The Role of COVID-19 Period Repurchase Agreements in Shaping Liquidity Dynamics in Kenyan Tier 1 Banks

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By

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Abstract

The outbreak of the COVID-19 pandemic in 2020 had far-reaching repercussions on financial markets worldwide, impacting the liquidity dynamics of commercial banks. In Kenya, this occasioned the Central Bank of Kenya (CBK) to implement measures to cushion its impact on bank liquidity. Among these was an adjustment in the repos's maximum tenor, which was raised from 28 to 91 days. This study sought to establish how Kenyan commercial banks' liquidity was affected by the adjustment in the repos's during the COVID-19 period. The study focused on tier 1 commercial banks. The findings show that COVID period repos tenor significantly influenced the liquidity of commercial banks. These results offer practical insights for regulators and policymakers when confronted with unparalleled uncertainties, such as the COVID-19 pandemic.

Keywords: *Repurchase Agreements (Repos), Liquidity Dynamics, COVID-19 Pandemic, Tier 1 Commercial Banks, Central Bank of Kenya (CBK)*

1.0 Introduction

The World Health Organization (WHO) declared a public health emergency on March 11, 2020, occasioned by the emergence of coronavirus (COVID-19), first in Wuhan City, China, in December 2019. The pandemic wreaked havoc on nations across the world and rapidly affected the global economy (Duan et al., 2021; Fernandes, 2020). The resulting losses surpassed those of the 2008 global financial crisis (Hanif et al., 2021). The COVID-19 pandemic brought about a significant disruption and financial losses to the world economy, placing tremendous strain on financial markets and institutions worldwide (Feyen et al., 2021).

The COVID-19 virus threat cut beyond boundaries, gender, and ethnicity. The outbreak has arguably been the greatest health crisis, to date, of the 21st century, prompting travel restrictions, stay-at-home orders and an unprecedented shutdown of global commerce. Governments were forced to impose extensive closures of educational institutions, businesses, and places of worship due to the severe impact the pandemic had on people's lives. Lockdowns were imposed in large

cities and towns in an attempt to stop the virus's spread. These lockdowns forbid non-essential social gatherings (Cuesta & Pico, 2020).

The COVID-19 pandemic caused a significant shock to the world economy and a sharp decline in the stock market. Financial markets responded negatively to the global spread of COVID-19 and behaved in a way that had not been witnessed since the 2008 credit crisis (Ullah, 2023). The US S&P-500 index dropped to its biggest level in one day in market history on March 12 and 16 (Mazur et al., 2021). The Shanghai stock market plunged by 8% on February 3, 2020 (Li et al., 2022) Global stock markets saw tremendous volatility as a result of the pandemic. The early phases of the crisis caused a large drop in the value of stocks worldwide and widespread panic selling (Feyen et al., 2021). Additionally, the length and intensity of market downturns differed among nations, indicating variations in economic resilience and pandemic management (O'Donnell et al., 2021).

The increasing spread of pandemic COVID-19 forced policymakers to urgently rethink the possible impacts on global financial market. Central banks globally initiated monetary policies to alleviate the adverse effects of the COVID-19 pandemic's shocks (Long et al., 2022). Central banks sought to play a crucial role in alleviating the repercussions of the COVID-19 pandemic by formulating appropriate monetary policies. These included policies related to interest rates, reserves, foreign exchange, lending operations, asset purchases, and others (Budnik et al., 2021). The actions taken by central banks were aimed at positively affecting both the financial market and the real economy (Long et al., 2022).

Earlier studies looking at bank stability and risk in the wake of shocks like the 2008 Global Financial Crisis (GFC) have shown that banks are becoming more interconnected, which might cause entire financial systems to collapse (Duan et al., 2021). A study relating to the COVID-19 pandemic and the banking sector is difficult because of the unique characteristics of the crisis, which differ significantly from earlier crises like the European debt crisis and the Great Financial Crisis of 2008 and originate from a global pandemic that quickly turned into an economic downturn. As a result, the conclusions drawn from earlier crises might not be easily applied to the particulars of the COVID-19-induced crisis (Duan et al., 2021).

Research by Hartley and Rebucci (2020) indicates that, in the context of the COVID-19 pandemic, the policies of central banks have a more impact on advanced economies compared to emerging economies. Scholars have shown interest in the significance of central banks policies amid the global financial turmoil triggered by the COVID-19 outbreak (Elgin et al., 2021) There remains a need to scrutinize the role of monetary policies during the pandemic. The question of whether the proactive measures taken by central banks can effectively alleviate the economic impact of the pandemic is an area that requires further investigation. This paper explores the role of COVID-19 period repurchase agreements in shaping liquidity dynamics in Kenyan tier 1 banks.

The financial sector plays a fundamental role in a country's economic development, with commercial banks serving as key players in this dynamic landscape (Smith & Swain, 2010). The banking sector in Kenya is characterized by a mix of domestic and international banks, offering a wide range of financial services to individuals, businesses, and the government. Some of the prominent commercial banks in Kenya include Equity bank, Kenya commercial bank, and Cooperative bank, among others (Getugi et al., 2023).

These banks provide various services, including savings and current accounts, loans, investment products, and electronic banking solutions. One notable feature of the Kenyan banking sector is

the emphasis on innovation and financial inclusion. Many commercial banks in Kenya have embraced technological advancements, leading to the widespread adoption of mobile banking and other digital services. This has significantly enhanced financial access, especially in remote areas where traditional banking infrastructure may be limited. Additionally, the Central Bank of Kenya plays a regulatory role, ensuring the stability and integrity of the banking sector while fostering an environment conducive to sustainable economic growth. The collaboration between commercial banks and regulatory bodies has contributed to the resilience and adaptability of the Kenyan banking system in the face of evolving economic challenges (Wahinya et al., 2023).

Understanding bank repos is vital in the financial landscape, as it plays a pivotal role in shaping economic stability and financial markets. Bank repos, short for repurchase agreements, are financial transactions wherein banks sell securities with an agreement to repurchase them at a later date (Gorton & Metrick, 2012b). Repos agreements are crucial tools for managing short-term liquidity needs in the banking sector, allowing banks to maintain a delicate balance between risk and liquidity (Bassi et al., 2023). Understanding bank repos is essential for financial professionals, policymakers, and investors in navigating the dynamics of the banking system and to make informed decisions that contribute to the overall health of the financial markets (Michl & Park, 2023).

The importance of bank repos to risk management and general financial stability is one of the main motivations for learning more about them. By guaranteeing that financial institutions can obtain short-term funding, these repurchase agreements effectively reduce liquidity risk. But as previous financial crises have shown, these transactions can be misused or misunderstood, which can result in systemic dangers. Policymakers and regulators can put in place efficient oversight and risk-reduction measures by having a thorough grasp of bank repos. By reducing the cascading effect of financial instability that can occur when banks have liquidity issues, this understanding helps to maintain a robust financial system (Gottardi et al., 2019).

Understanding bank repos is essential to understanding the wider effects on market dynamics and monetary policy. Repo transactions are a common technique used by central banks to carry out monetary policy, affecting interest rates and managing the money supply. The fluctuations in repo markets can significantly influence the general well-being of financial markets by influencing borrowing rates and liquidity circumstances. A comprehensive understanding of bank repos enables central banks to efficiently adjust monetary policy tools, guaranteeing interest rate stability and creating an atmosphere that supports long-term economic expansion (Sissoko, 2019).

In addition, bank repos information can help investors and financial institutions make wise investment choices and manage market volatility with more caution and confidence. To put it simply, understanding bank repos has implications that go beyond the banking industry and have an impact on the larger financial scene as well as the stability of the world economy (Schultz & Bockian, 2017).

1.1 Research Objective

This research investigated the impact of the adjustment in repos's maximum tenor, specifically raised from 28 to 91 days during the COVID-19 pandemic, on the liquidity dynamics of tier 1 commercial banks in Kenya. The study looked into the impact of this policy change, using both descriptive and inferential statistical methods.

1.2 Research Hypothesis

The study sought to test the following hypothesis:

H₀: COVID period repurchase agreements tenor did not have a significant effect on liquidity of commercial banks in Kenya.

2.0 Literature Review

A vital element of banking operations is liquidity management, which reflects commercial banks' capacity to fulfill short-term obligations without suffering large losses. The body of research on commercial banks' liquidity management emphasizes how crucial it is to both efficient risk mitigation and financial stability. The ways in which banks manage liquidity have been the subject of much scholarly investigation. It is widely acknowledged that maintaining financial intermediation and protecting solvency depend on the effective distribution of liquid assets (Bassi et al., 2023; Gorton & Metrick, 2012b).

Various theoretical frameworks and mathematical models have been created to explain the workings of commercial bank liquidity management. The groundwork for understanding the inherent trade-offs between liquidity and profitability was established by the pioneering research of (Diamond & Dybvig, 1983; Merton, 1974). Understanding of the relationship between market conditions and liquidity management measures has been enhanced by subsequent research, such as the work of Acharya and Pedersen (2005) on the relationship between liquidity and asset prices. These theoretical frameworks offer insights into the dynamic nature of liquidity risk and provide a conceptual foundation for evaluating the effectiveness of various liquidity management strategies used by commercial banks.

The regulatory environment has a big impact on how commercial banks manage their liquidity. The effect of regulatory frameworks, including the Basel III liquidity criteria, on banks' tactics for managing liquidity risk has been thoroughly studied by academics. The significance of regulatory supervision in influencing banks' actions during times of financial strain is highlighted by research by (Acharya & Pedersen, 2005). Additionally, research has examined how well liquidity stress testing works as a regulatory instrument to evaluate and strengthen banks' ability to withstand unfavorable liquidity shocks. It is crucial for academics and professionals to comprehend how regulatory actions and liquidity management interact in order to effectively navigate the changing financial supervisory landscape (Ivashina & Scharfstein, 2010).

The dynamics of liquidity risk and risk management techniques in the real world have been better understood informed by empirical research on commercial banks' liquidity management procedures. The foundational study by Kashyap et al. (2002) examined the connection between banks' liquidity reserves and their capacity to extend credit during financial crises. Their results emphasized the significance of sound liquidity management procedures and the critical role that liquidity buffers play in preserving the stability of credit provision. This line of investigation was continued Ivashina and Scharfstein (2010) who investigated how hoarding liquidity during crises can worsen the negative consequences of financial shocks.

The factors influencing banks' liquidity holdings and their effects on financial stability have also been extensively covered in the empirical literature on liquidity management in commercial banks. A thorough investigation of the variables influencing banks' choices to hoard liquidity was carried out by Heider et al. (2009) who clarified the significance of market- and regulatory-related causes. It is imperative for policymakers to understand these motivators in order to create regulatory

frameworks that effectively encourage prudent liquidity management. Moreover, empirical research has looked at how banks' risk profiles and general financial health are affected by their liquidity management strategies. Through the identification of correlations between liquidity holdings and risk-taking behavior, these studies provide vital insights for regulators, practitioners, and scholars seeking to improve the banking sector's resilience against volatile market conditions (Sissoko, 2019).

Empirical research has examined central bank repos agreements' regulatory function. The usefulness of central banks' involvement through repo agreements as a means of easing liquidity constraints during financial crises has been examined in the work of Echarte Fernández et al. (2021) and further research. These studies emphasize how crucial it is for central banks to use repurchase agreements strategically and on time in order to lessen market disruptions. One important aspect affecting the commercial banks' ability to withstand liquidity crises is the regulatory environment around central bank repos. Researchers like Gorton and Metrick (2012a) have studied how central bank repo interventions function as a signaling mechanism that restores market confidence and stops the economy from going into a negative spiral, in addition to providing much-needed liquidity to the system.

Repos agreements between central banks have regulatory implications that go beyond the short-term reaction to a crisis to long-term liquidity sustainability. Empirical research has examined how regulatory frameworks regulating central bank repos impact the behavior of commercial banks during times of normalcy and crisis, as evidenced by the studies of Duffie and Skeel (2012)and Krishnamurthy and Vissing-Jorgensen (2015).

These studies demonstrate the dual use of repos agreements as tools for maintaining long-term liquidity sustainability and for mitigating crises. Regulators are able to improve and optimize the design of repo facilities by using the insights from these empirical analyses. This helps to ensure that these facilities not only offer immediate relief during crises but also, in the long run, contribute to the overall stability and resilience of the financial system. Since central bank repos are still crucial to crisis management, policymakers, practitioners, and academics working to develop sustainable and successful liquidity management strategies in the contemporary banking environment need to have a sophisticated understanding of the regulatory implications of these repos, which come from empirical research (Breckenfelder & Hoerova, 2023).

The economic shocks brought on by the COVID-19 pandemic produced unprecedented global disruptions and significant changes in market conditions. As a result, central banks throughout the world implemented a variety of measures, including measures on repos, to stabilize financial markets and guarantee the sustainability of liquidity. It would be appropriate to conduct a thorough analysis of these policies' effects to assist policymakers in better addressing potential future occurrences of this kind. It is crucial for academics and policymakers to understand the effectiveness, difficulties, and consequences of the measures on repos in this particular setting. A study of this kind offers important insights into how flexible repos mechanisms are during periods of extreme stress. This lays the groundwork for improving crisis response plans in the future and strengthening the resilience of the financial system (Ivashina & Scharfstein, 2010).

A comprehensive evaluation of the function of repurchase agreements during the COVID-19 period is especially relevant in the Kenyan context. Kenya had particular difficulties during the pandemic, similar to many other developing nations, such as trade disruptions, changes in international money flows, and internal economic concerns. In response, the Kenyan Central Bank

adopted a number of policies, including as repo interventions, to maintain liquidity in the financial markets (Wangari et al., 2021).

An empirical investigation on the unique dynamics of COVID-19 period repos in Kenya provides information about how effective these interventions were in the unique regulatory and economic environment of the nation. Additionally, this kind of research might help policymakers understand how flexible repo mechanisms are in developing economies, which adds to the current conversation about bolstering financial resilience against international crises. In order to improve future policy responses and promote a robust financial system, Kenya must understand the role that repos have in influencing liquidity dynamics as it navigates the challenges of the post-pandemic recovery (Wangari et al., 2021).

3.0 Research Methodology

This study used survey-based descriptive research. Because Kenya tier 1 commercial banks operate across the country and were consequently significantly more exposed to the economic effects of COVID-19 than other banks, the study focused on them. Given that the accounting periods of all Tier 1 commercial banks run from January 1 to December 31st, the pre-COVID period was determined to be January 1, 2018, to December 31, 2019; the COVID period was determined to be January 1, 2020 to December 31, 2021.

At the time of the study, there were nine tier 1 in Kenya. To qualify for the study, it was determined that a bank must have operated throughout the COVID period and that there should not have occurred an out of the ordinary even in its operation that had a significant impact on its liquidity. On this basis, of the nine banks, one bank, NCBA was excluded from the study. This bank was formed following a merger between two banks during the determined study period. Therefore, eight banks were studied, resulting in a total of thirty-two financial statements released by these banks over the determined four-year period (Delios et al., 2023)

The Tier 1 commercial banks' annual integrated financial reports provided quantitative data for the study. To collect secondary data, the study used a data sheet. These included the variables along which data from the annual integrated financial reports would be keyed in, as well as the number assigned to the bank. The required fields were featured on the columns. Each bank's yearly integrated financial reports for the study period were downloaded and looked at in chronological order.

The study made use of statistical software for data science, Statistical Package for Social Sciences (SPSS) version 27 for data analysis. The dataset was cleaned before analysis to remove factors that were not relevant to the current investigation. In order to analyze measurable data and describe the results. This research used both descriptive and inferential statistics.

The following model was used:

$$Y = \beta_0 + \beta_1 RAT + \varepsilon$$

Where:

Y = Liquidity

β_0 = Constant term

β_1 = Beta coefficient

RAT = COVID period repurchase agreements tenor

ε = Error term

Prior to conducting the inferential analyses, diagnostic tests were performed. These included a correlation and normality tests.

4.0 Results and Discussions

4.1 Descriptive Statistics

The goal of the study was to determine how Kenyan commercial banks' liquidity was impacted by the COVID period repurchase agreement tenor. Consequently, the study gathered information on the tenor of repurchase agreements for both the pre- and covid-period, as shown by the maximum repos that CBK set. Table 1 presents the descriptive data for leverage.

Table 1: Descriptive Statistics

	Pre-Covid Period	Covid Period
Minimum	24.00	65.00
Maximum	28.00	91.00
Mean	26.0000	83.2500
Std. Deviation	1.37649	7.11466

Table 1 shows that, in the pre-COVID era, repurchase agreements had a tenor of 26 days on average, with a minimum of 24 days and a high of 28 days. This was significantly different from the 83.3 day mean (minimum 65 days, maximum 91 days) that was documented during the COVID period. For most of the banks, the standard deviation was only one day, indicating a small departure from the established mean.

4.2 Inferential Statistics

Preliminary Diagnostic Tests

To ascertain whether the data was suitable for regression, the study examined the numerous assumptions before performing regression analysis. These included tests for homogeneity of variances, linearity, multi-collinearity, normalcy, and outliers. This was done to ensure the data was suitable to be used in regression analysis and that the results were accurate.

Test for Outliers

Anomaly is a data point that deviates from the paradigm while the remaining data appears distant from the majority of the data and falls within the range. Outliers have been found to negatively affect the regression equation and often yield incorrect results. Their identification is therefore crucial for precise modeling and outcomes (Ruff et al., 2021). The Mahalanobis Distance (D2) test was used in this investigation to look for multivariate outliers, and the presence criterion was set at less than or equal to 0.001. It was concluded that there was no outlier in the data because all of the assertions in this study had probability linked to their D2 that were greater than 0.001.

Test for Normality

The normal distribution of the data is a fundamental presumption of regression analysis. Regression analysis with skewed data that deviates from normality produces unreliable results that cannot be taken to be representative of the study population. A visual evaluation of the quantile–quantile (Q-Q) plots was done in order to determine whether the data had a normal distribution.

According to Schmidt and Finan (2018) the Q-Q plot is an appropriate approach for determining whether or not the information deviates from normal spread. Figure 1 presents the yield of a Q-Q plot for repurchase agreements tenor.
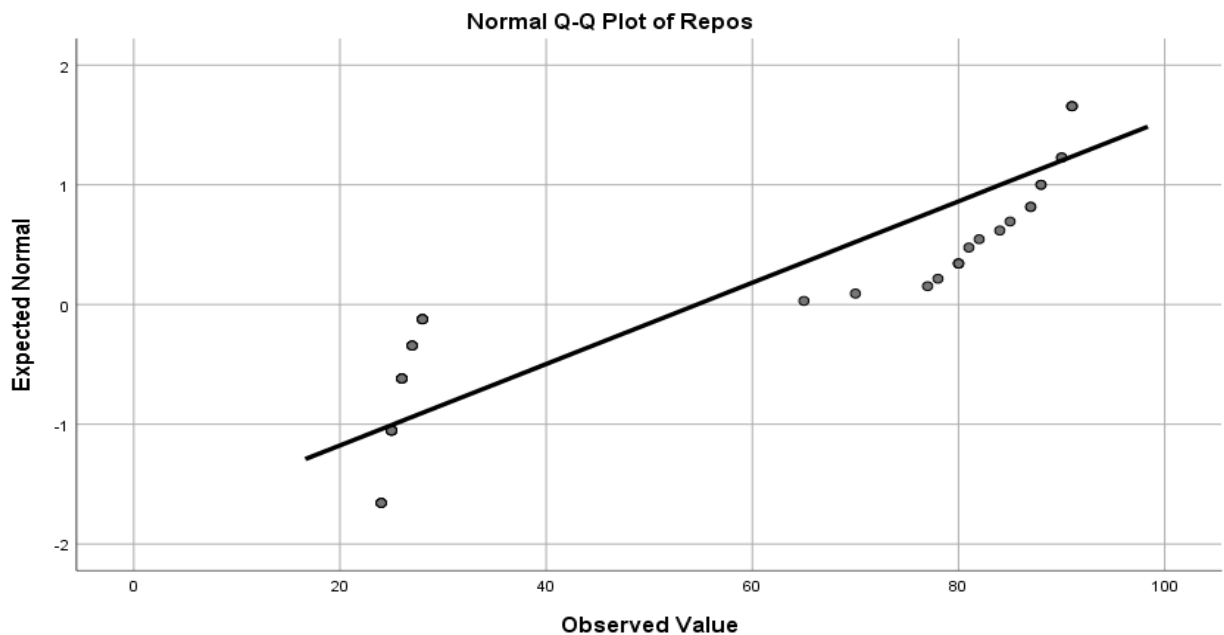

Figure 1: Q-Q Plot

The line of best fit is where most data points are aligned. As seen in Figure 1. The observed values were within the predicted values, indicating that the data on the Q-Q plot that was displayed is normally distributed. Since there were no outliers in the repurchase agreement tenor data that required to be removed before analysis, the data was normally distributed.

Homogeneity of Variances

Homoscedasticity tests were performed as part of the study, assuming a constant error variance. It is difficult to ascertain the true standard deviation of errors when heteroscedasticity, or the violation of homoscedasticity, occurs. This typically results in confidence intervals that are excessively narrow or wide (Yang et al., 2019). A plot of the expected and standardized residual values was done to find out if there was homoscedasticity. The result is shown in Figure 2.
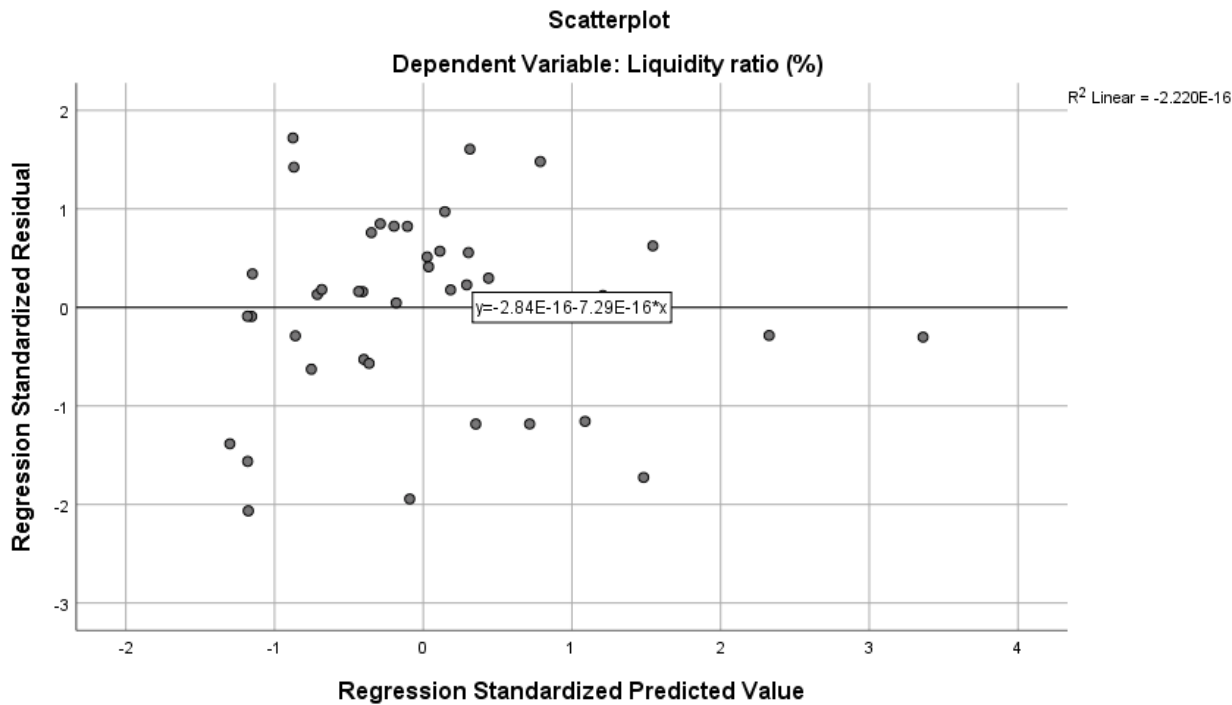
Scatterplot

Dependent Variable: Liquidity ratio (%)

Figure 2: Tests for Homogeneity of Variances

The majority of the residual data points on both sides of the fitted line are near to 0, resulting in a mostly symmetrical plot of the standardized residual and anticipated values. According to this, there is no heteroskedasticity, or violation of homoscedasticity, and the average residual error for each level is roughly 0. On this basis, regression analysis was performed since the data was regarded as exhibiting homoscedasticity.

Pearson Correlation Analysis

The repurchase agreement tenor was the independent variables, while liquidity was the dependent variable. A Pearson correlation analysis was performed to determine the strength and direction of a linear relationship between the two variables. The Pearson correlation coefficient (denoted as r) quantifies the linear relationship between two variables. In this case, the Liquidity Ratio and Repos. Table 3 displays the results.

Table 2: Pearson Correlation Matrix

		Liquidity ratio	**Repos**
Liquidity ratio	Pearson Correlation	1	. 142
	Sig. (2-tailed)		.044
	N	32	32
Repos	Pearson Correlation	.142	1
	Sig. (2-tailed)	.044	
	N	32	32

The correlation coefficient between these two variables is 0.142. This indicates a weak positive linear relationship. The significance level, or p-value, tests whether the observed correlation is statistically significant, that is, it is unlikely to have occurred by chance. The p-value here is 0.044, which is less than the commonly used threshold of 0.05, this means the correlation is statistically significant. There is only a 4.4% chance that the observed correlation occurred by random chance.

Regression Analysis

A simple regression analysis was performed, focusing on modeling the relationship between repurchase agreements tenor and liquidity. This analysis yielded three key results: the model fit summary, ANOVA, and the estimated model table. The model fit summary is presented in Table 3.

Table 3: Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate
1.	0.704	0.298 [a]	0.465	2.341

This shows a strong positive correlation between repurchase agreements tenor and liquidity. An R value of 0.704 is indicative that as the tenor of repurchase agreements changes, liquidity tends to change in the same direction. The R Square value of 0.298 means that approximately 29.8% of the variance in liquidity can be explained by the repurchase agreements tenor. At the same time, it also suggests that 70.2% of the variance in liquidity is influenced by other factors not accounted for by the predictive model employed for this study. This significant portion of the variance in liquidity that remains unexplained is indicative that other factors may also play an important role.

The Adjusted R Square adjusts the R Square value for the number of predictors in the model, providing a more accurate measure of the model's explanatory power. The Adjusted R Square of 0.465 implies that when accounting for the number of variables, the model still explains about 46.5% of the variability in liquidity.

The standard error of the estimate is essentially the standard deviation of the residuals (the differences between observed and predicted values). It quantifies how much the observed data points deviate from the regression line (that is, the line that best fits the data). A lower standard error indicates a better fit, meaning that the predicted values are closer to the actual data points. For this study, a standard error of 2.341 suggests a moderate level of accuracy in the model's predictions.

Table 4: ANOVA Analysis Results

	Sum of Squares	df	Mean Square	F	Sig.
Regression	256.544	1	256.544	6.090	0.002
Residual	258.055	34	7.588		
Total	514.599	35			

https://doi.org/10.53819/81018102t4293

Table 4 displays the ANOVA analysis results, which indicate that the regression model used in the study was significant (F = 6.090, Sig. < 0.05). The findings indicate that the regression squares' sum was 256.544, based on the overall squared sum of 514.599. The total of the remaining squares, which equals 258.055, suggests that 50.15% of the variance in the database is unexplained, whereas the regression model explains roughly 49.85% of the variation in the dataset.

Table 5: Coefficients

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta
(Constant)	10.357	0.841	
Tenor	0.234	0.067	0.706

The expected impact of Repos tenor on liquidity is displayed in the results in Table 5. The coefficient B for the constant term, or intercept, is 10.357. This indicates that the estimated value of the dependent variable (liquidity) is 10.357 units when the independent variable (tenor) is zero. Tenor, the independent variable, has a coefficient B of 0.234. This indicates that, if all other factors remain constant, the projected value of liquidity increases by 0.234 units for every unit increase in the tenor variable.

Discussion

The study sought to examine the effect of the COVID period repurchase agreements tenor on liquidity of commercial banks in Kenya. Repurchase agreements tenor was recorded at an average of 26 days during the pre-covid period, which was notably different compared to the mean of 83.3 days recorded during the covid period. This can be attributed to the CBK extending the maximum tenor of repurchase agreements from 28 to 91 days to enable banks access longer term liquidity secured on their holdings of government securities without having to discount them. The regression analysis shows that tenor has a positive and significant impact on liquidity, with a strong standardized coefficient (Beta = 0.706). This indicates that as tenor increases, liquidity is likely to increase as well. Further, the low standard errors suggest that the estimates are precise, providing confidence in the model's predictive power.

The duration of repos determines how long banks can access funds. Commercial banks may need to get short-term liquidity in order to manage cash flows and satisfy liabilities during times of market and economic volatility, such as the COVID-19 epidemic. Respos with longer tenors, which allow banks to secure liquidity for a longer period of time, are one way the central bank helps banks fulfil their short-term funding needs and strengthen their liquidity position.

The findings are in line with (Wullweber, 2020) who studied the overall instabilities inherent in the current global financial system in general, and the system's performance in reaction to the COVID-19 pandemic in particular. The study while noting that central bank intervention managed to stabilize financial markets, that stability will remain highly precarious unless strong and appropriate rules for financial markets are in place and governments complement monetary policy with forceful and comprehensive fiscal policies.

The findings also agrees with (Hüser et al., 2024) who examined how the repo market operates during liquidity stress by applying network analysis to novel transaction-level data of the overnight gilt repo market including the COVID-19 crisis. The study noted that there was important changes in the repo volumes and spreads during the stress relative to normal times.

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