DYNAMIC LINK BETWEEN STOCK MARKET SIZE AND STOCK MARKET INVESTMENT RETURNS IN NIGERIA

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ABSTRACT

Purpose—_This research examines the dynamic link between stock market size and investment returns in Nigeria._

Design/Methodology: _Based on the ex-post facto research design, the Autoregressive Distributed Lag (ARDL) technique was applied to the annual time-series data obtained from the Central Bank of Nigeria's statistical bulletin for the period 1985 to 2019._

Findings-- _Findings of this study indicate a negative, weak and significant correlation and a long-run relationship between stock market size and stock market returns in Nigeria. Furthermore, this study confirmed that the stock market size has a negative and significant effect on stock market returns in Nigeria in the long run. However, in the short run, the effect of stock market size on returns is positive and statistically significant._

Practical Implications--_capital market policies directed at expanding the market size must be vigorously pursued by the Government in close partnership with the organized private sector. In contrast, the long-run negative effect of stock market size on stock market investors should be mitigated by improving the environment of the financial market in the area of law and policy framework, professionalism and ethical operations, infrastructural improvements, etc._

Original Value—_This study posits a significant negative long-run relationship between size and the Nigerian Stock Exchange investment returns. This relationship has long-run policy implications for the economy._

Keywords- _All-share index, Autoregressive Distributed Lag, Investments, Market capitalization, Stock market size, Stock returns._

Paper Type—_Research paper_

INTRODUCTION

Life is full of risks and activities such as stock market investment. Stock market investment involves the commitment of capital resources into acquiring financial assets, or securities in shares, stocks, bonds, loan stocks, government securities, etc., mainly on a medium and long-term basis, in anticipation of future returns. Finance theory posits a proportional relationship between risk and return. Thus, the higher the risk, the higher returns. In mitigating stock market investment, investors do consider diversification as a good strategy, wherein they combine various investment options/securities of varying degrees of risk that are heterogeneous, such that if a particular security is doing poorly, some other set of securities will be producing positive returns, thereby reducing the aggregate risk of their portfolio. Aside from the formal risk mitigation strategy, some crops of investors, primarily self-directed investors, consider the size of the market, believing that the larger the size of a stock market, the better the ability of the market to absorb shocks from both within and outside the market. Another notion among self-directed investors is the assumption that a significant stock market tends to produce encouraging investment returns. Thus, these investors tend to subscribe to the maxim of "The bigger, the better" in their stock market investments.

To investigate the nexus between stock market size and market returns, the author found that quite a large body of studies exist on the stock market risk-returns nexus (Abdullahi et al., 2011; Mollik & Bepari, 2015; Aluko & Abogun, 2018). The emphasis on the risk-return complexion of the market is largely not unconnected with the notion that that risk and returns are the two most important factors of consideration in stock investment (Pandey, 2005; Abdullahi et al., 2011; Akinsulire, 2011; Akintoye, 2016; Omolehinwa, 2016; Nwude, 2018). Studies have shown that firm-level characteristics such as earnings per share, profit after tax, sales volume, and return on assets affect stock returns (Anwaar, 2016; Alaagam, 2019; Kayode et al., 2020). The macroeconomic view of the stock market places emphasis on macroeconomic variables (such as interest rate, inflation, exchange rate, exchange rate volatility, government expenditures, treasury bills rate) as determinants of stock market returns (Osisanwo & Atanda, 2012; Abbas et al., 2014; Al-Abdallah & Aljarayesh, 2017; Babarinde, 2019). The relationship between

stock returns and stock market variables such as market capitalization, the market value of securities traded, number and value of government securities, among others, has remained relatively less explored empirically. Even though some studies on stock returns and stock market variables such as the volume of trade (Pathirawasam, 2011; Mpofu, 2012; Gidigbi & Akpansung, 2015), there still appears to be scanty empirics on the link between stock market capitalization and stock returns, most especially in a developing country such as Nigeria. This subject matter calls for empirical investigation because expansion in size and market deepening is advocated by policymakers, researchers, Government, and the investment community. How much does the advocated market size expansion influence the general stock market returns? How accurate is the view of some investors that "the bigger a stock market, the better the investment returns in such market"?

This study is motivated by the need to provide practical answers to resolve the above puzzling questions. In that light, this research examined how the size of the stock market influences the investment returns in the Nigerian stock market. Therefore, the central aim of this study is to investigate the size-returns relationship in the Nigerian stock market for the period 1985 to 2019. The specific study objectives are: To determine the relationship between stock market size and stock returns in Nigeria; and evaluate the effect of stock market size on stock returns in Nigeria. To these ends, the following research questions are stated: What is the nature of the relationship between stock market size and stock returns in Nigeria? Does stock market size have a significant effect on stock returns in Nigeria?

REVIEW OF LITERATURE

The stock market, otherwise called the capital market, refers to a financial market where medium to long-term funds are exchanged between buyers and sellers of financial assets and liabilities. Stock market size is often measured as the ratio of market capitalization to gross domestic product (GDP). It is also measured simply as market capitalization. Market capitalization means the market value of all securities listed in a particular stock market. It is the product of the market prices and the number of securities listed on the Exchange. The term returns can be described as the financial gain from an investment, which includes

capital gain and current income from dividends in the case of stock investment. The stock market index often depicts the market returns, which could be expressed as percent change (Pathirawasam, 2011; Gidigbi & Akpansung, 2015) or logarithmically, as the first difference between the natural logarithm of both the current stock market index and the previous Index (Aluko & Abogun, 2018).

Theoretically, as a normative theory, portfolio theory provides insights to investors when making investment decisions in an environment of risk and uncertainty (Pandey, 2005). Therefore, the theory guides investors in investment portfolio construction to ensure an optimum balance between return and risk (Institute of Chartered Accountants of Nigeria, 2014).

Empirically, studies on the effect of stock market size on stock investment returns are relatively scarce. Related studies include Abdullah et al. (2015), which examined the impact of financial leverage and market size of selected stocks on the Dhaka Stock Exchange stock returns. The study concludes that leverage and market size have a significant negative and positive effect on stock returns. In a related study, Kayode et al. (2020) found that leverage, market capitalization, and sales growth rate do not significantly affect stock return in the financial sector in Nigeria. In the manufacturing sector, however, capitalization was found by the study to have a positive and significant effect on stock return. Furthermore, Agustin et al. (2019), with a focus on the listed manufacturing companies in Indonesia, submit, among others, that firm size impacts negatively on stock returns.

Furthermore, some studies argued that trading volume positively affects stock returns (Pathirawasam, 2009; Mpofu, 2012). Others found no significant relationship between the two (Gidigbi & Akpansung, 2015). However, Onoh et al. (2017) concluded that trade volume had a negative but significant effect on stock returns in Nigeria. Abdullahi et al. (2011) indicate that sectoral size has no significant influence on both sectoral risks and return. The authors note further that investment in the significant sector or blue chips neither serves as a cushion against risk nor guarantees high returns. Similarly, Aluko and Abogun (2015) also argue that in the overall period, the risk does not exert a significant effect on return in Nigeria.

The above review exposes empirical lacuna on the link between stock market size and stock returns. The author is

unaware of exact past studies on the subject matter size-return in the Nigerian stock market. The related few pieces of evidence on the subject failed to distinguish between the short-run and long-run influence of market capitalization on stock returns. This study is significant because it serves as one of the pioneering studies on the size-returns hypothesis in the Nigerian stock market. The study also provides evidence on short and long runs relationships and the effect of stock market size and stock investment returns in Nigeria.

METHODS

This is a time-series study of the link between market size and stock investment returns in Nigeria, spanning 35 years, 1985-to 2019. Secondary data, on an annual basis, was used in this study. Estimates are based on the raw data obtained from the Central Bank of Nigeria (2019)'s Statistical bulletin. In this study, stock market size (noted as SMS) is defined as the natural log of annual market capitalization on the Nigerian Stock Exchange [In(MCAP)], while SMR represents stock market returns. SMR is measured as the first difference of the natural logarithm of the annual all-share index (ASI) on the Nigerian Stock Exchange (NSE). SMS and SMR are mathematically defined in equations (1) and (2), respectively, below.

$$SMS = In(MCAP) \tag{1}$$

$$SMR = In\left[\frac{ASI_t}{ASI_{t-1}}\right] \tag{2}$$

Where SMS= stock market size; SMR represents stock market returns; $MCAP_t$= Market capitalization of the NSE at time t; ASI_t refers to the All-share index at NSE, at the current ASI_{t-1} corresponds to All-share index at NSE, at the previous period.

This study is situated within the Autoregressive Distributed Lag (ARDL) model. At the same time, the Pearson correlation test was also applied in the data analysis after necessary preliminary tests such as descriptive statistics, Augmented Dickey-Fuller unit root test, and F-Bounds cointegration test.

In modeling, the long-run model and the short-run and error correction model of the ARDL are specified in equations (1) and (2), respectively.

$$InSMR_t = \alpha + \beta_{1i}InSMR_{t-1} + \beta_{2i}InSMS_{t-1} + \mu_t \qquad (1)$$

$$InSMR_t = \alpha + \sum_{i=1}^{n} \Psi_{1i} \, \Delta InSMR_{t-1} + \sum_{i=0}^{n} \Psi_{2i} \, \Delta InSMS_{t-i} + \gamma ECT_t + \mu_t \qquad (2)$$

Where Δ denotes the first difference operator; *In* represents natural logarithm; α signifies the drift component; μ_t represents the error term; Ψ_1 - Ψ_2 = the parameters of the short-run dynamics of the model; β_1 - β_2 denotes parameters of the long-run relationship; and γ is the coefficient of the error correction term(ECT).

RESULTS AND DISCUSSION

Descriptive Statistics

The statistical properties of the variables in Table 1 show that stock market returns (SMR) range between -0.7810 and 0.6901, while that of the stock market size (SMS), 1.8870 and 10.1616 are the lowest and highest over the study period. There is evidence of a negative investment return over the study period. With an average value (0.1621), less than its standard deviation (S.D) (0.2916), stock market returns could be regarded to be relatively stable (not widely dispersed). Similarly, the Nigerian stock market size does not exhibit wide dispersion because its standard deviation is less than its mean value. Both variables are negatively skewed, but stock market size is leptokurtic (kurtosis>3) as against the platykurtic nature of the stock market size series(kurtosis<3). The Jarque-Bera (J-B) of stock market size, with an associated high p-value (p>10), suggests that stock market size (SMS) passes the normality test at a 10% level. Similarly, stock market returns (SMR) attain normality at a 5% level of significance (since its J-B's p-value>5%).

Table 1: Descriptive Statistics

Variables	Mean	Max.	Min.	S. D	Skewness	Kurtosis	J-B
SMR	0.1621	0.6901	-0.7810	0.2916	-0.9358	4.5043	8.16
SMS	6.6091	10.1616	1.8870	2.8700	-0.3105	1.6529	3.20

Source: Author's computation

Unit Root Tests

Empirical time series analysis assumes stationarity of underlying variables, such that the employment of non-stationary

variables in time series regression often leads to spurious results (Babarinde et al., 2019; Gujarati, 2003). Stationarity is critical since "if a time series is stationary, its mean, variance, and auto-covariance (at various lags) remain the same no matter at what point we measure them; that is, they are time-invariant" (Gujarati, 2003:798). Thus, the time series variables of the study were examined in terms of their unit root properties via the Augmented Dickey-Fuller (ADF) unit root test. The results of the ADF test are presented in Table 2.

The null hypothesis of the presence of unit root in the variable is rejected when the probability value does not exceed any of the three critical levels. Conversely, the null hypothesis is rejected if the test statistic exceeds the critical values. Therefore, the study rejects the hypothesis of a unit root in both variables (SMR and SMS) since their respective p-value does not exceed any of the three test critical values. Therefore, the study concludes that stock market returns (SMR) are stationary at a level while stock market size (SMS) attains stationarity at first difference.

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test

		Stock Market Returns (SMR)		**I(d)**	**Stock Market (SMS)**	
		t-Statistic	**Prob.**		**t-Statistic**	**Prob.**
ADF test statistic		-3.8325	0.0064*	I(0)	-4.4971	0.0011
Test critical values:	1% level	-3.6537			-3.6463	
	5% level	-2.9571			-2.9540	
	10% level	-2.6174			-2.6158	

Source: Author's computation
Note: * statistically significant at 1% level, since the p-value< 0.01.

Correlation Analysis

Correlation analysis was employed to determine the nature of the relationship between stock market returns and stock market size, and the results are reported in Table 3. The results indicate a negative correlation coefficient (-0.3881) and a probability value (0.0233) of less than a 5% significance level. This suggests the existence of a negative, weak and significant relationship between stock market returns and stock market size in Nigeria in the period under investigation.

Table 3: Correlation Analysis

	Correlation	Prob.
Correlation between stock market returns and stock market size	-0.3881	0.0233**

Source: Author's computation
Note: ** Statistically significant at 5% level of significance, since the p-value< 0.05.

Cointegration Test

The F-Bounds test of cointegration is considered suitable because the variables attain stationary at different orders, of zero and one. The test results (shown in Table 4) indicate that the variables are cointegrated. This is because the null hypothesis of no levels relationship is rejected since the respective F-statistics (25.2589) exceed the critical values of the upper bounds at 10%, 5%, and 1% (3.51, 4.16 and 5.58), respectively. In other words, there is a long-run relationship between stock market returns and stock market size in the period. This implies that the relationship between the two variables has long-term policy implications. Furthermore, there is a long-run short-run, suggesting that both long-run and short-run models could be estimated.

Table 4: F-Bounds Test of Cointegration

Test Statistic	Value	Significant levels	I(0)	I(1)
F-statistic	25.2589	10%	3.02	3.51
		5%	3.62	4.16
		1%	4.94	5.58

Source: Author's computation

Models Estimation

The long-run and short-run and error correction models' estimates of the effect of stock market size on stock market investment in Nigeria are summarized in Table 5. From the long-run estimates in Panel A in Table 5, both one-year and two-year lagged values of stock market returns are negatively signed but only the two-year lagged is statistically significant. This confirms the autoregressive nature of stock returns and the weak-form efficiency of the Nigerian stock market. This implies that the past values of the returns can explain the current returns in investment in the Nigerian stock market by suppressing its current value. Furthermore, in the long run, the current value of stock market size (SMS) is positively signed (0.5121) and statistically significant at a 1% level. This implies a positive and significant effect of stock market size on stock market returns in Nigeria. Though negatively

signed (coefficient, -0.0549), the one-year lagged value of stock market size [SMS(-1)] does not exert a significant effect on stock market returns in the long run. This position is reversed to negative (-0.4947) and has a significant effect when the two-year lag of stock market size is examined vis-à-vis stock market returns in the long run in Nigeria. Therefore, it can be inferred that the net effect of stock market size on stock market returns is negative and statistically significant in the long run.

Moreover, Panel B of Table 5 contains the short run and error correction model estimates. Like in the long run, the short-run value of the stock market returns [SMR(-1)] still attests to the weak form efficiency of the Nigerian stock market. However, unlike the negative coefficient of the long-run value of the stock market size, short-run stock market return is positively signed with itself. This implies that the past value of stock market returns helps significantly determine its current value by increasing it in the short run. Moreover, in the short run, both one-year and two-year lags in stock market size have positive and significant effects on stock returns in Nigeria. The error correction term (ECT) is negatively signed and statistically significant at 1%.

Table 5: ARDL Long Run and Short Run and ECM Estimates

Method: ARDL	Long Run Estimates		Short Run and ECM Estimates		
Selected Model:	ARDL(2, 2)		ARDL(2, 2)		
Variable	**Coefficient**	**Prob.**	**Variable**	**Coefficient**	**Pro**
SMR(-1)	-0.0985	0.5536	D[SMR(-1)]	0.1857	0.05
SMR(-2)	-0.1857	0.0999***	D(SMS)	0.5121	0.00
SMS	0.5121	0.0000*	D[SMS(-1)]	0.4947	0.00
SMS(-1)	-0.0549	0.7941	ECT	-1.2843	0.00
SMS(-2)	-0.4947	0.0032*			
Constant	0.2102	0.0663***			
R-squared (R^2)	0.7884		R-squared (R^2)	0.8386	
Adjusted R^2	0.7478		Adjusted R^2	0.8214	
F-statistic	19.3836	0.0000*			
Diagnostic Tests					
			Test statistic	**p-value**	
Durbin-Watson stat			1.7973		
Breusch-Godfrey Serial Correlation LM			0.2807	0.7576	
Jacque-Berra Normality			0.5981	0.7414	
ARCH Heteroscedasticity			0.1904	0.8277	

Ramsey RESET Linearity	2.7726	0.1084

Source: Author's computation

Note: * and *** denotes statistically significant at 1% and 10%, respectively, since the p-value is less than 0.01 and 0.10.

Furthermore, Table 5 also shows the models' diagnostic tests, namely, serial correction, normality, heteroscedasticity, and regression specification error test (RESET) of linearity. The models are robust to all the previous diagnostic tests, going by the respective high probability value of each test statistic, which culminates in the non-rejection of the null hypothesis of each test. In the same vein, the cumulative sum of recursive estimates (CUSUM) of the ARDL models depicted in Figure 1 indicates that the parameters of the models are relatively stable and do not imply the presence of structural break. This is because the test plot (blue line) is enclosed within the region of both upper and lower critical boundaries (red lines) of the test graph. Generally, the models are homoscedastic, free from serial correlation, normally distributed, free from misspecification error, and their parameters enjoy relative stability over time.
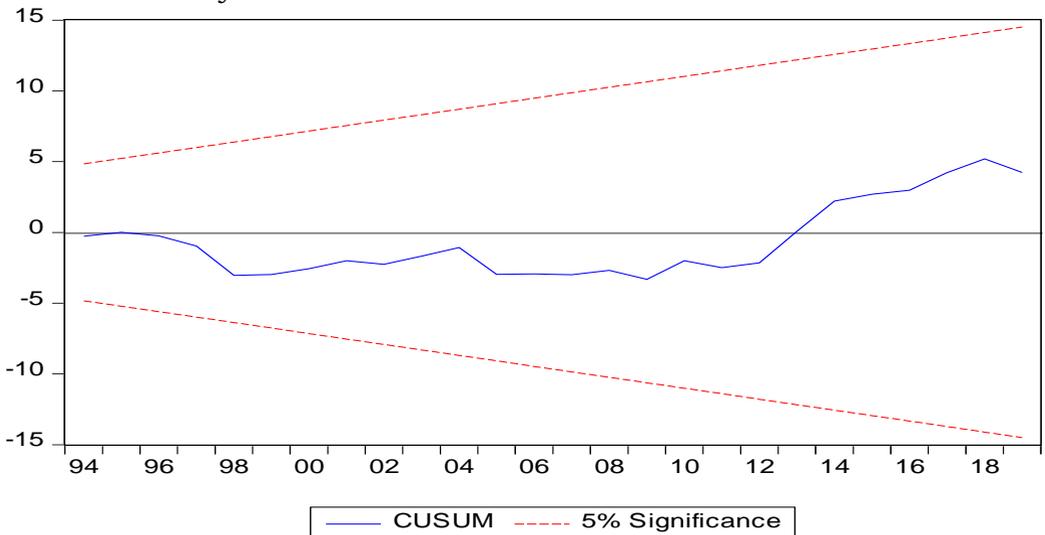

Figure 1: CUSUM Test for Model Stability
Source: Author's computation
CONCLUSION

This research is on the dynamic link between stock market size and stock market investment returns in Nigeria, stretching from 1985 to 2019. The study is situated within the Autoregressive Distributed Lag (ARDL) regression model, allowing long-run and

short-run estimations. This study, via correlation test, indicates a negative, weak, and statistically significant relationship between stock market returns and stock market size in Nigeria. The two variables are cointegrated, suggesting that a long-run relationship exists between Nigeria's stock market returns and stock market size. This implies that the relationship between the two variables has long-term policy implications.

Furthermore, empirical findings from the regression model show that stock market size has a negative and significant effect on stock market returns in Nigeria in the long run. However, in the short run, stock market size exerts a positive and significant effect on stock market returns in Nigeria. This study also supports Nigeria's weak form hypothesis of stock market efficiency. This is because it found evidence that in both the short-run and long-run, past values of stock returns help to explain the current stock market returns in Nigeria significantly.

This study recommends that since the stock market size-returns relationship has a long-run policy, it is therefore expedient that measures be put in place by the Nigerian Government to deepen the stock market by easing further bottlenecks in the listing process of small firms and speeding up to full digitalization of stock market operations in Nigeria. Capital market policies directed at expanding the market size in terms of breadth, depth, and residence should be vigorously pursued by the Government in close partnership with the organized private sector of the economy. The long-run negative effect of stock market size on stock market investors should be mitigated by improving the environment of the financial market in the area of law and policy framework, professionalism and ethical operations, infrastructural improvements, etc. Future studies should incorporate other variables (mostly macroeconomic indices) in modeling size returns in the Nigerian stock market.

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