The Relationship of the Stock Market Prices on Exchange Rate and Market Capitalisation: the Case Dar es Salaam Stock Exchange in Tanzania

Iddi. Salum Haji*   Wei Jianguo

School of Economics, Wuhan University of Technology, Wuhan 430070 China
* E-mail of the corresponding author: iddisalum2001@yahoo.com

Abstract

This paper investigated the relationship between the Dar es Salaam Stock Exchange All Shares Index (DSEI), Exchange rate (EX) and Market capitalisation (MC) using monthly data from July 2009 to December 2013 obtained from quarterly Updates and website of Dar es Salaam Stock Exchange. The regression and correlation techniques were used to establish the relationship. The dependent variable was the Dar es Salaam Stock Exchange All Shares Index while Exchange rate and Market capitalisation, were independent variables of regression. The results show that the Exchange rate and the Dar es Salaam Stock Exchange All Shares Index have positive regression coefficient, Market capitalisation and Dar es Salaam Stock Exchange All Shares Index also have positive regression coefficient. Also these three variables were found to have positive correlation coefficients. From these results obtained, we suggested that there is strong positive linear relationship between Market capitalisation and Dar es Salaam Stock Exchange All Shares Index, and moderate positive relationship between Exchange rate and the Dar es Salaam Stock Exchange All Shares Index.

Keywords: Dar es Salaam Stock Exchange, Market capitalisation, exchange rate, relationship, regression

1. Introduction

The Capital markets are facilities and interactions through which funds move from fund holders to productive users. The market channels funds at the market price, to productive activities. The Capital market is classified into two segments. These segments are primary and secondary markets (DSE, 2010, Bodie et al., 2009). In Primary markets securities are issues to initial buyers at the first time-Initial Public Offering (IPO). Initial Public Offering is used when the firms floats shares or its corporate bonds to the investors for the first time. Those companies wishing to raise fund for expanding their capital and increase their business activities can issue their shares for the first time through the IPO.

The securities initially issued at the primary markets, are later traded in the secondary markets (Bodie et al., 2009). The secondary markets bring the interaction of buyers and sellers of the securities previously issued to and subscribed by investors in primary markets. The secondary markets are administered by formal institutions given the mandate of trading securities. Some examples of the secondary markets include, New York Stock Exchange (NYSE), Tokyo Stock Exchange (TSE) and the Dar es Salaam Stock Exchange (DSE).The secondary market facilitates the process of buying and selling securities initially sold at the primary market to investor (Bodie et al., 2009).

Before 1990s, Tanzania was following centralized economic policies, all economic activities at that time were only driven by the government, there were very few or no opportunities for the private sector to participate in the economy. Since the economy was centralised the public had no idea of the opportunities available in the capital market. By that time the economy of Tanzania was dependent on almost 700 poorly performing government's corporations (CMSA, 2006).

In 1990s the Tanzanian government established economic reforms. The reforms were targeted to improve the access of financial services to all sectors that were previously excluded by financial providers. The financial sector reforms introduced were, liberalization of interest rates, eliminating administrative credit allocation and strengthening the role of the Bank of Tanzania in regulating and supervising financial institutions (Simpasa, 2011). The reforms were also aimed on restructuring the state owned financial institutions and allow entry to new private financial institutions in the market. During the reforms Tanzania had privatized more than 300 government organizations, also had observed the growth of financial Institutions, the increased participation of public in investment activities , the establishment of the Capital Market and Security Authority (CMSA) and the establishment of the Dar es Salaam Stock Exchange (DSE).

2. Dar es Salaam Stock Exchange (DSE)

The Dar es Salaam Stock Exchange (DSE) is the only formal trading place for securities in Tanzania. The DSE was established in 1996 under the Companies Ordinance (Cap. 212). It is a private company limited by guarantee with no share capital. It is a non-profit making body established to facilitate the Government implementation of the economic reforms and share ownership of all privatized companies in Tanzania. The exchange is registered

by Capital Market and Security Authority (CMSA). DSE operates in close association with the Nairobi Securities Exchange in Kenya and the Uganda Securities Exchange in Uganda. Plans are underway to integrate the three to form a single East African bourse.

2.1 Trading

DSE is open for 5 working days in a week from Monday to Friday except on public holidays. Currently the volume of trading at exchange has increased ,this lead to the increase in operating time to four hours, at the past the volume of trading was at the exchange was not big, the duration of trading lasted for two hours, started at 10 a.m. and closed at 12 a.m. (Mohamed,2008, www.dse.co.tz).

Trading started on 15th April, 1998 with only one equity product, by Tanzania Oxygen Limited (TOL) and later in the same year Tanzania Breweries Limited (TBL) became the second listed company at DSE. Currently, the DSE is trading 18 equity products, 5 corporate bonds and 17 Government bonds. Out of eighteen companies, six companies' shares are not only cross listed at the DSE but also at the Uganda Stock Exchange and Nairobi Stock Exchange .These companies with their trading symbols and year of listing in brackets are Kenya Airways Ltd (KA, 2004), East African Breweries Ltd (EABL, 2005), Jubilee Holdings Ltd (JHL, 2006), Kenya Commercial Bank Ltd (KCB, 2008), National Media Group Plc (NMG, 2011) and African Barrick Gold Plc (ABG, 2011) (www.dse.co.tz).

Along with TOL and TBL, other domestic companies listed in DSE with their trading symbols and year of listing in brackets are TATEPA Ltd. (TATEPA, 1999), Tanzania Cigarette Co. Ltd. (TCC, 2000), Tanga Cement Co. Ltd. (SIMBA, 2002), Swiss port Tanzania Ltd. (SWISSPORT, 2003), Tanzania Portland Cement Co. Ltd. (TWIGA, 2006), DCB Commercial Bank Plc (DCB, 2008), National Microfinance Bank Plc (NMB,2008), CRDB Bank Plc (CRDB,2009), Precision Air Services Plc (PAL,2011) and Maendeleo Bank Plc (Maendeleo,2013) (www.dse.co.tz).

2.2 Trends of Market Capitalisation, Exchange Rate and Dar es Salaam Stock Exchange All Shares Index at the Dar es Salaam Stock exchange

Within a span of 54 months DSE witnessed an increase in market capitalisation (MC) from TZS 5,140.51 billion in July 1999 to TZS 16,464.30 billion in December 2013. The market capitalisation at December 2013 exceeded the market capitalisation of July 2009 by a factor of 3.2. From the period starting July 2009 to December 2013 the maximum and minimum market capitalisation was TZS 17175.03 billion in November 2013 and TZS 4,888.0 billion in November 2010 respectively.

On the other hand from July 2009 the Dar es Salaam Stock Exchange All Shares Index (DSEI) increased by 6.7% to TZS 1,304.0 in November 2011, then decreased by 3.2% from November 2011 to TZS 1,262.82 in May 2012, then it increased by 53.7% from May 2012 to TZS 1,940.37, then it decreased by 3.8% from November 2013 to TZA 1,866.57 in December 2013. The exchange rate (EX) has shown upward and downward movements for different time periods between July 2009 to December 2013.From July 2009 exchange rate increased by 24.5% to 1,672.0 TZS/USD in November 2011, then decreased by 9.2% from November 2011 to 1,518.33 TZS/USD in May 2012, then it increased by 6.1% from May 2012 to 1,611.67 TZS/USD in July 2013, then it decreased by 2.3% from July 2013 to 1,574.01 TZS/USD in December 2013.
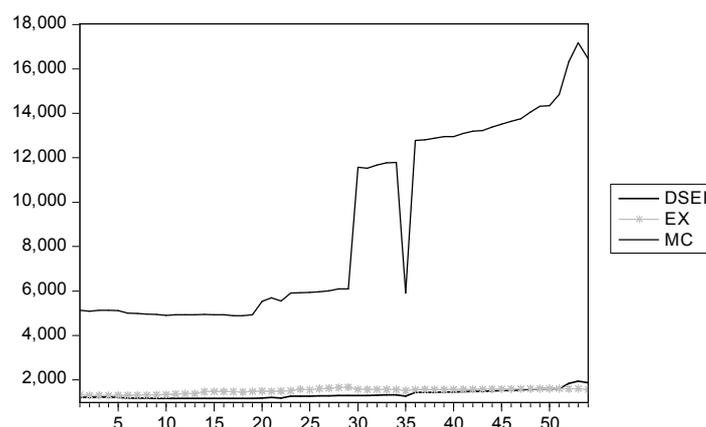
Figure 1: DSEI, EX and MC July 09 to June 2013

Figure 1 above shows the graphs of DSEI, EX and MC, the vertical axis represents the values taken by the three variables, while the horizontal axis shows the time period measured in months, the above graph shows the trends of MC with a non uniform increase and decrease, the two lower graphs are the graphs of EX and DSEI, the two graphs shows almost similar trends through the time, except from the 50th month DSEI started to go above EX.

From the information observed in figure 1 above it is obvious that there exist non uniform increase in market

capitalisation, the fluctuations in both exchange rate measured in Tanzanian Shilling (TZS) against US dollar (USD) and the Dar es Salaam Stock Exchange All Shares Index (DSEI). Do these fluctuations in Exchange rate and All share Index, and increase in market capitalisation has any relationship to enable the investors to predict for the future of their investments?

The objective of this paper is to investigate the impact of Dar es Salaam Stock exchange All share Index on exchange rate and market capitalisation, more specifically to test the two hypothesis:

a) Exchange rate measured in TZS/ USD is positively related to Dar es Salaam Stock exchange All share Index.

b) Dar es Salaam Stock Exchange All share Index is positively related to Market capitalisation measured in TZS.

3. Literature Review

The analysis on the impact of the macroeconomic variables on the stock market in Turkey using the data from 2001 to 2008 revealed that, there is a bidirectional causality between exchange rate and the stock prices of the Turkey stock exchange , further more the study suggested positive causal relationship between the exchange rate and technology indices. (Aydemir & Demirhan, 2009).

The study conducted using data from 1991 to 2000 obtained from South Asian countries ie Pakistan, India, Bangladesh and Sri Lanka to investigation on the short run and long run association between exchange rate and price of shares revealed the following, firstly there is no long-term or short term relationship between exchange rate and prices of shares in Pakistan, India, also the study found no short term relationship between exchange rate and prices of shares in both Bangladesh and Sri Lanka, but suggested the possibility of the bidirectional long-run causality between exchange rate and prices of shares for Bangladesh and Sri Lanka. The study argued that the stock prices and exchange rates of the South Asian countries are not related, so the information from one stock market cannot used to predict another stock market (Rasheed, 2002).

The study conducted to seek evidence of mutual interaction between stock prices and exchange rates in the EU and the USA revealed the following. The study firstly found that there was no relationship between exchange rate and stock prices on analysing the data from 1970-1992, among the reason for this was that exchange rate was given a limited space for the exchange rate volatility. Secondly stronger long run causality between variable was found in analysing the data from 1993 to 2003. Four out of nine countries appeared to have cointegration between stock prices and exchange rates, but the direction of the relationship was not uniform. Furthermore the test of short term relationship between exchange rate and stock market prices gave mixed results; the granger causality tested showed that the relationship was unidirectional running from stock prices to exchange rate (Stavárek, 2005).

Another study conducted to examine the relationship between stock prices and exchange rates using a sample of four emerging markets countries (India, Korea, Pakistan and Philippines), granger causality and cointegration methods shows a unidirectional causality running from exchange rate to stock prices as compared to the same study conducted using EU and USA data above (Abdalla & Murinde, 1997).

The examination of the causal relationship between exchange rate and stock price in using quarterly data from 1990 Q1 to 2990Q4 in Nigeria reveals that, the existence of the long run equilibrium relationship between exchange rate and stock prices. The study also shows that there is strong unidirectional causal relationship from stock price to exchange rate; further this study revealed that exchange rate has negative influence on the Nigerian stock prices when using vector co integration (Okpara, 2012).

Another study was conducted to investigate the relationship between stock prices and exchange rates using the data from January 2003 to June 2008 collected from South Asian emerging markets namely Bangladesh, India and Pakistan. The study used monthly data of exchange rates and stock market prices collected from each country, the data was tested for the unit root tests and the results revealed that exchange rates and stock prices data series are non stationary and integrated of order one, also the cointegration method was used to check the possibility of the relationship but resulted with no relationship between exchange rates and stock prices. The causality relationship test conducted by the study revealed that there was no causal relationship between stock prices and exchange rates in all three countries (Rahman & Uddin, 2009).

Another attempt to examine the relationship between foreign exchange rates and stock market was conducted in India, this study used data collected from India stock exchange and exchange rate expressed in Indian Rupees per US dollar for the period from 2004 to 2009. The granger causality method was used to establish the relationship between foreign exchange rates and stock market, the result revealed that there exists no relationship between foreign exchange rates and stock market even if the correlation results revealed very small positive coefficients between the two variables (Gulati & Kakhani, 2012).

4. Methodology

This study examines the impact of Dar es Salaam Stock Exchange All share Index on exchange rate and market

capitalisation in Tanzania. The data were collected from quarterly reports and http://www.dse.co.tz/main/index .php of the Dar es Salam Stock Exchange (DSE) and covered 54 monthly observations from years July 2009 to December 2013.The linear regression and correlation methods were used to analyse the data.

The set of data includes Dar es Salaam Stock Exchange All Shares Index (DSEI), exchange rates (EX) and Market capitalisation (MC). In this study DSEI was used as dependent variable, EX and MC were used as independent variables.

The regression model used in this study is shown in equation 1 below. To obtain the result DSEI was regressed on EX and MC.

$$DSEI = \alpha + \beta 1 EX + \beta_2 MC + \varepsilon \qquad (1)$$

Where

DSEI is the Dar es Salaam Stock Exchange All Shares Index, a dependent variable

α is a regression constant

EX is the Exchange rate, an independent variable

MC is the market capitalisation, an independent variable

$\beta 1$ and $\beta 2$ are the slopes of the equation for the EX and MC respectively

ε is the standard error (residue) of the estimate.

5. Analysis of the Result

Table1: Descriptive Statistics.

	DSEI	EX	MC
Mean	1347.786	1508.447	8953.835
Median	1283.000	1568.620	5995.500
Maximum	1940.370	1672.000	17175.03
Minimum	1162.000	1301.840	4888.000
Std. Dev.	193.4700	109.9474	4240.312
Skewness	1.238243	-0.729962	0.385180
Kurtosis	4.023109	2.149612	1.440481
Jarque-Bera	16.15441	6.422714	6.807501
Sum	72780.47	81456.15	483507.1
Observations	54	54	54

Source: Own estimate.

The table 1 above shows descriptive statistics for the DSEI, EX and MC. These variables are mean, maximum, minimum, standard deviations and other measures of distribution that includes Skewness, Kurtosis and Jarque-Bera. The averages for DSEI, EX and MC are 1347.786, 1508.447 TZS/US and 8953.835 respectively as shown in the table 1 above.

During the period of investigation DSEI averaged to 1347.786, with highest value of 1940.37 and minimum value of 1162.00. The Exchange rate of Tanzania ranges from 1301.84 to 1672.0 within a period of 54 months, from July 2009 to December 2013.The MC of Tanzania ranges from 4888.0 bil TZS to 17175.03 bil TZS., the. MC and DSEI show the standard deviations of 4240.312 and 193.4700 respectively, while EX has the smallest standard deviation of 109.9474.

The table1also reveals that MC and DSEI have positive Skewness values of 0.385180 and 1.238243 respectively, while EX shows a negative Skewness of 0.729962. All three variables show positive Kurtosis and Jarque-Bera measurements, with DSEI show the highest values of 4.023109 and 16.15441of Kurtosis and Jarque-Bera measurements respectively, while MC shows the smallest Kurtosis of 1.440481and EX shows a smallest Jarque-Bera measure of 6.422714.

Table 2 Correlation Statistics

	DSEI	EX	MC
DSEI	1.000000	0.616890	0.918783
EX	0.616890	1.000000	0.669008
MC	0.918783	0.669008	1.000000

Source: Own estimate

The Table 2 above shows the correlation matrix results for the DSEI, EX and MC. The correlation coefficient between DSEI and EX is 0.616890; while the correlation between DSEI and MC is 0.918783, also it was revealed that MC and EX have the correlation coefficient of 0.669008.

Table 3: Regression results
Dependent Variable: DSEI
Method: Least Squares
Date: 04/10/14   Time: 23:26
Sample: 1 54
Included observations: 54

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	962.8787	178.8278	5.384390	0.0000
EX	0.007063	0.130867	0.053967	0.9572
MC	0.041798	0.003393	12.31801	0.0000
R-squared	0.844171	Mean dependent var		1347.786
Adjusted R-squared	0.838060	S.D. dependent var		193.4700
S.E. of regression	77.85579	Akaike info criterion		11.60155
Sum squared resid	309137.8	Schwarz criterion		11.71205
F-statistic	138.1407	Durbin-Watson stat		0.460249
Prob(F-statistic)	0.000000			

Source: Own estimate.

The table 3 above shows the result obtained after running the regression of DSEI, on EX and MC. From the table we see that α is equal to 962.8787 while EX and MC coefficients are 0.007063 and 0.041798 respectively. The t-statistics for the EX and the MC are 0.053967 and 12.31801respectively. The coefficient of determination R squared is 0.844171and the Durbin-Watson statistic of 0.460249.

The result obtained from Table 1 above for Skewness, Kurtosis and Jarque-Bera indicates that the distributions of DSEI, EX and MC are not normally distributed; the distributions of MC and DSEI are skewed to the right, while that of EX is skewed to the left, and DSEI shows the highest skewness of 1.238243.

 The correlation result revealed that there are positive correlation coefficients between DSEI with MC and DSEI with EX. This means that DSEI has positive relationships (association) with EX and MC, when one of these three variables tends to increase the other variables also will tend to increase and the opposite is true for all variables, also EX and MC show a positive relationship, that explains each of these two variables at the rate of 66.9%. The relationship between DSEI and MC is strong with 91.87 % of each variable explaining one another. DSEI and EX shows a moderate relationship of 61.69%.

The result from regression shows that DSEI has positive impact on MC with significant positive coefficient of 0.041798 and also DSEI has positive impact on EX with a coefficient of 0.007063. The contribution of the MC to DSEI is positive and its slope (coefficients) is statistically different from zero, also the contribution of the EX to DSEI is positive and its slope (coefficients) is statistically not different from zero. If MC is zero, for every USD100 increase in EX, We expect DSEI to increase by USD 0.71 and if EX is zero, for every USD 100 increase in MC, we expect DSEI to increase by USD 4.2, the coefficient of determination, R- squared is 84.42% indicates that DSEI shows strong degree of linear association with EX and MC, their linear relationship is only explained by 84.42%, this suggest that there are other factors that explain the remaining 15.58% of the relationship of DSEI ,EX and MC in the Dar es Salaam Stock Exchange.

6. Conclusion

This paper conducted an investigation to check for the impact of Dar es Salaam Stock exchange All share Index on exchange rate and market capitalisation in Tanzania, the study used monthly data from Dar es Salaam Stock exchange. The data were analysed using Regression and Correlation methods.

The results obtained indicate that there is a strong positive relationship between the DSEI and MC, and on the other hand EX shows moderate relationship with DSEI in Dar es Salaam Stock Exchange in Tanzania. These results suggest that DSEI has positive relationship with MC, and the magnitude of that relationship is strong, also DSEI shows positive relationship with EX, the magnitude of the relationship is also moderate. Despite the fluctuations shown by in Exchange rate and All share Index, and non uniform increase in market capitalisation, the three variables show have positive relationship.

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