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Price Transmission along Value Chain for Frozen Fish in Ibadan

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Abstract

The study analysed the price transmission along value chain for frozen fish in Ibadan.. Multi-stage sampling technique was used to select 105 respondents. Data for the study were collected by means of structured questionnaire from market intermediaries (distributors, wholesale and retailers) along the three product flow channels exists for the fish marketing in the area. The analytical technique used include descriptive statistics, gross margin models, multinomial logit model and double log regression model for price transmission elasticities. The result showed that females dominated both at the wholesale and retail levels while the men dominated the distributors' level. The mean age was 46.33±13.4 years for the distributors, wholesale and retailers respectively. Majority (70%) of the marketers were married for all the three categories with an average household size of six persons. The distributors had the highest gross margin (N 28,090,415) followed by wholesalers (N 363,663) and finally by retailers (N 65,711). The number of cartons sold per day were the only factor that determines the choice of market by correspondent and there was a significant relationship between the price of retailers, wholesalers and distributors' price. Highest elasticities of price transmission occur red between the distributor and the wholesale level. All price transmission elasticities were significant.

Keywords:
Price transmission, value chain, frozen fish

Introduction

Price transmission refers to the effect of prices at one end of a market on prices at other ends of a market. It is generally measured in terms of the transmission elasticity, defined as the percentage change in the price at one end of a market given a 1% change in the price at the other end of the market (Minot, 2011). Thus price transmission is important from the welfare point of view (Meyer and Cramon–Taubadel, 2004). The adjustment of price shocks along the chain from producer to wholesaler and to retail levels, and *vice-versa* is an important characteristic of the functioning of markets. As such, the process of price transmission through the supply chain has long attracted the attention of agricultural economists as well as policy makers. An implication of this asymmetry in price transmission, if it exists, is that price of policy reform, because the reduction in farm prices might not be immediately or fully transmitted to the final consumers (Aguero, 2004).

It should be noted that market power might be an important explanation for any evidence of asymmetries in price transmission, but it may not be the only casual factor that is incomplete or asymmetric price transmission may take place for a number of reasons such as market structures and it cannot simply be concluded that presence of asymmetric price transmission implies market power (Vavra, 2005).

Materials and Methods

Data were collected through field survey using a well-structured questionnaire administered to selected 105 respondents in the study area – Oyo State. The questionnaire was designed to collect data on socioeconomic characteristics of the respondents such as, age, gender, marital status, household size, level of education, number of children, source of credit, access to credit, risk management etc. The study made use of a combination of analytical tools namely Descriptive statistics, Gross margin, Multinomial Logit (MNL) model, Double Log Regression.

A Multi-stage sampling technique was used for this study. At the first stage, Ibadan North and Ibadan North East Local Government Area was purposively selected because of the prevalence of frozen fish marketers in the area. At the second stage, a random sampling technique was used to select 105 respondents and structured questionnaire administered on them.

Descriptive statistics such as frequency distribution was used to determine socioeconomic analysis of respondents in the study area. Gross margin model was used to examine gross margin along the value chain. Gross margin is the difference between the value of production (that is, total revenue) and the total variable cost. The empirical model is specified below:

GM = TR – TVC
Where,
GM = Gross Margin
TR = Total Revenue
TVC = Total Variable Cost

Multinomial logit regression was used to analyse factors that determined gross margin along Value Chain. This model was applied to determine the factors affecting the choice of various channels in fish marketing. The independence or irrelevant alternatives (IIA) property is the main set of this model. The MNL model is generally specified as follows:

$$\Pr(A_{i=j}) = \frac{\exp(Xi\,\beta i)}{\sum j\,k=0\ \exp(Xi\beta i)} \qquad (i = 0, 1, \ldots, J)$$

Where:
Ai = random variable representing choice of a particular marketing channel, and
Xi = explanatory variables such as socio economic, institutional and marketing factors
Double log regression is used to examine price transmission elasticity between different stages The price transmission elasticity between two stages of the market chain can be calculated as:

$$\varepsilon_T = \frac{\partial P_d}{\partial P_u} \cdot \frac{P_u}{P_d}$$

The parameter $\frac{\partial P_d}{\partial P_u}$ represents the variation of prices at the downstream level when the prices at the upstream level change can be obtained by estimating the regression coefficient that relates downstream and upstream stage prices. When the variables are considered in their log form, the regression coefficient is equal to the elasticity of price transmission.

$$Ln(P_d) = c + ln(bP_u)$$

$$\varepsilon_T = \frac{\partial P_d}{\partial P_u} \cdot \frac{P_u}{P_d} = \frac{\partial Ln(P_d)}{\partial Ln(P_u)}$$

Results and Discussion

Frequency of restocking

Table 1: Frequency of restocking

Names of sellers	Cartons of fish weekly	Time of restocking
Retailers	7- 28	Daily
Wholesalers	35-497	Weekly
Distributors	250-373	Monthly and twice in a month

Table 1 shows how the fish sellers are categorized using the number of cartons per day. The retailers sold between 1 to 4 cartons per day, wholesalers sold a minimum of 5 cartons per day, While distributor will sold a minimum of 20 cartons per day.

Table 2: Socioeconomic characteristics of frozen fish intermediaries

SEX	Retailers		Wholesalers		Distributors		All	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Female	48	96	13	37.14	3	15	64	60
Male	2	4	22	62.86	17	85	41	39
Total	50	100	35	100	20	100	105	100

Variables	Retailers		Wholesalers		Distributors		All	
	mean	std	mean	std	mean	std	mean	std
Age (years)	40.26	11.50	50.4	13.22	54.4	13.4	46.33	13.4
Experience (years)	15.06	12.30	11.4	6.33	9.5	4.9	12.78	9.70
Household size (number)	6.02	2.63	6.2	1.76	5.3	2.08	5.9	2.27

Table 3 shows the problem facing frozen fish trade. Of these problems, unstable power recorded the highest frequency and relative frequency of 64 and 60.95% respectively. Second, was price fluctuation of fish with relative frequency of 47.62%. The implication of these two factors put together would cause spoilage of fish and also increase the price of fish. Poor road network with a frequency of 36.19%, delay in supply with 33.33%, high storage cost with 32.40% and inadequate capital with 27.62%.

Table 3: Distribution of problems confronting frozen fish trade in study area

Problems	Frequency(n=105)	Percent
Unstable power	64	60.95
Inadequate capital	29	27.62
High storage cost	34	32.40
Poor road network	38	36.19
Delay in supply	35	33.33
Price fluctuation	50	47.62

*Multiple responses recorded

The study revealed the average prices for 11 different fishes for retailers, wholesalers and distributors in the study area; (Table 4) the average retail price of herrings was higher than Kote while that of mackerel was greater than blue whiting. The price varied for one stage of the market to another stage of the market.

Table 4: Average prices of frozen fish in cartons among intermediaries

Names of fish	Common name	Carton/ Kg	Distributors (₦)	Wholesalers (₦)	Retailers (₦)
Herrings	*Sawa*	20kg	14,406.25	14,937.5	16,531.25
Horse mackerel	*Kote*	20kg	11,035.29	11,500	13,535.29
Mackerel	*Titus*	20kg	20.926.67	21,466.67	23,200
Blue whiting	*Panla wewe*	10kg	10,990.63	11,421.88	12,948.38
Argentina silus	*Ojuyobo or express*	20kg	16,968.71	17,514.29	19,014.28
Croaker	*Croaker*	20kg	21,434,38	22,109.38	24,062.5
Mullet	*Mullet*	10kg	9,287.5	9,781.25	10,798.88
Red paddock	*Owere*	10kg	8093.75	8,450	10.798.875
Pegacious	*Obokun*	10kg	8,125	8518.75	10,043.75
Hakes	*Panla osan*	20kg	15,472.73	16,124.24	18,060.61

Marketing Expenditure

Table 5 revealed the result of analysis that the highest component of the variable cost is the running cost. For retailers, wholesalers and distributors, cost of purchase of frozen fish carried 99.95%, 72.71% and 97.12% respectively. It thus accounted for the lion's share of the total expenditure. Apart from purchase of fish, retailers other cost was transportation cost, this is due to the fact that majority of the respondents do not sell more than one carton of fish per day therefore, cost of generator, staff payment, electricity bills and offloading was insignificant. For wholesalers and distributors, payment of staff were 20.62% and 1.14% respectively, the value of wholesalers was higher than distributors because more staff were needed in terms of the capacity of cartons sold. Transportation cost for retailers, wholesalers and distributed took 0.05%, 0.96% and 0.60% of the total variable cost respectively. The cost of electricity bill took 0.73% and 0.49% of the total variable cost for wholesalers and distributors respectively. The offloading cost accounted for 0.05% and 0.28% of the total variable cost for distributors and wholesalers respectively.

Table 5: Average monthly marketing expenditure for the respondents

Item of Expenditure	Retailers (₦)		Wholesalers (₦)		Distributors (₦)	
Purchase of fish	546,360	(99.95%)	1,506,875	(72.71%)	15,235,375	(97.12%)
Transportation cost	289	(0.05%)	12,228.57	(0.96%)	94,000	(0.60%)
Generator	-	-	17,833.17	(14.01%)	57,500	(0.37%)
Staff payment	-	-	26,314.23	(20.62%)	179,000	(1.14%)
Nepa bills	-	-	11,342.86	(0.73%)	77,000	(0.49%)
Offloading cost	-	-	942.8571	(0.05%)	41,950	(0.28%)
TOTAL	546,649	100.00	1,575,537	100.00	15,684,835	100.00

Average monthly revenue for the respondents

The Table 6 showed that the average monthly revenue were 612,360, 1,939,200, and 43,775,250 for retailers, wholesalers, and distributor respectively.

Table 6: Average monthly revenue for the respondents

Retailers (₦)	Wholesalers (₦)	Distributors (₦)
612,360	1,939,200	43,775,250

Gross margin analysis

Table 7 shows the result of gross margin analysis. The table shows the monthly average total revenue are 612,360, 1,939,200, 43,775, 250 for retailers, wholesalers and distributors respectively and with monthly average total variable cost of 546,649, 1,575,537, 15,684,835 for retailers, wholesalers and distributors respectively. The average gross margin of 65,711 for retailers was very high considering the amount of total revenue to total variable cost, although smaller when compared with the gross margin of 363,663 and 28,090,415 for wholesalers and distributors respectively. The smaller gross margin of retailers is revealed that most retailers do not sell more than one carton of fish per day due to the standing rules of the market frozen fish association. The positive gross margin value for the intermediaries revealed that frozen fish business was highly profitable in the study area. This is in line with the finding of Adeleke and Afolabi (2012).

Table 7: Gross Margin Analysis

Cost	Retailers (₦)	Wholesalers (₦)	Distributors (₦)
Total revenue	612,360	1,939,200	43,775250
Total variable cost	546,649	1,575,537	15,684,835
Gross margin	65,711	363,663	28,090,415

Table 8 shows the ratio of gross margin to the various variable costs of the market intermediaries in the study area. For every purchase of fish by retailers, wholesalers and distributors, 0.1203, 0.241 and 385.703 of the gross margin was made.

Table 8: Distribution of Margins for the Intermediaries

	Retailers	Wholesalers	Distributors
Purchase of fish	0.1203	0.241	385.703
Transportation	227.4	29.74	465.69
Generator	-	20.39	761.31
Staff payment	-	13.82	244.55
Nepa bills	-	32.06	568.51
Off loading cost	-	385.70	1043.51

Factors Determining Gross Margin along Value Chain

The result of multinomial logit analysis showed the factor that influenced the intermediaries along value chain for frozen fishes in Ibadan as shown in Table 9. The effect coefficients were estimated with respect to group 1 which is the retailer as reference group (base outcome). Therefore, the inference from the estimated coefficient for each choice category was made with reference to group 1. Table 10 shows that the pseudo R square Value is 0.8722. (That the entire slope coefficient is not equal to zero). The results of

the estimated equations were discussed in terms of significance and signs on the parameters. Therefore, evidence from the model as contained in Table 10 showed the variables sets with their significance and signs. However, sales volumes and gross margin were significant for wholesalers and distributors respectively.

Sales volume measured in terms of cartons was significant at 5% ($p<0.05$) and had a positive relationship with gross margin. The numbers of cartons of fish sold will boost gross margin. The numbers of cartons sold will aid in increasing revenue. It could also be recommended that for an intermediary to move away from being a retailer to a wholesaler or distributor, the volume of sales (cartons of fish) should be increased.

Table 9: Multinomial Logit Regression Analysis

Variable	Wholesalers		Distributors	
	Coefficient	**Standard error**	**Coefficient**	**Standard error**
Sales volume (Cartons)	.4105002**	.1655943	.4223523**	.1786122
Transportation cost (₦)	.0000351	.0000813	.0001644	. 0003795
Age (years)	.0058205	.0517995	.0623766	.983292
Educational level	.1585614	.1585614	-1.540041	12.67505
Year of Experience	-.0838081	.0837967	.016604	1.066179
Level of credit	.0000373	.0000355	.0000447	.0000648
Constant	-3.851519	2.573736	-13.23271	69.85543

Number of observation = 105
Log likelihood = -13.776872
LR $chi^2(16)$ = 187
Prob > chi^2 = 0.0000
Pseudo R^2 = 0.8722
*, **, *** coefficients are significant at 10%, 5% and 1% respectively

Price Transmission Elasticity

The price transmission elasticities between the different market stages of the 10 fish products analysed are reported in Table 10. All price transmission elasticities were significant. Results showed that the highest elasticities of price transmission occur between the distributor and the wholesale level, while the lowest was between the wholesale level and retail level. Similarly, the largest proportion of variance explained by the price transmission elasticity was between the distributor and wholesale levels followed by the wholesale and retail, and lastly by the distributor and retail levels. This result is similar to the findings of Guillen and Franquesa (2015).

The result of the study showed that retail price has a positive and significant response (co-integration) with the distributor price of frozen fish. This implies that wholesale price response to price signals from distributors' price and retail price depends on wholesale price signals. This result implies that transaction costs are transferred in the frozen fish marketing chain. This means that there is increase in marketing cost at every stage of the market. But the costs are completely transferred to the ultimate consumer of frozen fish. This result is in line with findings of the Odemero (2012).

Table 10: Prices elasticities, standard error and proportion of variance explained

	Distributor-wholesale		**Distributor- retail**		**Wholesale - retail**	
	Elasticity (S.E)	**R-adj.**	**Elasticity (S.E)**	**R-adj.**	**Elasticity (S.E)**	**R-adj.**
Herring *(sawa)*	0.972 (0.006)	0.997	0.884 (0.014)	0.987	0.915 (0.115)	0.993
Mackerel *(titus)*	0.882 (0.054)	0.843	0.869 (0.069)	0.805	0.9530 (0.255)	0.966
Horse mackerel *(kote)*	0.954 (0.122)	0.992	0.595 (0.055)	0.706	0.835 (0.088)	0.643
Blue whiting *(panla wewe)*	0.988 (0.017)	0.9846	0.951 (0.036)	0.933	0.963 (0.032)	0.949
Argentina silus *(Ojuyobo)*	0.9819 (0.028)	0.9622	0.0001 (2.78e06)	0.9054	0.2369 (0.0317)	0.9495
Croaker	0.982 (0.016)	0.9875	0.910 (0.032)	0.944	0.923 (0.029)	0.955
Tilapia	0.934 (0.282)	0.962	0.693 (0.048)	0.806	0.748 (0.397)	0.856
Mullet	0.992 (0.282)	0.9618	0.736 (0.043)	0.858	0.735 (0.397)	0.949
Hakes *(panla osan)*	0.986 (0.008)	0.997	0.828 (0.029)	0.9400	0.8399 (0.295)	0.9428
Owere (red paddock)	0.954 (0.037)	0.929	0.3975 (0.075)	0.3551	0.4291 (0.074)	0.3964
Obokun	0.895 (0.956)	0.8369	0.398 (0.075)	0.3551	0.5455 (0.0863)	0.4428

Conclusion

The study examined the price transmission along value chain for frozen fishes in Oyo State. The specify objective were to determine socioeconomic analysis of respondents in the study area, examine gross margin along the value chain, examine factors influencing changes in gross margin along value chain, examine price transmission elasticity between different market stages and to make policy recommendation in the study. It was concluded that a strong case can be made in favour of the fact that fish selling is a profitable business looking at the gross margin of the intermediaries, The gross margin was significantly influenced by volume of sales among the intermediaries, Positive relationship between the product prices and the elasticities of price transmission means that price changes are not fully transmitted to the downstream level of the market chain. It is recommended that the younger people should be more involved in the retailers

stage, to expand trade, capital is required to increase the volume of sales. The entire marketing system should be restructured. Marketers should be encouraged to form agricultural marketing cooperatives in order to eliminate the exploitative activities of some middlemen.

References

Adeleke, M. L. and Afolabi, J.A. 2012. Appraisal of fresh fish marketing in Ondo State, Nigeria. *IIFET 2012 Tanzanian Proceedings*, 1–10.

Aguero, J. 2004. "Asymmetric price adjustments and behaviour under risk: Evidence from Peruvian agricultural markets", Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Denver, Colorado, July 1-4, 2004.

Amao, J. O., Oluwatayo, I. B., and &Osuntope, F. K. 2006. Economics of fish demands in Lagos State , Nigeria, 19(1), 25–30.

Apata, T. G., A. I. Ogunyinka, R. A. Sanusi and S. Ogunwande (2010). Effect of global climate change on Nigerian agriculture: an empirical analysis. A paper presented at the 84th annual conference of the Agricultural Economics Society, Edinburgh. 29th - 31st March, pp 5-20.

Ardeni, P.G. 1989. "Does the law of one price really hold for commodity prices?" *American Journal of Agricultural Economics,* 71: 303-328.

Baffes, J. (1991). "Some further evidence on the Law of One Price", *American Journal of Agricultural Economics*, 4: 21-37.

Buse, R. C. and Brandow, G. E. 1960.The relationship of volume prices and costs to marketing margins for farm foods. *Journal of Farm Economics* 42:362-370.

Capps Jr., O. and P. Sherwell, 2005. "Spatial asymmetry in farm-retail price transmission associated with fluid milk products", Selected paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Providence, Rhode Island, July 24-27, 2005.

Cecilia, A. 2009. Analysis of price transmission along the food supply chain in the EU. *Institute of Agricultural Economics, Romanian Academy Agricultural Economics, Romanian Academy*, (2), 69.

Coster, A.S and Otufale, G. A. 2010. Economic analysis of frozen fish marketing In Ijebu Ode Local Government Area , *1*(5), 96–101.

Esiobu, N.S and Onubuogu, G.C,. 2014. Socio-economic analysis of frozen fish marketing in Owerri Municipal Council Area , Imo State , Nigeria? : An Econometric Model Approach, 4(8), 449–459.

Esiobu, N.S., Nwosu, C.S and Onubuogu, G.C. 2014. Economics of pineapple marketing in Owerri Municipal Council Area, Imo State, Nigeria. *Int. J. Appl. Res. Technol.* 3(5): 3 – 12.

Esiobu, N.S., Onubuogu, G.C and Okoli, V.B.N. 2014b. Determinants of income from poultry egg production in Imo State, Nigeria: An Econometric Model Approach; Global Advanced Res. *J. Agric.l Sci.* 3(7): 186-199.

FAO 2016. The state of world fisheries and aquaculture 2016. *Contributing to food security and nutrition for all.* Rome. 200 pp.

García DelHoyo J.J. (ed.), 2002. *Análisisbioeconómicoyestadístico de pesquerías Andaluzas*. Sevilla: Serviciode Publicaciones de la Consejería de Agricultura y Pesca.

Gardner, B.L. 1975. The Farm-retail price spread in a competitive food industry. *American Journal of Agricultural Economics* 57(3):399-409. George.

Gardner, B.L. (1975). The farm-retail price spread in a competitive food industry. *American Journal of Agricultural Economics* 57(3):399-409.

George P.S. and King G.A., 1971.*Consumer demand for food commodities in the United States with projections for1980*. University California, Berkeley: Giannini Foundation. Monograph, 26.

Gonzales, F. 2002. The transmission of price variability along the french cod value chain 1, 1–12.

Granger, C.W.J. 1969. Investigating casual relations by econometric methods and cross-spectral methods, *Econometrica, Vol. 37,* pp. 24-36.

Hausman, Y. H. and D. McFadden 2001. Economic choices. The American economic review. 9(1):351-378.

Hicks, J.R. 1956. *A revision of demand theory*. Oxford, Clarendon Press.

Hildreth C. and Jarrett F.G., 1995. *.A statistical study of livestock production and marketing*. New York: John Wiley and Sons. Cowles Commission Monograph, 5.

Hildreth, C. and Jarrett, F.G. 1995. *A statistical study of livestock production and marketing*. Cowles Commission Monograph No. 5. John Wiley & Sons, Inc. New York.

Hosseini, S. S., Afsaneh, N., and Dourandish, A. 2012. Price transmission analysis in Iran chicken market, 5852.

Idachaba, F.S. 1991. The Nigerian Food Problem. *Journal of Agriculture, Science and Technology,* Vol. 1(1): 5- 16 June, 1991.

Mafimisebi,T.E. and Okunmadewa, F. 2002. Are middlemen really exploitative? Empirical evidence from the sundried fish market in southwest, Nigeria, 1–11.

McCorriston, S., Morgan, C. W. and Rayner, A. J. 2001. "Price transmission: the interaction between market power and returns to scale", *European Review of Agricultural Economics*, 28, 143–159

Meyer J. and von Cramon-Taubadel S., 2004. Asymmetric price transmission: a survey. *Journal of Agricultural Economics*, 55: 581-611.

Meyer, J. and S., Von Cramon-Taubadel, 2004."Asymmetric Price Transmission: A Survey" Journal of Agricultural Economics, Vol. 55(3), pp. 581-611.

Guillen, J., and Ramon Franquesa. 2015. Price transmission and volatility along the Spanish fresh fish market chain Price transmission and volatility along the Spanish fresh fish market chain, New Medit 14(1): 4-11.

Nkang, M.N, Ndifon, H.M and Odok, G.N 2007. Price transmission and integration of cocoa and palm oil markets in Cross River State, Nigeria: Implications for Rural Development. *Agricultural Journal* 2(4): 457-463.

Odemero, A. F. 2012. Price transmission and households demand elasticity for frozen fish under fuel subsidy reform in Delta State, Nigeria Achoja Felix Odemero, 1(1), 119–127.

Ogbe, F.G, Onuche, U. and Danjuma A. 2004. Marketing, distribution and consumption of frozen fish in Anyigba metropolis of Kogi State, Nigeria. *IIFET Tanzania Proceedings*, 1–12.

Ohen, S., Abang, S, and Idiong, I. 2007. Price Transmission and Market Integration : Vertical and Horizontal Price Linkages for Live Catfish in Nigeria it β, 17–20.

Okeoghene, E. S. 2013. Assessment of the Marketing of Frozen Fish (Iced Fish) in Edo State, Nigeria, 5 (4), 353–357.

Olaoye, O., Ashley-dejo, S., Fakoya, E., Ikeweinwe, N. B., Alegbeleye, W., Ashaolu, F., and Adelaja, O. 2013. Assessment of socio-economic analysis of fish farming in Oyo State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Veterinary*, *13*(9), 45–53.

Ozigbo, E., Anyadike, C., Adegbite, O., and Kolawole, P. (2014). Review of Aquaculture Production and Management in Nigeria, *4*(10), 1137–1151.

Q.M. Chilaka, G.O. Nwabeze and O.E. Odili, 2014. Challenges of Inland Artisanal Fish Production in Nigeria: Economic Perspective. *Journal of Fisheries and Aquatic Science, 9: 501-505.*

Rahji, M.A.Y; Popoola, L; and L.A. Adebisi. 2001. Analyses of the demand for and supply of fish in Nigeria 1986-1997. *Journal of West African Fisheries*, Vol. 10: 543-550.

Rapsomanikis, G., Hallam, D., and Conforti, P. 2003. Market integration and price transmission in selected food and cash crop markets of developing countries: Review and applications. *In* FAO, *Commodity Market Review*, FAO Commodities and Trade Division, Rome.

Shepherd, G. S. 1962. *Marketing farm products-economic analysis*.4th ed. Iowa State University press, Ames.

Thomsen, F.L. 1951. *Agricultural marketing.* McGraw-Hill book co., Inc. New York.

Vanessa, S. and Jonathan K. 1992. Economic analysis of agricultural marketing. overseas development and administration publishing company.

Vavra, P., Goodwin, B. K. 2005. Analysis of price transmission along the food chain, (3). https://doi.org /10.1787/752335872456.

OECD Agricultural and Fisheries Working Paper. No 3, 1-58.

Ward, W.R. 1982. Asymmetry in retail, wholesale, and shipping price point pricing for fresh vegetables. *American Journal of Agricultural Economics* 64:205-212.

Zango-Daura, S. 2000.*Fish Import Gulps N12 billion Yearly*. *New Nigerian Newspaper,* Monday 22nd, May, 2000Pg.1.

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