POLAC ECONOMICS REVIEW (PER)
DEPARTMENT OF ECONOMICS AND MANAGEMENT SCIENCE
NIGERIA POLICE ACADEMY, WUDIL-KANO

CAPITAL MARKET AND MANUFACTURING SECTOR CAPACITY UTILIZATION IN NIGERIA 1990 TO 2022

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Abstract

Developed economies with optimally performing capital market sometimes encounter over capacity utilization of their manufacturing sectors. In developing countries like Nigeria however, there is the prevailing problem of under –utilization of the manufacturing sector. The capital market is germane for the growth rate of manufacturing capacity utilization in all free market economies. However, the role of the capital market in the development of Nigerian manufacturing sector has remained unaddressed and the effect not felt despite several policy tools by the government aimed at improving the manufacturing sector. Hence, the paper seeks to investigate the effect of capital market on manufacturing sector capacity utilization in Nigeria from 1990 to 2022. The Auto regressive distributed lag model method of analysis was adopted in carrying out the analysis. Findings from the paper revealed that market capitalization has a positive effect on the rate of manufacturing capacity utilization, all share index also has a positive effect on the rate of manufacturing capacity utilization while value of traded stocks has a negative on the rate of manufacturing capacity utilization. The study recommended steps aimed at enhancing the sustainability of market capitalization and all share index as both has positive and significant effects on the rate of manufacturing capacity utilization as well as put in place measures to improve on the value of traded assets on the Nigerian Stock Exchange.

Keywords: Manufacturing Sector, Capital Market, Econometrics, Growth, All Share Index.

JEL Codes: N6, G24, C01, N01 and G12.

1. Introduction

One way of enhancing the capacity utilization of the manufacturing sector adopted globally is through the capital market. According to Adekunle (2022), the capital market plays a highly germane role in the growth and development process of an economy. The market provides a means for obtaining long term funds at low cost to finance long term capital project by industrial sector. The market also enables government to have access to long tern financial resources in order to provide infrastructural facilities which are necessary tools for growth and development (Faloye & Adekunle, 2016).

The indicator for measuring the growth of the manufacturing sector is through the rate of capacity utilization. Adeyemi & Olufemi (2016) alluded to this by asserting that the use of capacity utilization as an indispensable factor to be considered if an increase in productivity and expansion of firm's production become inevitable. Theoretically, a cost-minimizing firm has the likelihood to increase the utilization of its capital if the returns to scale decreases as its production increases (Afroz & Roy, 2016). Economic theory therefore postulated that a rise in manufacturing activities in which manufacturing capacity utilization is the major indicator brings about improved gross domestic product of a nation. However, the trend analysis above showed that even though the manufacturing capacity utilization increases overtime, however this sector's growth remains infinitesimal compared to the growth rate of manufacturing capacity utilization in the economy (Afroz & Roy, 2016).

As stressed by Okpaleye (2018), the rate of capacity utilization is directly related to the level of employment but inversely related to per unit capital service cost. Thus, an increase in capacity utilization means a reduction in the average cost of production. Capacity utilization in industry is described as "the level of utilization of an industry's installed productive capacity. When market demand grows, capacity utilization rises and in contrast, if demand weakens, capacity utilization slackens. In the short run, capacity utilization is important to determine the elasticity of supply.

In developed countries like the United States, United Kingdom, Russia and Canada, among others, there are often cases of capacity over-utilization; hence manufacturing industries' productivity slowdown was largely associated with a decline in capacity utilization (Gu & Wang, 2013). A study conducted by Bresnahan and Ramey (2013) on the American automobile industry therefore, found that the most usual way of adjusting production is to shut the plant down for a week to reduce capacity utilization. Similar surveys of business activities also showed that an important proportion of firms in most Western European countries run excess capacities from time to time (Fagnart, Licandro & Portier, 2018).

In Nigeria, most manufacturing firms have been faced with capacity under-utilization. This constitutes a threat to firm productivity and production growth, and served as an impediment to economic growth and development of the country. The statistics from the Nigeria Bureau of Statistics (2020) show that the capacity utilization of the Nigerian manufacturing sector has overtime been sluggish and very low compared to the developed and other emerging economies. A trajectory of statistics on the capacity utilization of the Nigeria's manufacturing sector show that the rate of capacity utilization reported at 40% in the year 1990, rose to 53.9% in 2008. By 2009, the manufacturing sector capacity utilization was 55.88%, rising further to 60.50% in 2015. The rate declined to 51.300 % in June 2022, indicating also a decrease from the previous rate of 55.400 % for March 2022. Moreover, the economic structure of Nigeria reflects typically an under-development nation trait, where more than 50% of the total GDP is being contributed by a single primary sector of the economy as the performance of the Nigerian manufacturing sector since independence has been unimpressive, leading to a mixture of initial mild growth and subsequent retrogression.

Thus, the linkage between capital market and manufacturing sector is adequately established in financial development theories and as a result of this, empirical studies have erupted on the relationship between capital market and manufacturing sector in recent years.

However, majority of previous studies have focused examining the contribution of capacity utilization change in the production process of Nigerian manufacturing firms. Despite the important the contribution of the capital market to the manufacturing sector of Nigerian economy, there is limited literature focusing on the impact of capital market on manufacturing sector capacity utilization in Nigeria. Hence the need to examine the impact of the capital market on manufacturing sector capacity utilization in Nigeria.

2. Literature Review

The review of related literature is conducted under three sub-sections. These sub-sections are conceptual review, empirical review and theoretical review.

2.1 Conceptual Review

The Capital Market: The Federal Reserve Bank (2023) conceptualizes the capital market as financial markets that bring buyers and sellers together to trade stocks, bonds, currencies, and other financial assets. Capital markets include the stock market and the bond market. They help people with ideas become entrepreneurs and help small businesses grow into big companies. A capital market could also be conceptualized as a financial market in which long-term debt (over a year) or equity-backed securities are bought and sold, in contrast to a money market where short-term debt is bought and sold. Capital markets channel the wealth of savers to those who can put it to long-term productive use, such as companies or governments making long-term investments (Udoh & Ogbuagu, 2012). The key components of capital market include all share index (ASI) and value traded stock (VTS)

All Share Index: A stock market index is a technique for recognizing trend using previous high and low points in averages as benchmarks. The theory behind stock market indices consists of a set of precepts which, taken together, provide a framework for evaluating the future of the market from its past performance. A very common use of stock market indices is to measure portfolio performance.

Value of Traded Stock: The value of shares traded is the total number of shares traded, domestic and foreign, multiplied by their respective matching prices. To calculate the value of a stock is to compute the company's price-to-earnings (P/E) ratio. The P/E ratio equals the company's stock price divided by its most recently reported earnings per share (EPS). A low P/E ratio implies that an investor buying the stock is receiving an attractive amount of value

Manufacturing Capacity Utilization: Capacity utilization in economic term implies the ratio of actual output to the level of optimum output beyond which the average cost of production begins to rise. That is, capacity utilization expresses output as a percentage of total potential output. In other words, capacity output can be defined either in economic term (Cassel 1937, Klein, 1960, Berndt & Morrison, 1981) or in technical term (Johansen, 1968). Thus, the economic definition was adopted in this study. However, pure technical efficiency relative to full capacity measures the difference between actual outputs to capacity output. It is caused by both inefficient utilization of the variable inputs and fixed inputs. Deb (2014) denotes it as gross capacity utilization and divides capacity utilization into net capacity utilization and gross capacity utilization. Net capacity utilization measures the difference between frontier output and capacity output. It is caused by only inefficient utilization of the fixed inputs. The higher the capacity utilization, the lower the fixed costs per unit, which gives a boost to profit margins. Capacity utilization is calculated using a formula: the rate of capacity utilization is equal to the ratio of the actual level of output over the maximum level of output multiplied by a hundred percent. That is, capacity utilization rate = actual output/optimal output.

2.2 Empirical Review

Grbic (2020) examined the nexus between stock market development and economic growth within the republic of Serbia from quarter one 2000 to quarter four 2018 i.e., using quarterly time-series data. Real GDP was utilized as a dependent variable while independent variables were measured by market capitalization, total value ratio and turnover ratio; these were analyzed with Vector Autoregressive Model using Toda-Yamamoto-Dolado-Lutkhepohl approach for granger causality check. It was discovered that a unidirectional Granger causality is moving from stock market development towards economic growth.

Although Grbic's (2020) the study is related to the present study since both studies border on capital market as a study variable, the former used economic growth as a dependent variable while the present study concentrates on manufacturing capacity utilization. Also, while the former spanned between 2000 – 2018, the present study improves on recency, covering the period of 1990 – 2022.

Oprea and Stoica (2018) investigated the impact of the capital markets integration on economic growth in European Union (EU) countries and identified the main factors through which capital markets' development influences economic growth using panel data of EU countries from 2004 to 2016. The dependent variable was measured with GDP growth, multifactor productivity while the independent variables were measured using capital mobility, foreign portfolio investments, market capitalization, value traded, turnover ratio, stock indices, unemployment rate, and immigrants. Analysis was executed using Autoregressive Distributed Lag Model which showed integration of capital markets has a positive impact on economic growth. The main factors responsible for these positive effects are stock market capitalization, capital mobility; value traded, stock indices, immigrants and foreign portfolio investments.

The relationship between Oprea and Stoica's (2018) study and the present study is not in doubt as both studies border on capital market. However, while the former used economic growth as a dependent variable, the present study concentrates on manufacturing capacity utilization. Also, the former was conducted in European Union (EU) countries while the present study is domesticated in Nigeria.

Carporale, Howells and Solimanet, (2014) examined the causal relationship between stock market and economic growth. Through vector auto-regression

(VAR) methodology, the paper uses a sample of seven countries, Argentina, Chile, Greece, Korea, Malaysia, the Philippines and Portugal. The overall results indicate that a well-developed stock market can foster long-run economic growth. In another study, Carporale et al. (2014) use the Vector Auto-regression (VAR) framework to test the endogenous growth hypothesis for four countries: Chile, South Korea, Malaysia and the Philippines. The overall findings indicate that the causality between stock market components, investment and growth the manufacturing sector is significant and is in line with the endogenous growth model It shows also that the level of 38 investments is the channel through which stock markets enhance economic growth in the long run.

The study of Carporale, Howells and Solimanet (2014) is related to the present study through its focus on the capital market. However, while the former again used economic growth as a dependent variable, the present study concentrates on manufacturing capacity utilization. Also, the former was conducted in foreign countries like Argentina, Chile, Greece, Korea, Malaysia, the Philippines and Portugal while the present study is domiciled in Nigeria.

In France, Vazakidis and Adamopoulos (2009), employed Co integration, Granger Causality test and Vector Error Correction model, to examine the causal nexus between stock market developments and manufacturing sector's growth for period of 1965 to 2007. They found that there exists a significant positive association between economic growth and stock markets development.

While the study of Vazakidis and Adamopoulos (2009) focused capital market market and the manufacturing sector just as the present study, the two differed on manufacturing sector's growth, manufacturing sector's capacity utilization, respectively. Moreover, while the former used Co integration, Granger Causality test and Vector Error Correction model for data analysis, the present study used Auto-Regressive Distributed Lag (ARDL) for analysis.

In India, Mishra, Mishra, Mishra and Mishra (2010) examine the impact of capital market efficiency of economic growth on India in using the time series data on market capitalization, total market turnover and stock price index over the period spanning from the first quarter of 1991 to the first quarter of 2010. Their study reveals that there is a linkage between capital market efficiency and economic growth in Indian.

The study of Mishra, Mishra, Mishra and Mishra (2010) is related to the present study as both of them border on capital market as a study variable. However, while the former used economic growth as a dependent variable while the present study concentrates on manufacturing capacity utilization. Also, the former was conducted in India while the present study is domiciled in Nigeria.

In Romania, Brasoveanu, Dragota, Catarama and Semenescuet (2008), study the correlation between capital market development and economic growth for the period 2000 to 2006. The result indicates that capital market development is positively correlated with economic growth by way of feed-beck effect. Bolbol, Fatheldin and Omranet (2015), indicates that capital market development has contributed to the economic growth of Egypt.

There is a close relationship between Brasoveanu, Dragota, Catarama and Semenescuet's (2008) study and the present study as both studies focused on the capital market. The point of departure between the two studies however, is that while the former factored economic growth, the present study was concerned with manufacturing capacity utilization. The study was also conducted in Nigeria unlike the former which was conducted in Egypt.

Adamu and Sanni (2015), examine the roles of the stock market on Nigeria's economic growth, using Granger-causality test and regression analysis. They discovered a one-way causality between GDP growth and market turnover. They also observed a positive and significant relationship between GPD growth and market turnover ratios. The authors advised that government should encourage the development of capital market since it has a positive effect on economic growth.

Adamu and Sanni's (2015) study is related to the present study through its focus on the capital market.

However, while the former again used economic growth as a dependent variable, the present study concentrates on manufacturing capacity utilization. Also, while the former used Granger Causality test for data analysis, the present study used the present study used Auto-Regressive Distributed Lag (ARDL) for analysis.

Osinubi and Amaghionyeodiwe (2013) examine the relationship between Nigeria stock market and economic growth during the period 1980 to 2000, using Ordinary least square regression. The results show that there is a positive relationship between the stock market development and economic growth. They therefore suggested that government should pursue policies that are geared toward rapid development of the stock market. Abu, (2009) examines whether stock market development raises economic growth in Nigeria, by employing the Error Correction Approach. The econometric results indicate that stock market development raises economic growth. He however encouraged SEC to facilitate the growth of the market, restore the confidence of stock market participants and safeguard the interest of shareholders by checking sharp practices of market operators.

The study of Osinubi and Amaghionyeodiwe (2013) is related to the present study as both of them border on capital market as a study variable. However, while the former used economic growth as a dependent variable while the present study concentrates on manufacturing capacity utilization.

Amadi, Oneyema and Odubo, (2010) employed multiple regressions to estimate the functional relationship between money supply, inflation, interest rate, exchange rate and stock prices. Their study revealed that the relationship between stock prices and the macroeconomic variables are consistent with theoretical postulation and empirical findings in some countries. Though, they found that the relationship between stock prices and inflation does not agree with some other works done outside Nigeria.

The study use of stock prices is similar to the stock market used in the present study. However, money supply, inflation, interest rate and exchange rate are a departure from the manufacturing capacity utilization used in the present study.

2.3 Theoretical Review

The Neo-Classical Model

The Neo classical model was propounded by an American Economist, Robert Solow (1956) and an Australian Economist Trevor Swan (1956). The theory suggests that long run total output can be enhanced by technological expansion. The neo-classical theorists believed that progress in technological advancement is capable of pushing the production function upward by leading to the overall growth in an economy. The core neo-classical growth theory opined that a rise in savings rate will bring about a momentary increase in total output or production in the short run but in the long run, output will adjust to a new level and savings accumulation will only affect aggregate output and not its growth rate (Ndako, 2010). The implication of this is that notwithstanding the savings rate, financial development will have no momentous effect on the long run cumulative output.

However, within the neo-classical model, the effect of capital market on economic growth can be captured by using unrestricted neo-classical growth model of the Cobb-Douglas (C-D) type. This type of growth model enables the introduction of modifications and extension to bring it more in line with empirical phenomena of related variables accounting for increasing returns (Ndebbio, 1991).

The implication of Solow and Swan neo-classical theory to the present study is that the capacity utilization rate can be enhanced through technological expansion if adequate capital is allocated from the capital market to the manufacturing sector of Nigeria. Thus, increased investment in the capital market supplies investible funds required for investment in the country, which in turn leads to economic growth.

The Endogenous Growth Model

The endogenous growth model was propounded by Paul Romer in 1990. The emergence of endogenous growth model following the criticisms laid against the neo-classical growth model has increasingly acknowledged the role of financial markets in the process of economic growth. In the endogenous growth model, growth rate of aggregate output can be determined within the model rather outside the model through savings and investment. Within the endogenous growth model, theoretical literature such as Caporale, Howells and Soliman (2004) have held that financial market has a long run effect on economic growth by mobilizing savings into productive investment which leads to the growth rate of output. Therefore, an efficient and functional financial market can lead to an increase in aggregate output (Olweny and Kimani, 2011).

As applied to the present study, the theory suggests that the capacity utilization rate of the manufacturing sector in Nigeria will be enhanced through savings and investments. The savings mobilized from manufacturing firms can therefore, be investment in the financial market and thus, help these firms increase their capacity utilization in the long-run.

The Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is attributed to William Sharpe (1964), Jack Treynor (1961, 1962) and John Lintner (1965) and Jan Mossin (1966). The model takes into account the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), often represented by the quantity beta (β) in the financial industry, as well as the expected return of the market and the expected return of a theoretical risk-free asset. CAPM assumes a particular form of utility functions (in which only first and second moments matter, that is risk is measured by variance, for example a quadratic utility) or alternatively asset returns whose probability distributions are completely described by the first two moments (for example, the normal distribution) and zero transaction costs (necessary for diversification to get rid of all idiosyncratic risk). Under these conditions, CAPM shows that the cost of equity capital is determined only by beta.

Allen and Morris (1993) have used a special case of expected utility to build up a theory of portfolio choice. He considered the case where investors are only concerned with the mean and variance of the pay offs of the portfolios they are choosing. This is a unique case of expected utility provided the investor's utility of consumption is quadratic and/or asset returns are multi-normally distributed. According to Allen and Morris (1993) in models involving competitive markets, symmetric information and row frictions such as transaction costs, the only variations in returns across assets are due to differences in risk. Under this scenario all information known to the investors are reflected in stock prices and no investor can earn higher returns except by bearing more risk. The idea that the differences in returns are due to differences in risk came to be known as the efficient markets' hypothesis.

The application of CAPM to the present study is the need for the manufacturing sector in Nigeria to investment in the capital market by diversified its stock capital and in the process, diversifying market risk. This will reduce the cost of investment and the probability of market failure, thereby, enhancing high profitability and thus, increase the rate of capacity utilization.

3. Method of Research

The study adopts the ex-post facto research design. It is used because it describes the statistical relationship between two or more variables which implies cause-and-effect. The use of this study design allows for the testing on expected effect of market capitalization on the manufacturing sector capacity utilization in Nigeria and enables the study to make prediction regarding their outcome.

3.1 Sources of Data Collection

The data used for this study are annual secondary data collected from the Central Bank of Nigeria Statistical Bulletin 2022. The data collected are data on market capitalization, All Share Index, Value of traded stock and manufacturing sector output.

3.2 Analytical Techniques

This study conducted the pre-estimation diagnostic test (unit root test) using the Philip-Perron (PP) to ascertain the stationarity of the data before carrying out the co integration test. Dicky and Fuller (1979) also have emphasized on the importance of investigating time series data to find out if they exhibit random that need to be white nosed before using them for estimation purposes.

After conducting the stationarity test, it was important to find out if the variables have long run relationship with each other and the use of co integration technique allowed the study to capture the equilibrium relationship between non-stationary series within a stationary model following Adam (2009). It allowed the combination of the long-run and short-run information in the model and overcame the problem of losing information which could have occurred when attempting to address non stationary series through differencing. The study made use of the Auto Regressive Distributed Lag Model (ARDL) for data estimation.

The choice of ARDL was informed by the need to investigate the long run and short run relationships between the explanatory variables and the dependent variable. This method of error correction modeling has three distinct advantages over other error correction models. First it is applicable to modeling involving data that are of mixed order of integration; second, it is relatively more efficient in cases of small and finite data sizes and third, it yields unbiased estimates of the long-run model. (Harris &Sollis, 2003).This method involves unit root test for variables using one or more of the unit root test methods (Augmented Dickey Fuller test, Phillips-Perron test, among others), the Co-integration test which is conducted to test the possibility of existence of level relationship or long run (equilibrium) relationship between the variables (dependent and explanatory variables) and, if the variables are found to be Co-integrated, that is if the Co-integration test indicates existence of level relationship between the variables, then an error correction model estimation is needed, as Co-integration is a condition for error correction representation according to the Granger Representation Theory.

3.3 Model Specification

The paper adapted model of Buzugbe (2022) who worked on capital market performance and manufacturing sector performance in Nigeria. The original model specified by Buzugbe (2022) was as follows:

$$MSGI= \propto 0+ \alpha MCap + \alpha STP + \alpha LEV + \alpha INTRATE + \alpha\ EXCHRATE + \varepsilon\text{--} \quad (1)$$

Where: MSGI = Manufacturing Sector Growth Index; MCap=Market Capitalization; STP = Stock Price; LEV = Leverage; ASI=All Share Index; INTRATE=Interest rate; and EXCHRATE = Exchange rate; α0=Constant Coefficient; α1-5 = Coefficients; ε=error term.

Buzugbe’s (2022) is modified and adapted in the present study as follows:

$$RMCU= + MCap + VTS + ASI + \varepsilon \quad (2)$$

Where: RMCU = Manufacturing Capacity Utilization Rate (determined as actual output/optimal output level); VTS = Value of Traded Securities; MCap=Market Capitalization; ASI=All Share Index; =Constant Coefficient; = Coefficients; ε=error term.

Transforming the above equations into natural log and true regression form,

$$\Delta LnRMCU = \beta_0 + \beta_1\Delta LnMCA + \beta_2\Delta LnASI + \beta_3\Delta LnVTS + \mathcal{E}_t \quad (3)$$

The ARDL model of any identify Co-integrating vector is re-parameterized into ECM, which result gives short run dynamics and long run relationship of the variables of a single model. However, when there are multiple Co-integrating vector, ARDL approach to Co-integration cannot be used. For the sake of this study, the Co-integration process pertaining to health indicators, economic development entry starts with the re-modification of equations above into ARDL framework.

$$\Delta RMCU = \beta_0 + \sum_{t=i}^{p} \beta_1 \Delta InRMCU_{t-1} + \sum_{t=i}^{Q} \beta_2 \Delta IMCA_{t-1} + \sum_{t=i}^{R} \beta_3 \Delta InASI_{t-1} + \sum_{t=i}^{S} \beta_4 \Delta InVTS_{t-1} + \Phi_1 \Delta InARMCU_{t-1} + \Phi_2 \Delta IMCA_{t-1} + \Phi_3 \Delta InASI_{t-1} + \Phi_4 \Delta InVTS_{t-1} \quad (4)$$

Where is the difference operator, while is the parameter for the manufacturing sector output. - represent the short run parameters, the terms with the summation signs represent the error correction dynamics, and - are the long run parameters. The cointegration test requires setting up the two hypotheses (null hypotheses against the alternative hypothesis as follows:

H_0 = = = = = ………… Null hypothesis

H_0 = = = = = …………...... Alternative hypothesis

If the F-statistic is greater than the upper critical bound value, the null hypothesis is rejected confirming the existence of the long run relationship and vice versa. After establishing the long run relationship, the next step is to estimate the long run model started as follows:

$$\Delta RMCU = \beta 0 + \Phi_1 \Delta MSCU_{t-1} + \Phi_2 \Delta MCA_{t-1} + \Phi_3 \Delta UASI_{t-1} + \Phi_4 \Delta VTS_{t-1} \quad (5)$$

After estimating the ARDL long run specification and the connected long run multipliers, the error correction model needs to be estimated too. Thus, the error correction model mainly formulated to estimate the short run dynamics. This is started as follows:

$$\Delta LRMCU = \beta_0 + \sum_{t=i}^{p} \beta_1 \Delta InRMCU_{t-1} + \sum_{t=i}^{Q} \beta_2 \Delta IMCA_{t-1} + \sum_{t=i}^{R} \beta_3 \Delta InUASI_{t-1} + \sum_{t=i}^{S} \beta_4 \Delta InVTS_{t-1} + \Phi_1 ECM_{t-1} \quad (6)$$

Where - represent the short run parameters and is the speed of adjustment parameter which is expected to be less than zero. ECM is the lagged error correction term obtained from the estimated cointegration model equation above.

3.2.2 A Priori Expectation

According to economic theory, it is expected that market capitalization (MCA) and all share index (ASI) will have a positive impact on the manufacturing sector capacity utilization rate (RMCU), while value of traded stock (VTS)will have a negative impact on the RMCU. This a priori expectation is expressed mathematically below:

<0 or >0,

$>0, <0,<0$

4. Results and Discussion

Table 1: Descriptive Statistics

	RMCU	**ASI**	**MCA**	**VTS**
Mean	46.89572	20716.62	9323.951	545.6763
Median	48.15088	22335.84	4010.48	366.595
Maximum	62.04167	57990.2	42054.5	2350.88
Minimum	30.4	513.8	16.3	0.23
Std. Dev.	9.40879	15162.86	11433.3	600.0845
Skewness	-0.30864	0.334695	1.310056	1.022385
Kurtosis	1.933163	2.326764	4.125234	3.667258
Jarque-Bera	2.025579	1.201772	10.84152	6.168426
Probability	0.363204	0.548326	0.004424	0.045766
Sum	1500.663	662931.7	298366.4	17461.64
Sum Sq. Dev.	2744.285	7.13E+09	4.05E+09	11163142
Observations	32	32	32	32

Source: Authors computation using e-views 10

From Table 1, the skewness of the RMCU is negative with value of -0.30864 which tends towards the left. Also, the MCA, ASI and VTS are skewed towards the right because their values are all positive. The kurtosis of a normal distribution is 3. If it exceeds 3 it means the distribution is leptokurtic. On the other hand, if less than 3, it indicates the distribution is platykurtic relative to the normal distribution. From table 1, the kurtosis value of RMCU, MCA, ASI and VTS which are 1.933163, 2.326764, 4.125234 and 3.607258 respectively shows that RMCU and MCA are less than 3, and VTS and ASI are greater than 3. These mean that VTS and ASI is leptokurtic because they are greater than 3, while both MFO and MCA are platykurtic because they are less than three relatives to the normal distribution.

For the Jarque-Bera statistics, the Null Hypothesis which states that the distribution is normally distributed is rejected at 5% level of significance. From table 1, the probability values of the Jarque-Bera show that RMCU and ASI, are normally distributed with their probability values of0.363204and 0.548326 which are greater than 5%, while MCA and VTS are not normally distributed because its probability value is less than 0.05%

4.1 Unit Root Test Result

The Augmented Dicker-Fuller (ADF) unit root test is used to conduct a pre-diagnostic test to ascertain the underling properties of the time series variables. This test is important because estimating a model in the presence of non-stationary time series variable usually leads to spurious (meaningless) regression output with biased and inconsistent estimates of the standard errors of the coefficients, which could lead to misleading inference. Table 2 shows the summary of the computed Augmented Dicker Fuller Unit Root test for each of the variables.

Table 2: Summary of Augmented Dicker Fuller Stationarity Test

Variable	ADF Test Statistics	Critical ADF Test Statistics	Probability Value	Order of Integration
RMCU	-6.078747	-2.967767	0.0000	I (1)
MCA	-4.454966	-2.963972	0.0014	I (1)
ASI	-5.9177033	-2.967767	0.0000	I(1)
VTS	-3.640790	-3.562882	0.0424	I (0)

Source: Authors Computation using E-view 10

From the summary of Table 2, it could be seen that the AMCU, MCA and ASI are stationary at first difference while VTS is stationary at levels. Based on the combination of the order of integration of I(0) and 1(1)without integrated at (2), we shall proceed to estimate the variables using the Auto regressive Distributed Lag (ARDL) Model.

4.2 ARDL Bound Test for Co-integration

The bound test is performed to show the levels of Co-integration among the variables. It helps to show if there is a long run relationship among the variables

Table 3: Result of ARDL Bounds Test for Co-integration

Test Statistic	Value	Significance Level.	I(0)	I(1)
F-statistic	17.03839	10%	2.72	3.77
K	3	5%	3.23	4.35
		1%	4.29	5.61

Sources: Authors Computations using E-views 10

The bound test null hypothesis states that no level relationship if the value of the F-statistics is lower than the value of the lower and upper bound, we cannot reject the null hypothesis but if it is greater than the lower and the upper bound, we can reject the null and accept the alternate that there is a long run relationship amongst the variables. From table 4.3, the bounds test value of the F-statistics which is 17.03839 is higher than the values of the upper and lower bound limit which are 3.23 and 4.35 at 5% critical level of significance. This means that there is a long run equilibrium relationship between the variables AMCU, MCA, ASI and VTS. Having established that there is long run relationship between the variables, the next step is estimating the Error Correction Model

Table 4: Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ASI	0.000733	0.00014	5.235914	0.0001
MCA	-0.00068	0.000182	-3.711522	0.0019
VTS	0.008708	0.003672	2.371603	0.0306
EC = RMCU - (0.0007*ASI -0.0007*MCA + 0.0087*VTS)				

Sources: Authors Computations using E-views 10

The long-run form of the model in terms of magnitude, the coefficient of MCA which gave a value of -0.00068 implies that market capitalization negatively affect RMCU. It means for every 1% increase or decrease in MCA will lead to 0.01% decrease or (increase) in RMCU. It will on average, lead to 0.00068 percent decrease (or increase) in MSCU. With respect to the coefficient of ASI which gave a value of 0.000733 shows that for every 1 % increase (or decrease) in ASI, will on average lead to 0.000733 percent decrease (or increase) in AMCU. Also with respect to the coefficient of VTS which gave a value of 0.008708 shows that for every 1 % increase (or decrease) in VTS, will on average lead to 0.008708 percent decrease (or increase) in AMCU.

4.3 Error Correction Model (ECM)

Since there is long run relationship among the variables, we shall proceed to estimate the ECM.

The Error Correction Model is shown as follows:

$$\Delta LRMCU = \beta_0 + \sum_{t=i}^{p} \beta_1 \Delta InRMCU_{t-1} + \sum_{t=i}^{Q} \beta_2 \Delta InMCA_{t-1} + \sum_{t=i}^{R} \beta_3 \Delta InUASI_{t-1} + \sum_{t=i}^{S} \beta_4 \Delta InVTS_{t-1} + \Phi_1 ECM_{t-1} \quad (7)$$

Table 5: Result of ARDL Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.63511	3.473276	8.532322	0
D(ASI)	0.000259	0.000106	2.43933	0.0267
D(ASI(-1))	-5.15E-05	0.000106	-0.48714	0.6328
D(ASI(-2))	-0.0001	8.90E-05	-1.149	0.2674
D(ASI(-3))	-0.00027	8.14E-05	-3.27346	0.0048
D(MCA)	0.000832	0.000292	2.84808	0.0116
D(VTS)	-0.00531	0.001866	-2.84354	0.0117
D(VTS(-1))	-0.00587	0.002091	-2.80791	0.0126
CointEq(-1)*	-0.94074	0.104571	-8.99624	0
R-squared	0.862997	Mean dependent var		-0.08383
Adjusted R-squared	0.805312	S.D. dependent var		7.046358
S.E. of regression	3.1091	Akaike info criterion		5.361635
Sum squared resid	183.6635	Schwarz criterion		5.789844
Log likelihood	-66.0629	Hannan-Quinn criter.		5.492543
F-statistic	14.9604	Durbin-Watson stat		1.43531
Prob(F-statistic)	0.000001			

Sources: Authors Computations using E-views 10, * p-value incompatible with t-Bounds distribution.

The Error Correction Model (ECM) shows the short run relationships between the dependent and the independent variables. The Error Correction Term (ECT) must be negative and less than 1 and should be statistically significant. In table 4.5 the probability value of 0.000001 of the F-statistics, indicates that there is a short run relationship between the MSCU, MCA, ASI and VTS. The ECT shows the speed of adjustment from a disequilibrium states. Its value of -0.83944 indicates that it is negative, less than 1 and statistically significant. This means that, the speed of adjustment from the short run to the long run is 83%. It also means that it will take 83% speed of adjustment for the model to adjust within a year from the short run to the long run. The R-square value of 0.907437 revealed that the MCA, ASI and VTS jointly accounted for about 90 percent of the variation in MSCU while the remaining 10 percent are accounted for by other factors outside the model.

4.4 Post Estimation Tests

Post estimation tests used were Breusch-Godfrey Serial Correlation LM Test for presence of serial errors, the cumulative sum (CUSUM) and the cumulative sum of Squares (CUSUM SQ) tests to assess the stability of coefficients.

Table 6: Breaush-Godfrey Serial Correlation LM Test

Statistic	Value	Parameter	Probability
F-statistic	1.28332	Prob. F(2,14)	0.3078
Obs*R-squared	4.33799	Prob. Chi-Square(2)	0.1143

Sources: Authors Computations using E-views 10

In line with the rule of the Breusch-Godfrey Serial Correlation LM Test, the probability value of 0.3078 of the F-statistics indicates that the model has no serial correlation because the probability value is greater than 5%. A CUSUM test assesses the stability of coefficients whether there is a structural change in a model. The CUSUM is shown in Figure 1 and CUSUM sq in Figure 2

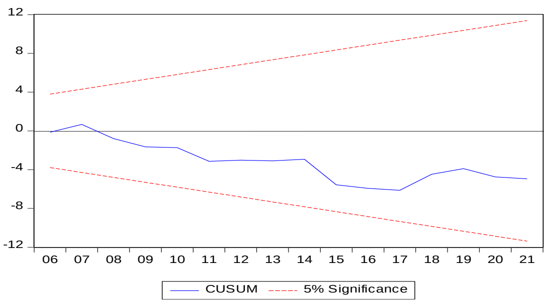

Figure 1: The cumulative sum (CUSUM) chart

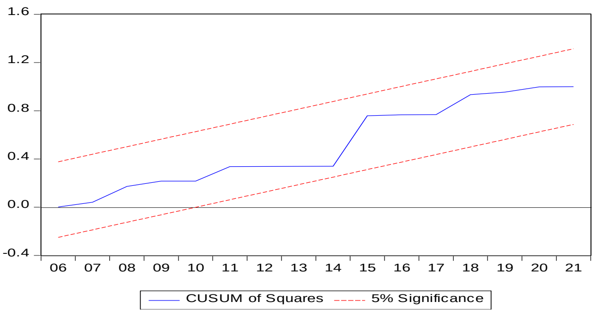

Figure 2: The cumulative sum of Squares (CUSUM SQ.) Chart

The null hypothesis for CUSUM test states that the parameters are stable while the alternate hypothesis states that the parameters are not stable. The guideline is that, if the blue line lies within the red line, we accept the null hypothesis that the parameters are stable. On the other hand, if the blue line crosses the red line, we reject the null and accept the alternative hypothesis that the parameters are not stable. From figures 1 and 2, it could be seen that for both CUSUM AND CUSUM SQ the blue line lies between the two red lines. This means that the model is stable.

5. Conclusion and Recommendations

The paper investigated the effect of selected capital market indicators on the rate of manufacturing capacity utilization in Nigeria for the period from 1990 to 2022 using the ARDL-based Bounds test approach to Co-integration and error correction model. The study finds that capital market indicators positively and significantly affected the rate of manufacturing capacity utilization in the short- and long-run. It also found positive and no significant short, but a long- run negative effects of market capitalization on the rate of manufacturing capacity utilization and no significant impact in the long run given the level of probability. The short-run effect of all share index on Manufacturing sector capacity utilization (RMCU) was found to be positive and significant, while the long-run effect was also positive and statistically significant. The positive effect was attributed to the probable dominance of the positive effect of ASI on RMCU. Further evidences from the study were that MCA negatively affect MSCU in the long-run and statistically insignificant, the short-run effect of VTS is also negative and highly insignificant.

In light of the empirical evidence, the following are recommended for policy consideration:

i. There is need to improve on the value of traded stock, as this will improve the average manufacturing capacity utilization and performance. This is in consideration of the observed positive impact of (increase in) VTS on the RMCU.

ii. Considering the fact that MCA negatively affected RMCU in both (short-run and long-run) models, there is need for the authorities to sustain policies and procedures of arriving at prices of quoted shares and securities to reflect their real value instead of allowing operators to continuously be ripping off investors. Sustaining and even improving on these policies will greatly affect the manufacturing sector positively hence and improvement in AMCU.

iii. Government should also fine turn ways of improving on the volume of traded stocks in the market as this will allow investors invest in multiple company's thereby helping them improve productivity. This is because of the positive impact of the ASI from the regression results

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