, 2009). The trade-offs that generally exist 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's return but also increases its liquidity risks and the inverse is true. Thus, a high liquidity ratio indicates a less risky and less profitable bank (Hempe l et al, 1994). Thus, management is faced with the dilemma of liquidity and profitability. Myers and Rajan (1998) emphasized the adverse effect of increased liquidity for financial Institutions stating that, "although more liquid assets increase the ability to raise cash on short-notice, they also reduce management's ability to commit credibly to an investment strategy that protects investors" which, finally, can result in reduction of the "firm's capacity to raise external finance" in some cases (Olweny & Shipho, 2011)

In Kenya the statutory minimum liquidity requirement is 20%. However, according to CBK Bank (RBZ, 2018), the average liquidity ratio for the sector was 48.4% in 2018, 44.0 % in 2017 and 40.3% in December 2016, way above the minimum requirements. This has baffled many financial analysts as to how could banks withhold such amount of cash in a credit needy economy such as Kenya (Kamau, 2009). The CBK attributes this to the banking industry's preference to invest in the less risky government securities, while Kamau, (2009) attributes this liquidity problem to the restrictions placed on commercial banks at the discount window, coupled with thin interbank market, a high reserve requirement and preference of government securities..

Liquidity is defined as all the cash and cash equivalents or assets that the bank can convert on request to meet their short-term responsibilities (Olweny & Shipho, 2011) Liquidity is expressed as a fraction of liquid to total assets and bank's advances to deposits. Liquidity is way for investors to determine the ability measures. Due obligations. Liquidity ratio is a key measure of performance since it determines the firm's ability to meet short term obligations through adopting certain measures such as converting certain assets to cash (Banafa *et al.*, 2015). It expresses the bank's ability to service its assets to immediately meet cash, cheques, other withdrawals obligations and legitimate new loan demand without violating minimum reserve requirements (Banafa, 2016)

To adhere to these regulations, banks closely follow and control the quantity of long-term and short-term loans (Elliott, 2014).. The ability to access short-term sources of finances ensures that the banks are able to maintain a buffer against shocks. Managements function to reduce liabilities and improve the quality of assets

since failure to do so could lead to penalties due to violation of the operating requirements (Mwangi, & Iraya, 2014). Liquidity management, therefore, constitutes the strategic supply or withdrawal of capital relative to the volume of capital in holding to ensure that there is no interference with the bank's responsibilities with its stakeholders (Ibe, 2020). It is a consistent process which requires daily assessment of the banks' liquidity rating. This is necessary to determine the volume of liquidity that should be supplied to or withdrawn from the market (Njeri, 2014).

Effective liquidity management ensures that the firms are able to sustain their profit ratios ensuring that the financial system remains healthy and safe from eventualities such as insolvency (Agbada, Andrew & Osuji, 2013). Banks have to maintain adequate cash reserves and near cash assets such as securities which can be useful should there arise the need to meet certain financial obligations (Marozva, 2017). Maintaining positive balance sheets would not only secure a country's financial system but also its economic integrity since the banks, which are financial intermediaries work under favorable economic conditions and with adequate liquidity (Okaro & Nwakoby, 2016).

(Heryanto, 2016) assessed companies at the Indonesian Stock Exchange with the aim of determining whether liquidity ratios impact stock returns of banks. The study applied a descriptive study design on a population of 29 banks. Data was sought from reports which ranged from 2009 to 2010. of the entire population, a sample of 26 banks was taken. The study found that liquidity negatively and significantly impacted the stock returns of the banks. This was similar to findings by Sitorus & Elinarty, (2017) who found that liquidity had a negative influence towards the growth of stock prices of Indonesian banks. The study used dividend payout as a measure of stock growth and spanned from 2011 until 2014. The study applied an explanatory research design on a population of 30 banks. Anwaar (2016) assessed how overall performance impacted returns of stocks of companies listed at the FTSE-100 Index London, UK over the period 2005 to 2014. The study applied a descriptive study design on a sample of 30 firms. Earnings ability improved stock returns of the banks while liquidity as measured by quick ratio was noted to have minimal effects on stock returns. Rjoub *et al.*, (2017) conducted a study focusing on the effect of micro and macroeconomic determinants of stock prices in the Turkish banking sector. The study adopted a panel data approach and the findings showed that micro and macroeconomic determinants of stock prices in Turkish banking sector.

Muchiri (2014) carried out a Kenyan study which aimed to assess the impact of effective liquidity management on stock market returns of the country's banks. The study applied a descriptive design on a population of 11 banks. The study eliminated banks which lacked adequate reports and remained with a sample of 9 banks. The study period spanned from 2009 to 2013. The study determined that stock return have a negative and significant relationship with liquidity management. Stocks which were thought to have lower or higher liquidity ratios experienced low returns. The researcher demonstrated that this was a result of the market assuming that the banks had failed to properly implement liquidity management decisions. High liquidity levels are interpreted to impact investment while low liquidity was associated with over investment. This showed that it is crucial for banks to maintain the recommended liquidity levels by employing competent liquidity management policies, since this would see better valuation of their stocks in the market.

Ngira, et al., (2014) looked into the impact of liquidity management on returns of NSE-listed banks in Kenya. The study used data from 2008 to 2013 and adopted a descriptive research design. A census of all the 63 companies (excluding companies that had an industry regulated policy and those that did not have continuous trading during the period of study, that was 2008-2013) listed at the NSE in Kenya. The proxy for liquidity management was quick ratio. Results showed that there was a significant difference between the market performance of liquid companies and that of the illiquid companies. Management of liquidity levels significantly impacted returns among illiquid companies. The portfolios of liquid companies reported greater returns and gains than portfolio of illiquid companies. The difference in quality of returns was interpreted to be a result of the nature of the risks involved in the portfolios of the two types of companies. The study concluded that liquidity management impacted illiquid companies more than it impacted liquid companies since this effect was more pronounced with an increase in illiquidity levels.

Aiyabei, Macharia and Olweny, (2019) looked into the relationship between liquidity and idiosyncratic volatility of stock returns among listed firms in Kenya. The study adopted both Correlation and Descriptive research design. The study determined a strong and positive relationship between idiosyncratic volatility and listed firms' stock returns. Mwangi, Muturi, and Kibati (2019) looked into the relationship between liquidity and unit trust price volatility of companies listed at the Capital Markets Authority in Kenya. Data analysis revealed that liquidity has a statistically strong relationship with returns among unit trusts.

Although the above studies established a relationship between liquidity and stock performance, Ngira, Oluoch, & Kalui, (2014) and Heryanto (2016) among others adopted a descriptive study design. These methodologies differed from that which was adopted in this study which is a descriptive explanatory design which combined both descriptive and explanatory research designs. Aiyabei, *et al.*, (2019) assessed liquidity and idiosyncratic volatility while adopting a Correlation and Descriptive research design. Mwangi, Muturi, and Kibati, (2019) focussed on unit price volatility and not on stock returns. Hence, the study sought to

provide an in-depth discussion of the effect of bank specific factors on the stock returns of Kenyan banks which is conspicuously missing.

III. Research Methodology

Research Design

A descriptive research design was applied. The descriptive research design was used due to its ability to depict the actual nature of the subjects under study in their present environments. Kothari, (2012) noted that this type of research design focuses on analyzing complex variables and revealing any association that may exist between them. This design in particular allowed the researcher to describe and present liquidity and stock returns of the banks under study so that a true picture of the study variables in these banks was painted.

Furthermore, by conducting complex analyses mainly through inferential analysis, the use of this design allowed the researcher to make inferences from the data pertaining the relationships that exist between the study variables (Cooper & Schindler, 2011). By revealing the causal relationship existing between the variables, the researcher was able to establish how bank specific characters impact the value of returns of bank stocks in Kenya. This design was also easy to plan and execute, making it easy for the researcher to collect and analyze real-time data pertaining to the issues in the research.

Target Population

(Sekaran, 2013) defined a population as the total collection of elements which a researcher uses to make inferences from. This study's population consisted of all the 11 banks listed at the Nairobi Securities Exchange (Central bank of Kenya, 2020). A census of all the 11 banks, as referred to the appendix, was taken due to the minimal population which is relatively cheap to manage and source data from.

Data Collection Instrument and Procedures

The study sourced secondary data across a ten-year period. The data was retrieved from financial reports from the companies, as well as from existing reports within the CBK and NSE databases. The study utilized panel data from 2010 to 2019. This study period had been considered since it consisted of periods when banks under study experienced times of stability and also turmoil. Furthermore, this period had witnessed several major developments and changes within the banking sector such as interest capping and heightened financial innovations that were likely to affect some of the bank specific factors such as earnings and efficiency and ultimately their stock market performance. The period also encompassed major events such as the placing under receivership of some banks and also fluctuating political risk that are likely to affect the operations of the banks under study. Moreover, the NSE had undergone various crucial developments especially in legal and institutional changes which were aligned with global standards affecting listed firms.

Liquidity in this study was measured in terms of total loans to total deposits.

Liquidity = $\frac{\text{Total Loans}}{\text{Total Deposits}}$

Quarterly panel data of the banks' total loans and total deposits was sourced from the statements and reports from the banks. The period of collecting the data was one month and the data was expressed in percentage form before the analysis was carried out. The stock returns of the banks were measured using the bank stock prices where quarterly averages of the stock prices of the banks at the NSE were used. The ratio was expressed in percentage form before the analysis as follows:

$$\text{Stock Returns} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where, P_{t-1} is quarterly average stock price of the previous quarter while P_t is quarterly average stock price at a particular quarter.

$$SR_{it} = \alpha_0 + \beta_s L_{it} + \varepsilon_{it}$$

SR_{it} = Stock Returns of bank i at time t

α_0 = Intercept

β_s = Coefficient of the explanatory variable

Subscript i = Banks (cross-section dimensions) ranging from 1 to 11;

Subscript t = Years (time-series dimensions) ranging from 2010 to 2019;

ε_{it} = Composite error term of the model.

L_{it} = Liquidity of bank i at time t

Data Analysis

According to (Burns, and Grove, 2005), data analysis is the reorganization of data to produce findings that the researcher can interpret without additional challenges. Data analysis involved descriptive, correlation, and panel regression analysis. The EVIEWS software was useful in organizing panel data methodology. Descriptive statistics involved minimum, maximum, mean and the standard deviation expressions to assist in summarizing the findings. The correlation analysis was conducted to establish the direction, strength and

significance of the association between the study variables. The regression analysis enabled the quantification of the effect of each bank specific factor on stock returns. The direction and significance of the effect was assessed. All inferences were made at the 0.05 significance level. The results were presented in tables and figures. Trend analysis for each variable was also given.

Upon accounting for violations of classical linear assumptions, the Feasible Generalized Least Square estimation was carried out. Panel data estimation can be carried out with the help of three models: Pooled Ordinary Least Square (OLS) regression model, Fixed Effect (FE) model and Random Effect (RE) model (Baum, 2006). All three models were applied to the data before selecting the most appropriate model. This study settled on FE or RE models after encountering unfavorable limitations with the Pooled Ordinary Least Square (OLS) regression model.

The normality assumption ($ut \sim N(0, \sigma^2)$) is necessary for the conduction of single or joint hypothesis testing on the model parameters (Brooks, 2008). The Bera and Jarque, (1981) tests of normality were carried out to determine whether the data was from a normally distributed sample. If the p-value is less than 0.05, the null of normality at the 5% level was rejected.

The multicollinearity test helped in identifying any high inter-correlations among the independent variables which might make it difficult for the researcher to determine the importance of a given predictor. Variance inflation factor was preferred over the Pearson correlation coefficients when measuring for multicollinearity. All VIF factors that were between 1 and 10 were adopted since they indicated zero multicollinearity.

The term autocorrelation may be defined as correlation between members of a series of observations ordered in time [as in time series data] or space [as in cross-sectional data]. The presence of serial correlation would be a clear indication that the variables in the model violate the assumptions of the regression (Honnery *et al.*, 2004). The study applied the Durbin-Watson test to determine the correlation.

The nature of the data raises concerns of heteroscedasticity. The classical linear regression model assumed that the error term is homoscedastic, that is, it has constant variance. Inconsistent error variances pointed to the existence of heteroscedasticity, which would limit the results of the analysis. The Likelihood ratio tests was applied. Presence of heteroscedasticity would reject the null hypothesis that the error variance is homoscedastic. A FGLS model would be executed if the researcher determined heteroscedasticity in the panel data.

The nature of the data prompted the stationarity test. Unit root tests were carried out on all the study variables. The Levin, Lin & Chu t^* statistic test was executed to test the properties of the data series. The Levin, Lin & Chu t^* statistic tested the null hypothesis of non-stationarity against the alternative hypothesis of stationarity. The rejection criterion was that if Levin, Lin & Chu t^* statistic is less than the p value at 1%, 5%, 10% level of significance, then the null hypothesis is rejected.

Differencing was undertaken for those variables found to be non-stationarity.

IV. Findings and Discussions

Descriptive Analysis

The study focus was the 11-listed commercial banks in Kenya. The study utilized secondary research data collected for the period 2010-2019 with liquidity and stock the summary of the descriptive analysis is discussed in Table 4.1 below. The key for interpretation is as follows; SR- stock returns and LQ – liquidity.

Table 4.1 Summary of Descriptive Research Observations

| | LQ |
|------------------|----------|
| Mean | 0.83889 |
| Median | 0.81377 |
| Maximum | 1.590949 |
| Std. Dev. | 0.204877 |
| Skewness | 1.034913 |
| Kurtosis | 4.76512 |

The study findings presented indicate that listed commercial banks had attained an average of 0.008 in their stock returns between the period 2010-2019. This shows that investors are generally making gains on their investments. The study results also show that the maximum attained stock return was 46.78% within the same period with a minimum of -75%. This shows that some of these companies are making significant losses on their stocks hereby discouraging investors from investing.

The research also showed that the maximum liquidity was 1.59 compared to a minimum of 0.33. These were all in line with the Central Bank’s regulation which require the minimum liquidity to be 20%. According to (Agbada and Osuji, 2013), these results show that all the commercial banks have effective liquidity management which ensures that the firms are able to sustain their profit ratios ensuring that the financial system remains healthy and safe from eventualities such as insolvency.

The research conducted correlation analysis to establish the type of association between liquidity and the stock returns of the listed banks. The correlation tests have values ranging from -1 to +1 which are an indication of the strength of the interaction between the study variables. The study analyzed the effect of liquidity on the stock returns of the listed commercial banks in Kenya. The results of the study established that liquidity has a negative and insignificant effect on the stock returns of the listed commercial banks in Kenya ($r = -0.0747$). These results are in line with (Anwaar (2016) who found minimal effect of liquidity on stock returns among listed UK banks.

Diagnostic Tests

The study applied linear regression assumption tests to determine the suitability of the research data. The main tests adopted in the analysis were normality tests, collinearity tests, autocorrelation, heteroscedasticity and stationarity test.

This study adopted the Bera, and Jarque, (1981) tests of normality to examine if the data was from a normally distributed sample. The tests criterion examines whether the significance value is less than 0.05.

Table 4.2 Jarque Bera Results

| | SR | Liquidity |
|--------------|----------|-----------|
| Jarque-Bera | 82.56655 | 135.6635 |
| Probability | 0.7040 | 0.000000 |
| Observations | 440 | 440 |

The test results indicated that except for stock returns ($J-B = 82.5665$, $Prob = .704$) the null of normal distribution based on the Jarque-Bera test was accepted for the other variables.

The research applied the Variance Inflation Factor to determine the level of collinearity between the predictor variables. All VIF factors that were between 1 and 10 were adopted since they indicated zero multicollinearity.

Table 4.3 VIF Results

| Variance Inflation Factors | | |
|----------------------------|-------------|----------|
| Sample: 2010Q1 2019Q4 | | |
| Included observations: 440 | | |
| Variable | Coefficient | Centered |
| | Variance | VIF |
| Liquidity | 0.001203 | 1.361815 |

liquidity ($VIF = 1.362$). This indicated there was zero correlation problem in the research since all the VIF values were below 10.

The presence of serial correlation would be a clear indication that the variables in the model violate the assumptions of the regression (Honnery *et al.*, 2004). The study applied the D-W tests.

The Likelihood Ratio test was applied to test for the existence of heteroscedasticity. The findings are shown below.

Table 4.4 Heteroscedasticity Results

| Panel Period Heteroskedasticity LR Test | | | |
|--|--|--|--|
| Null hypothesis: Residuals are homoscedastic | | | |
| Specification: SR C Capital Adequacy Asset Quality | | | |
| Management Efficiency Earnings Liquidity | | | |

| | Value | df | Probability |
|------------------|----------|----|-------------|
| Likelihood ratio | 168.1331 | 11 | 0.0000 |

LR test summary:

| | Value | df |
|-------------------|----------|-----|
| Restricted LogL | 256.8865 | 434 |
| Unrestricted LogL | 340.9530 | 434 |

The study results demonstrated a Likelihood ration Prob =.000<.05 which was an indication that there was no heteroscedasticity presence in the study data.

Stock returns was found to be stationary at intercept and level I (0) because the Levin, Lin & Chu t* statistic had a probability value of 0.0000 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that Stock returns has a unit root.

Table 4.7 Unit Root Test Stock Returns

Panel unit root test: Summary
 Series: SR
 Sample: 2010Q1 2019Q4
 Exogenous variables: Individual effects
 User-specified lags: 1
 Newey-West automatic bandwidth selection and Bartlett kernel
 Balanced observations for each test

| Method | Statistic | Prob.** | Cross-sections | Obs |
|--|-----------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) | | | | |
| Levin, Lin & Chu t* | -6.77904 | 0.0000 | 11 | 418 |
| Null: Unit root (assumes individual unit root process) | | | | |
| Im, Pesaran and Shin W-stat | -8.33874 | 0.0000 | 11 | 418 |
| ADF - Fisher Chi-square | 111.362 | 0.0000 | 11 | 418 |
| PP - Fisher Chi-square | 130.466 | 0.0000 | 11 | 429 |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Stock returns was found to be stationary at first difference I (I) because the Levin, Lin & Chu t* statistic had a probability value of 0.0000 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that Stock returns has a unit root.

Table 4.8 Unit root tests at first difference I (I) Stock Returns

Panel unit root test: Summary
 Series: D_SR
 Sample: 2010Q1 2019Q4
 Exogenous variables: Individual effects
 User-specified lags: 1
 Newey-West automatic bandwidth selection and Bartlett kernel
 Balanced observations for each test

| Method | Statistic | Prob.** | Cross-sections | Obs |
|--|-----------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) | | | | |
| Levin, Lin & Chu t* | -14.7013 | 0.0000 | 11 | 407 |
| Null: Unit root (assumes individual unit root process) | | | | |
| Im, Pesaran and Shin W-stat | -17.3876 | 0.0000 | 11 | 407 |

| | | | | |
|-------------------------|---------|--------|----|-----|
| ADF - Fisher Chi-square | 262.054 | 0.0000 | 11 | 407 |
| PP - Fisher Chi-square | 404.202 | 0.0000 | 11 | 418 |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Liquidity was found to be stationary at first difference I (I) because the Levin, Lin & Chu t* statistic had a probability value of 0.0000 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that Liquidity has a unit root.

Table 4.9 Unit root tests at first difference I (I) Liquidity

Panel unit root test: Summary
 Series: D_LQ
 Sample: 2010Q1 2019Q4
 Exogenous variables: Individual effects
 User-specified lags: 1
 Newey-West automatic bandwidth selection and Bartlett kernel
 Balanced observations for each test

| Method | Statistic | Prob.** | Cross-sections | Obs |
|--|-----------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) | | | | |
| Levin, Lin & Chu t* | -10.3406 | 0.0000 | 11 | 407 |
| Null: Unit root (assumes individual unit root process) | | | | |
| Im, Pesaran and Shin W-stat | -12.2260 | 0.0000 | 11 | 407 |
| ADF - Fisher Chi-square | 175.938 | 0.0000 | 11 | 407 |
| PP - Fisher Chi-square | 322.960 | 0.0000 | 11 | 418 |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Hausman Test

The Chi-square test statistic was 13.500311 with a significant probability value of 0.0002 which was significant at 5 percent level of significance. This therefore meant that the null hypothesis was rejected in favor of the fixed effects model. Therefore, we accept the fixed effects model as suitable for this study.

Correlated Random Effects - Hausman Test
 Equation: Untitled
 Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 13.500311 | 1 | 0.0002 |

Cross-section random effects test comparisons:

| Variable | Fixed | Random | Var(Diff.) | Prob. |
|----------|-----------|-----------|------------|--------|
| LQ | -0.279857 | -0.067379 | 0.003344 | 0.0002 |

Fixed effects model

Dependent Variable: SR
 Method: Panel Least Squares
 Date: 07/08/21 Time: 15:13
 Sample: 2010Q1 2019Q4
 Periods included: 40
 Cross-sections included: 11
 Total panel (balanced) observations: 440

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| LQ | -0.279857 | 0.067896 | -4.121865 | 0.0000 |
| C | 0.243335 | 0.057324 | 4.244917 | 0.0000 |

Effects Specification

Cross-section fixed (dummy variables)

| | | | |
|--------------------|----------|-----------------------|-----------|
| R-squared | 0.064285 | Mean dependent var | 0.008566 |
| Adjusted R-squared | 0.040237 | S.D. dependent var | 0.138626 |
| S.E. of regression | 0.135809 | Akaike info criterion | -1.128244 |
| Sum squared resid | 7.894039 | Schwarz criterion | -1.016787 |
| Log likelihood | 260.2137 | Hannan-Quinn criter. | -1.084274 |
| F-statistic | 2.673123 | Durbin-Watson stat | 1.503411 |
| Prob(F-statistic) | 0.002495 | | |

Pairwise Granger Causality

Pairwise Granger Causality Tests

Date: 07/08/21 Time: 15:09

Sample: 2010Q1 2019Q4

Lags: 2

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|------------------------------|-----|-------------|--------|
| LQ does not Granger Cause SR | 418 | 0.04799 | 0.9532 |
| SR does not Granger Cause LQ | | 7.81490 | 0.0005 |

The null hypothesis that Liquidity does not Granger cause Stock returns was accepted because the probability Value of 0.95 was insignificant at 5 percent level of significance. The null hypothesis that Stock returns does not Granger cause Liquidity was rejected since the probability value of 0.0005 was significant at 5 percent level of significance. There we accept that Stock returns Granger causes Liquidity hence a Unidirectional causal relationship.

Liquidity had a coefficient of -0.28 and a probability value of 0.0000 which is significant at 5 percent level of significance. This means that when liquidity reduced by 0.28 percent Stock returns increased by 1 percent in the same quarter. Thus, the study rejects the null hypotheses and holds that liquidity has a significant effect on stock returns. The findings resonate with earlier work by Muchiri (2014) who found out that liquidity management had a negative relationship with stock returns of Kenyan banks. Similar observations were drawn by Heryanto (2016) who noted that liquidity had a negative effect on the stock returns of Iranian banks. These

sentiments were echoed by (Sitorus and Elinarty (2017) conclusion that liquidity had a negative influence towards the growth of stock prices of Indonesian banks.

V. Conclusions

The study sought to determine the effect of liquidity on stock returns of listed commercial banks in Kenya. The panel regression results indicated that liquidity has a negative and significant relationship with the stock returns of the listed commercial banks in Kenya. This is consistent with a study of Kenyan Banks by Muchiri (2014) who determined that stock return have a negative and significant relationship with liquidity management. The study also recommends that the institution should actively undertake liquidity management. This will ensure that illiquid assets are minimized and this will expand the institutions capacity to meet their obligations. Further, commercial bank managers should ensure that commercial banks invest excess cash in productive assets. This ensures that they do not hold excess cash at the expense of fixed assets that can improve their returns. The study also finds that stock returns granger causes bank liquidity this would be interesting to pursue in the non-financial sectors of the security markets.

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