PRICE ELASTICITY OF DEMAND FOR FISH BY RURAL HOUSEHOLD IN OYO STATE, NIGERIA

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ABSTRACT

Large proportion of rural households lack adequate protein intake in quality and quantity. The estimation of elasticity of demand for fish by rural households in Oyo State, Nigeria, was investigated. Respondents were selected using multistage sampling procedure. Thirty percent of the Local Government Areas (LGAs) were selected. Proportionate sampling technique was used to select 125 households from 20 villages each from water and non-water body strata. Structured questionnaires were used to collect data on socio-economic characteristics, income and price elasticity of demand for fish in Oyo State. Fish expenditure data were collected quarterly, also information on socio-economic characteristics of households, income and of fish type and quantities of fish consumed. Data collection covered dry and rainy seasons. Data was analyzed using Quadratic Almost Ideal Demand System (QUAIDS) at $\alpha_{0.05}$. The QUAIDS regression result for income elasticity of demand for marine fish was (1.31) and captured fresh water fish (1.30) were higher than cultured fish (0.49) during dry season. The own price elasticity of marine (-3.09), cultured (-1.25) and captured fresh water fish (-2.45) were elastic during dry season while in rainy season marine (-0.61), cultured (-0.49) and captured fresh water fish (-0.62) were inelastic. The cross price elasticity showed that marine and cultured (-0.51 and -0.47), cultured and captured fresh water fish (-1.09 and -0.33) were complements while marine and captured fresh water fish (2.93 and 0.53) were substitutes in both seasons. Estimates of income and price elasticity for fish (marine and capture) are income elastic and significant at 5% significant level. Price elasticity for marine and captured fishes was perfectly inelastic with estimates of -1.75 and -1.19 respectively using Marshallian (uncompensated) own price elasticity. The Hicksian (compensated) own price elasticities showed elastic trend for marine fish while both culture and capture fish species are inelastic. The result showed that marine fishes are a luxury irrespective of the season while cultured fishes are necessity irrespective of the seasonality condition but captured fishes remained a luxury during the entire sample and during the dry season but a necessity during the rainy season. Household demand for fish in Oyo State is high but further awareness should be encouraged in meeting the exploitation level for fish demand and its importance in the state.

Keywords: Price elasticity, Captured and cultured fish, Rural household, QUAIDS

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INTRODUCTION

Nigeria is endowed with many large rivers, man-made lakes, creeks and about 200 nautical miles of marine water under the Exclusive Economic Zone (EEZ) (Raji *et al*., 2010). The extent to which Nigerians face the protein shortage problem calls for an urgent solution. Global surveys revealed that nearly one billion people mostly in developing countries (including Nigeria) are chronically undernourished, lacking sufficient food to live healthy and active lives (Addo, 2005). A healthy and nutritionally well-fed population is indispensable for attaining economic growth and development objectives of a nation, yet there have been persistent reports of widespread malnutrition among Nigerians.

One of the greatest problems confronting a large proportion of rural households today is lack of adequate protein intake both in quality and quantity. At present, protein consumption falls short of the recommended protein intake of 65g of protein per day as recommended by WHO (Amao *et al*.,2006). This has implication on the general well-being and health of the population. Evidence abounds in the literature indicating that Nigerians are inadequately fed. This, it is believed to be due mainly to the high cost of animal protein needed for growth and development. (Kushwaha *et al*., 2007).

Consequently, FAO (2007) reported that, many rural dwellers are malnourished and a lot are undernourished. The report further stress that food intake of majority of rural dwellers is mainly carbohydrates (such as rice, maize, cassava) and low proportion of other important nutrients like protein, minerals and vitamins. Protein malnutrition is still wide spread in Nigeria affecting vulnerable groups. These include infants, pre-school children, pregnant and nursing mothers and adults particularly from low-income households (Amao *et al.*, 2006). Most of the proteins consumed in Nigeria are from plant sources because of their relative cheapness (Mafimisebi, 2008). Thus, there is low consumption of high-quality animal proteins and pervasive protein deficiency problems nationally. This has necessitated the on-going campaign for increased in-take of high-quality animal proteins which can be more cheaply sourced from fish (Agbogidi and Okonta, 2011).

The popularity of fish as a source of animal protein in Nigeria has been aptly shown by some researchers (Ojo, 2008, Omorinkola, 2011 and Mafimisebi, 2012), who reported that fish, in usually small quantity, is an important component of the high carbohydrate diets in low-income households who, because of income constraints, cannot afford other more expensive sources of animal protein. Although the problem of protein deficiency is both a demand and supply issue, over the years, several programmes and policies have been put in place to ensure availability of fish products but the problem of protein deficiency still persists particularly in rural areas.

A number of factors have been adduced for the short fall in protein intake in Nigeria (Mafimisebi, 2012). Chief among these is poverty while others include ignorance, inadequate preservation and processing technologies and cultural/religious beliefs. Fish constitutes an important component of many Nigerian dishes with a projection of an annual consumption rate of about 2.35 million metric tons (Adewumi and Fagbenro, 2010). This high consumption value has been traced to the wide availability and relative cheapness of fish in comparison with other protein sources. Fish contains a high level of protein (17-20%) with an amino acid profile similar to that of land animals (Evangelos, *et al*., 2012). However, fish consumption of rural households in Nigeria is still below the required standard of 54 and 46 grams per day for the average man and woman respectively. Most low-income households assume that fish is meant for the adult members of the family; hence, nutrition problems still persist most especially among the young ones. Recent surveys showed that one out of five persons is undernourished and that hunger, malnutrition and serious health problems are still inherent in many parts of Nigeria (Adeniyi *et al*., 2012).

The greatest challenge facing policy makers in Nigeria is how to improve household food intake. This is in terms of the quality and quantity of diet as well as to address the problem of nutritional imbalance of the teeming population of the country (Abdulahi, 2009). Thus, understanding the demand side of the issue is imperative because availability does not guarantee accessibility. The problem of malnutrition implies a need to understand those factors militating against access to fish products especially in Oyo State. However, there has been no empirical research finding that has compared fish consumption in rural households based on water and non-water body and seasons (dry and rainy) of Oyo State. This was the motivation for this study, which looked at the estimated elasticity of demand for fish in Oyo State. Hence, the study on the income and price elasticity of demand for fish consumed by rural households in Oyo State.

METHODOLOGY

The target population for the study comprises of rural households in the water body and non-water body communities of the rural areas across the ADP zones of Oyo State. Primary data were used for the study and well-structured questionnaires were administered to the respondent households as a major tool for the survey. It was designed to record responses to specific questions on rural households' demand for fish in Oyo State. To determine the income and price elasticity of demand for fish consumed by rural households in Oyo State, a multistage sampling system was employed to obtain the sample size for the study. In the first stage, 30% of the local government in the four zones of ADP in Oyo State was selected from the existing 33 local governments to make a total of 10 dominantly rural local governments sampled. Five blocks were selected from each of the stratum (water body and non-water body blocks) using simple random sampling method for selection of non-water body blocks while purposive sampling method was used to select water body blocks, (because of prevalence of water bodies adjacent to the villages in the study areas) in the four administrative zones of Oyo State ADP. The second stage of the selection process involved simple random sampling of 20 villages from the non-water bodies, while random selection of 20 villages was selected on basis of proportionate to size from the water body. In the third stage, proportionate sample 0.24% and 0.19% were used to select 125 households from both the water and non-water body villages thus making a total of 250 households. The number of sampled respondents was obtained using the formula below:

$$n_h = \frac{N\text{h}}{\text{N}} \text{ x n}$$

Where n_h = estimate number of households in the local government of the sample population;
N_h = population of household per zone
n = sample population.

The analysis was estimated using the Quadratic Almost Ideal Demand System (QUAIDS) model developed by Banks *et al* (1997), which has budget shares that are quadratic in log total expenditure, is an example of the empirical demand systems that have been developed to allow for this expenditure nonlinearity. The QUAIDS model is estimated using maximum likelihood (ML), with theoretical restrictions of adding-up, homogeneity and symmetry imposed during estimation. The empirical specification of the QUAIDS budget share equations is given as follows:

$$\mathbf{w_i} = \boldsymbol{\alpha_i} + \sum_{J=1}^{j} \gamma_{ij} Inp_j + \beta_i In\left[\frac{m}{a(p)}\right] + \frac{\lambda_i}{b(p)}\left\{In\left[\frac{m}{a(p)}\right]\right\}^2 + \sum_{s=1}^{L} \delta_{is} z_s + \varepsilon_i \text{ - - - - - (ii)}$$

The following restrictions were economically imposed to ensure integrability of the demand system (Moro and Sckokai, 2000):

$\sum \alpha_i = 1, \sum \gamma_{ij} = 0, \sum \beta_i = 0, \quad \sum_i w = 1$ ………….. (ii)
(Adding up); simply require that the household does not spend more than its total budget. (i.e.
$\sum Y_{ij} = 0$ (Homogeneity)

$Y_{ij} = Y_{ji}$ (Symmetry)

Following Banks et al (1997), we simplify the expressions for the elasticity formulas by using the intermediate results: By taking the first differential of equation (ii)

$$\mu_i = \frac{\partial w_i}{\partial l_n m} = \beta_i + \frac{\partial \lambda_i}{b(p)} \left\{ l_n \left[\frac{m}{a(p)} \right] \right\}$$ - - - - - - - - - - - -(iv) Expenditure elasticity.

$$\mu_{ij} = \frac{\partial w_i}{\partial l_n p_j} = \gamma_{ij} - \mu_i \left(\alpha_j + \sum_k \gamma_{jk} l_n P_k \right) - \frac{\lambda_i \beta_i}{b(p)} \left\{ l_n \left[\frac{m}{a(p)} \right] \right\}^2$$ - - - (v) Price of own and cross price elasticities.

We arrive at the following to estimate expenditure and price elasticities. In terms of the μ_i, the formula for expenditure elasticities can be written as: $\boldsymbol{e_i = 1 + \frac{\mu_i}{w_i}}$

The expression for the Marshallian or uncompensated price elasticities can be written as:

$\boldsymbol{e_{ij}^u = \frac{\mu_{ij}}{w_i} - \delta_{ij}}$

Where δ_{ij} is the Kronecker delta taking the value $\delta_{ij} = 1$ if $i = j$ and $\delta_{ij} = 0$ if $i \neq j$. The Hicksian or compensated price elasticities are obtained from the Slutsky equation: $\boldsymbol{e_{ij}^c = e_{ij}^u + w_j e_i}$

RESULTS AND DISCUSSION

Seasonality Analysis of Income Elasticity of Demand for Fish consumed by Rural Household in Oyo State: The income elasticity of demand is the relative responsiveness of quantity demanded to changes in income (Adamu, 1996). On seasonality ground, both dry and rainy seasons were considered while water-body and non-water body were the two environmental factors necessary. Table 1 presents the seasonality of income elasticity of demand for fish consumed by rural households in Oyo State.

The table (Table 1) shows that in relation to the seasonality factors, the income elasticity obtained for dry and rainy seasons are highly revealing as it suggests that marine fish and captured fish with 1.31 and 1.30 elasticity respectively are luxury during the dry season. The cultured fish, with elasticity coefficient of 0.49 is a necessity during the rainy season, only marine fish (with 1.30 elasticity) is a luxury while both culture and capture fresh water fish species are necessities with 0.85 and 0.84 elasticity coefficient respectively. According to Dey, (2000), due to the seasonality in supply of different fish species, it is possible that all types of fish will not be consumed in particular period. This according to Goletti (1992) implies that fish is a luxury commodity for the poor and a necessity for the rich. It is important to note that the conclusion reached during the dry season converges with that of the entire sample; it however, differs significantly from that of the rainy season. These similarities between the entire and dry seasons and dissimilarities between the entire sample and rainy seasons are all significant because the Z-statistics values are all greater than its critical value counterparts at the five percent level of significance (using 1.96 as the rule of thumb).

Uncompensated Own-price Elasticity (Marshallian) on Seasonality Condition: The implication of these findings is that marine fishes are a luxury irrespective of the season while cultured fishes are necessity irrespective of the seasonality condition but captured fishes remain a luxury during the entire sample as during the dry season but a necessity during the rainy season. On the whole, seasonality, factors/conditions are a serious factor for consideration in the income elasticity of demand for fishes by rural households in Oyo State.

The seasonality with respect to price elasticity of these fishes; considering compensated for and uncompensated for circumstances were evaluated as shown in Table 2.. For the uncompensated Marshallian Own-price elasticity, it is evidenced that the demand behavior of the rural households to changes in prices of these fishes, if compensated for by the government through subsidy or rebate, remain same for all seasons. This is so, in that signs of own-price elasticity are negative for marine (e_{11}), cultured (e_{22}) and captured (e_{33}) fishes. These signs are also significant at the 5% level since all z-statistics value is greater than the critical values of 1.96. (Table 2). This study is in line with Awoyemi *et al.,* (2006) who reported a negative own price elasticity for fish for Urban households in Ogbomoso, Nigeria.

The implication of the elasticity below is that an increase in the price of cultured fishes, left compensated for, results in a more than proportionate reduction in the quantity demanded of this fish by rural households in Oyo State. However, this situation is not sustained in entire sample season and the rainy season as the quantity demanded of cultured fish tend to reduce/decrease less proportionately to its price increase.

On the other hand, the situations of marine, cultured and captured fishes remain same all through the dry and rainy seasons with the price elasticity of these fishes remaining perfectly inelastic all the way. An increase in the marine, cultured and captured fishes left the rural households with no other choice than to consume the same quantity as ever before. This is because, a higher proportion of children are expected to increase average per capital consumption of fish (Dey, 2000).

Nonetheless, will this elasticity remain same or will the rural households behave differently in relation to quantity demanded of these fishes due to increase in its prices if government compensated for the increase in price with subsidy or rebate? This question will be appropriately answered with the analysis of Hicksian Own-price elasticity under the periods of normal, dry and rainy seasons, (Table 3).

Compensated Own-Price Elasticity (Hicksian) Demand of Seasonality Conditions: The compensated own-Price elasticity (Hicksian) demand of seasonality conditions is as shown in Table 3 below. As rightly observed, the elasticity obtained, given the fact that the government compensated for increases in prices of fish through subsidy and rebate, indicate that no substantial difference if the rural households were to totally bear the brunt of an increasing prices. This according to Amao *et al.,* (2006) stated that for the past 15years, fish has enjoyed an explosive increase in demand around the world; a demand that has also boosted its price. Unlike the uncompensated situation however, where the elasticity under the rainy season were all significant at the 5 percent levels, the case of cultured fish under the compensated circumstance is the only one significantly at 5.22 z-values while those of marine and captured fishes are insignificant at the 0.89 and 1.80 absolute values of z-statistics, (Table 3). These imply that the elasticity for these latter fishes cannot be taken too seriously for policy suggestions.

In conclusion, seasonality factors do not also seriously matter for the price elasticity of fishes in rural households in Oyo State, both for the compensated and uncompensated conditions. As such, the demand for fishes due to increase in its price are not affected either by rainy or dry season; irrespective of whether government compensated for this price or not. This according to (Ye, 1996), agree that factors that closely affects fish consumption is disposable income of individual households.

Additionally, it is imperative to examine how the rural households in Oyo

State respond to the demand in any other fishes due to changes in the price of other ones. To do this, the cross elasticity of demand under the seasonality conditions of dry and rainy season will provide us with a better understanding, giving the compensated and uncompensated circumstances.

Table 1: Seasonality of income elasticity of demand for fish consumed by rural households in Oyo state

Fish Type	Dry Season Coeff.	Z-value	Nature of Fish Elasticity	Rainy Season Coeff	Z-value	Nature of Fish Elasticity	Entire Sample Estimate	Z-value	Nature of Fish Elasticity
MF (e_1)	1.31 (0.17)	7.65 (0.00)	Elastic	1.30 (0.13)	9.99 (0.00)	Elastic	1.31 (0.00)	11.79 (0.00)	Elastic
CFish (e_2)	0.49 (0.13)	3.78 (0.00)	Inelastic	0.85 (0.15)	5.82 (0.00)	Inelastic	0.67 (0.11)	6.33 (0.00)	Inelastic
CFWF (e_3)	1.30 (0.21)	6.30 (0.00)	Elastic	0.84 (0.13)	6.72 (0.00)	Inelastic	1.02 (0.11)	9.06 (0.00)	Elastic

Source: Extracted from Estimated Quaids Model, (2017).
Coeff. = Coefficient; MF = Marine fish; CF = Cultured fish; CFWF = Captured fresh water fish.
Note: Figures in parenthesis are standard error and probabilities value (P>/Z/)

Table 2: Uncompensated Own-price Elasticity (Marshallian) on Seasonality Condition

Fish Type	Dry Season Coeff.	Z-value	Nature of Fish Elasticity	Rainy Season Coeff.	Z-value	Nature of Fish Elasticity	Entire Sample Estimate	Z-value	Nature of Fish Elasticity
MF(e_{11u})	-3.09 (0.31)	-9.93 (0.00)	Elastic	-0.61 (0.26)	-2.36 (0.02)	Inelastic	-1.75 (0.21)	-8.38 (0.00)	Elastic
CF(e_{22u})	1.25 (0.14)	8.90 (0.00)	Elastic	0.49 (0.13)	3.89 (0.00)	Inelastic	0.77 (0.09)	7.90 (0.00)	Inelastic
CFWF(e_{33u})	-2.45 (0.36)	-6.73 (0.00)	Elastic	-0.62 (0.19)	-3.12 (0.00)	Inelastic	-1.19 (0.19)	-6.33 (0.00)	Elastic

Source: Extracted from Estimated Quaids Model 2017. Coeff. = Coefficient; MF = Marine fish; CF = Cultured fish; CFWF = Captured fresh water fish. ***Note:*** *Figures in parenthesis are standard error and probabilities value (P>/Z/)*

Table 3: Compensated Own-Price elasticity (Hicksian) demand of seasonality conditions

Fish Type	DSE	Z-value	Nature of FE	RSE	Z-value	Nature of FE	Entire Sample	Z-value	Nature of FE
MF (e_{11c})	-2.77 (0.30)	-9.25 (0.00)	Elastic	-0.22 (0.24)	-0.89 (0.38)	INE	-1.39 (0.19)	-7.00 (0.00)	Elastic
CF (e_{22c})	1.38 (0.15)	9.30 (0.00)	Elastic	0.71 (0.14)	5.22 (0.00)	INE	0.95 (0.10)	9.08 (0.00)	INE
CFWF (e_{33c})	-2.17 (0.35)	-6.15 (0.00)	Elastic	-0.35 (0.19)	-1.80 (0.07)	INE	-0.92 (0.18)	-4.99 (0.00)	INE

Source: Extracted from Estimated Quaids Model 2017. Coeff. = Coefficient; DSE = Dry season elasticity; FE = Fish Elasticity. RSE = Rainy season elasticity; MF = Marine fish; CF = Cultured fish; CFWF = Captured fresh water fish; INE = Inelastic. *Note: Figures in parenthesis are standard error and probabilities value (P>/Z/).*

Hicksian (Compensated) Cross-Price Elasticity of Demand for Fishes in Rural Households in Oyo State under Seasonality Conditions: This is as shown in Table 4. The estimates obtained (Table 4) suggests that the cross price elasticity are properly signed on account of interchangeable elasticity of the fishes (that is, e_{12c} and e_{21c}; e_{13c}; e_{31c}; e_{23c} and e_{32c}). As such, it implies that marine and culture fishes (proxied as e_{12c}) are complement as well as culture and marine fishes (proxied as e_{21c}); marine and captured fishes (proxied as e_{13c}) are substitute as well as captured and marine fishes (proxied as e_{31c}), while the cultured and captured fishes (proxied as e_{23c}) are complement as well as captured and cultured fishes (proxied as e_{32c}). This implies that Hicksian cross price elasticity for all products are substitutes for each other. This is inconformity with the work of Asche and Bjorndal (1999), that commodities are related as substitutes or complements depending on the sign.

Table 4: Hicksian (Compensated) Cross-Price elasticity demand of fish species in rural household in Oyo State under seasonality conditions

Variable	Dry Season Elasticity	Z-value	Nature of FE	Rainy Season Elasticity	Z-value	Nature of FE	Entire Sample	Z-value	Nature of FE
e_{12c}	-0.51 (0.17)	-2.96 (0.00)	Complement	-0.47 (0.12)	-3.76 (0.00)	Complement	-0.34 (0.12)	-3.13 (0.00)	Complement
e_{13c}	2.93 (0.27)	10.88 (0.00)	Substitute	0.53 (0.19)	2.67 (0.00)	Substitute	1.48 (0.17)	8.94 (0.00)	Substitute
e_{21c}	-0.43 (0.16)	-2.69 (0.00)	Complement	-0.48 (0.17)	-2.94 (0.00)	Complement	-0.30 (0.18)	-2.58 (0.01)	Complement
e_{23c}	-1.09 (0.17)	-6.54 (0.00)	Complement	-0.33 (0.13)	-2.49 (0.01)	Complement	-0.78 (0.11)	-7.36 (0.00)	Substitute
e_{31c}	3.37 (0.31)	10.84 (0.00)	Substitute	0.48 (0.19)	2.54 (0.01)	Substitute	1.52 (0.17)	8.84 (0.00)	Substitute
e_{32c}	-1.55 (0.21)	-7.27 (0.00)	Complement	-0.23 (0.11)	-2.11 (0.04)	Complement	-0.80 (0.11)	-7.51 (0.00)	Complement

Source: QUAIDS Model Output, 2017. FE = Fish Elasticity.
Note: Figures in parenthesis under elasticity are standard error while figures under Z-statistics are probabilities; P>/Z/.

Marshallian (Uncompensated) Cross-Price Elasticity Demand of Fishes in Rural Household's in Oyo State under Seasonality Conditions: The elasticity obtained under the Marshallian uncompensated cross-price elasticity demand, (Table 5) are as good as that obtained for the Hicksian counterpart (Table 4 above). However, the elasticity for marine and captured fishes (proxied as e_{13u}) as well as captured and marine fishes (proxied at e_{31u}) are insignificantly substitute under the rainy season condition but otherwise (i.e. highly significant) for the dry and normal (i.e. entire sample) seasons.

The implication of these findings is that, the compensation efforts of the government or any designed authority to leave the rural household on the same consumption level of fishes in Oyo State is relatively substantial as there is no marked difference between two scenarios.

It also implies that: the behaviour of rural households on consumption of these fishes is not significantly different across the tripartite periods of normal, dry and rainy season, except for that of the marine and captured fishes (entire sample) under the rainy season. Ma, *et al.*, (2004) reported a negative and less than one own price elasticity for fish. This result also shows the same trend for cultured and marine fishes.

CONCLUSIONS AND RECOMMENDATION

- The demand for fish was price elastic during the dry season but was inelastic during the wet season. This showed that seasonality factor or conditions are a serious factor for consideration in the income elasticity of demand for fishes by rural households in Oyo State.
- Price positively influenced demand for fish species in both seasons.
- The prices of fish species were inelastic since varieties of fish were available for household's demand.
- The uncompensated own-price elasticity (Marshllian) on seasonality condition revealed that Marine fishes are luxury irrespective of the

season while cultured fishes are a necessity irrespective of the seasonality condition and that captured fresh water fish species remain luxury during the entire sample season but a necessity during the rainy season.

- The compensated own-price elasticity (Hicksian) demanded, showed that seasonality factors do not seriously matter for the price elasticity of fishes in rural households in Oyo State, both for compensated and uncompensated conditions.
- Household demand for fish protein in Oyo State is high since a variety of fish is available from marine, cultured and captured water bodies.
- There is need to examine how the rural households in Oyo State respond to the demand in any other fishes due to changes in the price of other ones.

Table 5: Marshallian (Uncompensated) Cross-Price Elasticity Demand of Fish Species in Rural Household in Oyo State under Seasonality Conditions

Variable	Dry Season Elasticity	Z-value stat.	Nature of FE	Rainy Season Elasticity	Z-value stat.	Nature of FE	Entire Sample	Z-value	Nature of FE
e_{12u}	-0.88 (0.16)	-5.41 (0.00)	Complement	-0.81 (0.12)	-6.57 (0.00)	Complement	-0.69 (0.10)	-6.60 (0.00)	Complement
e_{13u}	2.65 (0.28)	9,52 (0.00)	Substitute	0.11 (0.19)	0.57 (0.06)	Substitute	1.13 (0.17)	6.71 (0.00)	Substitute
e_{21u}	-0.54 (0.17)	-3.21 (0.00)	Complement	-0.74 (0.19)	-3.91 (0.00)	Complement	-0.48 (0.13)	-3.71 (0.00)	Complement
e_{23u}	-1.19 (0.18)	-6.79 (0.00)	Complement	-0.59 (0.14)	-4.34 (0.00)	Complement	-0.95 (0.11)	-8.40 (0.00)	Complement
e_{31u}	3.06 (0.32)	9.40 (0.00)	Substitute	0.23 (0.20)	1.14 (0.26)	Substitute	1.25 (0.18)	6.90 (0.00)	Substitute
e_{32u}	-1.91 (0.20)	-9.52 (0.00)	Complement	-0.45 (0.11)	-4.22 (0.00)	Complement	-1.08 (0.10)	-10.45 (0.00)	Complement

Source: QUAIDS Model Output 2017. FE = Fish Elasticity.
Note: Figures in parenthesis under elasticity are standard error while figures under Z-statistics are probabilities; P>/Z/.

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