Influence of Macroeconomic Variables on Construction Material Prices in Lagos State: An Auto-Regressive Distributed Lags Approach

Babalola, A. J.
Department of Quantity Surveying,
Faculty of Environmental Sciences,
University of Lagos, Yaba
E-mail: Adewumi_babs@yahoo.com

Abstract

In Nigeria, many building projects have been abandoned because of increases in the price of the materials involved due to the unstable macroeconomic variables prevailing in the country. This study aims to develop an auto-regressive distributed lag model to investigate the effect of selected macroeconomic variables on the price of selected building materials in Lagos State and develop policy statements that will benefit all stakeholders in the Lagos State construction industry. The research methodology adopted for this study was an ex-post facto survey research design because it was based on secondary data. Data used for the analysis were quarterly data for twelve years ranging from 2008 to 2019, obtained from published sources. The data for the price of building materials were obtained from the Nigerian Institute of Quantity Surveyors (NIQS), Quarterly Journal and Guardian Newspaper of Nigeria. In contrast, the data on the macroeconomic variables, which are inflation rate, interest rate and exchange rate, were extracted from the Annual Reports and statistical bulletins of both the Central Bank of Nigeria (CBN) and the National Bureau of Statistics of Nigeria. The data collected were processed using E-view, an econometric statistical software package; the suitability of the package is enhanced by the interactive nature of the programme, which makes it user-friendly and time-efficient. The statistical tools used for the study were the ordinary least square method, correlation and auto-regressive distributed lag model. The result showed that interest, inflation, and exchange rates positively affect building materials prices. The study recommended a reduction in import duties, an exchange rate reduction, and a reduction in the interest rate on bank loans. At the same time, the government should promulgate policies that will stabilise the macroeconomic variables in the economy.

***Keywords**:* Building material prices, building project, construction industry, Lagos State, macroeconomic variable

Introduction

The construction industry is essential to the economic growth of any country, and it is regarded as a stimulant aiding the infrastructural development for the productivity of every sector of an economy. Construction industry stakeholders comprise the following: developers, contractors, consultants, building materials merchants, equipment suppliers, financiers and regulators of policies. Ogunsemi and Aje (2012) concluded, based on the study of Ladin, that the construction industry contributes significantly to economic, social, and environmental development by providing infrastructure and employment. They went further that the activities of the construction industry affect every sector of any economy, and the industry serves as an engine for the economic sustainability of any country.

However, in most cases, the movement in the macroeconomic variables in a given economic environment significantly affects the performance of the construction industry. In Nigeria, the macroeconomic variables are unstable; they are usually volatile and influence the construction industry (Babalola & Onyebuchi, 2021). The volatility of the macroeconomic variable pushes costs

up and then transfers the risk to all those involved in a construction project (Li, 2001). According to Ashiru and Lu (2010), volatility usually causes the construction project cost to fluctuate. This fluctuation in the construction project cost typically results in changes in the contractor's profit margin without any provision in the contract (Chappell et al., 2010).

The cost of building materials is also significant in the construction process, and this aspect has generated many controversies among the stakeholders in the construction industry in recent times. For example, a bag of cement cost ₦1350 in 2006 and rose to ₦1850 in 2009, representing a 27% increment within three years; the same bag of cement cost ₦2000 in the year 2012 (Anosike, 2009; Akanni et al., 2012). For instance, project managers, architects, developers, consultants and the financials are concerned about this daily upsurge in the price of the construction materials and the aftermath effect on the construction project delivery. According to Idoro and Jolaiya (2010), many projects are abandoned due to the increase in the cost of materials, especially in most developing countries.

Macroeconomic factors prevailing in a given environment are essential in determining the trend of construction material prices in the locality. Some notable macroeconomic factors affecting construction material prices are interest rate, inflation rate, exchange rate and money supply, to mention a few. Khalid et al. (2012), in their study on macroeconomic factors affecting construction prices, described and explained how some macroeconomic affect construction materials prices as follows: inflation rate affects the construction material prices for inputs and outputs in the short run; interest rate affects the cost of capital and thereby affecting the price of materials; exchange rate affects the value of a currency relative to international currency, hence affecting the construction material prices.

Several studies have been carried out on the building materials in Nigeria and their effect on building projects (Okpala & Aniekwu, 1988; Elinwa & Buba, 1993). However, none of the above authors addressed the issues of the influence of macroeconomic factors on building material prices using ARDL. This study aims to proffer a solution to the present problem of construction material price fluctuation due to the unstable macroeconomic variables in the Nigerian economy. This study is unique and would provide a policy statement that would assist policymakers in formulating monetary and fiscal policies relating to the construction industry and the economy. The study will also be an additional knowledge to the academia and every stakeholder in the construction industry.

Literature Review

The importance and significance of building materials in any country's sustainable growth and development cannot be overemphasised. According to Adegbemro and Adeniyi (2015), the building material is used for construction purposes; it includes every material used in construction work, both for the substructure and the superstructure. These materials occurred naturally in ancient times, including items such as stone, wood, straws, clay and brick (Taylor, 2013).

However, the advent of modern development in science and technology at the beginning of the 20th century brought about the introduction of durable and reliable construction materials such as reinforcement concrete, steel, plastics, and metal (Taylor, 2013). Building material constitutes about 60% of the total cost of any construction project (Omange & Udegbe, 2000). Construction material prices also determine the quality and the total cost of any construction output (Akanni & Oke, 2012). The supply and demand of construction products depend on the price of the end products (Sunde & Muzindutst, 2017). From the study by Oladipo and Oni (2012), building materials constitute a high proportion of the cost of construction projects, and the prices of materials at any given time respond to market forces of demand and supply. Jagboro and Owoeye (2004) believed that there is a multiplier effect on the construction industry anytime the industry experiences instability or fluctuations in the prices of building materials.

Building material cost has many implications on the construction cost. Vernon (1992) believed that one of the factors influencing the selection and use of building materials is their cost and availability. To Akanni and Oke (2012), the purchasing cost of the materials involved in a given construction project accounted for about one-half of the total cost of the

project. One of the historical analyses of the prices of construction materials in Nigeria, according to Olabopo (1992), is that the phenomena of the high costs of construction materials in Nigeria can be traced to the introduction of the Structural Adjustment Programme (SAP) by General Babangida regime (1985-1993). The scholar further opined that during this period, the economy of the country started to experience a high increase in its economic indicators such as interest rate, inflation rate, and exchange rate, to mention but a few. These increases in the economic indicators contributed to the high material prices.

According to Jagboro and Owoeye (2004), Aibinu and Jagboro (2012), an increase in the price of material has a multiplier effect on the construction industry, causing fluctuations in construction project costs, project abandonment, project delays, resulting in many projects not being commissioned, leading to unemployment, and poor workmanship due to the use of low-quality local materials (Oladipo & Oni, 2012). The high cost of construction materials was attributed to high dependence on imported materials for construction. Okupe (2000) believed that dependence on importation had been on the increase since the era of the oil boom, and this had led to the escalation of prices of building materials.

Macroeconomic indicators are fundamental in price determination in any economy, construction materials prices inclusive. Macroeconomic indicators refer to economic statistics that show the current situation of the economy of a state or an environment (Labour market, trade indices, industry and other economic criteria), published by government agencies such as the Central Bank of a country or the Bureau of Statistics. Macroeconomic indicators include unemployment rate, capacity utilisation, money supply, external debt, inflation rate, exchange rate, and interest rate. These are risk components of an economy (Asaolu & Ogunmakinwa, 2011), which affect every aspect of the economy.

Inflation is a macroeconomic factor that is a powerful determinant of material prices in any economy. The principle behind inflation and how it affects construction materials prices, according to Rakhra and Wilson (1982), is that there is a time lag between an increase in inflation and the effective resulting increase in building material prices. Umeora (2010) observed that developing nations appear to have a greater experience of the devastating effects of inflation. Over the years, a significant constraint in the Nigerian construction industry has been rapid inflation in the cost of building materials. According to Windapo et al. (2004), this situation arising from the rapid increase in the cost of building materials may degenerate into an acute shortage of housing, with millions of middle- and low-income families being priced out of the market for home ownership across Nigeria.

Another important macroeconomic factor affecting building material prices is the exchange rate. The exchange rate is the value of a nation's currency in terms of another currency. It is the amount for which one currency is exchanged for the other and is used to determine the strength of one currency over the other (Windapo & Cattell, 2010)—a market-based exchange rate changes when the values of either of the two component currencies change. A currency also becomes more valuable whenever its demand exceeds the available supply. Conversely, it becomes less valuable when its demand is less than the available supply. Over the years, Nigeria has attempted almost every exchange rate system to find an appropriate exchange value for the Naira. The difficulty has been that Nigeria is a net importer whose external earnings derive primarily from one product which is crude oil (Adedipe, 2004). The degree to which building material prices are affected by exchange rate movements depends on the type and quantities of materials being imported by a country at a specific time, the need to import the raw materials used in the production of building materials locally, and on whether local materials (such as copper, timber and steel) are internationally traded commodities (Busreport, 2006; Mohammed, 2006; and Anderson, 2011).

According to Acha and Acha (2011), the developmental role of interest rate is possible because of the interlocking linkage existing between the financial and real sectors of the economy, and it is because of this linkage that the effect of interest rate on the financial sector is transmitted to the real estate industry. Thus, the importance of interest rates is hinged on their equilibrating influence on supply and

demand in the financial sector (Adegbembo & Adeniyi, 2015). Colander (2001) asserted that the channelling of savings into financial assets and the willingness of individuals to incur financial liabilities is highly influenced by the interest rate on those financial assets and liabilities. High lending rates hamper investment borrowing.

Research Methodology

This section presents the methodology adopted to carry out the study. This section aims to present various statistical approaches explored in this study to formulate an appropriate methodological framework that will ensure the achievement of the study's aim and objectives.

In any study, collecting adequate and valuable data can be one of the most crucial operations in executing good research. According to Umeh (2018), instruments for data collection are apparatuses, materials, equipment, devices, or mechanisms used in collecting data from selected samples (respondents) studied. Instruments for data collection may include cameras, surveying equipment, computers, questionnaires, closed-circuit televisions, recorders etc. In order to garner enough information and ensure credibility and uniformity, the quarterly journal of the Nigerian Institute of Quantity Surveyors (NIQS), as well as annual reports and statistical bulletin for the period in the review of both the Central Bank of Nigeria and the National Bureau of Statistics was garnered as the primary method of data collection.

Data for this study were processed and analysed using econometric view 9.0. The regression model or equation was used to predict changes or effects caused by independent variables or variables on a dependent variable. Analysis of the cause-and-effect relationships between the dependent and the independent variable(s) using the regression model is referred to as the regression analysis. The regression model is given as follows:

$$Y_t = \alpha + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + ... + \beta_n X_{nt} + \mu_t \quad (1)$$

Equation (1) is a general multiple regression equation where Y_t is the dependent variable while X's are the set of explanatory variables. To make the model stochastic, the error term is added to the model. The dependent variables are the prices of cement (PCE), prices of sharp sand (PSS) and prices of granite (PGR). The independent variables are inflation rate (INF), exchange rate (EXCH) and interest rate (INT). Thus, the models are in the vector of:

$$\begin{bmatrix} PCE_t \\ PSS_t \\ PGR_t \end{bmatrix} = \begin{bmatrix} \beta_1 \\ \alpha_1 \\ \psi_1 \end{bmatrix} + \begin{bmatrix} EXCH_t & INT_t & INF_t \\ EXCH_t & INT_t & INF_t \\ EXCH_t & INT_t & INF_t \end{bmatrix} + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \end{bmatrix} \quad (2)$$

Expanding equation (3.2) in econometrics form yields equation (3) – (5)

$$PCE_t = \beta_1 + \beta_2 EXCH_t + \beta_3 INT_t + \beta_4 INF_t + \mu_{1t} \quad (3)$$

$$PSS_t = \alpha_1 + \alpha_2 EXCH_t + \alpha_3 INT_t + \alpha_4 INF_t + \mu_{2t} \quad (4)$$

$$PGR_t = \psi_1 + \psi_2 EXCH_t + \psi_3 INT_t + \psi_4 INF_t + \mu_{3t} \quad (5)$$

Table 1 Variable Definition

Variable Name	Type	Definition	Symbol	Appriori Expectation
Cement Price	Dependent Variable	Price of cement (₦)	PCE	-
Sharp Sand Price	Dependent Variable	Price of sharp sand (₦)	PSS	-
Granite Price	Dependent Variable	Price of granite (₦)	PGR	-
Inflation Rate	Independent Variable	Inflation rate (%)	INF	Positive
Foreign Exchange Rate	Independent Variable	Exchange rates of Nigerian currency (₦) to $1 US	EXCH	Positive
Interest Rate	Independent Variable	Interest rates (%)	INT	Positive

Source: Author's computation using CBN Fourth Quarter 2019 Statistical Bulletin and Quarterly Journal of the Nigerian Institute of Quantity Surveyors (NIQS)

Data Analysis

This study employs the Augmented Dickey-Fuller (ADF) test to examine the time series' stationarity and test the unit root's null hypothesis. It is expected that the series does not contain unit roots in order to determine the relationship between variables in the long run; the test is carried out at level and at the first difference using a 5% Mackinnon critical value.

The decision criterion states that if the p-value is greater than 5%, we accept the null hypothesis (H_0) that the variable has unit root and is not stationary, but if the p-value is less than 5%, we accept the alternative hypothesis (H_1) that the variable does not have unit root and it is stationary. The variables used for the study include the Price of Cement (PCE), Price of Granite (PGR), Price of Sharp Sand (PSS),

Exchange Rate (EXCH), Interest rate (INT) and Inflation rate (INF), and they were tested.

Table 2: Unit Root Tests at level

Variables	Statistic value	5% critical value	Probability value	Order of integration
EXCH	-0.859739	-2.925169	0.7922	Not stationary
INF	-2.458976	-2.928142	0.1321	Not stationary
INT	-2.052188	-2.925169	0.2644	Not stationary
PCE	-0.960318	-2.925169	0.7597	Not stationary
PGR	-4.248974	-2.925169	0.0015	I(0)
PSS	-2.817009	-2.925169	0.0635	Not stationary

Source: Author's computation using CBN Fourth Quarter 2019 Statistical Bulletin and Quarterly Journal of the Nigerian Institute of Quantity Surveyors (NIQS)

Table 2 shows that ONLY the price of granite is stationary at level. We then move further to test other variables at first difference.

Table 3: Unit Root Tests at First Difference

Variables	Statistic value	5% critical value	Probability value	Order of integration
EXCH	-8.153128	-2.926622	0.0000	I(1)
INF	-5.630354	-2.926622	0.0000	I(1)
INT	-4.510019	-2.926622	0.0007	I(1)
PCE	-6.249586	-2.926622	0.0000	I(1)
PSS	-5.691872	-2.926622	0.0000	I(1)

Source: Author's computation using CBN Fourth Quarter 2019 Statistical Bulletin and Quarterly Journal of the Nigerian Institute of Quantity Surveyors (NIQS).

From Table 4.4, after further investigations, it shows that the Price of Cement (PCE), Price of Sharp Sand (PSS), Exchange Rate (EXCH), Interest rate (INT) and Inflation rate (INF) are stationary at first difference as their probabilities are less than 5%.

ARDL Bound Co-integration Test Result

Table 4: ARDL Bounds Wald Statistic Result

	Price of cement equation		Price of granite equation		Price of sharp sand equation	
Significance	I0 Bound	I1 Bound				
10%	2.37	3.20	2.37	3.20	2.37	3.20
5%	2.79	3.67	2.79	3.67	2.79	3.67
2.5%	3.15	4.08	3.15	4.08	3.15	4.08
1%	3.65	4.66	3.65	4.66	3.65	4.66
F-statistic		6.034715		4.094516		4.172688
D.F		3		3		3

Source: Author's computation using CBN Fourth Quarter 2019 Statistical Bulletin and Quarterly Journal of the Nigerian Institute of Quantity Surveyors (NIQS)

Table 4 presents the Autoregressive Distributed Lag (ARDL) bound test that was carried out to test in the long run if co-integration exists. Before any useful conclusion can be made regarding the relationship between variables, it is paramount that co-integration exists. The F-statistics is compared with a 5% critical value at both the lower bound and upper bound; the lower bound is based on the assumption that all variables are I (0), while the upper bound is based on the assumption that all variables are I (1).

Therefore, it can be seen from Table 4 that the F-statistic is higher than the I (1) upper bound of the 5% critical value. Thus, we can conclude that there is co-integration and the variables are I (1) for all three equations.

Autoregressive Distributed Lag Model

Table 5: Regression Result

Dependent Variables:	Price of Cement			Price of Granite			Price of Sharp Sand		
Variable	Coefficient	t-stat	Prob.	Coefficien	t-stat	Prob.	Coefficien	t-stat	Prob.
C	664.2648*	2.019521	0.0507	7.1525**	4.140510	0.0002	0.6483	0.547940	0.5868
PCE$_{t-1}$	-0.473028**	-4.620911	0.0000	-	-	-	-	-	-
LOGPGR$_{t-1}$	-	-	-	-0.6164**	-4.279420	0.0001	-	-	-
LOGPSS$_{t-1}$	-	-	-	-	-	-	-0.2139*	-2.267032	0.0289
INF$_t$	9.859903	1.032932	0.3083	0.0017	0.283738	0.7781	-	-	-
INF$_{t-1}$	-	-	-	-	-	-	-0.0252**	-2.489509	0.0170
INT$_t$	-	-	-	-	-	-	-0.0444*	-2.141620	0.0384
INT$_{t-1}$	12.60867	0.787724	0.4359	0.0053	0.498595	0.6208	-	-	-
EXCH$_{t-1}$	3.547841**	3.599991	0.0009	0.0004	0.003378	0.9973	0.570374	2.521400	0.0158
Short run									
ΔINF$_t$	-	-	-	-	-	-	0.007846	0.577562	0.5668
ΔINT$_t$	44.99867	1.773789	0.0843	-0.0257	-1.579357	0.1221	-	-	-
ΔINT$_{t-1}$	60.16870*	2.285843	0.0281	-	-	-	-	-	-
ΔEXCH$_t$	-1.172417	-1.552472	0.1291	0.2016	1.927442	0.0610	0.113111	0.554833	0.5821
ΔEXCH$_{t-1}$	-1.979748*	-2.041833	0.0483	-	-	-			
CointEq$_{t-1}$	-0.473028**	-5.782351	0.0000	-0.6164**	-4.745507	0.0000	-0.213897	-4.790593	0.0000
Post diagnostic test									
R-squared	0.937367			0.797300			0.749322		
Adjusted R-squared	0.923824			0.706895			0.711721		
F-statistic	69.21754			4.394666			19.92793		
Prob(F-statistic)	0.000000			0.001344			0.000000		
D.W.	1.975			1.973			1.964		
Ramsey RESET stat	2.3086			0.1733			0.4212		
Ramsey RESET Prob.	0.1220			0.6794			0.5201		
BPG Hetero. Stat.	0.5119			1.9397			10.7656		
BPG Hetero. Prob.	0.8397			0.9252			0.0959		
BG Serial Corr. Stat.	0.0204			0.3619			0.5463		
BG Serial Corr. Prob.	0.9799			0.0007			0.7610		
JB Prob.	0.0000			0.0000			0.0000		

Source: Author's computation using CBN Fourth Quarter 2019 Statistical Bulletin and Quarterly Journal of the Nigerian Institute of Quantity Surveyors (NIQS)

From Table 5 above, in the long run, the coefficient of the inflation rate is positive but statistically insignificant at 5%; this implies that there is a positive impact of the inflation rate on the prices of cement. Also, the result shows that the interest rate has a positive but statistically insignificant impact on the price of cement. In contrast, the exchange rate has a positive and statistically significant impact on the price of cement. The result shows that all the impact intensities conform to the apriori expectation, and we can thus conclude that macroeconomic variables significantly affect the price of cement.

From Table 5 above, in the long run, the coefficient of the inflation rate is positive but statistically insignificant at 5%; this implies a positive impact of the inflation rate on the prices of granite. Also, the result shows that the interest rate has a positive but statistically insignificant impact on the price of granite. In contrast, the exchange rate has a positive and statistically insignificant impact on the price of granite. The result shows that all the impact intensities conform to the apriori expectation, and we can thus conclude that macroeconomic variables do not significantly affect the price of cement.

Considering the statistical properties of the ARDL result reported in Table 5 for the price of granite equation, the R-squared value of 0.7069 indicates about 70.69% variation in the price of granite is explained in the model by the explanatory variables – macroeconomic variables all put together. The F-statistics tells us how jointly and significantly the independent variables are in explaining the dependent variable. An F-statistics of 4.39 is statistically significant, and this shows a considerable harmony between the price of granite and the explanatory variables put together, confirming that all the independent variables jointly significantly influence the dependent variable. The Durbin-Watson statistic of 1.94 indicates no serial correlation associated with the regression result as it is approximated to 2.

The Breusch-Pagan-Godfrey (BPG) F-stat tests for the presence of heteroscedasticity in a regression result; the BPG tests the null hypothesis of no heteroscedasticity against the alternative hypothesis of heteroscedasticity. The BPG probability value was 0.8397 for the price of the cement equation, 0.9252 for the price of the granite equation and 0.0959 for the price of the sand equation, which is all greater than 5%, implying that there is no presence of heteroscedasticity in the regression result. The Breusch-Godfrey Serial Correlation F-stat test is used to test for serial correlation among the variables. The B-G tests the null hypothesis of no serial correlation of higher order against the null hypothesis of serial correlation. The result of the B-G Serial correlation probability was 0.9799 for the price of cement equation, 0.9307 for the price of granite equation and 0.7610 for the price of the sand equation, and they are greater than 5%. Hence, we fail to reject the null hypothesis of no serial correlation, implying that the model has no higher-order serial correlation.

The Ramsey (Regression Specification error test) RESET is used to examine the stability of the ARDL model. The Ramsey RESET tests for specification error in terms of omitted variables, incorrect functional form and correlation between the explanatory variables and the error term. The Ramsey RESET tests the null hypothesis of the model is relatively stable, which implies unbiasedness and consistency, which produces a zero mean vector against the alternative of specification error. The result revealed that the probabilities are greater than 5%, thereby failing to reject the null hypothesis; this implies that the model is free from specification error and is relatively stable for the three equations.

Conclusion

This study looked at the influence of macroeconomic factors on the prices of building materials in Lagos State. It adopted the ARDL approach to determine whether there is a long-run relationship between both the dependent and the independent variables in the study. To achieve a reliable model for predictive purposes, raw data for the study were tested for stationarity using the Augmented Dickey-filler test. ARDL Bound Co-integration test was carried out to determine whether there is a long-run co-integration between the building materials prices and the macroeconomic factors used in the study. The ARDL model was carried out, and from the model, it was discovered that there is a positive impact relationship between the inflation rate and the price of cement. Interest rate, too, has a positive but statistically insignificant impact on the price of cement.

Generally, the macroeconomic variables in the study affect the price of cement.

In the case of granite, the result shows that interest rate has a positive and statistically insignificant impact on the price of granite. In conclusion, the macroeconomic variables do not significantly affect the price of granite. The impact of macroeconomic variables on the price of sharp sand; from the study, it was discovered that the macroeconomic variables, as expected, affect the price of sharp sand, but only an increase in consumer prices and an increase in exchange rate does not significantly impact the price of sharp sand.

Recommendations

The recommendations that emanated from this study are as follows:

This study also shows the exchange rate to be a confident predictor of cement price and is shown to have a significant relationship with the price of sharp sand. Given these findings, it is recommended that the government, through the Central Bank of Nigeria (CBN), exercise more control on the foreign exchange rate to ensure general stability in the rate, especially with respect to the Naira/Dollar exchange rate. The government is also expected to synergise with academia, professional bodies in the construction industry and the private sector to formulate policies that will eliminate sharp exchange rate fluctuations while promoting exchange rate stability.

The cement cost model shows that the combined forces of the inflation rate, interest rate and exchange rate statistically predict cement price, and these factors confidently explain the variance experienced in the price of cement. In view of this, the government and the Central Bank of Nigeria are expected to churn out policies that ensure thestabilisation of the inflation rate.

The study shows interest rate to be a confident predictor of cement price and is shown to have a significant relationship with the price of granite. The study also shows that interest rate predicts sharp sand prices as the relationship between the two variables is significant. In view of these findings, it is recommended that the Central Bank of Nigeria adopt the quantitative easing policy that would lower interest rates since a fall in interest will lead to a fall in cement and sharp sand prices. In conclusion, the government, through the machinery of the Central Bank of Nigeria, being the sole body regulating the monetary policy in the country, must formulate reliable policy that will bring about the stability of the macroeconomic variables in Nigeria. When the macroeconomic variables are stable, the prices of goods in the economy, including that of the construction industry, will be stable.

References

Acha, I.A. & Acha, C.K. (2011). Interest Rates in Nigeria: An Analytical Perspective Research. *Journal of Finance and Accounting*, 2(3), 71–81.

Adegbembo, T. F. & Adeniyi O. (2015). Evaluating The Effect of Macroeconomic Indicators on Building Materials Prices. Confluence of Research, Theory and Practice in Quantity Surveying Profession for a Sustainable Built Environment. *Proceeding of The Nigerian Institute of Quantity Surveyors: 2nd Research Conference, between 1st - 3rd September at Federal University of Technology, Akure.*

Aibinu, A.A. & Jagboro, G.O. (2002). The Effects of Construction Delays on Project Delivery in Nigerian Construction Industry. *International Journal of Project Management*, 20, 593-599

Akanni, P.O. & Oke, A.E. (2012). An Assessment of Trend in the Cost of Building Materials in Nigeria. *Environmental Research Digest*, 8(2): 103-116.

Akanni, P., Oke, A. and Omotilewa, O. (2014). Implication of Rising Cost of Building Materials in Lagos State Nigeria. *SAGE Open*, 4,1-7. https://doi.org/10.1177/ 2158244 014 561213.

Anderson, J. A. (2011). *6 Factors Affect Today's Bid Prices*, Daily Journal of Commerce, 1, available: http://www.djc.com/news/co/ 120 28676. html.

Anosike, P. (2009, April 6). Nigeria Groans Under High Cost of Building Material. *The Daily Sun*, pp. 38-39.

Asaolu, T.O. and Ogunmakinwa, M.S. (2011). An Economic Analysis of the Impact of Macroeconomic Variables on Stock Market

Movement in Nigeria. *Asian Journal of Business Management*, 3(1), 72-78.

Busreport (2006). *Construction Costs to Soar with Cement Price Increase, Daily Tenders available:*www.dailytenders.co.za/Global/News/Article/Article.asp?ID=2442.

Babalola, A. J. and Onyebuchi, I. (2021). Cost of Road Infrastructure Development,

Macroeconomic Conditions and Nigerian Economic Growth. *Lagos Journal of Architect.* Vol. 5, No. 1, pp 21-45

Chappel, D., Cowlin, M., & Dunn, D. (2010). *Building Law Encyclopedia*, West Sussex: Wiley Blackwell

Elinwa, U., & Buba, S. (1993). Construction Cost Factors in Nigeria. *Journal of Construction Engineering and Management*. 119, (4) 698–714.

Idoro, G.I. & Jolaiya, O. (2010). Evaluating Material Storage Strategies and their Relationship with Construction Project Performance. *Proceedings of CIB International Conference on Building Education and Research, University of Cape Town, 103-113.* Retrieved from http://www.rics.org/cobra

Jagboro, G. O., & Owoeye, C. O. (2004). A Model For Predicting the Prices of Building Materials using the Exchange Rate in Nigeria. *The Malaysian Surveyor, 5(6), 9-14.*

Khalid, Z., Iqtidar, A. S., Muhammad, M., K., Mehboob, A., (2012). "Macroeconomic factors determining FDI impact on Pakistan's growth", *South Asian Journal of Global Business Research*, 1 (1), 79 – 95.

Li, C. K. (2001). Internet-based Geographical Information Systems; Systems for E-commerce Application in Construction Material Procurement', *ASCE Journal of Construction Engineering and Management*, 129(6), 689–697.

Mohamed, S. (2006).*The Costs of Ongoing Exchange-Rate Volatility*, EngineeringNews.co.za, available: http://www.engineeringnews.co.za/article/the-costs-of-ongoing-exchangerate-volatility-2006-11-24

Okpala, D.C., & Aniekwu, A.N. (1988). Causes of High Costs of Construction in Nigeria. *Journal of Construction Engineering and Management*. 114, 233-244.

Okupe, L. (2000). The Role of Private Sector in Housing Delivery in Nigeria. *A Seminar Paper of Effective Approach to Housing Delivery in Nigeria Organised by the Nigerian Institute of Building*, Ibadan.

Olabopo, O.L. (1992). Effect of Delayed Payment Retention and High Interest on Contractors' Cash Flow. *The Quantity Surveyor*, pp. 15-17

Oladipo, F.O. & Oni, O.J. (2012). A review of Selected Macroeconomic Factors Impacting Building Material Prices in Developing Countries. A Case of Nigeria. *Ethiopian Journal of Environmental Studies and Management,* 5(2), 131-137.

Oladinrin, O., Ogunsemi, D. R. and Aje, I. O. (2012). Role of Construction Sector in Economic

Growth: Empirical Evidence from Nigeria. *FUTY Journal of the Environment*, 7(1), 50-60.

Omange, G. Y., & Udegbe, M. I. (2000). Government involvement in housing. In *Effective Housing in 21st Century Nigeria, Environmental Forum, Federal University of Technology Akure, Nigeria* (pp. 9–14).

Rakhra, A.S. & Wilson, A.J. (1982). *Inflation Budgeting and Construction Costs,* National Research Council, Canada.

Sunde, T. and Muzindutsi, P.F. (2017). Determinants of House Prices and New Construction Activity: An Empirical Investigation of the Namibian Housing Market. *The Journal of Developing Areas*, 51, 390-407.

Taylor, G.D. (2013). Materials in construction: An introduction. New York, NY: Routledge.

Umeh, O.L. (2018). *Research Methodology* (1st ed.). Lagos, Nigeria: Unilag Press and Bookshop Ltd.

Umeora, C.E. (2010). Effects of Money Supply and Exchange Rates on Inflation in Nigeria. *Journal of Management and Corporate Governance*, pp. 2, 73–87.

Windapo, A. O. & Cattell, K. (2010). Perceptions of key Construction and Development Challenges facing the Construction industry in South Africa, *Proceedings of the 5th Built Environment Conference of Association of Schools of Construction of Southern Africa*

(ASOCSA), July 2010, Durban, South Africa."

Windapo, A.O., Ogunsami, O. E., & Iyagba, R.O. (2004). *Modelling the Determinants of the Demand for Housing Construction in Nigeria.* In S. Ogunlana, C. Charocnngarn, P.Herabat & B.H.W. Hadikusumo (Eds), *Proceedings of the CIB W107 & TG 23 International Symposium on Globalization and Construction (*pp. 631-646*).* Klong