PRICE RESPONSIVENESS AND CLASS SUBSTITUTION OF WHITE AND YELLOW GARRI IN ABAKALIKI METROPOLIS OF EBONYI STATE

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Abstract
The increasing price volatility and variations of food commodities is now a common phenomenon. However, the responsiveness of consumers to price and class substitution of the commodity seems not to have received scholarly attention. A combination of purposive sampling technique involving systematic approach was used to select 90 respondents for the study. Primary data were collected with the aid of structured questionnaire. Both descriptive and inferential statistics were used to analyse the data generated. The results showed that price exerted significant effect on the consumption of white and yellow garri in Abakaliki metropolis as the coefficient of price of both yellow and white garri were positively signed and significant at 1% (P = 0.01) level; and the F-ratios were 286.891 & 392.869 for yellow and white garri respectively. The result further indicated that 58.9% of the respondents patronized white garri while 41.1% of them patronized yellow garri. The class analysis revealed that there exist four classes of garri consumers in the area which individual analysis showed that white garri was mainly consumed by students (41.5%) and farmers (30.2%) while, civil/public servants (48.7%) were the major consumers of yellow garri. The result showed that the consumption of white garri was influenced by organoleptic, health and economic factors while organoleptic, health and social factors influenced yellow garri consumption. The coefficient of price elasticity of demand for white garri was 0.7, implying that it is inelastic while that of yellow garri was 1.3, signifying elastic. The study recommended improving the organoleptic quality of white garri so as to make it compete favourably with yellow garri.

Keywords: Garri, class, organoleptic, demand, elasticity and substitution

Introduction
The response of agricultural commodity to relative price changes is crucial to understanding the effects of price policies and policy reforms that influence agricultural prices of agricultural output. These policies have been employed either to spur agricultural production and efficiency or to achieve some social goal, or both. However, most occasions of their use have been without prior knowledge of the extent of their effect on consumers' demand (Rahman and Yunus, 1993). An understanding of demand and supply response to prices and other economic factors is critical for developing sound policy, especially when the policy is specifically related to food consumption. In many cases, the relevant aspects of price responsiveness are summarized in terms of elasticity, and the quality of policy analysis is contingent on the quality of the available elasticity estimates. Policymakers have proposed a variety of tools to address the problem, including taxes and subsidies on food (Adamy, 2009; Chan, 2008). Several studies that address price responsive related policies use estimates of elasticity of demand with respect to price and expenditure from the literature to quantify the effects of actual or hypothetical changes in food prices or expenditure/income (Cash, Sunding and Zilberman, 2005; Schroeter, Lusk and Tyner, 2008). Several studies have estimated demand systems for food to determine whether the impacts of price and substitution on food consumption vary among consumers' class groups or between food stamp programme participants

and others (Raper, Wanzala and Nayga, 2002; Yen, Lin and Smallwood, 2003). Other studies use elasticity of demand for food in equilibrium displacement models of the food sector to determine how farm policy may affect food markets and how such price changes may affect economic welfare (Okrent, 2010). Standard demand theory analyzes the choice behaviour of an individual who gains utility or satisfaction from consuming goods and services given a limited budget set that is determined by exogenous prices and expenditure (Mas-Colell, Whinston, and Green, 1995). It assumes that consumers have complete information about the choices available and that they use this information to catalog and evaluate their choices prior to selecting goods or services to consume. The consumer chooses a utility-maximizing bundle of goods that are obtainable in the market. This traditional model of consumer behaviour provides the foundation for developing statistical models of demand and price responsiveness (Okrent and Alston, 2011). Garri like other food commodities undergo similar evaluation from consumers.

Garri is the most popular West African staple food produced from cassava. It is a fermented and roasted granular produce from cassava which hitherto was considered a poor man's food until recently (Afolabi, 2009). It constitutes over 70% of total cassava consumption in Nigeria (Ezeh, Anyiro, Obioma and Maduagwu, 2012). Garri is one of the staple food items consumed in Nigeria, which by implication suggests that garri is eaten by every family irrespective of their socio-economic status and religious background. This means that the demand for garri cut across class, ethnicity, religion and socio-economic background. Garri commands much interest and gets a considerable preference on the household's daily budget. It has now been elevated to an urban convenience food, cheap and readily source of vital energy. It is consumed as processed or reconstituted with hot water to give a dough-like paste called *eba*, which is consumed with sauce. Garri is commonly consumed either as a paste made with hot water and eaten with soup or by soaking in cold water with sugar, coconut, roasted peanut, fish, boiled cowpea as complements. Phillip *et al*. (2004) argued that garri has assumed a position of a true national food with urban market presence. It appears to be a "food of choice" even in the face of alternative food options in urban area (Maziya-Dixon *et al*., 2004). It is mainly produced for domestic markets but presently some of the product is finding their ways to emigrant Nigerian communities in United States, Europe and other parts of the world (Dipeolu *et al*., 2001).

Garri is a versatile commodity because its organoleptic characteristics can be adjusted to conform to consumer specifications. However, Olagunju, Babatunde and Salimonu (2012) observed that the main arguments against garri include its bulky starch content which can be augmented during processing or consumption. They further noted that garri should be consumed with animal or plant protein accompaniments or protein enriched diets to boost its protein content (from 1-2 to 91.2%) (Sanni and Sobamiwa, 1993). Garri is therefore, the most developed, convenient and storable commodity from cassava. Garri can be process at a small, medium or large scale levels (Sanni, 1991) but in Nigeria, women are mostly involved in small scale garri processing for economic gains. However, recent advancement has led to changes from "traditional processing method with little or no mechanization at subsistence level" to "commercial small-scale processing using essential mechanized equipment" (Olagunju *et al*., 2012). The essential equipments are available in various parts of West Africa markets (Ajibefun, 2002). The processing of garri begins with the harvesting of fresh cassava tubes, peeling, grating, dewatering, fermentation (optional), sieving, frying and ends in bagging. This process usually gives white or creamy white garri while addition of palm oil prior to dewatering will add yellow colour to garri known as "yellow garri". Olagunju *et al*. (2012) noted that yellow garri is preferred to white garri and most times cost twice as much as the price of white garri, making it less available to poorer households. As the intensity of competition in

garri trade has increased, so has the importance of differentiation of garri among processors. There are important differences in the quality of garri produced and sold at different markets. Consequently, differentiation has the potential to be a competitive factor in determining price responsiveness and class substitute of garri. These differences vary by regions and result from cumulative effects of tradition in agronomic practices, and variety of cassava-release, regulations, marketing, trading practices, and climate (Wilson and Gallagher, 1990). Due to these differences and the intensity of competition, institutions and policies influencing garri quality have increasingly come under public scrutiny in recent time.

Price is important both to garri consumers, processors and marketers. Effective price responsive markets curb the overall volatility of garri prices and provide rapid response to possible conditions of change. Price responsiveness is the key tool used to unlock these benefits for both garri consumers and marketers. Ogazi (2009) noted that responsiveness of consumers to price and non-price incentive or disincentives provides a clear picture of contribution of agricultural sector to the economy. This depends often on the responsiveness of domestic agricultural production to price in particular. He further deduced that the measurement of agricultural price responsiveness is a valid means of assessing the impact of economic policy reforms, in the view that policies which provide good incentives always bring high supply response while those that act as disincentives are unlikely to do so. Prices of garri products vary greatly across areas and this may be due to transportation and communication difficulties, rather than defects in the pricing system (Reuben and Mshelia, 2011). In a study of price fluctuation of maize and guinea corn in Adamawa State, Nigeria, Taru *et al.* (2010) opined that some of the factors influencing price fluctuation are inadequate storage facilities, speculative activities of middlemen, vicious cycle of production and insufficient supply of produce in the market. Echebiri and Edaba (2008) posited that exploitation practices of middlemen in the food marketing chain are the reasons for high volatility of food prices.

Garri as a food commodity has certain factor characteristics and preferences which influence the demand for the products. These factors influence the purchasing decision of consumers such as organoleptic features as colour, taste, aroma, texture, physio-chemical and hydrogen cyanide (HCN) residues. Ezedinma and Oti (2001) maintained that the traditional methods of cassava processing into garri are often contaminated with undesirable extraneous matters that make them unhygienic, thereby affecting its' demand and consumption. These factors have functional relationship with garri price responsiveness and class substitution by products. In other words, the quality of garri determines its acceptability and competitiveness in the market. Evidence however, had shown that food demand in Nigeria has not kept pace with the increasing population. National Bureau of Statistics (NBS) in 2002 reported that the annual growth rate of the food sub-sector is 2.0 percent while the annual population growth rate is 3.3 percent. This presupposes that a wide gap existed between supply and demand of food in Nigeria. The seasonality of agricultural products causes price instability. Evidence has shown that periods of surpluses are usually supplanted by periods of scarcity. This vagary in the price variable cause unpredictable fluctuations in the demand and supply of factors of agricultural products such as garri. Despite the economic and nutritional importance of garri, it is still unclear whether price responsiveness and class substitution influence the demand and consumption of white and yellow garri in Abakaliki metropolis of Ebonyi State due to absent of documented evidence. There is therefore the need for empirical evidence to fill the gap. To address the problem, the study categorized the consumers of garri in Abakaliki metropolis; analysed the factors that influenced the consumption of white and yellow garri; determined the effect of price on the consumption of the products in the area with a view of determining their elasticity,

Methodology
The study was carried out in Abakaliki urban metropolis of Ebonyi State which lies on latitude 4'N and longitude 8'E. The area covers two Local Government Areas - Abakaliki and Ebonyi and is delineated into seven (7) zones, namely: Kpiri-kpiri area, Abakpa main market area (town centre), rice mill area, Hausa quarters, Timber Shed area, New Layout area and Azugwu. According to National Population Commission Census of 2006, about 151,723 out of which 72,443 are males and 79,280 are females were residing in the area. The area is generally on the plane land with some hills found in Abakaliki urban such as the Juju hill. The major markets in the metropolis are: Abakpa main market, Meat market, Kpiri-kpiri market, Rice mill market, Eke-Aba food stuff market, among other small food commodity markets scattered all over the State. Garri is a common commodity sold across these markets. A combination of purposive and systematic sampling techniques was used to select 90 garri consumers. Purposively three major markets - Meat market, Kpiri-kpiri market and Rice mill market where garri products are marketed in large proportion in the metropolis were selected. From the selected markets, 30 consumers of garri were systematically selected to give a total of 90 consumers. Data for this study were collected from the primary source only. The data were sourced directly from the consumers of garri with the aid of a structured questionnaire that was administered to the 90 sampled respondents as interview schedule. The study applied both descriptive and inferential statistics to achieve the objectives of the study. Specifically, objective one was realised using descriptive statistics such as mean, percentage and frequency distribution. Objective two was actualized using factor analysis. Finally, objective three was achieved using simple regression analysis and was further subjected to elasticity analysis.

Results and Discussion
This section presents the analysis and discussions of the data analysis inline with the objectives of the study which include categorization of the consumers of garri in Abakaliki metropolis; analysed the factors that influenced the consumption of white or yellow garri; determining the effect of price on the consumption of the products in the area with a view of determining their elasticity.

Categorizing Garri Consumers
This section examines the class of households that demand white and yellow garri in the metropolis. The class considered here is based on the primary occupation of the sampled respondents. The result of this analysis is presented in Table 1.

Table 1: Category and Cross-tabulation of Consumers Garri

Type of Garri	Frequency (N=90)	Class of consumers	Type of garri	
			White	Yellow
White garri	53(58.9)	Students	22(41.5)	6(16.2)
Yellow	37(41.1)	Civil/public servants	7(13.2)	18(48.7)
		Farmer	16(30.2)	3(8.1)
		Business	8(15.1)	10(27.0)

Source: Field Survey, 2017.

The result in Table 1 shows that 58.9% of the sampled respondents patronized white garri while 41.1% of them patronized. This implies that white garri is the most widely consumed which is not unconnected to the lower cost of white garri, making it more affordable than yellow garri that cost almost twice the cost of white garri. Moreover, considering that large proportion of the respondents

are low income earners with low purchasing power; they will certainly prefer cheaper product such as white garri to satisfy their desire. This is in conformity with the findings of Ingawa *et al.* (2008) and Olagunju *et al.* (2012) who reported that yellow garri cost twice as much as the price of white garri thus, making it less available to poorer households. Meanwhile, further classification of the consumers of the two garri categories revealed that there exist four classes of garri consumers in the area. These consumers include the students, civil/public servants, farmers, and business men. Individual analysis revealed that white garri was mainly consumed by students (41.5%) and farmers (30.2%) while, civil/public servants (48.7%) were the major consumers of yellow garri. From the result, it was obvious that low income earners and dependents such as farmers and students go for white garri which is unarguably because it is cheaper while medium income earners such as civil and public servants, business individuals and artisans patronage both white and yellow garri products. Ingawa *et al.* (2008) also confirmed that yellow garri is more expensive than white garri in south eastern Nigeria.

Factors Influencing the Consumption of White or Yellow Garri
Factor analysis was used to determine individual factors that influenced the consumption of white or yellow garri in Abakaliki metropolis. The purpose was to identify new factors or variables that loaded high, which will be used in naming each extracted factor. Kaiser (1958) developed a simple rule of thumb, that the variables with coefficients of (0.40) or more can be considered in naming a factor. The rule has been generally applied. The results as shown in Table 2 identified three major factors influencing the consumption of white or yellow garri respectively. It was observed that the organoleptic and economic factors were the major factors influencing the consumption of white garri as that of yellow garri was influenced by organoleptic, health and social factors. Meanwhile, individual analysis of these factors revealed that the organoleptic factors that influenced the consumption of white garri are taste, flavour, and colour. The identified economic factors that influenced the consumption of white garri are the price and availability of the product. On the other hand, the identified organoleptic factors that influenced the consumption of yellow garri are the flavour, colour, and granular size. The study further identified storability, health advice, and nutritional content as the health factors that influenced the consumption of yellow garri. Lastly, the identified economic factors that influenced the consumption of yellow garri are availability, attractiveness, and neatness.

From the result, it was evident that while organoleptic and health related factors influenced the consumption of both white and yellow garri respective in Abakaliki metropolis, economic factor which influence white garri does not have influence on yellow garri rather social factor had influence on yellow garri consumption in the study area. Olagunju *et al.* (2012) submitted that garri is a versatile commodity because of its organoleptic characteristics such as flavour, colour and taste, thus making easy to be adjusted into consumers' specification. Meanwhile, standard demand theory analyzes the choice behaviour of an individual who gains utility or satisfaction from consuming goods and services given a limited budget is determined by exogenous prices and expenditure (Mas-Colell, Whinston, and Green, 1995). It assumes that consumers have complete information about the choices available and that they use this information to catalog and evaluate their choices prior to selecting goods or services to consume. The consumer chooses a utility-maximizing bundle of goods that can be observed in the market. This traditional model of consumer behaviour provides a foundation for developing statistical models of demand and price responsiveness (Okrent and Alston, 2011). White and yellow garri like other food commodities undergo similar evaluation from consumers. Consumers' preferences are affected by the level of education, life experiences, information, advertising and so on.

Table 2: Varimax Rotated Factor Matrix on Factors Influencing the Consumption of White and Yellow Garri

Factors	White Garri			Yellow Garri		
	Factor I Organoleptic	Factor II Health	Factor III Economic	Factor I Organoleptic	Factor II Health	Factor III Social
Taste	0.656	-0.254	0.108	-0.168	-0.934	0.104
Cost	-0.446	0.066	0.539	-0.405	-0.287	0.383
Flavour	0.907	-0.023	-0.059	0.950	0.250	0.148
Colour	0.770	0.201	-0.490	0.893	-0.088	0.304
Storability	0.055	0.043	0.245	-0.555	0.639	0.048
Availability	0.065	0.057	0.608	0.260	0.355	0.696
Health advise	0.297	-0.892	0.172	0.006	0.750	0.062
Nutritional purpose	-0.161	0.068	-0.209	-0.326	0.919	0.036
Attractiveness	0.114	0.148	0.375	-0.056	-0.115	0.935
Neatness	0.210	0.094	0.094	0.168	-0.084	0.745
Granular size	-0.057	0.042	0.300	0.922	0.019	-0.079

Source: SPSS Analysed Field Data, 2017

Effect of Price on Consumption of White and Yellow Garri

A simple regression analysis was used to determine the effect of price on the consumption of white and yellow garri respectively in Abakaliki metropolis. Summary of the result is presented in Table 3. The result of analysis showed that the coefficient of determination (R^2) for white and yellow garri was 0.603 and 0.525. This implies that 60.3% and 52.5% of the total variation observed in the consumption of white and yellow garri respectively was sufficiently explain by changes in price of the products. The F-ratios for white and yellow garri were high (392.869 and 286.891) respectively and the standard error of the estimates were quite low (0.33443 and 0.78646), signifying the good fit of the model. The overall models were statistically significant ($P < 0.05$), implying that the price exert significant effect on the consumption of white and yellow garri respectively in Abakaliki metropolis. The coefficient price of white garri was positively signed and statistically significant at 1%. This means that any unit increase in the price of white garri will trigger-off corresponding increase in the consumption of the product. In other words, increasing price will lead to increase consumption of white garri in the area. This is contrary to the basic hypothesis of demand which states that the "higher the price, the lower the demand" and versa visa provided all things are equal. This fall short of the a priori expectation, however, the phenomenon could be attributed to the essential nature of white garri especially to low income earners because of its lower cost. White garri is very popular staple food among the poor households in Nigeria (Afolabi, 2009). Hence, it could be inferred that white garri exhibits inelastic behaviour.

However, the coefficient of yellow garri shows negative sign but was statistically significant at 1% level of probability. This suggests that any unit increase in the price of yellow garri will decrease the consumption of the product. The fact that yellow garri costs as much as twice the cost of white garri explains the elastic characteristic of this commodity (Ingawa *et al*., 2008; Olagunju *et al*., 2012). This is in line with the *a priori* expectation and obeys the theory of demand that higher price will cause lower demand and versa visa. Nonetheless, the result shows that prices of both products are important determinant of demand for white and yellow garri in Abakaliki metropolis as evidently shown by the high level of significance.

Table 3: Effect of Price on Consumption of White Garri and Yellow Garri in the Study Area

Variable	White garri			Yellow garri		
	Coefficient	Std Error	t-value	Coefficient	Std Error	t-value
Constant	0.567	0.033	17.372*	0.526	0.086	6.106*
Price (X_1)	0.372	0.019	19.821*	-1.086	0.064	-16.938*
R	0.709			0.652		
R^2	0.603			0.525		
Adj. R^2	0.502			0.424		
Std. error est.	0.33443			0.78646		
F-ratio	392.869			286.891		
Coefficient of elasticity of white garri			*0.7*	*Inelastic*		
Coefficient of elasticity of yellow garri			*1.3*	*Elastic*		

Source: SPSS Analysed Field Data, 2017

* indicates significance at 1% level of probability.

Conclusion

Based on the findings of this study, it was concluded that while price responsiveness of white garri was inelastic, that of yellow garri was elastic. By implication, the study indicates that any change in price of yellow garri could lead to class substitution of the commodity with white garri and any other substitute commodity. However, any changes in the price of white garri will not lead to corresponding change in quantity demanded by the consumers. The cheaper price of white garri explains this phenomenon. Based on the findings of the study, the following recommendations have been put forward: Government should intensify the cassava production initiative to bridge the gap between demand and supply of the commodity. This will help to stem the tides of price instability and fluctuation of garri commodity. The processors of garri should improve the organoleptic quality of white garri so as to make it compete perfectly with yellow garri and close the wide price differential between white and yellow garri.

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