

Long Term Effect of Liquidity on Stock Market Development

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Abstract

The study investigates the long run relationship between stock market liquidity and development of stock market using panel dataset that spans 1990-2013 for seven selected Sub-Saharan African countries. It employs dynamic heterogeneous panel data analysis using the technique of Pooled Mean Group. Liquidity of the stock market is measured by both the stock value traded and turnover ratio. The result of PMG technique shows that there is a long run relationship between stock market liquidity and the development of stock market. It is thus recommended that the policy makers in these countries should design strategy to boost the liquidity of the stock market in order for the stock market to contribute to growth.

Keywords: Liquidity, Mean group, Pooled mean group, Stock market.

Introduction

The contribution of finance to growth cannot be overstressed. While some scholars believe that economic growth and finance have no relationship whatsoever (Lucas, 1988). Others Schumpeter, 1912; McKinnon 1973; Shaw, 1973) are of the views that finance is leading growth. Particularly Schumpeter holds the view that financial intermediaries are created for credit purposes. The granting of credit by banks is vital for economic development without which the entrepreneurial abilities would be curtailed (Fowowe, 2013). The important of stock market to the development of a nation is emphasized by Bencivenga, Smith & Starr (1996) where the paper points out the important of liquidity of the stock market. According to this paper the British industrial revolution is made manifest by the evolution of finance as emphasized by Hicks. The industrial revolution is made practicable by the existence of long term finance provided through the liquidity of the capital markets. In essence the reduction in transaction costs in efficient stock markets entails that long term investment can be undertaken in order to enhance growth. Stock market has also contributed immensely to the growth of the economies of the industrial countries. The development and growth of an economy is linked to the development of the stock markets (Mankiw, 2010). It provides avenue for risk diversification and better diversification of risk entails that riskier and high yields project are substituted for low risk-return projects. The debate on the influence of finance on growth was rejuvenated by both McKinnon (1973) and Shaw (1973) who suggested that developing countries can shore up the growth of their economies through the liberalization of their financial markets. However liberalization of financial markets has not been worth the pains (Ahmed, 2013). The literature on financial markets abounds with studies on stock markets and growth and few of these studies are focus on SSA region. There are also studies on the influence of stock market liquidity on the development of stock market. However to the best of our knowledge those studies that investigate the long run effects of stock market liquidity on stock market development are few. Liquidity of the stock market entails that investors who are in need of liquid cash can easily dispose of their stocks with minimum costs in exchange for liquid cash (Demirguc-Kunt & Levine, 1996). It is against this backdrop that the present study wants to examine the long term impact of stock market liquidity on the development of stock market for the seven selected SSA countries. The study conducts this investigation by employing panel data analysis that spans 1990-2013 for seven selected Sub-Saharan African (SSA) countries of Botswana, Cote d'Ivoire, Ghana, Kenya, Mauritius, Nigeria and South Africa.

The remainder of the paper is structured as follows: the next section gives a brief on the concept of stock market development and the overview of stock market trends in SSA. Section three reviews the literature while Section four is on theoretical framework. Section five contains methodology and data while Section six is on result interpretation. Section seven which is the final section concludes.

2 Concept of Stock Market Development

The concept of stock market development stems from the different indicators of measuring stock market. These are the indices of market size, liquidity, volatility, and market concentration. The development of stock market ensures that the size of the market must be relatively large to the size of the economy. The size of the market is measured by market capitalization which is the number of listed securities scaled by GDP (Levine & Zervos, 1998). Size is not the only means of measuring a vibrant market since large but illiquid market does not imply that the market is vibrant. Large size must be complemented with greater liquidity for the stock market to be developed. Market liquidity avails the investors the opportunity to transact easily and cheaply in securities which implies that investors can easily buy and sell shares in the market at little or no cost. Liquidity of stock can be measured through two indices. Stock value traded as a percentage of GDP and the turnover ratio. Total value of stocks traded shows the value of stocks in relation to the entire national income in the country. The turnover ratio

is the total value of shares as a ratio of market capitalization. Turnover ratio complements the stock value traded in evaluating liquidity of the market. While stock value traded measures market transaction as regards the entire economy, turnover ratio measures transactions regarding the market size hence the two indices combine measures the market liquidity (Demirguc-Kunt & Levine, 1996). High turnover ratio is a reflection of low transaction costs. Small exchange that has a high turnover ratio indicates low market capitalization but high liquidity ratio.

Developed and vibrant stock market can also be evaluated through market volatility. Studies describe stock volatility as a twelve-month rolling standard deviation estimate of stock returns (Levine & Zervos, 1998). Volatility of stock may be desirable because it reveals changing values among economic fundamentals for a better resource allocation. Excessive stock price changes are however not healthy for a better developed stock market. From the theoretical perspective, higher stock price volatility discourages savers and thus inhibits investment. In addition to this, investors tend to demand higher risk premium during high stock price volatility which increases cost of capital thus choking investment thereby leading to low economic growth. And finally excessive volatility may be the consequence of instability in some macroeconomic fundamentals like high inflation or exchange rate which would reflect in changing prices of stocks (El-Wasal, 2013).

Stock market concentration is another indicator of development of stock market. Concentration is measured by the share of securities or capitalization accounted for by the first ten largest companies. High concentration of stock is not a good indicator of developed stock exchange because it hampers liquidity since these dominant companies tend to control activities in the market (Demirguc-Kunt & Levine, 1996). Furthermore, Bencivenga, *et al.*, (1996) opines that the efficiency of equity market is predicated on the liquidity of equity market to minimize transaction costs. The ability of the low transaction costs to influence efficient stock market depends on the existing shareholder's tendency to allow investment in new capital. When transaction costs are low due to sound financial development, the existing shares command higher returns. The ability of the low transaction costs to translate to higher growth depends on the possibility of the existing shareholders to allow investment in new capital. This is because investment in new capital is what will stimulate growth.

Brief Overview of Stock Market Trends in SSA

The trends in the performances of the SSA stock markets have not been encouraging. Using the indices of measuring stock market, it can be seen that the performances of SSA stock markets are low even among the countries on the same level of development. The average market capitalization scaled by GDP of the entire seven selected SSA nations for the period 2001-2012 is 168.04 per cent; that of Malaysia alone for the same period is 138.6 per cent. Furthermore the average stock value traded during the same period for the whole selected SSA countries is 10.3 per cent while for only Malaysia it is 40.90 per cent (World Development Indicators, 2014).

Stock market concentration in the SSA region also does not portray vibrant stock market. Evidence of thick market concentration is found in such countries like Ghana and Cote d'Ivoire. From 1995 to 2000 the Ashanti goldfields control 90% of the entire market capitalization of Ghana. Also only five companies are in control of 75% of market transactions in Cote d'Ivoire (Allen, Otchere & Senbet, 2011). When stocks are dominated by few companies they tend to control trading activities in the exchange. Also liquidity of stock is adversely affected as the ability to exchange ownership of a country's productive resources is hampered through concentration and may lead to misallocation of resources (Levine & Zervos, 1998).

Notwithstanding these development, recent evidences on the activities of the stock markets show that the SSA markets are making remarkable improvements. Such Stock Exchanges as Mozambique, Uganda, Ghana, and Nigeria have been performing remarkably well. For instance Ghana's Exchange was rated as the world's best performing stock market for 2004 with a year's return of 144 percent in US\$ compared with 30 percent return by Morgan Stanley Capital International Global Index. Furthermore within the SSA region four other stock markets – Uganda, Kenya, Mauritius, and Nigeria were among the best market performers in the year (Adjasi & Biekpe, 2006; Yartey & Adjasi, 2007).

3 Review of Literature

Using time series study on the United States (US) and Norway, Naes, Skjeltorp & Qdegaard (2011) investigates effect of stock market liquidity on real economy. The data spans for US is 1947-2008 while the Norway dataset is shorter. The authors use four different measures from past studies to proxy for liquidity while the real GDP, real consumption and investment are proxies for macroeconomic level. Results for the investigation indicate that stock market liquidity is able to predict the state of the economy more for US than for Norway. Levine and Zervos (1998) in a panel of 47 countries from 1976-1993 examine the correlation between market size, liquidity, volatility and integration on one hand with current and contemporaneous rate of economic growth, capital accumulation and productivity improvement on the other hand. The paper also investigated the validity of correlation between bank and stock market activities with future economic growth. Findings show that both stock markets and banks are able to predict growth and capital accumulation. Furthermore, Jones (2002) using

annual time series data for US from 1900-2000 determines the effect of liquidity on firms 'returns. The author uses data on bid-ask spread which measures liquidity. The paper discovered that liquidity is capable of predicting future stock returns. High turnover ratio relates to low stock returns and concludes that stock liquidity is a real determinant of future returns.

Moreover, Fang, Noe & Tice (2008) in a panel dataset for the period 1990-2004 establish a relationship between stock liquidity and firm value in US. In examining the causal effect of liquidity on corporate performance, the authors found that there is bi-direction causality between liquidity and firms. This is due to the fact that the positive effect of liquidity on firm is attributable to better policies on investment and compensation of corporate insiders. Levine and Schmukler (2006) investigates the effect of raising capital from international markets on the liquidity of the other corporations in the local markets using panel data for 45 emerging countries for the period 1989-2000. Results show that there is a migration effect to the extent that the local trading of firms that invest in foreign stock market tends to reduce; this implies that more domestic firms now concentrate trading activities on foreign stock markets.

Furthermore, the migration effect is having negative influence on the stock market liquidity of the remaining firms via two links. First: aggregate liquidity of the domestic stock markets is positively linked with the individual firms trading activities in the same exchange; secondly liquidity in the international capital market is increasing and this is having negative impacts on the trading activities of the corporations. Yartey and Adjasi (2007) investigated the effects of stock market growth on selected African countries. The empirical finding is not conclusive although there is a positive relationship between stock market liquidity and the exchange for the selected African countries. Bortolotti, Jong, Nicodano & Schindele (2004) investigated the relationship between privatisation and stock market liquidity employing panel data for 19 industrial nations for the period 1985-2000. Findings indicate that privatisation improves the liquidity of the entire exchange. Moreover, through the spill over effects privatisation also enhances positive effects on the prices of other non-privatised firms. Deep looks at all the review studies indicate that none of these studies investigates a long run relationship between liquidity of the market and the development of the exchange. Liquidity from the perspective of the present research is on a macro economy level rather than at firm level. Stock market liquidity is one of the indices of measuring stock market development (Dermirguc-Kunt & Levine, 1996; El-Wassal, 2013; Levine & Zervos 1998; and Yartey, 2008). The major difference between our study and other studies is that we focus on long run relationship between stock market liquidity and the development of the market, the time duration is not the focus of other studies.

4 Theoretical Framework

Consequent on the theory of stock market development discuss in the previous section, the present study adopts the stock market development model of Calderon-Rosell (1990) as modified by El-Wassal (2005). In the existing model of El-Wassal, stock market development is model as the dependent variable. Stock market growth is measured as the local currency value of market capitalization. Thus given the model:

$$\log S_{it} = \alpha_i + \partial_1 \log D_{it} + \partial_2 \log V_{it} + \partial_3 \log L_{it} + \partial_4 \log P_{it} + \partial_5 \log R_{it} + u_{it} \quad (1)$$

Considering the theoretical determination of stock market development discussed previously, the analytical model of the present study is presented by modifying the existing model of El-Wassal (2005):

$$Mktcap_{it} = \alpha_i + \beta_1 Sturn_{it} + \beta_2 Straded_{it} + \beta_3 Institu_{it} + \beta_4 Dcps_{it} + \beta_5 Rgdp_{it} + \varepsilon_{it} \quad (2)$$

where $i=1, 2, \dots, N$ $t=1, 2, \dots, T$,

Definition and Measurement of Variables

Mktcap_{it} is a measure of extent capitalization of shares at the exchange and is proxy by market capitalization scaled by Gross Domestic Product (GDP). *Sturn* is one of the indices of measuring stock market liquidity which is turnover ratio. Turnover ratio for the present analysis is value of stock traded as a ratio of market capitalization and measured in percentage. *Straded* is the value of stock traded as a ratio of GDP and measured in percentage. *Institu* represents the quality of institutions in the respective economies of selected SSA it is measured in units. *Dcps* is the domestic credit to the private sector it is measured in millions of dollars. *Rgdp* represents the real GDP measures in millions of US dollars.

5 Data and Methodology

The dataset for the present analysis is sourced from World Development Indicators 2014. The period of investigation is 1990-2013. Data on Institutional quality is derived from International Country Risk Group (ICRG).

Methodology

The paper employs dynamic heterogeneous panel analysis by using the technique of Pooled Mean Group (PMG) of Pesaran, Shin & Smith (1999). The technique takes care of slope homogeneity in panel. Mean Group (MG) allows different coefficients among the individual units in the panel that is different intercepts, slopes, and short run variances and estimates the average for the entire group in the panel. The traditional fixed effect which is the dynamic fixed effects assumes homogeneity of the slopes, error correction and long run coefficients while allowing individual country to have different intercepts in the panel. PMG takes a middle position by differing the intercepts, slopes and short run variances while restricting the long run coefficients to be the same among the panel members (Bassanini and Scarpetta, 2001). According to Pesaran, Shin & Smith (1997) where the homogeneity of short run coefficient is wrongly assumed, the coefficients of the lagged value of the dependent variable would be biased upwards and in this case the PMG estimator would be the efficient estimator. The approach of the PMG is to allow common long run slope coefficient among the individual panel member in the group. It however allows each country to have different intercept, adjustment mechanism and short run coefficients. This is in contrast to the Dynamic Fixed Effects (DFE) that imposes similar long run, short run coefficients and adjustment mechanism while freeing only the intercept among panel member. The assumption of common long run is relevant for the present study where all the countries are on the same level of economic development according to World Bank categorization. It is however not plausible to assume that different countries would have the same adjustment mechanism.

Different studies have employed the PMG technique. Blackburne and Frank (2007) use this technique to estimate consumption through income and inflation in 24 OECD countries from 1960 – 1993. Bassanini and Scarpetta (2001) investigated the effect of human capital development on growth in a panel of 21 OECD countries over a period of 1971-1998 using the PMG technique.

The specification of the ARDL equation for $t = 1, 2, \dots, T$, specific time and $i = 1, 2, \dots, N$ countries for the dependent variable Y is:

$$Y_{it} = \sum_{j=1}^p \lambda_{ij} y_{i,t-j} + \sum_{j=i}^q \gamma'_{ij} X_{i,t-j} + \beta_i + \varepsilon_{it} \quad (3)$$

where $X_{i,t-j}$ is the $(k \times 1)$ vector of explanatory variable for group i and β_i is the fixed effect $y_{i,t-j}$ is the lagged dependent variable λ_{ij} represents the scalar coefficient of the lagged value of the dependent variable,

also γ'_{ij} shows the vector coefficient of the lagged value of the explanatory variable. The model can be re-parameterized as a Vector Error Correction Method (VECM) system:

$$\Delta y_{it} = \varphi_i (Y_{i,t-1} - \phi'_i X_{i,t-1}) + \sum_{j=1}^{p-1} \lambda'_{ij} \Delta Y_{i,t-j} + \sum_{j=1}^{q-1} \gamma'_{ij} \Delta X_{i,t-j} + \beta_i + \varepsilon_{it} \quad (4)$$

ϕ_i measures the long run coefficient while φ_i is the error correction mechanism. The technique of PMG main interest is the short run adjustment mechanism and the long run coefficient.

The long run stock market development model is given thus:

$$Mktcap_{it} = \alpha_i + \beta_1 Sturn_{it} + \beta_2 Straded_{it} + \beta_3 Institu_{it} + \beta_4 Dcps_{it} + \beta_5 Rgdp_{it} + \varepsilon_{it} \quad (5)$$

where $i=1, 2, \dots, N$ $t=1, 2, \dots, T$,

It is assumed that each of the variables in (5) are $I(1)$ and cointegrated making their residuals u_{it} to be stationary $I(0)$ for all i . Maximum lag of one is assumed thus the ARDL (1,1,1,1, 1,1) specification of equation (5) is:

$$Mktcap_{it} = \omega_i + \partial_{10i} Sturn_{it} + \partial_{11i} Sturn_{i,t-1} + \partial_{20i} Straded_{it} + \partial_{21i} Straded_{i,t-1} + \partial_{30i} Institu_{it} + \partial_{31i} Institu_{i,t-1} + \partial_{40i} Dcps_{it} + \partial_{41i} Dcps_{i,t-1} + \partial_{50i} RGDPS_{it} + \partial_{51i} RGDPS_{i,t-1} + \lambda_i Mktcap_{i,t-1} + \varepsilon_{it} \quad (6)$$

The error correction specification of equation (6) is:

$$Mktcap_{it} = \phi_i (Mktcap_{i,t-1} - \theta_{0i} - \theta_{1i} Sturn_{it} - \theta_{2i} Straded_{it} - \theta_{3i} Institu_{it} - \theta_{4i} Dcps_{it} - \theta_{5i} RGDPS_{it}) - \partial_{11i} \Delta Sturn_{it} - \partial_{21i} \Delta Straded_{it} - \partial_{31i} \Delta Institu_{it} - \partial_{41i} \Delta Dcps_{it} - \partial_{51i} \Delta RGDPS_{it} + \varepsilon_{it} \quad (7)$$

$$\text{where } \theta_{0i} = \frac{\omega_i}{1-\lambda_i}, \theta_{1i} = \frac{\theta_{20i} + \theta_{21i}}{1-\lambda_i}, \theta_{2i} = \frac{\theta_{20i} + \theta_{21i}}{1-\lambda_i}, \theta_{3i} = \frac{\theta_{30i} + \theta_{31i}}{1-\lambda_i},$$

$$\theta_{4i} = \frac{\theta_{40i} + \theta_{41i}}{1-\lambda_i}, \theta_{5i} = \frac{\theta_{50i} + \theta_{51i}}{1-\lambda_i}, \phi_i = -1(1-\lambda_i)$$

In order to establish a long run relationship between stock market development as measured in market capitalization and the measures of stock market liquidity of *Sturn* and *Straded* and other explanatory variables, the speed of adjustment ϕ_i would not be zero but must be significant and negative thus: $\phi_i \neq 0$. The approach in this study is to estimate the (6) using the three techniques of MG, DFE and PMG. The results of the estimates of the three techniques are presented in Table 1.

Table 1 Estimates Result of DFE, MG and PMG

Dep. Var. Mktcap	DFE	MG	PMG
Variables	Coeff.	Coeff.	Coeff.
Sturn	.52 (1.22)	.19 (0.35)	.74*** (4.98)
Straded	-.19 (-1.37)	.18 (0.71)	.15*** (4.90)
Institu	2.28 (1.02)	-.97 (-0.44)	-.62 (-1.44)
Dcps	.51** (2.02)	.09 (0.16)	.37*** (3.57)
RGDP	-2.18e-11 (-0.14)	1.11e-09** (2.48)	4.20e-11** (2.73)
Short run (ec)	-.64*** (-7.74)	-1.09*** (-7.52)	-.73*** (-3.73)
Cons,	1.69 (0.11)	36.32 (0.94)	18.80* (1.66)

Values in parentheses are t statistics *** and ** are significant levels at 1 and 5 per cent respectively, while * signifies significant level at 10 per cent

6 Interpretations of Results

Estimates results of the three techniques as presented in Table 1. The results of the main explanatory variables are only significant using the method of PMG. The estimates results of the two variables of *Sturn* and *Straded* show that they are both highly significant at one per cent significant level. The PMG result reveals that one unit increase in the liquidity (as measured in turnover ratio) of the stock market would lead to 74 per cent increase in stock market development in the long run for the selected SSA economies. The second measure of liquidity is value of stock traded shows that a unit increases in value of stock traded lead to 15 per cent increase in the development of the stock market in the long run. Using the DFE none of the variable is significant except domestic credit to the private sector which is significant at 5 per cent significant level. A unit increase in the level of domestic credit to the private sector leads to 51 per cent increase in stock market development in the long run for the selected seven SSA countries. The results of the MG also show that only the real GDP is positively significant at five per cent level of significant. The same real GDP is significant at five per cent using the method of PMG. The MG indicates that a unit increase in the real GDP leads to 111 per cent increase in the stock market development in the long run. Results of the adjustment mechanism for the three techniques which is the error correction are significant and appropriately signed. It indicates that MG has the highest adjustment period of the three methods which shows that 109 per cent of the distortion from long run equilibrium would be restored within one year. PMG reveals that 73 per cent of the short run disturbance would be restored within one year while for DFE it is 64 per cent.

7 Conclusion

The conclusion that emanates from the present study is that stock market liquidity as measured in turnover ratio and stock value traded are individually resulting into strengthening of the stock market in the long run for the selected seven SSA countries. The result is in tandem with Yartey (2007) and (2008) who investigates the determinants of stock market in SSA and emerging markets with focus on South Africa respectively. Based on these results it is then recommended that the selected seven SSA countries should design financial market strategy that would boost the liquidity of the stock market so as to contribute to the growth of the stock market. Based on our objective of examining the effects of stock market liquidity on the development of stock markets the implication from the empirical analysis is that trading activities in the stock markets for the selected seven

SSA countries would enhance the vibrancy of these stock markets.

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