

# Impact of Stock Market Integration on Industrial Corporate Investment in Nigeria: An Empirical Study (1986-2023)

## Abstract

Nigeria, a sub-Saharan African nation, is endowed with an abundance of natural resources, particularly those needed for industrial purposes. Despite this, the present level of output in the industrial sector in Nigeria is too low, particularly when it comes to investment undertaking by corporate investors. Therefore, the study examined the effect of stock market integration on industrial corporate investment in Nigeria from 1986-2023. Data used were sourced from the Central bank of Nigeria Statistical Bulletin. The study used Augmented Dickey-Fuller (ADF), bound test and Autoregressive Distributed Lag. The ADF estimate indicated that money supply and all share index were integrated of order one; while, corporate investment, stock market integration, real exchange rate, and lending interest rate were integrated of order zero. The  $F$ -value for the bound test estimate was much higher than upper bound of critical value at 5% conventional level; therefore, suggesting a long-run link between the use variables. The short-run estimates showed that stock market integration, real exchange rate and all share index were significant with direct effect on corporate investment; while, money supply and lending interest rate were significant also with indirect effects. Furthermore, long-run estimate showed that money supply and all share index were significant with direct effect on corporate investment; while, real exchange rate and lending interest rate were significant with indirect effects. This suggests that stock market integration currently witnessing in Nigeria is tentative. The study concluded that the current growth witnessing by industrial corporate investment in Nigeria due to stock market integration is not sustainable. Therefore, recommended that the Nigerian Exchange Group's management should ensure that stock market price exhibit low volatility rate by making sure that its stocks management policies reflect best global stock exchange practice.

**Keywords:** Stock market integration; corporate Investment; industrial output, crude oil, natural gas.

## 1. Introduction

Investors especially the corporate ones are rational beings, whom are always ready to invest little of their respective liquidity assets on business initiatives with the hope of sourcing for large percentage from stock market. Given this, Nejo (2023) finds that the majority of corporate investors are risk averse, with many of them always seeking to commit between 35 and 40 percent into the new business and source other funds from external sources. As such, financial

integration is crucial in this way in ensuring that most business investors have access to sufficient cash, particularly in emerging nations such as Nigeria. Given this, Falade et al. (2018) disclose that because the majority of developing nations' financial institutions lack sufficient financial funding, they require external funding sources to support business expansion. For instance, as of 2022, the total stock market capitalization of Nigerians was \$91.4 million, while that of South African was \$1.24 trillion; in contrast, the New York Stock Exchange, NASDAQ, and Shanghai Stock Exchange, China, had capitalizations of \$26.2 trillion, \$16.74 trillion, and \$16.24 trillion, respectively (Nejo, 2023; Johannesburg Stock Exchange, 2022; Obadiaru et al., 2022). This implies that, in spite of South Africa and Nigeria enormous market capitalizations, they lack finances comparable to those of the New York Stock Exchange. Hence, reduces the rate of fund accessibility for business investment.

Financial and economic barriers have been gradually falling since the late 1980s, and as a result, developing and developed capital markets have become more integrated. For example, Nigeria's economy became more liberalised with the implementation of the Structural Adjustment Program in 1986, allowing for the free movement of commodities and capital between the nation and other countries. As a result, this move helps Nigeria's stock market integrate. Nejo (2023) states that stock market integration happens when price, risk, and benefit movements on the stock markets of two or more nations tend to move at the same pace. On this note, still, it is widely acknowledged that increased foreign stock ownership promotes integration amongst nations (Falade et al., 2021; Hillier & Loncan, 2019). Conversely, Bekaert et al. (2016) show that there is still uncertainty around some of the advantages of financial liberalisation, particularly in relation to integration velocity and how it affects the improvement of the real economy.

Financial integration enables agents in many nations to pool their risks, resulting in welfare gains by reducing consumption volatility and disentangling changes in domestic output and consumption (Bonga-Bonga, 2018). Also, because the majority of investors are risk averse, the action frequently inspires them, particularly in the business sector. However, home bias, unstable exchange rate policies in emerging nations, weak corporate governance, weak institutional structures, and corruption all impede the seamless integration of the stock market

(Omorose et al., 2022; Sandulescu, 2019; Bonga-Bonga, 2018). In light of the aforementioned problems, it has been experimentally demonstrated that a large number of foreign investors are consistently hesitant to direct their respective foreign inflow into emerging nations.

The corporate sector is made up of several business entities in the twenty-first century. Thus, each of these divisions has made a significant contribution to the expansion and growth of the economy. For example, in Nigeria, the services sector contributes 44.04% of GDP, while the industrial sector accounts for 30.78% of GDP overall in 2022 (Central Bank of Nigeria, 2022). In addition, the industrial sector is distinct because of its significance to the economy in terms of creating jobs, paying taxes into the government's coffers, facilitating corporate social responsibility, and advancing technological knowledge (Falade, 2021; Mogaji et al., 2020). On this point, research indicates that foreign ownership of the stock market facilitates investment in the industrial sector, particularly in emerging nations (Omorose et al., 2022; Bonga-Bonga, 2018). According to Hillier and Loncan (2019), stock market integration promotes foreign ownership in a well-developed industrial sector. On this note, studies show that stable market capitalization coupled with foreign ownership are essentially indicators for stock market integration (Nejor, 2023; Hillier & Loncan, 2019). Given this, the current study examines the effect of stock market integration on industrial corporate investment in Nigeria from 1986-2023. The rationale for considering 1986 is based on economy liberalisation during the era; while, 2023 is due to using current economy reality data.

## **1.2 Statement of The Problem**

Nigeria, a sub-Saharan African nation, is endowed with an abundance of natural resources, particularly those needed for industrial purposes. For example, it is documented that Nigeria possesses over 89 total natural industrial resources (Falade, 2021). Despite this, the present level of output in the industrial sector in Nigeria is too low, particularly when it comes to investment undertaking by corporate investors. For instance, agriculture and the industry sectors contributed less to the aggregate GDP in the second quarter of 2023 than in the second quarter of 2022; while, the industrial sector's growth rate was negative, coming in at -1.94% in the first quarter compared to -2.30% in the second quarter of 2022 (National Bureau of Statistics, NBS, 2024). Such a move would have negative effects on the Nigerian economy,

including a high unemployment rate, decreased total output, lower government income collection, and others.

Also, there is currently many macroeconomic issue arising as a result of low production at local level, especially at the real sector of the economy, in which industrial sector plays major role. The notable ones include instability nature of exchange rate, inflation and others. On this, many studies have claimed that Nigeria needs to invest massively at local level, especially on goods we can produce locally to boost economy, as well as, revamp exchange rate stability (Nejo, 2023; Falade, 2021; Mogaji et al., 2020). However, this claim may be fulfilled on a notion of having substantial funds and resources from external sources due to insufficient financial capacity of Nigeria's capital market, when compared with developed nations. Empirically, studies reviewed in Nigeria that include Thomas et al. (2023), and Ososuakpor (2021) were mainly concerned with stock market, with many silent on the integration aspect of it; while, Akinmulegun (2018) looked at foreign portfolio investment and Nigeria's capital market. Also, Nejo (2023) was concerned with integration of stock market and corporate investment, but limit the study's scope to manufacturing firm. Hence, this current inquiry appraises corporate investment, with reference to Nigerian industrial sector (crude petroleum and natural gas, solid minerals and manufacturing) and stock market integration.

## **2. Literature Review**

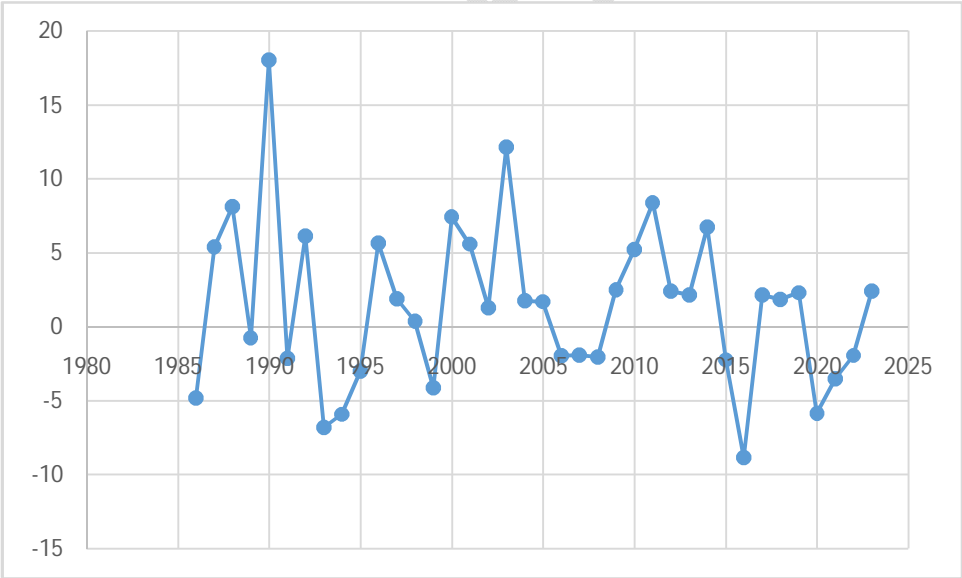
### **2.1 Corporate investment**

Corporate investing primarily targets people or organizations who donate their liquid assets to invest for the aim of profiting from capital gains or potential future revenue. Because corporations may now take advantage of greater investment possibilities, corporate investment activity in the twenty-first century is exclusively related to investment opportunities in a flawless stock market. However, agency problems, resource constraints, information asymmetry, and other practical challenges make inefficient investment phenomena like over- and underinvestment common (Nejo, 2023; Nyakurukwa & Seetharam, 2023). The total amount of resources invested by the company on investments may be split into two categories: (i) new

investments and (ii) investments made to hold onto present assets. Overinvestment and planned investment expenditure are examples of new investment expenditures in a project with a negative net present value (Dao, Minoiu & Ostry, 2017). Overinvestment is demonstrated by the example above, but underinvestment happens when companies don't fund projects that have a positive net present value or current assets. The expected investment amount varies based on industry affiliation, financial limitations, and the company's future prospects, among other variables. Under- or overinvestment by a corporation is a subjective issue that has nothing to do with the total amount of money invested (Wu & Wang, 2021).

The detrimental effects of uncertainty on investment have been the subject of extensive contemporary research. People become more risk cautious when uncertainty increases (Wu & Wang, 2021; Zhang & Yin, 2018), which causes business investment to decline, as seen in Nigeria's case (see Figure 1). Although uncertainty cannot be accurately estimated. Additionally, theoretical literature provides both positive and negative channels of uncertainty that might impact investment decisions. An example of an empirical finding that supports the idea that uncertainty encourages investment is the growth choices model.

**Figure 1: Trend Analysis of Nigerian Industrial Corporate Investment**



Source: Self-developed from Excel (2024) (Data from IMF Database, 2024)

**2.2. Stock Market Integration**

According to Hillier and Loncan (2019), stock market integration is a sign that the stock markets in several countries are moving in same line of direction, guaranteeing the same returns on assets for a given level of risk. Nejo (2023) asserts that if assets with the same risk have the same predicted returns regardless of the market, then the markets are fully integrated. In current inquiry, it is defined as the inflow of resources from one countries to another on the basis of countries involved showing the same stable degree of price market stock, as well as, similar degree level of risk. Since liberalisation of the global capital market is taking place due to globalisation, individual investors, institutional investors, international stock market portfolio designers, researchers, and other policy makers can now contribute to stock market integration.

As such, research and related studies have made a substantial contribution to stock market integration, which directly affects international portfolio investment decisions, diversifications, and even the financial stability of an economy (Thomas et al., 2023; Anthony-Orji & Ogbuabor, 2018).

Two categories of assets, investable and non-investable, and two types of agents, foreign and local, are characteristics of an imperfectly integrated market (Hillier & Loncan, 2019). While international investors can only hold the investable portfolio, domestic investors can hold both the investable and non-investable portfolios. Since certain local assets will be owned exclusively by domestic investors, they will not immediately benefit from enhanced risk sharing and will only be partially integrated into the process (Nyakurukwa & Seetharam, 2023). To protect themselves against the unique risk associated with the non-investable portfolio, local investors utilize the investable portfolio.

Also, returns on investable assets in this setting are determined by their covariance with global returns, as well as, an extra risk element resulting from pressure to hedge non-investible assets. Market segmentation (lack of integration) explains how much investable assets are valued locally in relation to non-investable asset returns or globally in relation to world market returns. This is quantified as the percentage of local market assets that foreign investors are unable to trade.

### **2.3 Empirical Review**

### 2.3.1 Studies Review from Nigeria

The impact of stock market integration on business investment in Nigeria between 1986 and 2022 was studied by Nejo (2023), using an Auto-regressive Distributed Lag (ARDL). The ARDL discovered that trade openness and lending interest rates were both negative and significant, while stock market integration indicated a trend toward non-stability over time and the real exchange rate displayed a negative sign but was not statistically significant at 5%. The study came to the conclusion that while trade emancipation and lower interest rates encourage corporate investment, stock market integration was unstable over time, limiting the pace of effect on corporate investment in Nigeria. Using OLS, Onigah and Ariwa (2023) also looked at the effect of capital market operations on economic growth in Nigeria between 1990 and 2019. The study found that the Nigerian capital market supports economic growth.

Thomas et al. (2023) used an impulse-response function and a short-run pairwise Granger-causality technique to examine how the all share index responded to an external financial flows shock between 1981 and 2021. The results demonstrated that ASI's impulsive reactions to one-unit shocks to trade openness, official development aid (ODA), remittance from compensation of employees (RECE), and personal transfers had observable beneficial effects on ASI over the long term. Conversely, long-term negative effects on ASI were caused by shocks to FDI and FPI. Furthermore, there were inconsistent causal correlations throughout the time periods. Ososuakpor (2021) investigated how macroeconomic and market uncertainty affected company investment choices between 2005 and 2019. The estimate method known as Generalized Autoregressive Conditional Heteroskedasticity (GARCH) was also utilized. Study discovered that there is a positive correlation between corporate investments and macroeconomic uncertainty measured by the inflation rate. Additionally, there was a statistically significant relationship between interest rate and exchange rate uncertainty, while there was no statistically significant relationship between the linear and quadratic market uncertainties.

Omorose et al. (2022) looked at the relationship between equities return and market risk in Nigeria from 1980 to 2019 using vector error correction model (VECM). The results showed that market risk variables and stock returns in Nigeria had a dynamic connection. Additionally, risks related to oil prices and currency rates have a major impact on stock returns, but risks related

to inflation, interest rates, and political instability have less of an impact. Lastly, a one-way association was found between stock return, political unpredictability, oil price, and interest rate. The study comes to the conclusion that the main market risk variables influencing stock return in Nigeria are the currency rate, oil price, interest rate, and political instability risks. Additionally, in order to investigate the effects of market risk variables with the fully modified ordinary least squares (FMOLS) approach, Oyetayo and Adeyeye (2017) utilized the APT model in Nigeria. The study's conclusions showed that while the link between RGDP and stock returns is continuous over the long term, APT is true in Nigeria in the near term. Bello and Fakunmoju (2019) investigated how market risk variables affected stock return on the Nigerian stock exchange. The twenty-one-year observation was analyzed using the ECM ARDL bound test. The analysis demonstrated that currency and inflation rates have a substantial negative impact on stock return. Additionally, trade volume had a negligible and negative long-term impact, whereas only the influence of market turnover was beneficial. In the near term, these factors have notable and advantageous consequences.

Using an error corrections model, Anthony and Ogbuabor (2018) investigated how the growth of Nigeria's capital market encourages foreign capital influx and how this foreign capital supports economic growth in Nigeria from 1985 to 2016. The results of the error corrections also show that, at the five percent tolerance level, the foreign exchange rate has a negative and statistically negligible influence on economic growth. The findings also claimed that market capitalization strongly and favourably promotes economic growth. Additionally, Akinmulegun (2018) investigated the relationship between foreign portfolio investment inflow and Nigeria's capital market development using data from 1985 to 2016 and the vector error correction technique.

The study found a substantial negative association between foreign portfolio investments and Nigerian market capitalization, as well as, a positive relationship between foreign portfolio investments and the Nigerian all-share index. Using data from 2007 to 2017, Iriobe et al. (2018) looked at the effect of inflows of foreign portfolio investments on the performance of the Nigerian capital market using ARDL. The results of the study demonstrated that inflows of foreign portfolio direct investment boost the performance of the Nigerian capital market.

### 2.3.2 Studies Review from Other Countries

Nyakurukwa and Seetharam (2023) used wavelet multiple correlation to investigate the connectivity of industrial sectors on the Johannesburg Stock Exchange. The results demonstrated that the Johannesburg Stock Exchange's sectors are particularly integrated at lower frequencies. Wavelet multiple correlation peaks in reaction to regional and worldwide shocks such as the Fitch Konradsson and Porss (2019) looked at the long-term diversification prospects across the BRICS countries between 1999 and 2019, using co-integration technique. The findings provide more evidence in favour of building a portfolio that only consists of companies from four of the five BRICS nations, as there have been no long-term co-movements in these markets. Furthermore, there are many of opportunities to lower portfolio risk without compromising adjusted portfolio performance in the markets of Brazil, India, China, and South Africa. The findings also show a number of causal links between the countries, with China acting as the primary catalyst. This implies that disruptions in the Chinese market have the potential to ripple out and impact the remaining BRICS economies, either directly or via one of the other markets.

Polanco-Martinez et al. (2018) conducted a study utilizing wavelet transform and a nonlinear causality approach from 2004 to 2011, with a particular focus on the EU stock market. Greece, Ireland, Portugal, Italy, and Spain are among the research regions. It was found that, between 2004 and 2007, there was a high degree of co-movement and significant at the 5% significant level in the stock market integration of the chosen nations. With an average gain of 12.3%, this indicates that there was a direct correlation between business investment and stock market integration. Furthermore, the country's stock market integration did not develop in tandem between 2008 and 2011 because of the severe crisis brought on by the 2008 recession. Finally, bi-directional causalities were found in the crisis era compared to the previous time using the nonlinear causality test. From 2003 to 2020, Delgado-Domonkos and Ai-Min (2023) looked at how the Latin American Integrated Market (MILA) affected investment efficiency. According to our study, MILA lessens the agency problem and knowledge asymmetry, which influences how efficient investment decisions are made. We provide strong empirical evidence that the over-investment problem is particularly affected by MILA's ability to improve investment

efficiency. Additionally, Naurival, Karu, et al. (2017) also investigated the financial integration of the equities markets in the BRICS countries. The results indicated that while the financial integration of the BRICS countries is increasing, it is still in its early stages, and they emphasized the need for more study before drawing definite conclusions. Since the BRICS nations do not have a long-term connection, there is more possibility for varied portfolio investments.

A study on whether the equity markets of the BRIC countries co-move over time was conducted by Singh and Kaur (2016). The data sample used in the study was split into two sets: the first set covered the years 2004–2013, and the second set, 2007–2013. In all of the samples, they are unable to discover any co-movements for BRIC; but, when looking at pairs, they are able to identify co-movements amongst China, Brazil, and Russia but not India during the financial crisis and the years that followed. The impact of market risk on the financial performance of companies listed on the Casablanca exchange between 2000 and 2016 was examined by Kassi et al. (2019).

The differenced and system GMM methodologies, as well as panel regression with fixed and random effects, were used. The study's conclusions showed that the 31 firms' financial performance that were taken into consideration in the sample was significantly impacted negatively by several indicators of market risk, including the degree of financial leverage, the gearing ratio, and the book-to-market ratio. Also, Mwenda et al. (2021) looked at Kenya's stock market's performance and systematic risk. The efficient market hypothesis, APT, and integration analysis served as the study's pillars and were utilized to determine the correlations between its variables. The analysis discovered a strong, long-term positive correlation between Kenya's stock market performance, inflation, and interest rates. According to the study, investment businesses and financial analysts should forecast future stock exchange performance for investors' advantage by using historical data on the rate of 91 Treasury notes and inflation.

### **3. Theoretical Framework and Methodology**

The current study used the Arbitrage Pricing Theory (APT) as its theoretical basis. Ross (1976) created the APT, a multifactor pricing model that determines asset values without requiring the identification of the market portfolio. It substitutes the mean-variance framework with a process that generates security returns, ignores some of the assumptions established by CAPM,

and assumes a homogeneous expectation. As a stand-in for risk, APT contends that returns on any given stock often follow a linear function of many indices. This suggests that the anticipated return depends on a number of factors rather than just one, beta. Although Roll and Ross (1984) and other later studies have discussed and recognized risk premium, interest rate term structure slope, industrial production, and inflation, Ross did not identify any external risk variables in his first study. But rather of being present and forward-looking, Camara (2009) and Brailsford (2007) harshly attacked the APT concept for looking backward. It is impossible to overstate this model's power point in spite of these objections. To begin with, the APT's flexibility allows it to anticipate stock returns, while accommodating various macroeconomic risks and firm-specific variables. It adheres to the return-generating procedure. To accurately anticipate long-term return, the model takes into account the risk premium of several macroeconomic risk indicators in addition to the projected return on assets (Ross, 1976). Thus, this model best fit a study of this nature. Mathematically expressing the theory as a single-period static model, we obtain the following:

$$r_j = f(f_1, f_2, f_3, \dots, f_n) \dots \dots \dots (i)$$

Where;  $r_j$ : industrial risk free trade,  $f_1 \dots \dots f_n$ : systematic factors

Putting equation (i) in econometric form, we have the following equation ii

$$r_j = \partial_0 + \partial_1 f_1 + \partial_2 f_2 + \partial_3 f_3 \dots \dots \partial_{4i} f_n + \mu_t \dots \dots \dots (ii)$$

$\partial_0$ : Constant for industrial asset j,  $\partial_1 - \partial_{4i}$ : the sensitivity of assets factor

### Model Specification

In the current investigation, the model was built on the theoretical frame work of APT, with a modification. As such, we have the following model

$$COI = f(STOCKI, MSS, REER, ASI, INT) \dots \dots \dots (iii)$$

Where;

COI = Corporate investment; STOCKI = Stock market integration, MSS= Money Supply, REER = Real Exchange Rate, ASI = All Share Index and INT = Lending interest Rate

Studies reviewed have identified many systematic risk factors, especially for stock market integration in developing countries, in which Nigeria is inclusive. However, in the current investigation, as shown in equation (iii), only five systematic risk factors are identified. The

rationale for such selection is based on the studies of Nejo (2023) and Hillier and Loncan (2019) reviewed. In the equation iii, stock market integration, lending interest rate and real exchange rate were included in-line with Nejo (2023) model; while, all share index and money are also included as control variable that directly impact corporate investment in industrial sector.

The econometric form of equation (vi) becomes

$$COI = \partial_0 + \partial_1 STOCKI + \partial_2 MSS + \partial_3 REER + \partial_4 ASI + \partial_5 INT + \mu_t \dots \dots \dots (iv)$$

The expected a priori sign;  $\partial_1 > 0, \partial_2 > 0, \partial_3 < 0, \partial_4 > 0, \partial_5 < 0$

Table 1: Measurement of Variables

Variable	Measurement	Source
COI	The annual sum of output of crude petroleum and natural gas, solid minerals and manufacturing as a percentage of GDP as constant price	CBN Statistical Bulletin (2023)
STOCKI	It is measured as annual portfolio value held by foreign investors as a percentage of total stock market capitalization.	CBN Statistical Bulletin (2023)
MSS	Money supply <sup>2</sup> /GDP(%)	CBN Statistical Bulletin (2023)
REER	It is measure as the relative ratio of price change of Nigerian naira (₦) to US' dollars (\$)	CBN Statistical Bulletin 2021
ASS	Average value of All share index/GDP(%)	CBN Statistical Bulletin 2021
INT	Measure as charges rate on deposit money bank loan on short-and-long term	CBN Statistical Bulletin 2021

Source: Self-developed from reviewed studies (2024).

## 4. Result and Discussion

### 4.1 Descriptive Statistics

Table 2: Descriptive Statistics Result

Statistics	COI	STOCKI	MSS	REER	ASI	INT
Mean	1.502105	1.423815	16.83165	102.1450	9.346829	3.528684
Median	1.730000	1.160122	13.77845	92.46000	9.527600	5.740000
Maximum	18.06000	3.580834	32.76000	275.2900	22.29356	18.75000
Minimum	-8.850000	-0.043211	8.464230	0.000000	0.000000	-31.45000
Std. Dev.	5.437845	1.244950	6.354376	60.92578	5.830835	10.38389

Skewness	0.644018	0.351566	0.570116	1.194110	0.129021	-1.111386
Kurtosis	3.870968	1.551699	2.221265	4.937653	2.090085	4.801976
Jarque-Bera Probability	3.827898	4.103954	3.018716	14.97532	1.416340	12.96407
Observations	38	38	38	38	38	38

Source: E-view-9 output (2024)

The Table 2 descriptive analysis revealed that on the average level, using mean estimate, real exchange rate (REER) exhibited highest value. Implying that rate of dollar to naira, as well as, price between goods and service within the Nigeria determine the stock market integration; also, the median established a similar finding, suggesting that investors considered exchange rate instability as risk factor for corporate investment. Also, real exchange rate (REER) was identified as the maximum value; while, independent variables that include lending interest rate (INT), as well as, stock market integration (STOCKI) exhibited a negative value. Also, the variables used confirmed with high degree of random variation around the mean. Implying that each appraised variable spread out. Also, both negative and positive skewness was discovered. Suggesting that a bell-shaped data. Policy wise, this shows that independents variables in current inquiry are suitable systematic risk factors for corporate investment in Nigerian industrial sector. Lastly, *p*-value of *Jarque-Bera* showed high degree of normally distributed of used data

## 4.2 Unit Root Estimate

**Table 3: Augmented Dickey-Fuller**

Variables	T-Statistics	critical values (5%)	Conclusion
COI	/3.047284/ 0.0011**	/2.943427/	I(0)
STOCKI	/3.227937/ 0000**	/2.963972/	I(0)
MSS	/4.847720/	/2.945842/	I(1)

	00004**		
REER	/3.571338/	/2.943427/	I(0)
	0.0113**		
ASI	/6.132566/	/2.948404/	I(1)
	0000**		
INT	/3.252632/	/2.943427/	I(0)
	0.0247**		

\*\* designates significant p-value at 5% level

Source: E-view-9 output (2024)

ADF estimate in Table 4 indicates that two of the use variables, namely money supply (MSS) and all share index (ASI), were integrated of order one; while, corporate investment (COI), stock market integration (STOCKI), real exchange rate (REER), and lending interest rate (INT) were integrated of order zero. It is implied that the variables employed in this investigation demonstrated strong confirmation of not being impacted by time degree at both level and first degree differences.

**Table 4. Bound Test Estimate**

Test Statistic	Value	K
F-value	4.411114	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: E-view-9 output (2024)

The *F*-value for the bound test estimate was much higher than upper bound of critical value at 5% conventional level; therefore, suggesting a long-run link between the use variables. Policy implication of such is that decrease or increase in any of the variable determine the level of change effect on others.

**Table 5. Lag Order Selection**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-658.5895	NA	1.25e+09	37.97654	38.24317	38.06858
1	-534.8222	198.0276	8595906.	32.96127	34.82769*	33.60556*
2	-491.1525	54.89906*	6712925.*	32.52300*	35.98920	33.71953
3	-461.0809	27.49401	16495367	32.86177	37.92776	34.61055

Source: E-view-9 output (2024)

According Pesaran et al. (2001), having ARDL that is unbiased required the application of lag order selection to arrive at reliable inferences. On this note, the majority of estimators considered lag two order. Hence, the current inquiry applied lag two order in analysis ARDL.

#### 4.5 Estimated Result of ARDL

Table: 6: Short-run and Long-run Estimates

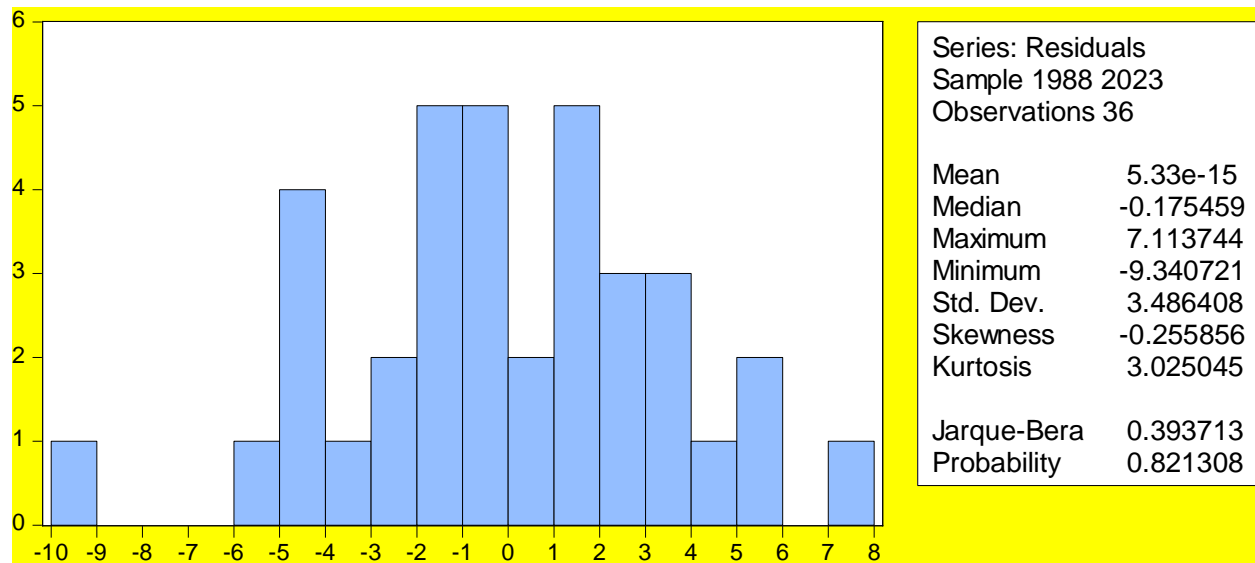
<b><math>R^2=0.621164</math>; <math>Adjusted\ R^2=0.563374</math>; <math>Prob.(F-statistic)=3.736113</math></b>				
<b>ARDL Short-Run Estimate</b>				
COI(-1)	-0.297444	0.115070	-2.584900	0.0036**
COI(-2)	-0.175847	0.230672	-0.762323	0.4557
STOCKI	7.612564	2.558572	2.975317	0.0022**
STOCKI(-1)	-5.648585	4.761233	-1.186370	0.2509
STOCKI(-2)	-2.910265	1.868954	-2.293440	0.0475**
MSS	-1.507277	0.542796	-2.776877	0.0124**
MSS(-1)	0.277469	0.741156	0.374373	0.7125
MSS(-2)	0.317429	0.619662	0.512261	0.6147
REER	0.024656	0.031822	0.774827	0.4485
REER(-1)	-0.048613	0.027267	-1.782869	0.0915
REER(-2)	0.033290	0.011138	2.988867	0.0024**
ASI	0.546497	0.242505	2.253549	0.0026**
ASI(-1)	-0.113149	0.326513	-0.214902	0.8323
ASI(-2)	0.030658	0.470360	0.065180	0.9487
INT	-0.322918	0.134390	-2.402848	0.0273**
INT(-1)	-0.067444	0.176024	-0.383151	0.7061
INT(-2)	0.372600	0.153123	2.433337	0.0256**
Constant	19.87721	19.84157	1.001796	0.3297
<b>ARDL Long-Run Estimate</b>				
CointEq(-1)	-1.473290	0.381643	-3.860385	0.0011**
STOCKI	-0.642295	0.208984	-0.531268	0.6017
MSS	0.619280	0.445764	2.519820	0.0007**
REER	-0.107239	0.016544	-6.482080	0.0000**
ASI	0.024431	0.421786	0.057923	0.9544
INT	-0.426307	0.151928	-2.805986	0.0117**
Constant	13.491715	11.509018	1.172273	0.2564

\*\* designates significant p-value at 5% level

Source: E-view-9 output (2024)

## 4.6. Robustness Check

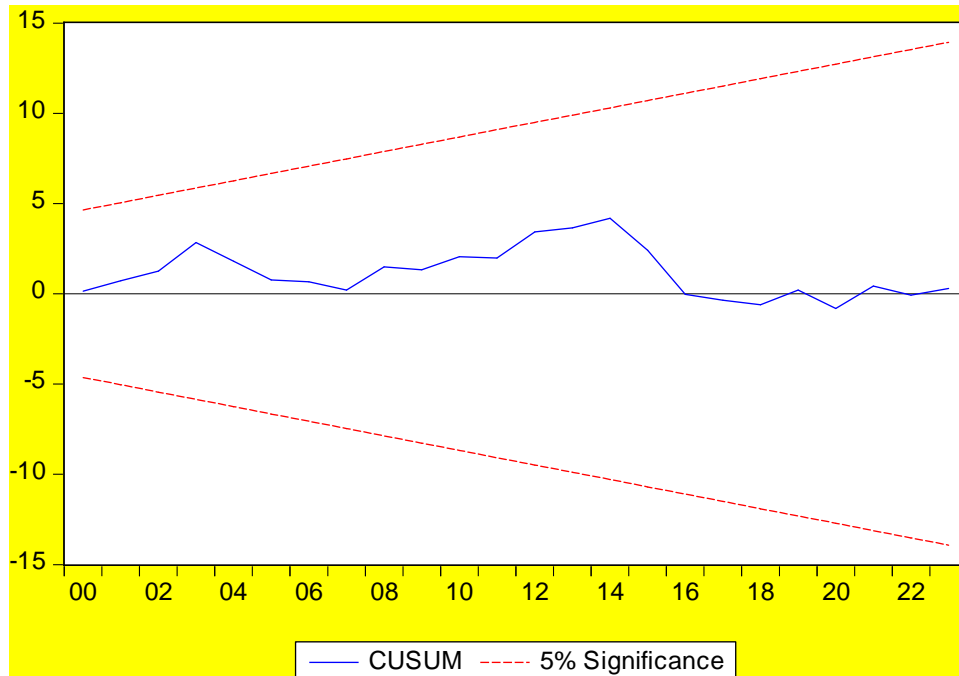
### a. Residual Normality Test



Source: E-view-9 output (2024)

It was discovered that *Jarquebera*(0.8213) obtained *p*-value was much higher than 0.05. suggesting that judging from the histogram chart, the variable in the model exhibited a bell-shaped pattern. Hence, the model is said to be normally distributed. Hence, the inference made in the study are not biased.

### b. Stability Test (CUSUM chart)



Source: E-view-9 output (2024)

The CUSUM plot line showed the blue was within the red line dot, suggesting that that variable in the model was stable since the residual line (blue line) having both high degrees of positive sign and infinitesimal degree of negative sign. The implication is that within the studied years of the variable in the model, they sometime exhibit instability.

### c. Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.608844	Prob. F(11,24)	0.8032
Obs*R-squared	7.854185	Prob. Chi-Square(11)	0.7263
Scaled explained SS	3.534462	Prob. Chi-Square(11)	0.9816

Source: E-view-9 output (2024)

The Breusch-Pagan-Godfrey's  $p$ -value was much higher than 0.05 significance level. Hence, suggesting the absence of heteroskedasticity in the model. The implication is that the model did not violate the linear regression analysis modeling.

## 4.7 Discussion of Findings

### Stock Market Integration and Corporate Investment

The coefficient of present lag period of stock market integration (STOCKI) was found to be significant and directly correlated with corporate investment (COI) at a conventional level of 5%; the lag two period's STOCKI was similarly significant and correlated with COI indirectly, with a value of 2.9 units. Furthermore, the long-term estimate revealed that STOCKI had a negligible and negative impact on COI. In the case of Nigeria, the obtained value of STOCKI has two economic implications on COI. First, relatively stability of price of Nigerian stock market with other countries increase the inflow of foreign ownership into industrial sector that promote corporate investment in the sector. As such, the inflow of such funds boosts local production and aggregate output in the industrial sectors, because developing countries do not have the sufficient resources coupled with less risk adventure investors are keyed into. Given this, Nejo (2023) finds that the majority of corporate investors are risk averse, with many of them always seeking to commit between 35 and 40 percent to new business, with the hope of sourcing the remaining from other sources.

Second, excessive volatility causes stock market prices to fluctuate, which deters foreign ownership structures and reduces corporate investment in the economy's real sector. However, home bias, unstable exchange rate policies in developing nations, weak institutional frameworks, high stock price volatility, inadequate corporate governance, and corruption all impede the seamless integration of the stock market (Omorose et al., 2022; Sandulescu, 2019; Bonga-Bonga, 2018). Accordingly, research done in Nigeria by researchers such as Nejo (2023) and Ososuakpor (2021) found an inverse relationship between stock market integration and corporate investment, concluding that the volatility of stock market integration over time limited its ability to influence corporate investment in Nigeria. Furthermore, a direct correlation between the STOCKI and COI was shown by Fakunmoju (2019) and Iriobe et al. (2018). Also, research conducted outside of Nigeria, such as that conducted by Nyakurukwa and Seetharam (2023) and Delgado-Domonkos and Ai-Min, Z. (2023), found an inverse relationship; nevertheless, Konradsson and Porss (2019) verified a positive relationship between the two.

### Money Supply and Corporate Investment

The money supply (MSS) for the present period was substantial but displayed a negative sign, as the ARDL estimate indicated. Furthermore, the long-term estimate demonstrated a direct and favourable impact of MSS on COI. In terms of policy, this means that the large amount of money in circulation held by bank and non-banking individuals has retarded corporate investment in the industrial sector. Long-run estimate, it also demonstrates that making sure that more funds are injected into the economy and directed toward the industrial sector encourages investments, which increases corporate investment. In the meanwhile, the derived negative sign for the short-run estimate was completely at odds with the *a priori* sign, based on the *p*-value of the 5% conventional threshold. A number of variables might be contributing to the negative sign, this include a situation in which majority of money supply are not directed toward the industrial sector, current governmental policy, insecurity, poor infrastructural development and many others. According to Hillier and Loncan (2019), stock market integration promotes foreign ownership in a well-developed industrial sector. However, the results did not agree with the research of Bonga-Bonga (2018) and Delgado-Domonkos and Ai-Min (2023) which established a direct correlation between MSS and COI. The year of the study, the different nations, and other factors are the causes of the discrepancy in the results.

### **Real Exchange Rate and Corporate Investment**

Also, at a 5% significant value, the short-run estimate for the lag two of the real exchange rate (REER) had a negative and significant impact on COI; similarly, the long-run estimate likewise shown a negative and significant effect. There are two implications that may be drawn from the findings. First, lowering the rate of dollar to naira, as well as, lowering stock market pricing in the Nigerian stock market discourage investment in the industrial sector. Second, the issue gets worse if such a practice is continued. Based on these findings, it may be concluded that the depreciation of the naira in relation to the currencies of other nations deters business investment, especially when market forces are not in operation. All of this has an impact on Nigeria's stock market capitalization in relation to other wealthy nations. As of 2022, the total stock market capitalization of Nigerians was \$91.4 million, while that of South Africans was \$1.24 trillion; when compared with the New York Stock Exchange, NASDAQ, and Shanghai Stock Exchange, China, with capitalizations of \$26.2 trillion, \$16.74 trillion, and 16.24 trillion,

respectively (Johannesburg Stock Exchange, 2022; Obadiaru et al., 2022). The results aligned with Ososuakpor's (2021) research, which found that the actual exchange rate was negative and statistically significant. Conversely, Nejo et al. (2023) found that the real exchange rate displayed a negative sign but was not significant at 5%. Additionally, a contradictory result of a positive and substantial association between them was validated by Oyetayo and Adeyeye (2017).

### **All Share Index and Corporate Investment**

The outcome demonstrated that the all share index (ASI) for current lag had short-run coefficients that were significant at the 5% conventional level, and had a direct impact on COI; conversely, the long-run estimate was positive but not significant at the same 5% level. This suggests that the average value of all the share prices of all firms on the Nigerian Exchange Group boosts stock integration and influences corporate investment in the industrial sector. The findings at the present and lag ones were directly consistent with the expressed *a priori* anticipation. Since the majority of the listed businesses' indices have improved over the course of the year, their share prices have contributed significantly to the GDP, which explains the positive character of the whole share index. The study by Bello and Fakunmoju (2019) and Naurival and Karu et al. (2017), which found a positive and significant association between the two, was consistent with the positive and significant sign derived from the findings.

### **Lending Interest Rate and Corporate Investment**

For both the short-run and long-run models, the lending interest rate's absolute coefficient (INT) was substantial and negative. The interest rate's negative sign was consistent with what was expected of the *a priori*. This suggests that interest rate increases have negative economic effects on the smooth operation of market integration and corporate investment in the industrial sector, by discouraging local corporate investors and creating an unfavorable business environment for foreign ownership. Because of this, business organizations' demands for funding for investments are based on the prospects, the rate of return, and the level of risk involved in such projects (Falade, 2021). Nejo (2023) and Bonga-Bonga (2018) both attested to an indirect and favourable relationship between them in this regard.

## 5. Conclusion and Recommendation

The current study examined the effect of stock market integration on industrial corporate investment in Nigeria from 1986-2023. In-line with the ARDL findings, the study concluded that the current growth witnessing by industrial corporate investment in Nigeria due to stock market integration is not sustainable. Therefore, it is recommended that:

- i. The Nigerian Exchange Group's management should ensure that stock market price exhibit low volatility rate by making sure that its stocks management policies reflect best global stock exchange practice.
- ii. It is recommended that apex bank within the country should ensure that money supply, especially from the banking and other financial related units are solely set for investment in industrial sector, via lowering lending interest rate to the areas to boost corporate investment, as well as, inflow of foreign ownership portfolio.
- iii. Local production should be encouraged via investment in both human capital and other economic resources to stabilise Nigerian naira in relation to other countries' currency.
- iv. More firms should be encouraged to be listed on Nigerian Exchange Group by ensuring that criteria for listing are more business friendly to boost current level of all share index.

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Details of the AI usage are given below:

- 1.
- 2.
- 3.

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