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MACROECONOMIC INSTABILITY, AGGREGATE FINANCIAL LIQUIDITY AND STOCK MARKET LIQUIDITY

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Abstract
This study examined the effects of macroeconomic instability and aggregate liquidity on stock market liquidity. Macroeconomic instability constitutes risk for investments, whereas financial liquidity encourages trading at the exchange. The purpose of this study was to investigate the combined impact of macroeconomic instability and financial liquidity measured at the aggregate level on stock market liquidity in Africa. A cross-section of 16 African countries who are members of African Security Exchange Association (ASEA) were engaged for period from 2013 to 2019. The dynamic model and the Generalized Method of Moments (GMM) in first difference transformation regression technique constitute the methods. This study found that macroeconomic instability has positive and significant effect on market liquidity, while diaspora remittances negatively and significantly influenced it. Bank liquidity and aggregate money supply positively and significantly determined stock market liquidity. This study concluded that the challenge of stock market liquidity in Africa could be tackled through diaspora remittances, bank liquidity and money supply because they have the potential to reduce the cost of raising capital and stimulate trading activities at the exchange, thereby influencing stock market liquidity.

Keywords: African Stock Markets; Aggregate Financial Liquidity; Macroeconomic Instability; Stock Market Liquidity.

JEL Classification: E44, F24, G12

I. INTRODUCTION

Financial market liquidity regained prominence following the 2008 to 2010 financial crisis, which resulted in a drastic drop in asset returns. Stock market liquidity represents the ease of trading financial assets at the exchange. A liquid financial market helps to narrow the gap between the ask price and the bid price (spread) because it enables traders to exchange positions speedily. Indeed, the liquid market is attractive to investors because it enables stocks to be traded without incurring much cost, thus minimizing investment risks. This kind of market is the delight of market regulators because it is an essential ingredient for the emergence of an efficient market (Chordia, Roll and Subrahmanyam, 2008). However, a market with low liquidity is characterized by low turnover due to infrequent transactions, thereby posing liquidity risk. Besides, there exists a substantial spread, thus constituting transaction costs to investors. Most African Stock markets are low in liquidity and loaded with a variety of investment risks (Chem, 2019). Therefore, it is necessary to ascertain the factors affecting the liquidity position of African Stock Markets.

Instability in macroeconomic variables constitutes a risk to investors and therefore discourages trading activities at the exchange, fact that may influence stock market liquidity. Macroeconomic instability signifies the variations in the exchange rate, interest rate, inflation, and so on. Aguiar and Broner (2006) highlighted that the challenges of the developing economies are the instability of macroeconomic factors because of the impact of these indicators on investment, particularly financial assets. The use of a single index to capture the risk associated with fluctuations in macroeconomic variables is vital in asset pricing because it reflects the interactions between macro indicators. Undeniably, the macroeconomic instability index as a composite factor is a comparatively more comprehensive measure of the instability (risk) associated with macroeconomic indicators (Haghighi, Sameti and Isfahani, 2012). On this background, this study engaged the macroeconomic instability index and examined its impact on stock market liquidity.

Aggregate financial liquidity signifies liquidity that reflects a large portion of the financial activities of economic subjects, whether individuals, firms, or nations. It takes the forms of banking liquidity, foreign inflows

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(diaspora remittances) and aggregate money supply. Market traders need financial liquidity to enable them to transact in large volumes at the exchange. Financial liquidity is a product of banks because of the instruments of their trade, and the national government using various instruments such as the cash reserve ratio (liquidity ratio) regulates this institution. Controls of liquidity by means of credit constraints weaken the availability of investment funds (Central Bank of Kenya, 2016) and this limits trading activity at the exchange, thus influencing market liquidity. It has been demonstrated that government monetary policy actions work through bank liquidity to influence the capital market (Lagos & Zhang, 2018). Therefore, it is important to examine whether the liquidity position of banks influences stock market liquidity in Africa.

The government controls national liquidity by regulating the money supply and a rise in money supply translate to more savings and investments. Indeed, monetary policy directed at contracting money supply influenced investors' financial liquidity and this ultimately may influence trading activities at the exchange. Undoubtedly, aggregate financial liquidity is stimulated through bank credits because government monetary policies are channeled by banks to the national economy (Eze & Mansi, 2017). Studies have shown that money supply influenced stock market performance (Osuagwu, 2009; Nkechukwu et al, 2015; Ahmad et al., 2015).

Furthermore, fund inflows whether personal remittances or foreign direct investments are sources of aggregate liquidity. Inflows enhance bank liquidity, boost the money supply and ultimately the trading activities at the exchange. A rise in fund inflows (personal remittances) boosts financial liquidity at the domestic level because it enhances savings, the lending capacity of financial institutions and reduces the cost of borrowing and this ultimately may boost activities at the exchange, thus affecting market liquidity. This informed the use of personal remittances as a variable to study stock market liquidity in Africa.

Though some studies have examined the effect of macroeconomic variables on the stock market (Ditimi & Ifeoluwa, 2018; Baroian, 2014; Omodero & Mlanga, 2019, Osamwonyi &Evbayiro-osagie, 2012; Kirui, et al., 2014), the use of composite macroeconomic instability index together with aggregate financial liquidity indicators (diaspora remittances, banking liquidity and growth in money supply) to address stock market liquidity in Africa is rare. Macroeconomic instability is a disincentive to investment, whereas financial liquidity facilitates large volume trading. Therefore, the objective of this study is to examine the effects of macroeconomic instability and aggregate financial liquidity on stock market liquidity in Africa.

II. LITERATURE REVIEW

Keynes (1936) is credited with the liquidity preference theory. In his view, people have preferences for liquidity because the future is uncertain (risky), therefore holding liquidity is a safeguard against risk. On this ground, the only way to persuade economic agents to give up their liquidity position is to offer a higher reward. Indeed, investors demand liquidity on the belief that it will yield better returns in the future. Vayanos and Wang (2012) opined that trading barriers imposed by funding constraints, transaction costs and asymmetric information depressed liquidity. Brunnermeier and Pedersen (2009) asserted that stock market liquidity declines with uncertainty.

Chordia, Sarkar and Subrahmanyam (2005) proved that monetary policy determines stock market liquidity co-movement. Nagel (2012) demonstrated that during financial crises, liquidity disappears because of funding liquidity constraints. Rehse, et al. (2019) reported that uncertainty weakens trading and resulted in enlarged liquidity. Bonner, et al (2018) uncovered that policy intervention and unusual monetary policy, influence asset liquidity in the capital market. Hardouveil (1987) shown that the stock market reacts to monetary news emanating from government actions. Macroeconomic variables have been identified as the major determinants of market liquidity in emerging markets. Prominent among the factors are government policy, regulatory environment and exchange rate (Emerging Market Committee Working Group on Regulation of Secondary market, 2007, December). Chordia, Sarkar and Subrahmanyam (2003) showed that expansionary monetary action accounts for stock market liquidity.

Wong, et al (2017) asserted that uncertainty associated with fluctuations in macroeconomic variables impacts not only economic operations, but financial environments as well. Changes in macroeconomic indicators influence the level of consumption and the pattern of savings and therefore, hinder investment decisions of both local and international investors (Garikai, 2019). Changes in monetary policy influence market price through their effect on the lending rate or risk premium and the collective effect on cash flows (Li & Hu, 1998). Lyziak, et al. (2014) recognized that the bank deposits and liquidity holdings as characteristics of banks are vital for the transmission of government monetary policy. Monetary policy is considered effective if it energizes credits to private sectors, savings and money supply. Brunnermeirer and Pedersen (2009) modeled the link between funding liquidity and market liquidity and concluded that the two entities reinforce each other. Studies have shown that the size (Market CAP) determines stock

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market liquidity (Dey, 2005; Muresani & Silaghi, 2012).

Frictions or barriers associated with trading in the capital market weaken market liquidity and the dearth of liquidity is attributable to funding constraints (Vayanos & Wang, 2012). Hameed, et al (2010) demonstrated that funds restrictions confronting market participants are the major determinant of market liquidity. Soliman and Obi (2017) uncovered that an increase in credit creation enhanced by bank capitalization influences market liquidity positively. Drehmann and Nikolaou (2013) shown that funding liquidity risk is indirectly related to stock market liquidity. Chowdhury, et al. (2018) inspected the impact of monetary policy on market liquidity in Asia and reported that variation in money supply and private borrowing influence significantly the stock market liquidity. Chatterjee (2015) examined the nexus between the liquidity creation capacity of the banks and market liquidity and revealed that financial market liquidity accounted for total bank liquidity. Dombret, et al. (2018) revealed that stock market liquidity is positively linked to the size of loans, while it is negatively connected to credit spread. Rehse, et al. (2019) documented that uncertainty broadens liquidity significantly. Osaro, et al. (2020) discovered that diaspora remittances have a positive and significant influence on stock market development.

III. METHODOLOGY

This study covered 16 member countries of the African Securities Exchanges Association for the period of 2013 to 2019. Data was collected from World Bank Development Indicator, African Securities Exchange Association (ASEA) and the Bank for International Settlements databases. The data were analyzed using descriptive statistics and panel unit root tests, which constitute the preliminary investigations. Specifically, the Levin, et al. (2002), and Im, et al. (2003), as well as Fisher's type test reflecting Augmented Dickey-Fuller (ADF-Fisher Chi2) and Philip Peron unit root tests (Choi, 2001) were applied on the data. The effect of macroeconomic instability and aggregate financial liquidity on stock market liquidity in Africa was determined using the Generalized Method of Moments (GMM) in the first difference transformation and dynamic panel data. A dynamic model is initiated when one or two past values of the dependent variable are included as an explanatory variable. Dynamic panels help to minimize the biases that may result when individual units are aggregated and the dynamic changes in variables are accurately captured in panel data. A dynamic panel model takes the form:

$$Y_{it} = \Upsilon Y_{it\_1} + \mathrm{b}K_{it} + \mathrm{a}_i + \mathrm{U}_{it} \quad (1)$$

Where:

- Y = dependent variable;
- K = set of repressors;
- Υ = coefficient of the lag of dependent variable;
- a = individual specific effects (unknown effects); and
- U = error term.

To capture the nexus between macroeconomic instability, financial liquidity and stock market liquidity in this study, the following model was implemented:

$$TOR = f(MII, DPR, BLR, EL, MKS) \quad (2)$$

The functional form of the model is represented thus:

$$TOR_{it} = \Upsilon TOR_{it\_1} + \mathrm{b}_1 MII_{it} + \mathrm{b}_2 DPR_{it} + \mathrm{b}_3 BLR_{it} + \mathrm{b}_4 EL_{it} + \mathrm{b}_5 MKS_{it} + \mathrm{U}_{it} \quad (3)$$

Where:

- TOR_{it} = stock market liquidity for marketi at time t (estimated in this study as value traded divided by market capitalization);
- MII_{it} = macroeconomic instability index for countryi at time t (proxy for macroeconomic instability in this study);
- DPR_{it} = inflows of funds into countryi at time t (proxy by the ratio of diaspora remittances to GDP);
- BLR_{it} = bank funding liquidity in countryi at time t (surrogate by ratio of bank liquid reserve to total asset);
- EL_{it} = economy-wide liquidity of countryi at time t (surrogate by growth in money supply);
- MKS_{it} = market size of countryi at time t (proxy by number of listed firms and used as control variable in

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this study);

- Υ = coefficient of the lag of dependent variable;
- $t\text{-}_1$ = lagged value of the variables;
- U_{it} = error term;
- $b_1 - b_5$ = parameters to be estimated.

Macroeconomic instability index (MII) proxy for macroeconomic instability in this study was adapted from Haghighi, Sameti and Isfahani (2012) with modification as follows:

$$MII = [\frac{1}{Wx}(\frac{Xt - Xmin}{Xmax - Xmin}) + \frac{1}{Wy}(\frac{Yt - Ymin}{Ymax - Ymin}) + \frac{1}{Wk}(\frac{Kt - Kmin}{Kmax - Kmin})] \div N \quad (4)$$

Where:

- MII is the macroeconomic instability index (a composite index, which measures the risk associated with macroeconomic variables; the index was calculated using the combined index of exchange rate, inflation and economic growth indicators);
- X, Y, K are the current value of exchange rate, inflation and economic growth respectively;
- N = the number of indicators (Max and Min are the Maximum and Minimum values of the respective indicators);
- Wx, Wy, Wk are the weight of the respective indicators proxy in this study by standard deviation (standard deviation, maximum, minimum values were extracted from descriptive statistics of the individual variables).

IV. RESULTS

Descriptive statistic

The summary statistics of the variables presented in table 1 indicate that, on the average, the stock market liquidity (TOR) in Africa is relatively low. The table further reveals that the maximum value of TOR (21.2500) is higher than the mean value of 1.0657, this suggesting that some stock markets in Africa performed better than the others in aspects regarding their liquidity. The standard deviation of TOR is higher than its mean value, implying a high level of risk associated with stock liquidity among the sampled exchanges. Other variables such as MII, BLR, DPR, El and MKS also display similar patterns of distribution. Specifically, the maximum values of MII, BLR, DPR and MKS are higher than their minimum values. This indicates disparity in the distribution of data set and spread in performance in the countries investigated.

Table 1. Descriptive Statistics of Variables

Variable	Mean	Max.	Min.	Std. Dev.	Skewness	Kurtosis	J. Bera	J. Bera Prob.
TOR	1.0657	21.2500	0.0000	2.5411	5.6725	41.0442	7289.334	0.0000
MII	1.3093	20.6268	-4.9442	2.8043	3.8313	24.5801	2425.426	0.0000
BLR	21.5060	93.3014	2.2593	18.1757	1.4800	5.6439	73.5145	0.0000
DPR	3.1968	10.4937	0.0045	2.9000	0.8237	2.7680	12.9162	0.0000
EL	16.5689	249.8353	-0.7941	26.2669	6.8698	58.3512	15178.55	0.0000
MKS	89.2792	395.0000	5.0000	96.0965	1.9038	5.8390	104.3351	0.0000

Source: Authors' compilation with the aid of E-view 9.0

Panel unit root tests

The output of the panel unit root tests on the data set in Table 2 shows that BLR and DPR are not stationary at levels. Particularly, BLR and DPR failed the stationarity tests at 5 percent significance level.

Table 2. Panel Unit Root Tests on Variables at Levels

Variable	Levin, Lin & Chu St.	Prob.	Im, Pesaran	Prob.	ADF-Fisher	Prob.	PP-Fisher	Prob.

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			and Shin W. St		Chi^2 Statistic		Chi^2 Statistic	
TOR	-4.7973*	0.0000	-1.5302*	0.0430	51.3831*	0.0163	65.2508*	0.0005
MII	-6.1256*	0.0000	-1.8136*	0.0349	51.2843*	0.017	57.6584*	0.0167
BLR	-0.8348	0.2019	0.7267	0.7663	26.5939	0.7368	35.7073	0.2983
DPR	-6.6858*	0.0000	-0.1962	0.4222	33.5330	0.3929	40.9033	0.1345
EL	-9.0731*	0.0000	-2.5021*	0.0062	61.5735*	0.0013	81.5215*	0.0000
MKS	-9.9762*	0.0000	-2.3194*	0.0102	57,6292*	0.0018	90.4403*	0.0000

Source: Authors' computation using E-view 9.0; * = Significance at 5% level.

Therefore, the tests were repeated on the entire variables, this time at their first difference. The result displayed in Table 3 indicates that all the variables are now stationary at first difference.

Table 3. Panel Unit Root Tests at First Difference

Variable	Levin, lin & Chu St.	Prob.	Im, Pesaran and Shin W.St	Prob.	ADF-Fisher Chi^2 Statistic	Prob.	PP-Fisher Chi^2 Statistic	Prob.
TOR	-13.3606*	0.0000	-4.1652*	0.0000	84.5969*	0.0000	124.689*	0.0000
MII	-10.1497*	0.0000	-2.5234*	0.0058	59.3301*	0.0023	85.7413*	0.0000
BLR	-7.7022*	0.0000	-1.7022*	0.0444	49.5906*	0.0244	65.8976*	0.0244
DPR	-11.4305*	0.0000	-2.5508*	0.0054	58.8528*	0.0026	77.4127*	0.0000
EL	-12.9284*	0.0000	-4.2681*	0.0000	81.0015*	0.0000	112.121*	0.0000
MKS	-7.0419*	0.0000	-1.6788*	0.0466	42.2737*	0.0230	57.0714*	0.0004

Source: Authors' computation with the assistance of E-view 9.0; * = Significance at 5% level.

The implication of the results in Table 3 is that the variables exhibit constant mean and variance over a long period. Therefore, we conclude that there are no unit roots in the data series, hence the regression on the variables will be consistent. Nevertheless, the variables were treated at their respective levels of stationarity.

Table 4 highlights the outcome of the generalized method of moments (GMM) regression on the impact of macroeconomic instability and aggregate financial liquidity on stock market liquidity in Africa.

Table 4. GMM Regression Output (TOR as Dependent Variable)

Variables	Coefficient	T.Statistic	Probability
TOR(-1)	-0.02371	-10.5051*	0.0000
MII	0.9086	67.4237*	0.0000
DDPR	-0.1747	-2.4906**	0.0150
DBLR	0.0219	2.0860**	0.0405
EL	0.0159	20.2709*	0.0000
MKS	0.0430	14.1996*	0.0000
J.Statistic: 10.7725 Probability of J.Statistic: 0.3755 Ranking of Instrument: 16 *; **: Significance at 1% and 5% levels respectively			

Source: Authors' computation from E-view 9.0 output

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Table 4 shows that the value of J. statistic is not significant at 5% level, implying that the instruments used in the regression are adequate. This connotes that there are no constraints in the estimation procedures implemented as well as the instrumental variables added, implying that the model is well stated. To test for autocorrelation in the regression output, the Arrelano and Bond (1991) technique was activated. The result in Table 5 confirmed that there is no serial correlation in the regression output. Indeed, the AR(1) and AR(2) statistics are not significant at 0.05 judging by their respective Probability values.

Based on the impressive outcome of the diagnostics tests and the fact that all the necessary conditions for a valid and consistent model are satisfied, we went ahead to interpret the results of the GMM regression estimation as displayed in Table 4 above. The GMM results indicate that the previous value of stock market liquidity with a coefficient value of 0.0237 (in absolute value) is significant at 1% level. The negative impact of the past market liquidity on the current value may not be disconnected with the low level of liquidity of most African stock markets. The negative effect implies that when unexpected macroeconomic news arrive, the market is not able to adjust rapidly due to lack of liquidity, so the impact of the disturbances from macroeconomic variables may last longer than expected.

A close look at Table 4 also shows that the coefficient of macroeconomic instability proxy by the macroeconomic instability index (MII) in this study has a positive value of 0.9086 and is significant at 1% level. This is an indication that the risk from the external environment is a major factor influencing stock market liquidity in Africa. This result suggests that the ability of African Stock Markets to withstand surprises from the external environment is low, therefore the market portends high risk. Importantly, heightened instability in the macroeconomic environment influences the liquidity of African Stock Markets to the tune of about 90.86 percent, thereby posing a challenge to the liquidity position of the markets.

However, fund inflows source of liquidity surrogate by diaspora personal remittances (DDPR) negatively and significantly influence stock market liquidity in Africa. This result suggests that fund inflows to domestic markets are a potent factor influencing stock market liquidity in Africa. The negative impact of the current diaspora personal remittances (DDPR) on stock market liquidity is probably occasioned by the fact that a substantial portion of these funds is still being committed to household consumption and luxurious lifestyles, as against investment in financial assets.

The banking system liquidity (proxy by the ratio of bank liquid reserves to total assets), another financial liquidity measure in this study is an important indicator for addressing stock market liquidity in Africa. The positive and significant effect of this indicator on stock market liquidity implies that the use of the bank liquidity ratio as regulating tool is vital to the liquidity challenges at the exchanges. Indeed, boosting banks credits creation through the reduction in cash reserves stimulates stock market liquidity because of its impact on trading activities at the exchange, hence the positive effect on stock market liquidity.

The result further reveals that economy-wide liquidity surrogate by growth in money supply (EL) in this study is positively related to stock market liquidity. The coefficient of EL is significant at 1% level and this indicates that an increase in money supply enhances the liquidity of African Stock Markets. This outcome portrays the money supply as a macroeconomic tool that can be leveraged by the regulatory agencies to tackle stock market liquidity issues in Africa. This is because a boost in money supply increases the purchasing power of the people and stimulates the availability of funds for investments and this ultimately enhances trading volume and stock market liquidity.

Table 5: Arellano-Bond Test for Autocorrelation

Order of Test	M.Statistic	Probability
AR(1)	-0.8252	0.4092
AR(2)	-0.0549	0.5301

Source: Authors' estimation achieved with the aid of E-View 9.0

V. DISCUSSION OF FINDINGS

This study aimed to examine the effects of macroeconomic instability and aggregate financial liquidity on stock market liquidity in Africa. Data collected on 16 member countries of the African Securities Exchange Association were analyzed. The following findings were revealed as discussed.

Firstly, this study found that macroeconomic instability positively and significantly influences stock market liquidity, implying that the risks from the external environment are major determinants of market liquidity in Africa. This result provides support for Rehse et al. (2019) that stated that instability (uncertainty) weakens trading, fact that

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resulted in enlarged liquidity. This finding also tends to agree with Pastor and Stambaugh (2003) which mentioned that a market with low liquidity is riskier, therefore investors should demand high returns from such a market.

Furthermore, this study revealed that inflows surrogate in this study by diaspora personal remittances significantly but negatively impact stock market liquidity. Meaning, that committing personal remittances to financial assets at the exchange can help tackle the challenges of stock market liquidity in Africa. This finding supports the view of Levine and Zervos (1998) that a rise in market size induced by foreign inflows boosts stock market liquidity.

In addition, this study discovered that bank liquidity has a positive and significant influence on stock market liquidity, indicating that funds constraints through boosting banks' liquidity account for stock market liquidity in Africa. The finding of this study agrees with: Chordia et al. (2005) that monetary policy determines stock market liquidity; Hameed et al (2010) who concluded that funds constraints are an important factor accountable for stock market liquidity; Bonner et al (2018) who stated that policy intervention and monetary policy influence stock market liquidity.

Finally, the economy-wide liquidity represented in this study by growth in money supply positively and significantly affects stock market liquidity. This suggests that a boost in money supply promotes stock market liquidity in Africa. This finding aligns with Chordia, et al. (2003) who documented that expansionary monetary policy determines stock market liquidity, with Fernandez-Amador, et al (2013) which stated that growth in money supply is a boost to stock market liquidity and with Chordia, et al. (2005) who found that monetary policy determines stock market liquidity. However, it disagrees with Chung and Ariff (2016) who demonstrated that money supply negatively accounted for stock market liquidity.

VI. CONCLUSION

This study concludes that macroeconomic instability and aggregate financial liquidity are important factors influencing stock market liquidity in Africa. Particularly, this study demonstrated that: (1) The challenge of stock market liquidity in Africa can be addressed through diaspora remittances, bank liquidity and money supply because they have the potential to reduce the cost of raising capital and stimulate trading activities at the exchange, thereby boosting stock market liquidity; (2) Instability in the exchange rate and general price level as well as unstable growth, jointly constitute risk impacting stock market liquidity in Africa.

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