
CONSUMERS' REACTION TO CHANGES IN THE PRICE OF RICE IN UYO, NIGERIA

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Abstract

In this paper, we examined how consumers react to the increase in the price of rice in Uyo, Akwa Ibom State. The study considered three markets: Akpan Andem, Anua, and Etuk Markets and the survey research design was adopted. A total of 156 respondents were drawn for the study, out of which 60 were from Akpan Andem Market, 56 from Anua Market, and 40 from Etuk market. The Panel Generalized Method of Moments was used in the estimation of the rice demand function. From the responses, the key influential factors to consumers' demand for rice were price and quality. From the estimated model, price exerted a negative and significant effect on rice demand while income and population exerted negative and significant effect. Based on the findings, the study recommended empowering farmers in the rice production and putting up measures to check the unscrupulous activities of middlemen in the rice market.

Keywords: Inferior Grains, Consumption Switching, Elasticity of Demand, Income, Rice

Introduction

Many Nigerians, and particularly those living in Uyo (the capital city of Akwa Ibom State), eat rice, which is a staple dietary item. The key factors that people consider when selecting their rice brand are the issue of quality and prices. Nowadays, rice buyers are more concerned with quality and regard the grain as a product that must meet specific standards in addition to being a commodity. The vast size of population and the expanding territory in which rice is consumed as a staple food are the primary causes of the high rice consumption. Consumer behaviour varies due to a number of factors, which include rice brands, price, and flavour. Also, cultural context, social status, purchasing power, motivation, and lifestyle all have a role to play (Lestari, Darma, and Aswan, 2022). This means that rice farmers have an obligation to supply rice products that satisfy customer needs, particularly those in the targeted market group.

The quality of rice is determined by several factors, including its physical and milling qualities, flavour and cooking qualities, and nutritional value. Consumers reactions to changes in prices of rice, basically regarded as 'rice demand response' (Obayelu *et al.*, 2022), is the variation in the amount of rice that consumers are willing and able to purchase in relation to their typical consumption patterns in response to changes in the price of rice, close substitutes, complementary items, household income, and a number of non-economic factors like tastes and preferences, family size, age of family members, location, shopping habits, and lifestyle choices (Adeleyonu *et al.*, 2021).

Nigerian urban markets are known for selling higher-quality imported rice, which has caused ongoing changes in customer tastes. For example, Nigerian-produced rice is rated as inferior quality and finds it difficult to compete with urban demands for rice in Nigeria that are slanted toward Asian export grade requirements (Coulibaly, Tebila, and Diagne, 2015; Fiamohe *et al.*, 2018). According to studies like Emodi and Dimelu (2012), Ogundele (2014), and Onya, Okezie, and Ejiba (2019), there is a demonstrated preference for imported rice over domestically produced Nigerian rice. According to prior studies, customers like imported rice because they believe it to possess higher-quality characteristics (Obih and Baiyegunhi, 2017).

Research indicates that customers' choice and willingness-to-pay for imported rice are reinforced by their impression that the higher price of imported rice reflects its superior quality (Akaeze, 2010). Obih and Baiyegunhi (2017) examined how customers' readiness to alter their current purchasing patterns and preferences is influenced by variations in the price and quality of rice, both domestically produced and imported. According to Obih and Baiyegunhi (2017), households with greater incomes utilize rice price as a heuristic for quality, reasoning that rice that costs more must be of higher quality. This results in a constant preference for imported rice despite higher costs and/or worse quality. Given that individuals have different tastes for quality and that rice will undergo different preparations, Nigerians now place a high value on rice grain quality. In the same way that increased demand for rice is a result of rising population growth and income levels, a number of variables appear to have contributed to the structural increase in rice consumption throughout time, with consumption spreading across all socioeconomic strata (Basorun, 2013). According to Demont *et al.* (2013), local rice does not meet expectations for less work and time spent on sorting and cooking rice because of a high percentage of impurities. As a result, it is less convenient than imported rice. This provides a fundamental explanation of the reasons that, with the exception of Mali, Guinea, and the Gambia, many nations choose to import rice than locally produced rice (United State Agency for International Development, FAO, 2000).

This preference has been ascribed to several factors, including its flavour, neatness, and ability to cook quickly in comparison to local rice (Odusina, 2008). Households are not happy with the local rice they purchase from the market, according to Emodi and Madukwe (2011), and they become tired of having to wash the rice many times and pick out stones from it. Nonetheless, there is still general recognition of the superior organoleptic qualities of local rice, even in spite of the disparity in cost and quality (Lancon *et al.*, 2003). Due to its association with fast food restaurants, ceremonies in many households, and quick and easy preparation for urban inhabitants and the working class, rice consumption has also grown as a result of urbanization (Rutsaert *et al.*, 2014).

The preference of consumers for certain qualities in rice varieties is relevant to the adoption of agricultural technologies because consumers get utility from the attributes that products give rather than the goods themselves (Lancaster, 1996). It follows that by consuming the features of the kinds that they prefer rather than the varieties that directly incorporate those chosen attributes, consumers are maximizing their household utility. To tackle the shortage between the supply of and demand for rice in Nigeria, the government has implemented several policies, initiatives, and establishments, including the Federal Rice Research Station (FRRS) in 1970, The National Cereals Research Institute (NCRI) in 1974, Abakaliki Rice Project (ARP) in 1978, The Presidential Initiative on Rice (PIR) in 1999, The National Rice Development Committee (NRDC) in 2003, and The National Rice Development Strategy (NRDS) established in 2009. Nigeria's incapacity to keep up with the exponential rise in demand relative to output raises severe concerns about food security, income inequality, and the fight against poverty. The outcome has been expressed in rising prices of rice across the country, with attendant effect of possible consumption switching among households. Thus, this paper seeks to examine how consumers in selected markets in Uyo, the Akwa Ibom State capital, reacts to increase in the price of rice over the period 2021 to 2024. The inclusion of 2024 is to capture the sudden hike in the price of rice in recent times, while the choice of the period is to ensure that consumers can be able to remember their consumption pattern for rice easily.

Literature Review

Theoretical Construct

Theory of Reasoned Action

The theory of reasoned action is a set of related ideas and theories that social psychologists have proposed and developed to explain and forecast human behaviour (Mckemoy and Sakyi-Dawson, 2000).

As one of the expectation-value models of human behaviour, the theory's nomenclature is not all that different from the well-recognized subjective expectancy utility model employed by economists (Lynne, 1995). Regarding human volitional behaviour, it is among the most important theories (Trafimor and Finlay, 2002). The foundation of the theory of reasoned action is the idea that, since they consider the facts at hand, most people act in a rational manner (Iweka and Ederewhebe, 2018). According to the theory, an individual's desire to carry out an action – or not – determines such action immediately. Behaviour is roughly equivalent to behavioural intention (Ajzen, 1988).

The relationship between an individual's belief, attitudes, norms, intention, and conduct is defined by Fishbien and Ajzen's (1975) model, which is based on a combination of the consumers' attitude toward making a purchase and the subjective norms around the activity. Although the idea of subjective norms theory acknowledges the influence that other people might have on behaviour (Solomon, Bamossy, Askegard, and Hogg, 2006), it takes into consideration other people's opinions about particular behaviours and is influenced by how much consumers are driven to agree with these opinions.

As pointed out by Miller (2005), depending on the particular consumer's inclination to care about other people's opinions, the consuming circumstance, or the product type under consideration, the relative contributions of attitudes and subjective norms in predicting behaviour may not always be comparable. An individual's intention to act in a particular way depends on their attitude toward the behaviour and how they see the societal influences to act in that way. According to this model, external stimuli can affect a person's attitude by changing the way they believe. As a result, the theory maintains that all other variables only indirectly affect conduct, if at all, by altering attitudes or subjective standards. According to Fishbien and Ajzen (1975), these elements are external variables. This model can therefore be used to explain consumers' preference for local and imported rice.

The Law of Demand

The Marshallian demand function forms the basis of the theoretical framework for this study. According to the theory, price is the major incentive for a commodity to be demanded. As such, quantity demanded is a negative function of price. The implication of this is that more quantity will be demanded at a lower price, and lower quantity will be demanded at a higher price at a given point in time. The law of demand therefore states that, all things being equal, higher quantities of a commodity will be demanded at lower prices and lower quantities will be demanded at higher prices, therefore specifying an inverse relationship between price and quantity demanded of a product. The Marshallian demand function is therefore adjusted to incorporate key variables (shift factors) that could influence demand. Such variables include the income of the household, population, prices of related commodities, taste and preferences, and seasonality. This law is also applicable in the study of the rice demand by household given the prevailing change in price.

The theory of demand can also be extended to measure both income and substitution effect arising from a change in demand given a change in price. This can be addressed using the Slutsky Equation. The income effect reflects on how demand changes due to changes in real income (purchasing power), while the substitution effect reflects on how demand changes as a result of changes in relative prices. In the case of a decline in prices, Slutsky stated that at the new prices, less income is needed to buy the original bundle then “real income” is increased; and in the case of rising prices, more income is needed to buy the original bundle, and “real income” is decreased. To keep the purchasing power constant, the consumer needs to be compensated after the price change such that the original bundle of the commodity is just affordable (Varian, 2010).

Empirical Literature Review

Some empirical studies have been conducted on rice demand across countries and regions. Marlia, Nasuddin, and Fazlen (2011) used a convenient sampling approach to randomly pick 100 customers in order to investigate the factors influencing Malaysian consumers' rice-buying behaviour. The analysis's findings indicated that the variables of particular interest that have an impact on consumers' purchasing decisions are their marital status, gender, age, occupation, number of heads of homes, and occupation. The findings also showed that characteristics of rice, such as flavour, cooking taste, cost, and location, can influence consumers' decisions over which brands to buy. Accordingly, most customers would rather buy modest qualities of domestic white rice than international ones.

Anang, Adjetey, and Abiriwe's (2011) study sought to identify the variables that influenced Tamale consumers' preferences for different rice brands as well as the qualities that had an impact on costs. A semi-structured questionnaire was used to interview 100 individuals who were chosen at random. The variables influencing customer choice were identified using the Kendall's coefficient of concordance. These preferences were examined in relation to price using the hedonic pricing model. Taste, cooking quality, cooking time, and aroma are the characteristics of rice quality that customers value the most. The characteristics like pricing, impurities, and rice source (local and foreign) that customers liked the least were listed. The consumer paid more premiums for the aroma and source of the rice, according to the hedonic price model.

In order to assess the variables influencing rice consumption in Cross River State, Agbogo, Udouso, and Tiku (2013) used 240 purposively selected data from 12 local government areas. The research employed a multi-phase sampling technique. The socioeconomic characteristics were analyzed using descriptive statistics, and the nature of the qualitative and quantitative exogenous variables was modelled using the covariance model to ascertain the financial relationship between consumption expenditure and disposable income, as well as between occupational status, preferred rice brand, and rice price. The results demonstrated how rice intake is influenced by socioeconomic factors such as age, mental health, family size, religion, and educational attainment.

David (2013) used the autoregressive distributed lag model to examine the rice acreage and output responses in Côte d'Ivoire from 1966 to 2009. The findings imply that rice farmers react more to price fluctuations of the competitive maize crop than to changes in their own prices because of the ineffectiveness of local rice industry collection, processing, and marketing, the limited involvement of different stakeholders in the creation of the rice supply chain, the majority of buyers' noncompliance with contract terms, and the surtax on producer price resulting from high transportation costs. The substantial negative relationship between rice yield and cultivated area is shown to be the cause of the production stagnation that was seen between 1988 and 2009.

Alfred and Adekayode (2014) used two randomly chosen local government districts in the state of Ondo to study consumer attitudes on local rice. Additionally, two villages were chosen from each local government district, for a total of 100 responders. First-hand information was gathered via a structured questionnaire. A correlation matrix and descriptive statistics were used to analyze the data. According to the results, 93% of respondents said they ate local rice, but just 26% said they ate more local than imported rice. The respondents' attitude indicated that they had no preference for domestic rice over rice that was imported.

Okeke, Iheanacho, and Obasi (2015) examined the factors influencing local rice consumption in Makurdi, the capital of Benue State, using data from 120 homes spread over six wards and twenty-four streets. The purpose of the study was to precisely characterize and ascertain the socioeconomic traits and inclinations about domestic and imported rice. Multi-stage random approaches were employed in the

sample selection process. The socioeconomic characteristics of local rice consumers and household preferences for imported rice were described using descriptive statistics. To find out what factors affect families' intake of local rice; multiple regression analysis was performed. The findings show that socioeconomic characteristics and the quality of local rice have an impact on family consumption of rice grown nearby.

In Imo State, Eze, Effiong, Osuji, and Maduiké (2017) assessed how customers behaved in relation to the retail price of rice. Three agricultural zones in Imo State – Owerri, Orlu, and Okigwe – provided the data. Consumers of rice at retail stores were given an interview schedule (questionnaire) to collect primary data. Both descriptive methods and the multiple regression analysis utilizing the ordinary least square (OLS) method were used to analyze the data. According to empirical findings, 63.3% of rice customers have a poor bargaining index of 0.67, which denotes a low level of consumer power over the food product. The outcome suggests that while customer negotiating power has a positive impact on pricing, the amount required of rice has a negative association with its own price.

In South-East Nigeria, Iweka and Ederewhevbe (2018) investigated the impact of rice quality on the selection of local rice. The study used correlational evidence from household consumers of rice and cross-sectional surveys, where the questionnaire was used to obtain the data needed for the study. Using purposeful non-probability sampling and stratified random sampling, a sample of 400 household rice consumers living in the five (5) South-East states of Nigeria were drawn from a limited population. Multiple regression and Pearson product moment correlation were used to test the hypothesis after the data were cross-tabulated and analyzed using descriptive statistics. Results show that customers' choice of local rice is influenced by their perception of the quality of the product.

In the context of consumers and wholesalers, Rahman (2019) investigated the variables influencing the price volatility and prospects of the rice market. Thirty rice wholesalers in Barishal, Bangladesh, and fifty consumers living in the three distinct villages were interviewed in-depth for the study. The results of this study showed that poor management and channel member syndication are the main causes of rice price fluctuations. This results in a situation where a farmer sells paddy at a lower price while a customer purchases rice at a higher price. Furthermore, the discrepancy between the supply and demand of rice is widened by natural disasters and seasonal output.

A hedonic pricing model was employed by Peterson-Wilhelm, Nalley, Durand-Morat, and Shew (2022) to determine customer preferences for quality attributes and possible market failures for rice choices among urban consumers in Nigeria. The findings showed that Nigerian rice consumers are unconcerned about chalkiness but prefer rice with uniformly long, thin kernels and little broken grains. Lestari, Darma, and Aswan (2022) investigated the relationship between cultural, social, psychological, and personal aspects and rice purchase decisions, as well as the elements that most impact consumer behaviour in Indonesia. A total of 55 purchasers of rice participated in the study, which employed an accidental sampling technique. The findings demonstrated that cultural and personal characteristics had no positive and only marginally significant influence on decisions to buy rice. In Majene, West Sulawesi, social and psychological variables influence decisions to buy rice in a favourable and substantial way. Additionally, the most important aspects affecting a choice to buy rice are personal characteristics.

Obayelu, Agbohin, and Obisesan (2022) used a sample of Oyo State households to investigate how demand responded to changes in rice prices during food price inflation in Nigeria. A total of 174 households were chosen for the study using a multi-stage selection technique. Data analysis was done using descriptive statistics and the Quadratic Almost Ideal Demand System, which accounts for the non-linear influence of changes in income. Imported long grain rice, local brown and wet grain rice, and local brown and dry grain rice accounted for more than 70% of household demand. Both the imported short

grain rice and the native short brown wet rice had expenditure elasticities that were less than one and positive, respectively, suggesting that they were both typical and essential food products.

In order to examine rice retail trader pricing behaviour in traditional markets, Feryanto, Harianto, and Herawati (2023) used an econometric model made up of six equations of price spread between the retail market level and wholesale level of various rice qualities and grades. It was decided that the simultaneous technique combined with the 3SLS methodology would yield reliable and effective coefficient estimations. The findings indicate that a price stabilization approach was used by rice sellers in the conventional market, as may be inferred from the model's behaviour of price spreads. An increase in wholesale prices was met by a decrease in the price spread. A price-averaging method was also used by rice sellers in traditional marketplaces.

Previous rice studies (Oyinbo *et al.*, 2013; Alfred and Adekayode, 2014) have concentrated on identifying the barriers to increasing domestic rice production in Nigeria. Conversely, other studies have attempted to explain the reasons behind the rise in rice consumption. In Nigerian rice-producing regions, several research evaluated consumers' inclination for local rice (Alfred and Adekayode (2014); Onu, 2018; Ekanem *et al.*, 2020; Ajayi and Ajiboye, 2020). The concern of this paper however shifts towards establishing how consumers of rice in Uyo reacts to the prevailing increase in the price of rice. As such, the aims of this paper are to examine the influential factors to consumers' preference for rice brands in markets in Uyo; to investigate the response of consumers to changes in the price of rice in markets in Uyo; and to estimate the various elasticities of demand coefficients (price, income, cross) for rice demand in markets in Uyo metropolis.

Methodology

Study Area, Sample and Survey Instrument

The coordinates of Uyo, the Akwa Ibom State Capital are 4°58'N to 5°04'N latitude and 7°51'E to 8°01'E longitude. Its northern boundary is formed by the Local Government Areas of Ikono, Itu, and Ibiono Ibom. Ibesikpo Asutan and Nsit Ibom Local Government Areas border it on the south; Uruan LGA shares its eastern boundary with it in the east; and Abak LGA borders it on the west. Around 214.31KM² make up the city's area. The population of the study consists of all rice consumers in Uyo metropolis. Due to the infinite nature of the population, we restricted ourselves in studying consumers of rice in markets in Uyo metropolis. The markets were Etuk Market, Akpan Andem Market, and Anua Market. These markets are notable for large volume of transactions and huge customers and sellers' presence. However, Akpan Andem Market has larger population followed by Anua Market before Etuk Market.

Due to the nature of this study which focused on consumers' reactions to changes in the price of rice in markets in Uyo, Akwa Ibom State, it becomes pertinent to adopt the non-probability sampling technique. This is because our interest is on only those that purchase rice during the period of investigation in the selected markets. As such, this research uses purposive sampling method. Accidental sampling is a technique of determining a random sample that is accidentally encountered by a researcher at the research site (Lestari, Darma, and Aswan, 2022). A total of one hundred and fifty-six (156) samples were selected for the study. Out of this, 60 were obtained from Akpan Andem Market, 56 from Anua Market, and 40 from Etuk Market. For the fact that required data cover the period of 2021 to 2024 (4 years) therefore gives a total of 624 cross sectional observations for each of the variables.

The research instrument used for the study is the structured questionnaire called "Consumers Reaction to Rice Price Surge Questionnaire". The instrument contains ten (10) items excluding the socio-demographic segment. Each item in the questionnaire will give us an insight towards ascertaining

consumer reactions towards the hike in food prices with special reference to rice which is a staple food in Uyo.

The Model

The model for this study is specified based on the Marshallian demand function which states that a consumers quantity demanded for a commodity at a given time is a function of its price. Thus,

$$Q_t^d = f(P_t) \quad (1)$$

Where Q_t^d is quantity demanded of a commodity at time t, and P_t is the price at time t.

To examine the reactions of consumers to the changes in the price of rice, the rice demand function is therefore specified as follows:

$$QDR_{i,t} = f(PRC_t, INC_{i,t}, POP_{i,t}, PRR_t) \quad (2)$$

Where QDR is the quantity demanded of rice by household i per unit of time, PRC is the price of rice at a given time, INC is the income of the household i at time t, POP is the population (which in this case is the number of individuals in household i at time t), and PRR is the prices of related commodities. It is worth noting that QDR is a sum of the various rice brands (foreign and local with their categories) and PRR is a vector of prices of related commodities which include prices of Spaghetti, and Garri. Equation (2) can therefore be written in a stochastic form as follows:

$$QDR_{i,t} = \beta_0 + \beta_1 PRC_t + \beta_2 INC_{i,t} + \beta_3 POP_t + \beta_4 PSP_t + \beta_5 PGR_t + \mu_t \quad (3)$$

Where PSP is the price of Spaghetti and PGR is the price of Garri. Since our interest is on the elasticities, the appropriate functional form to be employed is the double-log function (see Gujarati, 2003). As such, Equation (3) is further written as follows:

$$\ln QDR_t = \ln \beta_0 + \beta_1 \ln PRC_t + \beta_2 \ln INC_t + \beta_3 \ln POP_t + \beta_4 \ln PSP_t + \beta_5 \ln PGR_t + \mu_t \quad (4)$$

Where $\ln$ is the natural log, β_0 is the intercept of the demand function which is expected to be positive ($\beta_0 > 0$), $\beta_1 - \beta_4$ are the partial slope coefficients with $\beta_1 < 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, and β_4 and $\beta_5 > 0$ since the commodities are close substitutes. However, the case of the commodities involved (Spaghetti and Garri) are somewhat substitutes which therefore requires that $\beta_4 > 0$ and $\beta_5 > 0$.

Technique of Data Analysis

The data obtained from the survey will be presented in both tables and figures. Also, the Panel Generalized Method of Moments technique of analysis will be adopted to empirically examine how consumers react to changes in the price of rice. The selected approach will aid in the computation of elasticities to check the consumers' responses in a data combining both time series and cross-sectional properties.

Findings and Discussions

Respondent's Socio-Demographic characteristics

The socio-demographic characteristics of the respondents include gender, age, marital status, educational attainment, employment status.

Percentage distribution of respondents by gender

Out of a total of seventy-eight (78) respondents, about 40% were male while about 60% were female. The pictorial representation is given in Figure 1.

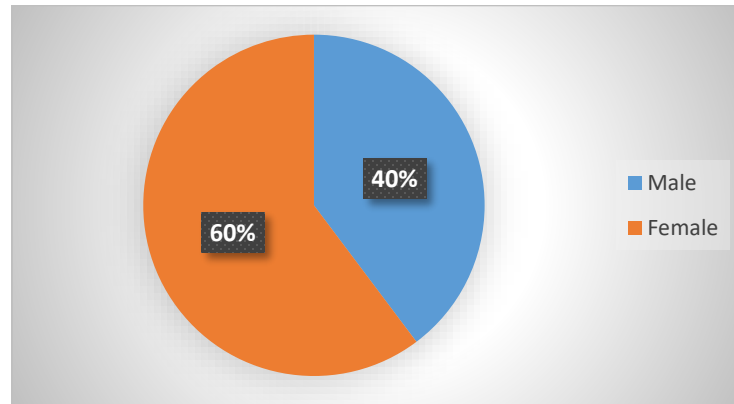


Figure 1: Summary of respondents by Gender

A total of sixty-two (62) respondents were male while the remaining ninety-four (94) were female. Thus, female constituted a greater proportion of the respondents in this study. The reason is not far-fetched since female are more involved in domestic activities compared to their male counterparts.

Percentage distribution of respondents by Age

The respondents within the age bracket of 20 to 29 years constituted the major participants in this study. This is captured in Figure 2.

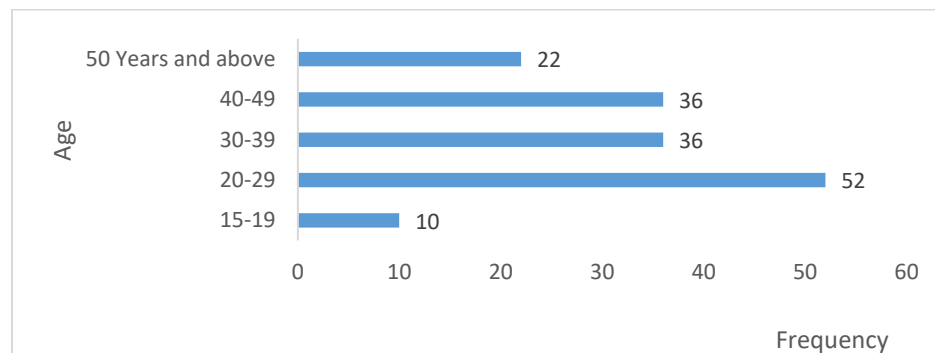


Figure 2: Summary of Respondents by Age

Individuals within the age bracket of 20 to 29 years constituted about 33.33% of the total respondents which was followed by those within the age bracket of 30 to 39 years and 40 to 49 years which both individually accounted for 23.08% of the total respondents.

Percentage distribution of respondents by Area of Residence

Three areas of residence – urban, semi-urban, and rural – were identified. The constitution of respondents from these three categories is presented in Figure 3.

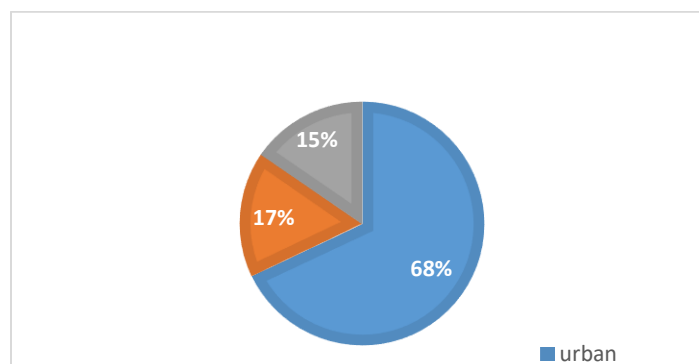


Figure 3: Summary of Respondents by Area of Residence

While those in the urban area constituted 68% of the total respondents, accounting for a total of one hundred and six (106) respondents, those in the semi-urban and rural areas constituted 15% and 17% of the total respondents respectively. Therefore, those in the urban area accounted for a significant proportion of the samples selected for the study.

Percentage distribution of respondents by Highest Educational Attainment

It is clear from Figure 4 that those with WASSC/SSCE constituted the highest proportion, 35.90%, of the samples selected for the study. This is followed with HND/BSc holders which constituted 29.49% of the total respondents for the study.

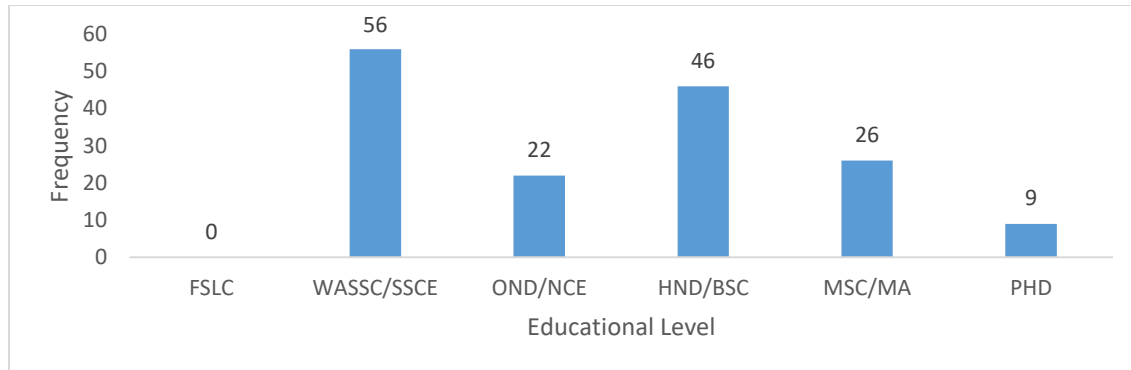


Figure 4: Summary of Respondents by Highest Educational Attainment

Percentage distribution of respondents by Employment Status

Going by employment status, the individuals that are employed constituted a significant proportion of the respondents (51.28%) followed by students with 30.77%. Out of the 156 respondents, 80 were employed, 48 were students, 18 were retired, and ten were unemployed.

This is presented in Figure 5.

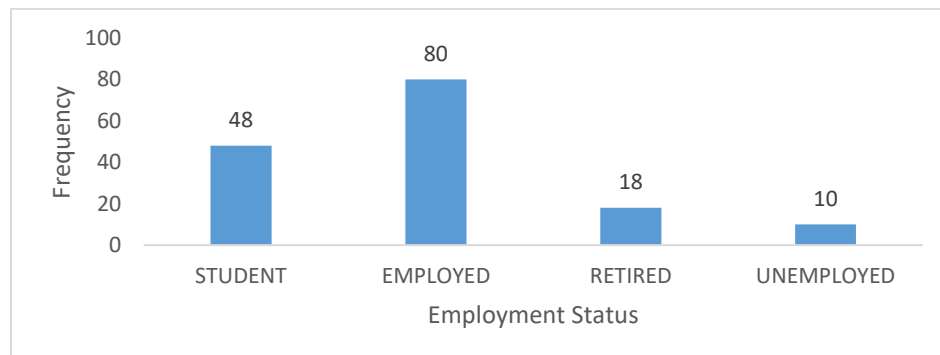


Figure 5: Summary of Respondents by Employment Status

Percentage distribution of respondents by Marital Status

The married category which was 86 out of the 156 respondents accounted for 55.13% of the total respondents in the study. Figure 6 therefore presents information about all the categories. While the married individuals accounted for a greater proportion of the respondents by marital status, this was followed by the single (unmarried) individual which accounted for 30.77% of the total respondents. The divorced accounted for 7.69% while the widowed accounted for 6.41% of the total respondents.

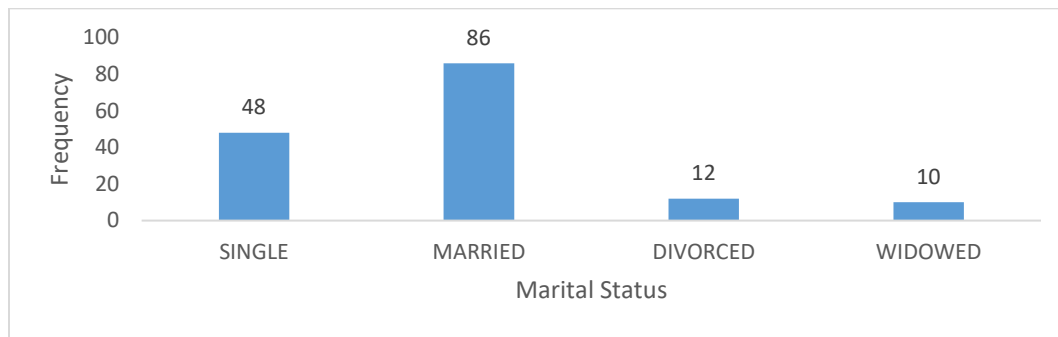


Figure 6: Summary of Respondents by Marital Status

Consumer Behaviour towards Demand for Rice

Frequency of Purchase of Rice

The frequency of purchase of rice have been presented in six categories. Figure 7 presents the dormant purchasing frequency by individuals. It is clear from Figure 7 that a greater proportion of individuals purchase their rice once in a week. This constituted about 30.77% when compared with other purchasing options. This was followed by monthly purchase and 'three to four times a week' purchase which individually accounted for 25.64% each for the two categories.

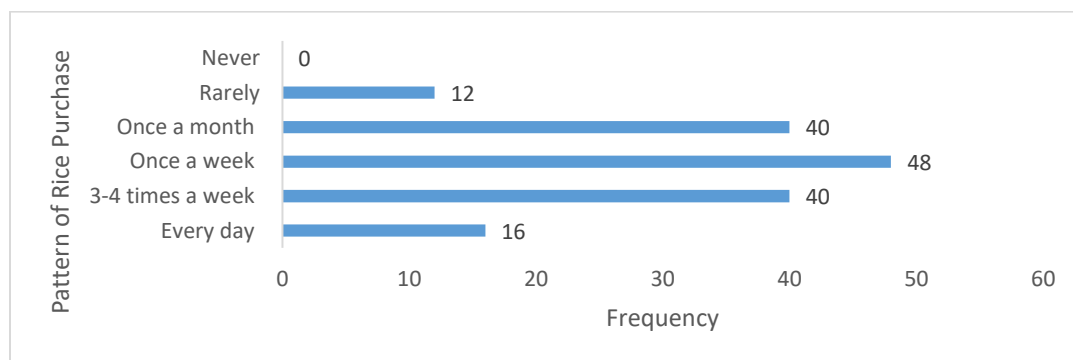


Figure 7: Frequency of Rice Purchase

Consumer's Perception on the Price vs Quality of Rice

Based on the information from the respondents, Figure 8 presents consumers' perception about the price relative to the quality of rice in the market. It can be noted from Figure 8 that majority of the respondents believed that rice in the market has the desired high quality however, they attract a considerably higher price. Thus, it can be noted that quality is not the problem, but the rising prices.

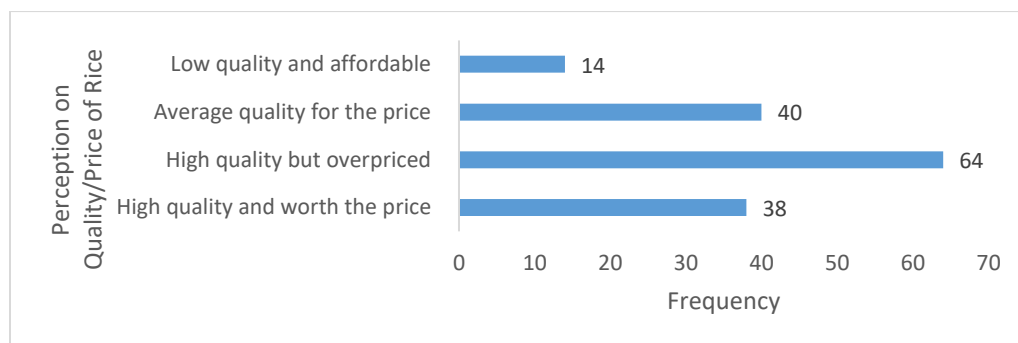


Figure 8: Perception on Quality vs Price of Rice in the Market

Factors that Determine Consumer's Preference for Rice Brands

The instrument specified six key factors including price, taste, stickiness, cooking time, and quality. The responses are presented in Figure 9.

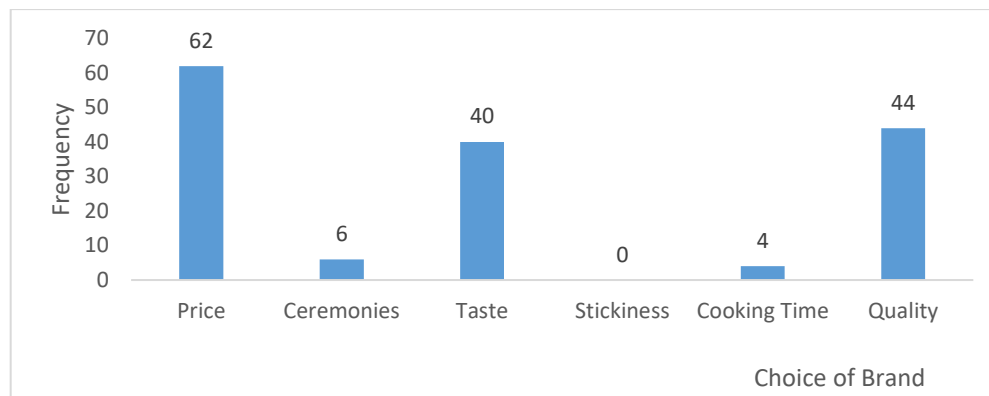


Figure 9: Key determinants of demand for various rice brands

The key determinant here is the price which constituted 39.74% of the responses followed by quality with 28.21%. This further validates earlier result where high quality but overpriced was the major perception of the consumers.

Possibility of Switching to Inferior Grains or Alternatives

Since there are various rice brands, there is possibility for consumers to shift their preference given some underlying factors. Figure 10 presents the perception of the consumers on this regard. It could be observed from Figure 10 that a greater proportion of the respondents (48.72%) are likely to switch to other inferior grains given the rising price of rice in the markets. This is made possible through the product differentiation (various brands) that are prevailing in the market with different prices. A very little proportion (7.69%) are very unlikely to shift their preference to inferior grains.

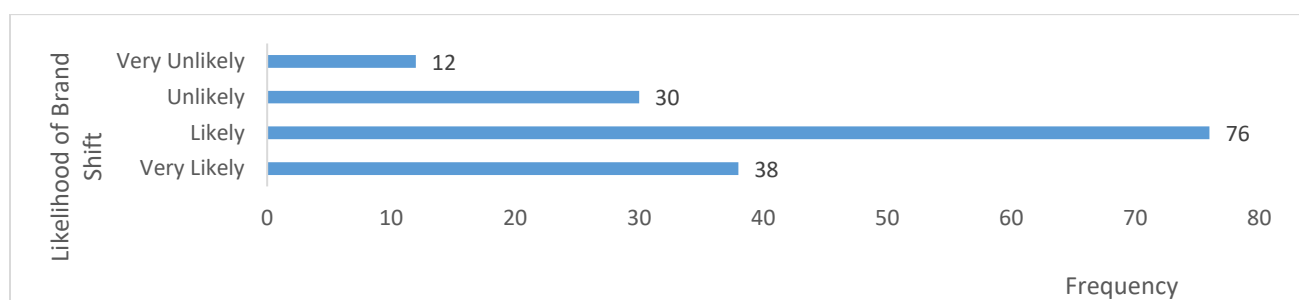


Figure 10: Possibility of demand shift to inferior grains.

Consumer's Attitude towards Adapting to the Increase in the Price of Rice

The responses of consumers of rice to the increase in price is presented in Figure 11. The information presented in Figure 11 portrays that majority of consumers revert to finding cheaper alternatives to rice (41.03%) given the price increase. This therefore points to the possibility of substitution in the demand of rice. This was followed by consumers' reduction in the consumption of rice (39.74%). However, 16.67% of the respondents are likely to budget for higher prices to purchase rice.

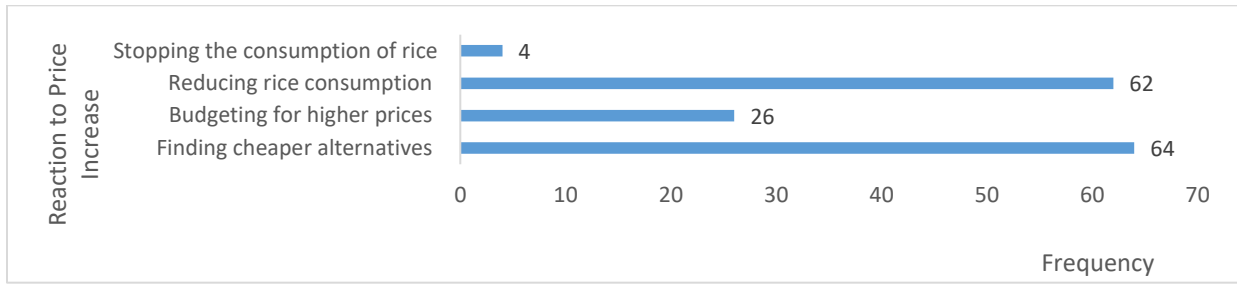


Figure 11: Consumers reaction to increase in the price of rice.

The Model Estimation

Table 1: Panel Generalized Method of Moments Regression Result.

Dependent Variable: lnQTR				
Method: Panel Generalized Method of Moments				
Instrument specification: lnC lnPRC lnINC lnPOP lnPSP lnPGR				
Constant added to instrument list				
Variable	Coefficient	Standard Error	t-Statistic	Probability
lnPRC	-1.6991	0.4290	-3.9606	0.0002**
lnINC	0.4686	0.0598	7.8361	0.0000**
lnPOP	0.2174	0.0767	2.8336	0.0050*
lnPSP	0.3398	0.2613	-1.3000	0.1949
lnPGR	1.6279	1.0381	1.5681	0.1182
lnC	6.9614	1.5989	4.3538	0.0000**
R-squared	0.8973	Mean dependent var		4.2818
Adjusted R-squared	0.8606	S.D. dependent var		0.8040
S.E. of regression	0.3002	Sum squared residual		20.6422
Durbin-Watson statistic	1.8277	J-statistic		0.0000
Instrument rank	83			

Note: * and ** denotes significance at 5% and 1% level, respectively.

Source: Researcher Computation.

To establish the effect of influential factors on quantity demanded of rice in Uyo, the Panel GMM result is presented in Table 1. The result presented in Table 1 was rearranged to obtain the following linear demand function for rice in Uyo, Akwa Ibom State:

$$\ln\widehat{QTR}_{i,t} = \ln 6.9614 - 1.6991\ln PRC_t + 0.4686\ln INC_{i,t} + 0.2174\ln POP_{i,t} + 0.3398\ln PSP_t + 1.6279\ln PGR_t \quad (5)$$

The demand function portrays that there is a negative relationship between quantity demanded of rice and its price. This is in agreement with the law of demand which opines that there exists an inverse relationship between quantity demanded and the price of a commodity. The validity of this law in this case is because rice is a normal good. The coefficient for the price-quantity relationship portrays that a 1% increase in the price of rice will lead to a 1.6991% decrease in the quantity demanded of rice. The coefficient of price elasticity of demand for rice is therefore given as follows:

$$e_{prc} = \frac{\partial \ln QTR}{\partial \ln PRC} = \beta_1 = -1.6991$$

It follows that change in the quantity demanded of rice increases at a rate more than the change in price. Thus, the demand for rice is price elastic since e_p in absolute term is greater than unity. This is a clear case that consumers will likely switch their consumption of rice for other related commodities in the market. It is also obtainable from the rice demand function that income exerts a positive and significant effect on the demand for rice in Uyo. The positive income effect is a validation of the fact that rice is a normal good since a rise in income is associated with a rise in its quantity demanded. It is evident that a 1% increase in the income of the household is associated with a 0.4686% increase in the demand for rice. The income elasticity of demand for rice is therefore given as follows:

$$e_{inc} = \frac{\partial \ln QTR}{\partial \ln INC} = \beta_2 = 0.4686$$

The positive income elasticity of demand for rice is an indication that rice is a normal good whose quantity will likely increase with the increase in income of the household. The effect of increase in income on the demand for rice is less than proportionate though positive. That is because as income increases, the purchases/demand for other commodities will also be increased. All the budgetary expansion will be accommodated within the income increase meaning that most of the commodities will have income elasticity coefficient that is positive be less than unity. The population is noted to exert a positive and significant effect on the quantity demanded for rice. The population elasticity of demand is given as follows:

$$e_{pop} = \frac{\partial \ln QTR}{\partial \ln POP} = \beta_3 = 0.2174$$

It portrays that an increase in the number of households will lead to an increase in the demand for rice. Thus, households with greater number of individuals will demand for more quantity of rice to satisfy them. The population elasticity is inelastic and reflects that a 1% increase in the population will lead to a 0.2174% increase in the quantity demanded of rice.

The effect of prices of other commodities on the quantity demanded of rice is also considered. This is to help us ascertain the cross elasticity of demand. For commodities like Spaghetti, there is a positive cross elasticity of demand as shown below:

$$e_{c1} = \frac{\partial \ln QTR}{\partial \ln PSP} = \beta_4 = 0.3398$$

The positive cross elasticity coefficient portrays that rice and spaghetti are weak substitutes. Thus, an increase in the price of Spaghetti will cause for greater quantity of rice being demanded. However, the cross elasticity of demand in this case is insignificant which could be due to the fact that Spaghetti and rice are not very close substitutes. In the case of the cross elasticity of demand between rice and Garri, the estimated coefficient is positive but statistically insignificant as shown below:

$$e_{c2} = \frac{\partial \ln QTR}{\partial \ln PGR} = \beta_5 = 1.6279$$

The positive coefficient portrays that consumers can substitute rice for Garri if the price of Garri changes. Thus, an increase in the price of Garri will cause consumers to consume more of rice and less of Garri while a price decline will generate the opposite effect. Based on the explanatory power of the model, the R-squared portrayed that the explanatory variables in the model were able to explain about 89.73% of the total variation in the quantity demanded of rice by the residents of Uyo in Akwa Ibom State. This represents a good fit of the regression model. The explanatory power remains high (86.06%) after being adjusted for the degree of freedom as captured by the adjusted R-squared.

Discussion of Findings

The result of the study has portrayed the fact that consumers are likely to respond negatively to price increase in rice. Such responses in quantity demanded for rice are likely to exceed the percentage of the price increase. Therefore, the demand for rice is price elastic. This is made possible because consumers can switch their consumption to other commodities to adjust their dietary needs. Consequently, a rise in the price of rice will either cause consumers to resort to inferior rice grains or related commodities. The established effect collaborates with the findings of Anang *et al.*, (2011), Rahman (2019), and Feryanto *et al.* (2023).

It has also been established that income plays a crucial role in the rice demand function. A higher level of income will be associated with higher demand for rice. The positive effect of income establishes the fact that rice is a normal commodity since increase in income will lead to an increase in quantity bought. However, the increase in income does not yield the same level of increase quantity demanded of rice on a one-to-one basis. The implication here is that consumers will spread any increase in income to capture other commodities which are necessary for the household. Consequently, the budget expansion through an increase in income will not generate an increase in quantity demanded by the same amount. Our established findings align with previous studies by Agbogo *et al.* (2013), Alfred and Adekayode (2014), Obayelu *et al.* (2022).

The population size (reflecting the household size) also positively influenced the demand for rice. The implication of this is that large household size is likely to demand for more quantity of rice compared to smaller household size. Thus, the household size can cause an outward shift in the demand function in the case of large size and vice versa. Studies like Okeke *et al.* (2015), Iweka and Ederewhevbe (2018), Peterson-Wilhelm *et al.* (2022), and Lestari *et al.* (2022) have also stressed the role of demographic factors in the rice-demand relationship.

Both the price of spaghetti and the price of gari were observed to exert a positive and but insignificant effect on the quantity demanded of rice. This is a clear case that both spaghetti and gari are weak substitutes for rice. Hence, a total substitution will not be possible in the midst of rising prices in the rice market.

Conclusion and Recommendation

Rice is one of the notable food items of households in Nigeria in general and Akwa Ibom State in particular. Being a major household staple food, the increase in its price will likely generate some reactions by households to meet up their dietary needs. As such, the essence of this paper was to check how consumers in Uyo responded to such changes in the price of rice. A structured questionnaire was utilized for the study which responses were derived from one hundred and fifty-six (156) respondents which cut across notable markets (Akpan Andem Market, Anua Market, and Etuk Market). While figures were utilized to capture the key determining factors of consumers' preference for rice brands and their responses to changes in the price of rice in markets, the Panel Generalized Method of Moments was utilized to estimate the rice demand function. Key findings of the study included that the price and quality of rice are the key determining factors for rice brands in Uyo. Also, it was observed that consumers will react to the increase in the price of rice by switching to inferior grains or alternatives. From the estimated demand function, it was observed that demand for rice is price elastic, with higher prices causing a reduction in quantity demanded. It was further observed that both household income and household size are positively related with the demand for rice. Thus, an increase in household income or household size will call for more quantity of rice being demanded. From these findings, it is therefore concluded that consumers shift their preference to inferior rice grains since price exerts a significant influence on quantity demanded. It is

therefore recommended that price stability in the rice market is crucial in order to curb consumption switching. This can be achieved by setting up price control board which checks the unscrupulous activities of unionism in the rice market.

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