



## ANALYSIS OF BUILDING MATERIALS PRICE FLUCTUATION IN ADAMAWA STATE, NIGERIA



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**Abstract:** Inflationary increase in prices of materials used in erecting building structures affects housing cost and the economy. The paper analyzed causative factors, effects and inflationary trends of building materials price fluctuation in Adamawa state, Nigeria. Primary data on causes and effects of building materials price fluctuation were obtained through structured questionnaire administered to 210 respondents. Secondary data on building materials average annual inflation rate and all items monthly inflation rates between 2014 and 2016 were sourced. Percentages and mean ratings were used to analyze the respondents' opinions on factors responsible for, and effects of materials price fluctuation and presented in charts, graphs and tables. Result shows general inflation increment between 2014 and 2016 due to recession in the country, and led to increase in building material prices. Inflation was high in 2016 at 15.7% in December, and aluminum roofing sheets has the highest annual inflation rate of 19.4% while 9 inches block has the least inflation rate of 17.5% in same year. Effect of price fluctuation of building materials resulting to low GDP ranked 1<sup>st</sup> with 3.81 mean rating. Other effects include increased unemployment, project abandonment. High exchange rate, cost of petrol, and transportation cost are the top three important factors responsible for building materials price fluctuation. It is recommended that the stability in naira exchange rate should be reinforced as instability in the naira will leads to instability in material prices and subsequently affects business prospect. Government should take drastic steps to reduce cost of production and transportation of materials for building, and also prioritize researches in the production of local building materials. The issue of price control board should be reconsidered as well.

**Keywords:** Building materials, fluctuations, inflation, price

### Introduction

The building sector of construction industry is very crucial in any nation's social and economic development. There are many factors responsible for this. Apart from the sector's potential with respect to employment generation, the various activities undertaken in the sector are very germane to fostering effective sectoral linkages and enhancing, as well as sustaining economic development (Mathews, 2009).

Building sector has been relevant in the development of Nigerian economy. Housing is a major component of the sector. Housing is a key input in economic, social, and civic development; many housing-related activities contribute directly to achieving broader socio-economic development goals, and it is a major driver of economic growth. The building sector has provided employment for different categories of employees, especially in major Nigerian cities where construction activities have been immense. These include the Federal Capital Territory (FCT), Abuja, and the various State capital cities like Lagos, Port-Harcourt, Kano, Kaduna, Uyo, and Adamawa among others. The sector is also pivotal in sectoral linkage as its activities have multiplier effects on the growth of other sectors, especially the building materials industry, real estate transactions, among others (Akanni *et al.*, 2014). The building sector is driven by players such as building professionals (Architects, Builders, Quantity surveyors, Engineers, Town Planners, etc.). Other players are contractors, building material and equipment merchants, suppliers, manufacturers, financiers, regulators, and others in the value chain.

Building materials have been playing an important role in erecting or constructing structures. No field of engineering is conceivable without their use (Akanni, 2006; Udosen and Akanni, 2010). Building materials contribute immensely to the quality and cost of housing, from substructure (foundation) to the superstructure including materials for roofing and finishes. The cost of building materials poses a

significant threat to both the building sector and people aspiring to own houses (Anosike, 2009; Mekson, 2008; Mohammed, 2008; Njoku, 2007). For example, bag of cement presently in 2017, is sold at two thousand eight hundred naira (N2800). A bag of cement, which is valued at N1,350.00 in 2006, goes as high as N1,850.00 in 2009 according to Anosike (2009), depicting about 37% increment. Supporting this view, Jagboro and Owoeye (2004) earlier established that increase in the prices of building materials has multiplier effects on the industry while Idoro and Jolaiya (2010) affirmed that many projects were not completed on time due to the cost of materials, which have been on the increase. Besides timely completion, high prices of building materials form a crucial constraint to improving housing conditions in the low-income earning countries, Nigeria inclusive (United Nations Centre for Human Settlement (UNCHS), 1993).

Building materials were all naturally occurring in the ancient times, for example, stone, wood, straws, clay, lime, and brick (Akanni, 2006; Taylor, 2013). As the building techniques were improving, simple composite materials, combined by means of mixing and/or heat treatment, were developed. A typical example is concrete, which was developed by the Roman Empire (Everett and Barritt, 1994). Due to advances in science and technology at the beginning of the 20th century, materials with better performance and durability were introduced, for example, reinforced concrete, steel, plastics, and metal (Taylor, 2013). Ibn-Homaid (2002) and the report of UNCHS (1993) found that building materials remain the most significant input in project development and delivery of building projects. Buttressing this view, Jagboro and Owoeye (2004) and Idoro and Jolaiya (2010) discovered that building materials alone account for 50 to 60% of project cost and control about 80% of its schedule.

A major constraint in the Nigerian construction industry today has been the rapid inflation in the cost of building materials. Windapo *et al.* (2004) observed that the situations arising

from the rapid increase in the cost of building materials may degenerate to acute shortages of housing with the millions of middle- and low-income families being priced out of the market for home ownership all across Nigeria. According to Obadan (2001), government policies set the economic environment in which all sectors operate including the building materials sector. Dlakwa and Culpin (1990) and Adekoya (2003) identified government fiscal policies as one of the factors affecting the cost of building materials in the Nigerian construction industry. However, findings of other researchers, Jagboro and Owoeye (2004); Mojekwu, Idowu, and Sode (2013); and Idoro and Jolaiya (2010), concluded that factors such as the change in government policies and legislations, scarcity of building raw materials, fluctuation in the cost of fuel and power supply, inadequate infrastructural facilities, corruption, fluctuation in the cost of plant and labor, seasonal changes, fluctuation in the cost of transportation and distribution, political interference, local taxes and charges, fluctuation on cost of raw materials, fluctuation in the interest rates and the cost of finance, inflation, and fluctuation in the exchange rate of Naira were many of the recipes for the rising cost of building materials in Nigeria.

Material resources are the heart and life wire of any building system. This simply means that increase in the cost of materials will affect the total cost of construction and subsequently housing supply in no small measure. Central Bank of Nigeria, (CBN) (2012), stressed that inflation is a social malady as well as a pervasive economic process whose effects are felt, to some degree, by every citizen and in all sectors of the economy. Inflation is thus felt in the building sector of the economy by the increase in building material prices. Inflationary increases in material cost are the major cause of construction cost overruns in Nigeria. Anosike (2009) further established that the prices of building materials in Nigeria have increased steadily over the years and this inflationary trend has led to higher project costs. These frequent increases give rise to cost overruns, claims, housing supply shortage leading to high cost of urban housing accommodation, construction cost estimate losing usefulness within short periods, difficulty in forecasting and planning, and frequent contract price variations, all of which often leads to project abandonment (Ayodele and Alabi, 2011). Anosike (2009) describes the construction industry as a barometer for measuring the economic growth of Nigeria. However, Jagboro and Owoeye (2004) and Aibinu and Jagboro (2002) noticed that increase in the prices of building materials has multiplier effects on the industry as it leads to fluctuation in construction costs and the eventual abandonment of projects. Other implications such as completion at the expense of other projects, delay in progress of project works, other valuable projects not being commissioned, rate of employment of construction workers, poor workmanship as a result of the use of low-quality local materials, and inhibited innovations in construction methods were identified by Elinwa and Buba (1993); Idoro and Jolaiya (2010); Okpala and Aniekwu (1988); Oladipo and Oni (2012); and Windapo *et al.* (2004) as the possible implications of the rising cost of materials. Sinclair, Artin and Mulford (2002) noted that increased material cost is primarily due to increased transport charges. Further, high transport and freight costs have been identified as the factors responsible for building material price increases in African countries such as Nigeria, Uganda, and Kenya (Mathews, 2009; Mwijagye, 2010; CBR, 2011).

In an attempt to establish the overall specific factors that promote inflation in Nigeria, Jagboro and Owoeye (2004) classified the causes of inflation in the Nigerian construction industry into two broad categories namely External (economic) and Internal factors. The External factors causing inflation in the Nigerian construction industry are those which

flow from a straight forward application of the laws of supply and demand or from the effect of government fiscal policies; these factors are influenced by governments or multi-national organizations and include the following: the shortage of locally manufactured building materials; the imposition by government of excise duty on locally manufactured building products or high import duty on imported building materials; Government fiscal policy determines interest rates charged by the bank and other finance houses; political instability; and excessive reliance on importation of materials for construction works and construction equipment. The internal factors includes: uncontrolled boom of construction works which lead to pumping of too much money into the economy; over dependence on foreign expertise in the construction industry in Nigeria; inefficient management of construction works on site; inadequate funding of the project by the employer; inadequate pre-contract documentation; design of a project in excess of the clients brief; and restricted importation of building materials and construction equipment which are not manufactured in the country.

Ayodele and Alabi (2011), Idoro and Jolaiya (2010) submitted that the predominance of many uncompleted and substandard buildings was connected to the inflation and high cost of building materials. Their studies also affirmed that the situation may have a multiplier effect on the industry and lead to fluctuation in construction cost. Construction costs within a preceding year can move up to as about 30 percent. Inflation causes serious problem to contractors. Njoku (2007) observed that the rate of inflation can cause serious problems in the economic accruals or rate of return to constructors for works undertaken, thus loss of profit. In the traditional procurement method, firm price contracts, where the contractor is paid in arrears. Inflationary forces render submitted bids unrealistic. This has made contractors' quantity surveyors more aware of the need to price inflationary risk at the pre-contract stage. Rakhra and Wilson (1982) opine that inflation can have an important effect upon the financial consequences of alternatives design solutions. The calculation of cost-in-use of alternative design solutions is often done without considering the impact of inflation on construction material prices. In order to factor inflation risk into pre-contract investment analysis, the appraisal thus requires an understanding of the relationship between inflation and construction materials prices. Inflationary effects on project appraisal are very significant and could pose difficulties to property developers. The ravaging effects of persistent price increases in Nigeria also discouraged investors from investing in the building sector. According to Lipsey and Chrystal (2007), the demand and supply or lack of Building materials can contribute to the rise in their prices where the law of supply and demand can be related. Orbals (2004) noted that cement and reinforcing steel like any other materials are affected by rising demand with no matching supply thereby affecting building material price levels. The research examined the inflationary trend of building materials price fluctuation from 2014 to 2016, the possible factors responsible for building materials price fluctuation, and evaluated the effect of material price fluctuation cost on construction of private residential building project in Adamawa State, Nigeria.

#### **Material and Methods**

The study focused on prices of building materials that are mostly used on building sites, and covers the period of three (3) years from 2014 to 2016. As Nigeria experiences economic recession, this period is adequate to reach a reasonable conclusion on the causes and effects of price fluctuation in building materials in the study area. Factors and the implications of the rising cost of building materials were identified.

A systematic literature review relevant to the study was conducted through which the questionnaire instrument was developed and used in the collection of primary data. Questionnaires were administered through random sampling. 210 questionnaires were returned out of 250 administered to respondents through hand delivery. Some of respondents were traced in their business premises while others in building material markets. Four point Likert scale was used as rating options in the questionnaire to elicit respondents' opinion on building materials price fluctuation. Percentages and mean ratings were used to analyze the respondents' opinions on factors responsible for, and effects of materials price fluctuation in Adamawa state and presented in charts, graphs and tables.

**Results and Discussion**

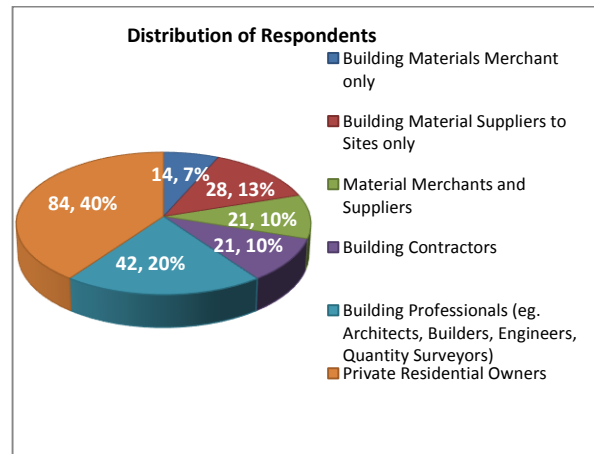
**Distribution of respondents**

Figure 1 indicates distribution of respondents (in numbers and percentages). Out of the total of 210 respondents, 84 respondents which represents (40%) are private residential owners. 14(representing 7%) of the respondents are involved in buying and selling of Building Materials only (i.e. Building Materials Merchant). 28 of the respondents (i.e. 13%) are involved in supply of materials to building construction sites only. 21 respondents (i.e. 10%) are both Material Merchants and Suppliers. 21 (representing 10%) of respondents involve in direct construction of buildings (Building Contractors), while building professionals (e.g. Architects, Builders, Engineers, and Quantity Surveyors) are 42, representing 20% of respondents. These respondents were actively involved in building construction activities in the study area, hence are knowledgeable in prices of various building materials.

**Inflationary trend of building materials price fluctuation**

Figure 2 shows all items inflation rates at 12 month average from 2014 to 2016. Looking at inflationary trend, it can be observed that inflation rate have been increasing from 2014 to 2016 but the greater inflation rise was in 2016 due to recession in the country, thus causing a general rise in the prices of building materials. Results show that inflation was at its peak in 2016 under review at 15.7% in December. Fig. 3 indicates average annual inflation rates of building materials for same period. Roofing sheets with 19.4% annual inflation rate is the highest among the building materials in 2016 and 9 inches block has the least inflation rate at 17.5% in same year as indicated in Fig. 3. Anosike (2009) established that the prices of building materials in Nigeria have increased steadily

over the years and this inflationary trend has led to higher material costs. Ayodele and Alabi (2011), Idoro and Jolaiya (2010) submitted that the predominance of many uncompleted and substandard buildings was connected to the inflation and high cost of building materials. This figures confirmed the statement of CBN (2012) that inflation is felt in the building sector of the economy by the increase in building material prices. Inflationary increases in material cost are the major cause of construction cost overruns in Nigeria.

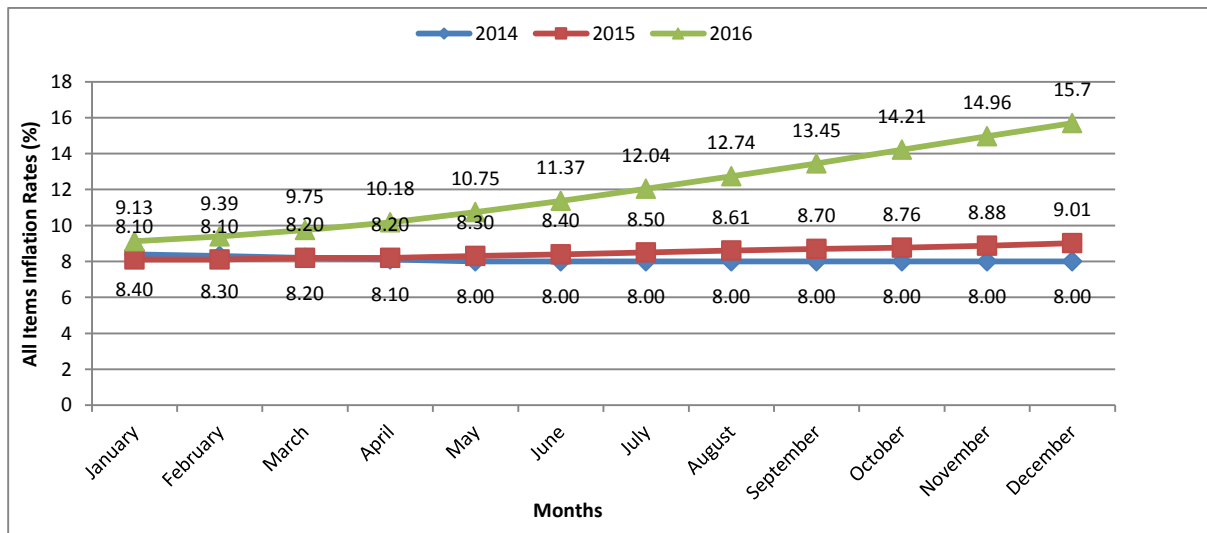


Source: Field Survey, 2016

Fig. 1: Distribution of respondents

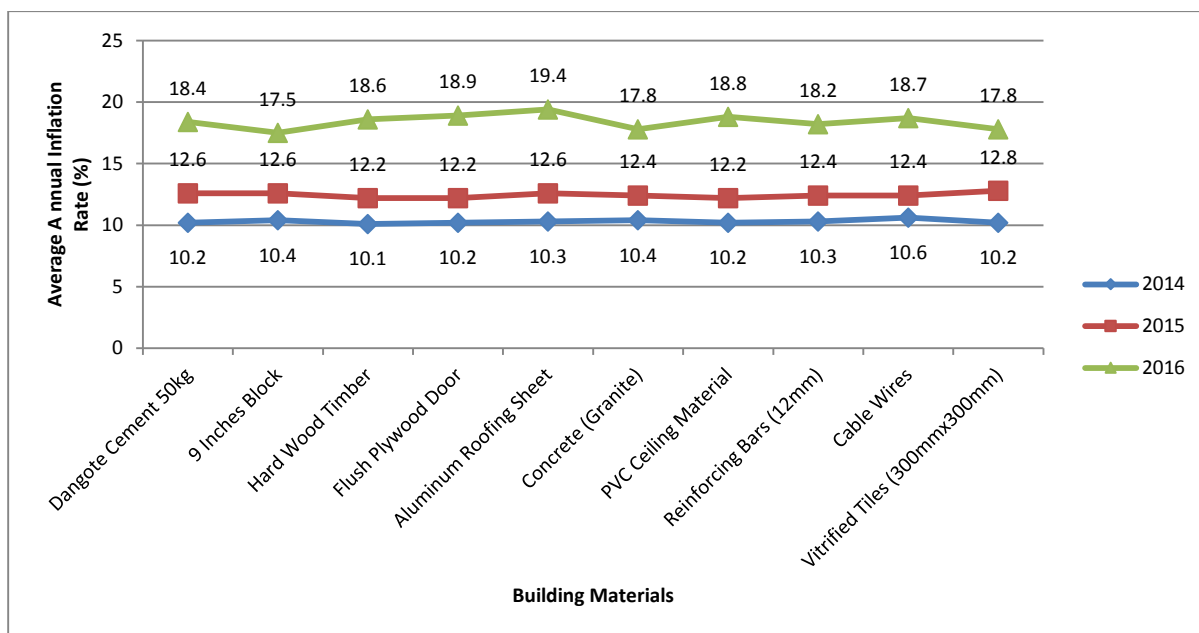
**Factors responsible for building materials price fluctuation**

Responses on factors responsible for building materials price fluctuation is shown in Table 1. Result shows that high exchange rate, high cost of petrol, and high transportation cost with mean ratings of 3.92, 3.78, and 3.66, respectively are ranked as the top three important factors responsible for price fluctuation of building materials. These findings confirmed the submissions of Jagboro and Owoeye (2004); Mojekwu, Idowu, and Sode (2013); and Idoro and Jolaiya (2010) in the factors responsible for building materials price fluctuation. Transportation was considered to be an important factor due to bad nature of roads which increases cost of material supply.



Source: <https://www.cbn.gov.ng/rates/inflrates.asp>

Fig. 2: All items inflation rates (%) (12 month average)



Source: CBN Statistical Bulletin, 2016

Fig. 3: Average annual inflation rate (%)

Table 1: Factors responsible for building materials price fluctuation

S/N	Factors Responsible for Building Materials Price Fluctuation	Variables				Total Response (Σf)	Total Point (S)	Mean Rating (S/Σf)	Rank
		LI r= 1	I r= 2	VI r= 3	MI r= 4				
1	Supply and Demand	16	39	20	135	210	694	3.30	5 <sup>th</sup>
2	High transportation cost	3	11	41	155	210	768	3.66	3 <sup>rd</sup>
3	Political instability	66	44	38	62	210	516	2.46	7 <sup>th</sup>
4	High exchange rate	2	1	9	198	210	823	3.92	1 <sup>st</sup>
5	Import duties	13	22	35	140	210	722	3.44	4 <sup>th</sup>
6	High cost of petrol	2	3	34	171	210	794	3.78	2 <sup>nd</sup>
7	Government fiscal policy on interest rate	56	21	34	99	210	596	2.84	6 <sup>th</sup>
8	The shortage of locally manufactured building materials	110	51	14	35	210	394	1.88	8 <sup>th</sup>

LI= Less Important; I= Important; VI= Very Important; MI= Most Important; r= Rating Point

Source: Field Survey, 2016

Table 2: Effects of building materials price fluctuation

No	Effect of Building Materials Price Fluctuation	Variables				Total Response (Σf)	Total Point (S)	Mean Rating (S/Σf)	Rank
		LE r=1	E r=2	VE r=3	ME r=4				
1	Low Demand	48	28	21	113	210	619	2.95	5 <sup>th</sup>
2	Economy Effect (Low GDP)	3	6	19	182	210	800	3.81	1 <sup>st</sup>
3	Effect on Real Estate Business	18	10	22	160	210	744	3.54	2 <sup>nd</sup>
4	Project Abandonment	43	14	31	122	210	652	3.10	4 <sup>th</sup>
5	Increased Unemployment	12	43	20	135	210	698	3.32	3 <sup>rd</sup>

LE= Less Effective; E= Effective; VE= Very Effective; ME= Most Effective; r= Rating Point

Source: Field Survey, 2016.

**Effects of building materials price fluctuation**

Table 2 shows responses on effects of building materials price fluctuation, which includes: low demand, economy effect (low GDP), effects on real estate business, project abandonment, and increased unemployment. Results show that the effect of price fluctuation of building materials is manifested on the economy (i.e. low GDP) which is ranked number one (1<sup>st</sup>) with 3.81 mean rating. Effect on real estate business (mean rating of 3.54), increased unemployment (mean rating of 3.32), project abandonment (mean rating of 3.10), and low demand (mean rating of 2.95) are ranked 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup>, respectively as the effect of materials price fluctuation. Effects on the economy are considered to be the most important. If fewer projects are executed, it directly affects a lot of

entrepreneurs. Its effect to businesses brings direct influence on Gross Domestic Product of the country's economy. Ayodele and Alabi (2011), Idoro and Jolaiya (2010) revealed that building materials price fluctuations have very important effect on the real estate development and project abandonment because when there is a hike in the price of building materials, a lot of projects get abandoned due to insufficient funds, thus affecting construction output and economy growth (GDP).

**Conclusion and Recommendations**

Between the periods of 2014 to 2016, there was general increase in the prices (inflation) of building materials. Import duties and exchange have influence on the prices of materials in the market. Fluctuation in prices of building materials

lowers GDP, this leads to high prices and low demand of buildings in the market, and have resounding effect on real estate business.

It is recommended that the stability in naira exchange rate should be reinforced as instability in the naira will lead to instability in material prices and subsequently affect business prospect. Efforts should be geared towards maintaining a stable inflationary trend in Nigeria. Government should take drastic steps to reduce import duties, cost of production, and transportation of materials for building and prioritize researches in the production of local building materials. Also, as a matter of policy, financial institution should be encouraged to reduce interest rate charged on facilities taken from banks or lending agencies because when interest rate is high, investment in capital projects development could be hindered. The paradigm shift by the global revolution opened up a plethora of opportunities as well as challenges. The incessant price increments should be looked into; there should be stringent measure to create the alignment between the work-practice and workplaces. The issue of price control board should be reconsidered. Driven by the global economy, Technology changes advance the course of construction and this has altered the way we work and do business which requires proactive reforms in order to respond to the changes rationally in a sustainable fashion.

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