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 guite 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 advocated by policymakers, deepening is 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

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investment. The stock market index often depicts the market returns. which could be expressed as percent change 2011: Gidigbi (Pathirawasam, Akpansung, 2015) 85 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 longrun 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, 1985to 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

$$= In(MCAP)$$
(1)

$$SMR$$

$$= In\left[\frac{ASI_t}{ASI_{t-1}}\right]$$
(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.

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

$$InSMR_{t} = \alpha + \sum_{i=1}^{n} \Psi_{1i} \ \Delta InSMR_{t-1} + \sum_{i=0}^{n} \Psi_{2i} \ \Delta InSMS_{t-i} + \gamma ECT_{t} + \mu_{t}$$
(2)

Where Δ denotes the first difference operator; *In* represents natural logarithm; α signifies the drift component; μ_t represents the error term; $\Psi_1 - \Psi_2$ = the parameters of the short-run dynamics of the model; $\beta_1 - \beta_2$ 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: Au	thor's co	mputatior	1					

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-

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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 Ma (SMR)	arket Returi	nsStock (SMS)	Market
			I(d)	t-	
		t-Statistic	Prob.	Statistic	Prob.
ADF test s	tatistic	-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 mark	et size		-0.3881	0.0233**

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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

Value	Significant	I(1)	
25.2589	10%	3.02	3.51
	5%	3.62	4.16
	1%	4.94	5.58
	Value 25.2589	Value Significant 25.2589 10% 5% 1%	Value Significant levelsI(0) 25.2589 10% 3.02 5% 3.62 1% 4.94

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 longrun 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 shortrun 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%.

6 Long Run Estimates		Short Run and ECM Estimates					
Selected Model:	ARDL(2, 2)		ARDL(2, 2)				
Variable	Coefficie nt	Prob.	Variable	Coefficien t	Prob.		
SMR(-1)	-0.0985	0.5536	D[SMR(-1)]	0.1857	0.0552***		
SMR(-2)	-0.1857	0.0999***	D(SMS)	0.5121	0.0000*		
SMS	0.5121	0.0000*	D[SMS(-1)]	0.4947	0.0020*		
SMS(-1)	-0.0549	0.7941	ECT	-1.2843	0.0000*		
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	v Serial Corre	lation LM	0.2807	0.7576			

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

Ramsey RESET Linearity	2.7726	0.1084	
ARCH Heteroscedasticity	0.1904	0.8277	
Jacque-Berra Normality	0.5981	0.7414	
Breusch-Godfrey Serial Correlation LM	0.2807	0.7576	
Durbin-Watson stat	1.7973		

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 Stabilit 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 sizereturns 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.

REFERENCES

- Abbas, S., Tahir, S. H., & Raza, S. (2014). Impact of macroeconomic variables on stock returns: Evidence from KSE-100 Index of Pakistan. *Research Journal of Economics* and Business Studies, 3(7), 70-77.
- Abdullah, M. N., Parvez, K., Karim, T., & Tooheen, R. B. (2015). The impact of financial leverage and market size on stock returns on the Dhaka stock exchange: Evidence from selected stocks in the manufacturing sector. *International Journal of Economics, Finance and Management Sciences,* 3(1), 10-15. doi: 10.11648/j.ijefm.20150301.12
- Abdullahi, I. B., Lawal, W. A., & Etudaiye-Muhtar, O. F. (2011).
 The effects of firm size on risk and return in the Nigerian stock market: A sectoral analysis. *British Journal of Economics, Finance and Management Sciences, 1*(2), 1-10.
- Agustin, M., Ar, M. D., & Darmawan, A. (2019). Analysis of the effect of firm size, financial leverage, profitability, diversification on market risk and stock return: Case study of manufacturing companies in the consumer goods industry sector listed on the Indonesia stock exchange in 2007-2016. The International Journal of Accounting and Business Society, 27(3), 28-57.
- Akinsulire, O. (2011). *Financial management* (7th ed.). Ceemol Nigeria.
- Akintoye, I. R. (2016). *Investment decisions in the 21st century*. Unique Educational.
- Alaagam, A. (2019). The relationship between profitability and stock prices: Evidence from the Saudi banking sector. *Research Journal of Finance and Accounting*, 10(14), 91-101. DOI: 10.7176/RJFA
- Al-Abdallah, S.Y., & Aljarayesh, N. I. A. (2017). Influence of interest rate, exchange rate, and inflation on common stock returns of Amman stock exchange, Jordan. *International Journal of Economics, Commerce and Management, 5*(10), 589-601.
- Aluko, O. A., & Abogun, S. (2018). The risk-return relationship in the Nigerian stock market in the presence of structural break. *Ilorin Journal of Management Sciences*, 5(1), 61-74.
- Anwaar, M. (2016). Impact of firms' performance on stock returns: Evidence from listed companies of FTSE-100 Index London, UK. Global Journal of Management and Business Research: D Accounting and Auditing, 16(1), 30-39.

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- Babarinde, G. F. (2019). Is exchange rate volatility related to the performance of the Nigerian stock market? *MAUTECH International Journal of Management and Entrepreneurship Studies*, 1(1), 110-130.
- Babarinde, G. F., Omofaiye, O. M., & Daneji, B. A. (2019). A vector error correction model of agricultural finance and economic growth in Nigeria (1992-2018). Nigerian Journal of Management Sciences, 7(1), 184-190.

Central Bank of Nigeria. (2019). Statistical bulletin. Retrieved from:

Gidigbi, M. O., & Akpansung, A. O. (2015). The relationship between trading volumes and returns in the Nigerian stock market. *International Research Journal of Finance and Economics*, 32, 151-163.

Gujarati, D.N. (2003). *Basic econometrics* (4th ed.). McGraw-Hill. http://statistics.cbn.gov.ng/cbn-

onlinestats/DataBrowser.aspx

- Institute of Chartered Accountants of Nigeria. (2014). Strategic financial management. Emile Woolf.
- Kayode, P. A., Oke, M. O., & Adegboyega, A. O. (2020). Firm characteristics and stock returns of Nigerian quoted firms: A two- sector comparative analysis. *Journal of Economics and Business*, *3*(1), 313-327. DOI: 10.31014/aior.1992.03.01.200
- Mollik, A. T., & Bepari, M. K. (2015). Risk-return trade off in emerging markets: Evidence from Dhaka stock exchange Bangladesh. *Australasian Accounting, Business and Finance Journal, 9*(1), 71-88.
- Mpofu, R. T. (2012). The relationship between trading volume and stock returns in the JSE securities exchange in South Africa. *Corporate Ownership and Control*, 9(4), 199-207.

Nwude, E. C. (2018). Investment analysis and portfolio management. El 'Demak.

Omolehinwa, A. (2016). *Work out strategic financial management* (4th ed.). Cleo Consult.

Onoh, J. O., Ukeje, O. S., & Nkama, N. O. (2017). Trading volume and market turnover in the Nigerian capital market: Implications to stock market returns. *IIARD International Journal of Economics and Business Management.* 3(1), 91-107. Osisanwo, B. G., & Atanda, A. A. (2012). Determinants of stock market returns in Nigeria: A time series analysis. *African Journal of Scientific Research*, 9(1), 478-496.

Pandey, I.M. (2005). Financial management (9th ed.). Vikas.

Pathirawasam, C. (2011). The relationship between trading volume and stock returns. *Journal of Competitiveness*, *3*, 41-49.