



EFFECTS OF MACROECONOMIC INDICATORS ON COST OF BUILDING MATERIALS IN NIGERIA

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ABSTRACT: *A fallacy may exist regarding the availability of affordable houses due to rising inflation and the high cost of construction supplies brought on by the struggling economy. Because of this, most developing nations, including Nigeria, are dependent on the importation of building materials. This study looked into how certain macroeconomic parameters affected the cost of building supplies. The macroeconomic indicators are the interest rate, GDP, and inflation. The study's main finding is that the prices of building materials are not much impacted by these macroeconomic indices. Quarterly data over a period of ten years, from 2012 to 2021, were used in the study and were taken from public sources. The Nigerian Institute of Quantity Surveyors Quarterly Journal and the Guardian Newspaper provided the information on building materials. The Central Bank of Nigeria Statistical Bulletin was used to derive data on Gross Domestic Product, inflation, and the minimum rediscount rate. Multiple regression was the analytical approach utilized, and the findings indicated that the GDP, inflation, and interest rates all had a positive, substantial impact on the cost of building materials. This means that the price of building materials is influenced by key macroeconomic indices such as inflation, GDP, and interest rates. The report suggested lowering import taxes, waiving taxes for local manufacturers of building materials, and lowering bank loan interest rates, while Nigeria's government and central bank should develop policies to regulate and stabilize these macroeconomic indicators.*

KEYWORDS: Building Materials, Macroeconomic Indicators, building Construction



INTRODUCTION

The construction industry is nearly universally utilized to examine country economies. The built environment is extremely important to the social-economic growth of a country, since the industry has typically been in charge of physical development and environmental transformation (Oladipo & Oni, 2012). The level of the construction industry's contributions to national economic, social, and political progression determines the yardstick for gauging national progress (Mogbo, 2001). According to the World Bank, the sector contributes between 3 and 8% of the Gross Domestic Product (GDP) of developing nations, including Nigeria. Since the 1970s, prices in Nigeria have generally increased, and since the introduction of the Structural Adjusted Programme (SAP) in 1986, the issue has gotten worse. Exchange rates and inflation rates both increased as a result of SAP policies (Umeora, 2010). In order to reduce inflation, measures like privatization and deregulation were put into place. These measures were put in place because it is thought that they have an impact on inflation.

Macroeconomic indicators' deteriorating and aggravating effects over time have raised concerns about the construction sector (Ojo & Awodele, 2013). Macroeconomic imbalances have developed in Nigeria over the past few years (International Monetary Fund, 2001), with current rates of accelerated double-digit inflation (22.79%), exchange rates (N850 to US \$1) according to the current Nigerian commercial bank rate, low gross domestic product (GDP) (4.20%), unemployment (37.7%), and interest rates (18.50%) leading to poverty levels of 40.1% (National Bureau of Statistics (NBS), 2022), and low-capacity utilization, among other factors. These aggregate macroeconomic indicators, however, reflect the overall performance of the economy and evaluate its viability, particularly as it relates to Nigeria's construction industry sector, which continues to exhibit exceptional growth (Bala and Asemota, 2013; Onasanya and Adeniji, 2013).

While Oladipo and Oni (2012) investigated the impact of macroeconomic indicators on the prices of building materials in Nigeria with a view to improving construction project procurement and delivery using the survey method, this study will use secondary data extracted from published sources within a period. Asaolu and Ogunmakinwa (2011) studied an econometric analysis of the impact of macroeconomic variables on stock market movement in Nigeria but not on building materials. The study found that important factors influencing building material prices are the rate of inflation, the currency rate, imports, the interest rate, and the money supply. Additionally, Izedonmi and Abdullahi (2011) used regression to examine how macroeconomic factors such as inflation, exchange rates, and market capitalization affected the returns on Nigerian stocks. The Nigerian stock exchange market was not significantly impacted by the macroeconomic parameters that were tested. In contrast to other sectors, the impact of macroeconomic indices on building material prices has not received much research. This study will employ multiple regression and focus on determining how inflation, currency rates, and interest rates affect the costs of building materials.

The construction industry is severely impacted by the rising incidence of inflation and other economic factors because few projects are completed at the initial contract sum due to rising building material prices, and clients hardly ever rely on initial contract sums (Gambo & Ashen, 2012). According to Hillebrandt (2000), the building industry is a key component of any country's economy. For the public and commercial sectors, clients and contractors, the deteriorating Nigerian economy and its impact on construction costs have turned into a big



issue. In order to forecast future price increases at a specific moment, this study looked at the effects of a few macroeconomic factors on the price of building materials through time.

LITERATURE REVIEW

The Construction Industry and Nigerian Economy

The fact that practically all projects are completed at amounts higher than their initial contract sum is one of the primary issues the Nigerian construction industry is currently facing (Achuenu, 1994). The escalating tendencies can be linked to governmental initiatives, economic inflation, and design elements. Over the past forty years, the Nigerian economy has undergone profound structural changes. However, there is evidence to suggest that the significant structural changes that took place did not lead to meaningful development or long-term economic growth (Ezirim, Okeke & Ebiriga, 2010).

After roughly a few decades of political independence and economic management, the Nigerian economy suffered from fundamental structural flaws and continued to be in a permanent state of disequilibrium. According to Mudasiru and Adabonyon (2001), the productive and technological base was unreliable, rigid, out-of-date, limited, and reliant on outside sources. The economy, which was essentially in its infancy during the first half of the 20th century, began to undergo considerable structural change as soon as the nation gained its independence in 1960. Nigeria's economy was dominated by agriculture by the time the country attained independence in October 1960. It was responsible for over 70% of the country's GDP, employed almost the same proportion of the labor force, and generated 90% of the federal government's revenue and foreign exchange earnings (Adedipe, 2004). The government started spending the newly discovered money in socioeconomic infrastructure across the nation, particularly in urban areas; the services sector also expanded in order to create a business environment that was favorable for future investments (Adedipe, 2004). Massive investments in socioeconomic infrastructure caused a large number of physically fit young people from the countryside to move to the cities, where they participated in the expanding and burgeoning oil-driven urban economy. This situation gave rise to a number of social issues, including traffic congestion, pollution, unemployment, and criminal activity. As foreign cash inflows outnumbered outflows and external reserves were accumulated, the national currency, the naira, strengthened.

Three categories—primary, secondary, and tertiary—can be used to categorize the various activity sectors of an economy. The agricultural and mining industries make up the primary sector. The secondary sector is made up of manufacturing, utility, and construction activities, while the tertiary sector consists of service activities like transportation, distributive trade, hotel and restaurant services, finance and insurance, real estate, other business services, and government services (Ezirim, Okeke & Ebiriga, 2010).



Building Material Prices

Any material used in construction is a building material. Building materials were named as one of the major variables influencing the effective operation of the Nigerian construction industry by Abiola (2000). Because materials are the single greatest input in construction and frequently account for nearly half of the overall cost of the majority of construction products, the building materials sector significantly contributes to the construction industry (Mogbo, 1999; Kern, 2004).

Many naturally existing materials, including rock, clay, wood, and sand, as well as twigs and leaves, have been employed in the construction of buildings. In addition to naturally existing materials, several man-made items, some more synthetic than others, are in use. The rapid rise in building material prices has been a significant barrier for the Nigerian construction sector. Because of its excellent adhesive quality, quick setting time, and workability, cement continues to be the most widely used building material. As a result, this one substance had come to be used for all types of construction. According to Ughamadu (1993), one of the causes that drove up building costs was the devaluation of local currencies. According to Olashore (1991), if there was no substitute for imported inputs, the cost of production would rise as a result of the devaluation of the Nigerian currency. According to Makoju (1995), the enormous Naira devaluation has made it hard to invest significantly in local manufacturing and has increased the cost of acquiring building resources as a result of manufacturers raising the pricing of their goods.

According to Oladipo and Oni (2012), supply and demand, an economic principle, determines how much resources cost in the market. Prices of building materials change in part due to the impact of shifting monetary policies, especially when it comes to imported commodities like cement, reinforcing, and sanitary ware. According to Ademoroti (1997), the importation of building supplies killed Nigeria's ambition to be independent, decreased internal production, increased construction costs, and depleted the country's foreign exchange reserves. Building material price increases have a multiplier effect on the industry since they will cause fluctuation, which will inevitably result in projects being abandoned. Building material prices have already been significantly impacted by the advent of the foreign exchange market (Jagboro & Atigogo, 2000).

Macroeconomic Indicators

Macroeconomic indicators are economic statistics that are frequently released at a specific time by governmental entities, nonprofit organizations, and the private sector. These statistics show the situation of the economy of a state in relation to a specific area. According to Asaolu and Ogunmakinwa (2011), macroeconomic variables including the unemployment rate, inflation rate, capacity utilization, external debt, and price stability, among others, are systemic risk factors for the economy that have an impact on each and every sector and participant. Despite numerous initiatives to address it, the high rate of inflation that plagues the Nigerian economy continues to worry everyone, even the government. The inflation rate was 11.40% in 2019, rising to 13.25% in 2020 and 16.95% in 2021 due to changes in the currency of the naira, lending interest rates, demand pressure, and a constrained supply of products, among other factors (Oranefo, 2022). Leading and lagging indicators make up the two categories of macroeconomic indicators.



Leading Indicators

Leading indicators can be used to forecast future trends since they frequently change before significant economic changes. Examples include the stock market, manufacturing processes, inventory levels, retail sales, and the housing market, among others.

Lagging Indicators

Lagging indicators are those that represent the economy's past performance, and changes to them are not noticed until after a trend or pattern in the economy has already taken hold. In contrast to leading indicators, lagging indicators fluctuate as the economy does. Even though they rarely predict where the economy is going, they do show how it evolves over time and can be used to spot long-term trends. Examples include income and wages, changes to GDP, unemployment, the change in the consumer price index (inflation), corporate profits, and the exchange and interest rates.

Inflation

A price index, such as the Consumers Price Index (CPI), which tracks changes in the cost of a variety of goods and services typically purchased by consumers, is typically used to estimate inflation. Different economists and financial experts attribute different causes for inflation to various circumstances. They said that a number of these elements, including the money supply, exchange rates, interest rates, the government's deficit budget, and a host of others, are substantially to blame for the inflation that affects various regions of the world to varying degrees. The effects of inflation seem to be most severe in developing nations (Umeora, 2010).

Interest Rate

Interest rates' significance depends on their ability to balance supply and demand in the financial industry. According to Colander (2001), interest rates on financial assets and liabilities have a significant impact on people's decision to invest their savings in financial assets as well as their readiness to take on financial liabilities. According to Ahmed (2003), deregulated interest rates are viewed as essential for both economic stabilization and growth. The relationship between interest rates and investment is covered by the implication. The interdependent relationship between the financial and real sectors of economies makes it possible for interest rates to play a developmental role in economies. Therefore, the influence of interest rates on the financial sector is transferred to the real sector through this relationship (Acha & Acha, 2011). High interest rates discourage borrowing for investments, and vice versa. On the other hand, when savings rates are high, this encourages saving, which ultimately results in more money being available for loans.

The Monetary Policy Rate (MPR) is one of the most important tools the Central Bank of Nigeria (CBN) uses to implement monetary policy in order to attain the desired level of interest rate. The CBN is willing to rediscount first class bills of exchange before maturity at this rate, which was known as the Minimum Rediscount rate (MRR) until 2006 (Onoh, 2007). The monetization of oil revenue, which results in an increase in the money supply, is reflected in Nigeria's interest, exchange, and inflation rate developments. This is made worse by Nigerians' preference for carrying large amounts of cash and making payments in it. As a result, changes in these rates have occasionally been irregular but have been seen to coincide with the pattern of oil revenue (Adedipe, 2004).



Gross Domestic Product and Building Construction

Gross Domestic Product (GDP) is the total market value of all products and services produced in a nation during a given time period, often one year. There are numerous ways to calculate GDP. The gross production minus intermediate consumption method i.e. value added approach is used by the Central Bank of Nigeria (CBN) to calculate GDP. The value-added technique adds up the end product (goods and services) values at the going rate but not the value of the intermediate items and services that were used in the production process.

The relationship between construction in general and economic development has been documented in numerous research for many years (Ahmad et al., 2019; Giang et al., 2011; Tan, 2002). According to 1969 research by the United Nations International Development Organization, the construction industry contributed between 3 and 9 percent of the GDP in industrialized countries and between 5 and 3 percent in underdeveloped ones. However, it appeared that the tide had turned due to increased infrastructure investments, particularly in China and India, as recent research revealed that the construction sector contributed 8% of GDP in developing countries while remaining at 5% of GDP in developed countries (Deloitte, 2018; Mito, 2019). The research from 1969 also showed that, regardless of whether an economy is developed or emerging, the construction sector makes up 45–60% of most economies. According to future forecasts, the GDP contribution of the construction sector was predicted to be 13% in 2014 and will increase to 14.7% by 2030 (Mella et al., 2018). Additionally, the 1969 survey showed that just 2–6% of employment in developing countries came from the construction sector, compared to 6–10% in wealthy ones. These projections have grown over time. For instance, recent data showed that the contribution of the construction industry to overall employment is approximately 7% globally (Mito, 2019), approximately 8.2% in Europe (Baker et al., 2017), and approximately 11.2 in low-income countries (LIC) (Mella et al., 2018).

The connection between construction output and economic development has been the subject of numerous studies. Turin (1973) is one in particular with significant ramifications in the context of developing countries. The study discovered a significant and positive linear association between GDP and the value-added and gross output of the construction sector using cross-sectional data from 87 low-income and middle-income countries collected between 1955 and 1965. The construction industry increases more quickly as the economy shifts from LIC to MIC, which causes a "middle-income bulge" (Jiang, 2013; Strassmann, 1970). According to Jiang's (2013) analysis, lower diminishing returns explain why the construction sector in developing nations like China with low GDP per capita tends to grow more quickly than in wealthier countries like the UK. The luxury of copying excellent production techniques, methodologies, and technology from rich countries for their own development is the second justification (Jiang, 2013; Oliete Josa et al., 2018). For instance, the Siemens AG international conglomerate firm is now being used by the Nigerian government to remodel and enhance the nation's power sector infrastructure (Zyl, 2020). The third justification makes reference to the Chinese government's actions. Jiang (2013) found that because China is a developing country, the government has focused more energy on enacting industrial policies like the Chinese Economic Stimulus Plan in 2008 to encourage the growth of the economy's infrastructure. The Economic Recovery and Growth Plan (EGRP), which was implemented in Nigeria, is comparable. Since April 2017, it has included major infrastructure construction as one of the primary areas for promoting economic development (Olanipekun et al., 2019; Ugwueze, 2018).



Because of the aforementioned factors, the output and value-added of the construction sector make up a growing share of GDP as GDP grows (Oshodi et al., 2020; Wells, 1984). However, as an economy ages, GDP growth slows down and infrastructure requirements diminish or disappear (Maddison, 1987; Ozkan et al., 2012; Yiu et al., 2004). Studies from various nations support the link between economic growth and construction-related activities. Ofori (1988) discovered that Singapore's economic growth was accelerated by the building sector's operations. According to Green (1997), the residential segment of the construction industry caused GDP growth. Additionally, Tse et al. (1997) discovered that growth in Hong Kong's GDP was correlated with an increase in the activities of the construction sector, using data from 1985 to 1995. According to a recent study based on the demand function for construction investments, Nigeria's GDP significantly affected the construction industry over the short and long terms (Olanipekun et al., 2019). The link between construction and economic development is not static or non-linear, according to traditional (Bon, 1988, 1992, 2000, 2001) and modern studies (Jiang, 2013; Osei et al., 2017). According to the studies, the construction industry is consistent with the inverted U-shaped relationship economic system, according to which an economy first evolves from the low-income economy (LIC) to the middle-income economy (MIC), then to the high-income economy (HIC). This comprises the volume of the entire construction sector as well as the sector's contribution to the overall GDP. No study from these robust investigations examined the impact of GDP and cost of building materials; however, this study looked at the impact of GDP, interest rate, inflation rate on cost of building materials.

METHODOLOGY

The data included in this study include interest, GDP, and inflation rate statistics from 2012 to 2021, as well as quarterly data on the pricing of a few specific building supplies. Between 2012/1 and 2021/4, 40 quarters of data were collected. The cost index is one of the most significant pieces of cost data that is based on historical data. This gauges how much an item's cost has changed over time, either individually or as a group. The Adegbembo Building Material Price Index (ABMPI) was created using the material index. This is due to the large number of building materials; hence, an aggregate index will be required to measure the change in cost.

The study's foundation is an economic model that captures the essential characteristics of the observed economic occurrence. The multiple regression analysis of the time series inflation, GDP, and interest rate served as the foundation for the model's specification. This made it easier to understand how the independent (explanatory) and dependent variables related. In other words, the model calculated the impact of GDP, interest rates, and inflation on the cost of building materials.

The Guardian Newspaper and other publications of Nigerian Institute of Quantity Surveyors provided the information on building material costs, while the Central Bank of Nigeria's statistical bulletin provided information on the inflation rate, gross domestic product, and the quarterly interest rate. Software called SPSS is used to process the data that was gathered for the study.



RESULT

Table 1: Summary of Multiple Regression Analysis

Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.934 ^a	.872	.808	262.622

The link between the specified independent variables (Inflation, GDP, and interest rate) and the dependent variable (Building Material Prices) may be examined using multiple regression analysis. It was possible to acquire the regression coefficients that quantify the relationship between the explained variance and the overall variance. Table 1 above also includes the figures derived for the R value, R square value, modified R square value, and standard errors of estimate.

The macroeconomic indicators (GDP, inflation rate, and interest rate) show a positive significant association ($R=0.934$), indicating that the two variables are moving in the same direction. This means that the cost of building materials will rise in response to an increase in any of the variables, such as the GDP, inflation rate, or interest rate, and vice versa. When the p-value is under 0.05, the figure is significant.

The correlation coefficients (R) should have values between 0 and 1, i.e., $0 = R = 1$. $R=0.934$ and $R^2 = 0.872$ within a standard error of estimate of 262.62 were obtained from the computer output. This indicates that 80.8% of the variation in building material prices was accounted for by macroeconomic indicators.

Table 2: Model Summary for Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1468.010	1073.792		1.367	.221
	INFLATION RATE	16.309	45.752	.089	.356	.734
	INTEREST RATE	-69.553	49.831	-.432	-1.396	.212
	NOMINAL GDP	.008	.004	.498	2.283	.063

Using Table 1, The dependent variable and independent factors were found to have a $R=0.934$ high positive association. This has the practical consequence that, while holding other variables constant, a unit change in the inflation rate will cause the greatest change in building material prices, and a unit change in the interest rate will cause the least change. The standardized regression coefficient is highest for inflation rate (0.829) and least for interest rate (-0.432).



CONCLUSION AND RECOMMENDATION

Important macroeconomic factors that have an impact on building material prices include GDP, inflation, and interest rates. The findings indicated that building material prices were positively and significantly impacted by interest rates, inflation, and GDP.

In order to stabilize GDP, inflation, and interest rates, the study recommended that stable economic policies are necessary. This would facilitate the acquisition of construction projects in Nigeria and lead to a decrease in building costs. To lessen the significant reliance on foreign/or imported goods, it should also be encouraged to employ locally produced materials. This will significantly improve the process of buying buildings.

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