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Small Ruminants' Meat Consumption Patterns in Nairobi, Kenya

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Abstract

The per capita consumption of livestock products is rising fastest in regions where there is urbanization and rapid income growth as people add variety to their diets. Urban consumers are the key movers of small ruminants' meat demand. Past research studies have focused mainly on production aspects with little focus on the small ruminants' meat consumption patterns. Thus, this study aims at filling the gap by providing information on patterns of small ruminants' meat consumption among different categories of urban consumers with respect to its own-price, price of other meats and total expenditures. Multistage and simple random sampling procedures were used to select a total of two hundred respondents from Dagoretti, Kibera, Central and Pumwani divisions in Nairobi County. This study employed descriptive statistics and an extended ideal demand system model to determine the patterns of small ruminants' meat consumption. In all the income groups, own price-price elasticities were negative and high for small ruminants' indicating that price for mutton and chevon greatly influence the demand for small ruminants' meat. The income elasticities for small ruminants' meats are greater than one in all income groups, implying that mutton and chevon are

luxury goods for all income groups irrespective of their income levels. Dissemination of these findings is important to both the scientists and extension workers to educate and encourage the producers to increase production which would result in increased income and improved livelihood of the people.

Key words: ***Small ruminants, patterns, an ideal demand system.***

Introduction

The small ruminants comprise of sheep and goats. Estimated meat production from shoats (Sheep and Goats) is 70000 MT annually (GOK, 2006). According to Food and Agricultural Organization (FAO) food balance sheets, per-capita meat consumption increased from 14.9 to 28.5 kg/year and milk consumption increased from 24.8 to 45.6 kg/year in the developing world between 1982 and 2002. It was also predicted that aggregate meat demand will grow from 209 million tons in 1997 to 327 million tons by 2020 and milk consumption from 422 to 648 million tons. (Delgado *et al.* 1999) labelled this trend the "livestock revolution." Most authors analysing the livestock revolution indicate that it is a demand driven process (Delgado *et al.*, 1999; Steinfeld, 2004) and it is perceived as an unstoppable phenomenon which can be very positive for developing countries. Per capita consumption of livestock products is rising fastest in regions where urbanization and rapid income growth result in people adding variety to their diets. Across countries, per capita consumption is significantly determined by average capita income.

Urban consumers are therefore key movers of small ruminants' meat demand. In urban areas we have different categories of consumers: low-income, middle-income, and high-income consumers. By being the major market for small ruminant meats, urban dwellers therefore stimulate a demand that would lead to increased production of small ruminants in ASAL therefore contributing to reduction of poverty in the ASALs.

This study was designed to evaluate the patterns of consumption of small ruminants' meats among consumers in the Kenyan capital Nairobi. The study targeted the urban consumers because they are especially important as urban areas are the market outlets for most small ruminants produced in the ASAL areas (Kariuki and Muthee, 2004). Patterns of the meat consumption among the different categories of consumers and the drivers influencing such patterns are directly important in influencing the livestock revolution (Steinfeld, 2004).

A number of research studies have been carried out on livestock in Kenya (Barrett *et al.*, 2003 and 2004; Njanja *et al.*, 2003). However, they have focused mainly on production aspects with little focus on the patterns of small ruminant meat products consumption. Thus, this study aims at filling the gap by providing information on patterns of small ruminants' meat consumption that can be used for formulating policies. Increased demand for small ruminant meat will lead to increased production of the small ruminant producer incomes, thus contributing to reduction in poverty.

The objective of the study was to estimate the demand elasticities for small ruminant meat among different categories of urban consumers with respect to its own-price, price of other meats, total expenditures.

The study tested two hypotheses which include:

H_1: Expenditure elasticity is negative, own-price elasticity is positive, and Marshallian cross-price elasticities are negative for small ruminant meat among different categories of urban consumers.

H_2: Different categories of consumers in urban areas do respond in the same way to changes in prices and income when purchasing small ruminants' meats.

Materials and Methods

Structured questionnaires were the main tools used in primary data collection. Primary data collected included the quantities and prices for the various meats consumed by the households for general food, festivities and holidays and household characteristics.

A multistage random sampling procedure was used to select sample respondents for the interview. In this approach, at level one, four divisions (Dagoretti, Kibera, and Central and Pumwani) were randomly selected from a total of eight divisions that make up Nairobi County. At level two, simple random sampling was used to select five locations from each of the four divisions forming a total of twenty locations for the study. The sample size chosen was based on minimum small sample statistically required (minimum of 30) plus a margin of 20, thus from each selected location a simple random sample of 50 consumers per location was selected making a total of 200 respondents.

In order to estimate demand elasticities for small ruminants' meat, the study employed the extended LA-AIDs model. The model was specified as follows:

$$w_{im} = \beta_0 + \sum \gamma_{ij} \ln p_j + \beta_i \ln\{X_m / P\} + \theta imr + \varepsilon_t \quad (2.1)$$

Where w_{im} is the budget share of the i^{th} commodity {mutton (*r*), chevon (h) pork (*g*), poultry-meat(*c*) and beef (*k*)}, for income group *m* (income group1, income group2, income group3, income group, 4 respectively). β_0 is the constant coefficient in the i^{th} share equation, γ_{ij} is the slope coefficient associated with the j^{th} meat type in the i^{th} share equation, p_j stands for the price of the j^{th} commodity, X_m stands for the total monthly expenditure within the system of goods of the different income groups and is given by

$$X = \sum_{i=1}^{n} p_i q_i \quad (2.2)$$

q_i is the quantity demanded for the i^{th} good *P* stands for price index defined by;

$$\ln p = \sum_{i=1}^{n} w_i \ln p_i \quad (2.3)$$

θimr is the inverse mills ratio and ε_t is the error term.

Marshallian and Hicksian measures of elasticities were computed from the estimated coefficients of the AIDS model as follows:

$$\varepsilon_{ii} = -1 + \gamma_{ij} / w_i - \beta_i \quad (2.4)$$

$$\varepsilon_{ij} = \gamma_{ij} / w_i - \beta (w_i + w_j) \quad (2.5)$$

$$s_{ii} = -1 + \gamma_{ii} / w_i + w_i \quad (2.6)$$

$$s_{ij} = \gamma_{ij} / w_i + w_j \quad (2.7)$$

$$\eta_i = 1 + \beta_i / w_i \quad (2.8)$$

Results and Discussions

Demand Elasticities for Different Meat Types

In order to investigate the difference in demand structure amongst income groups, all household were arranged in ascending order according to income level and classified into four income groups of 50 members each viz. Income Group 1(YG 1), Income Group 2 (YG 2), income Group 3 (YG 3) and income group 4 (YG 4). The ranges of monthly household incomes for these groups were: YG1: up to Kshs.10, 500, YG2: Kshs. 10,501 to Kshs.24,

500; YG3:Kshs.24, 501 to 50, 000, and YG4: above Kshs.50, 000.

Beef is a dominant meat type consumed at home by Nairobi households and forms the highest expenditure share on meats (0.46) irrespective of the income levels of the households. This is because beef is easily available in the urban areas and it is cheaper (Kshs. 249.00 per kg) compared to mutton (Kshs. 273.30 per kg) and chevon (Kshs. 280.48 per kg) (Author, 2010). Households often consume chevon and mutton away from home and therefore do not feature in most home diets. Table 3.1 below gives results of the households' expenditure share on various meats

Table 3.1: Households share of expenditure on different meat types as a percentage of total meats budget (n=200)

	YG1	YG2	YG3	YG4	OVERALL
Beef	0.46 (0.35)	0.47 (0.30)	0.48 (0.23)	0.44(0.28)	0.46 (0.29)
Chevon	0.10 (0.30)	0.05 (0.10)	0.10 (0.17)	0.11 (0.16)	0.09 (0.15)
Mutton	0.02 (0.07)	0.01 (0.04)	0.04 (0.13)	0.01 (0.05)	0.02 (0.08)
Pork	0.01 (0.02)	0.03 (0.09)	0.03 (0.09)	0.01 (0.03)	0.02 (0.07)
Fish	0.25 (0.25)	0.22 (0.25)	0.22 (0.25)	0.20 (0.22)	0.22 (0.24)
Poultry	0.16 (0.22)	0.22 (0.25)	0.13 (0.17)	0.24 (0.22)	0.18 (0.21)

Source: Own Survey Data, 2010
Note: Figures in parentheses are standard errors

The diagonal values in table 3.2 - 3.5 represent own price elasticity. The negative values of own price elasticity are consistent with economic theory. However, the magnitude of own price elasticities of demand for chevon and mutton varied among the four different income groups. Households in the income group 3 were more responsive to price changes of both mutton and chevon followed by the households in income group 2. High income group (YG 4) households were least responsive to price changes. A high own price elasticity for chevon and mutton was an indication that consumption of small ruminant meat was greatly influenced by change in price. The nature and extent of substitution is indicated by the cross-price elasticity between meats. The Marshallian cross price elasticities for small ruminants (both chevon and mutton) is positive for the selected Nairobi households. Chevon and mutton showed a substitutive relationship with all other meat types in all the four income groups. These results suggested that the price of other meat types play an important role in determining

the quantity of small ruminants meat consumed which is similar with what Gamba *et al.* (2010) obtained.

The calculated expenditure elasticities are positive for all types of meat in Nairobi. The positive sign implies that meat of different types can be considered normal goods. The expenditure elasticities for all meat types are greater than one, implying that they can be considered as luxury goods for all income groups. A rise in income of the household will result in an increase in consumption of meat across all the income groups in the study. Households in the income group 2 (YG2) have the greatest expenditure elasticity of (6.54) with the household in the income group 4 (YG4) having the lowest expenditure elasticity for chevon of (1.26). Expenditure elasticity for mutton is greater in the income group 3 (YG3) followed by the income group 2 (YG2) households. This suggests that demand for small ruminant would increase greatly but at different rates for the four income groups when their income increases. The estimated own-price, cross and expenditure elasticities are presented in the Table 3.2, 3.3, 3.4 to 3.5.

Recommendations

Dissemination of these findings is important since knowledge to existing and potential demand for small ruminants' meat would assist both the scientists and extension workers to educate and encourage the producers to increase production which would result in increased income and improved livelihood of the people.

This study targeted the urban consumers only, it is therefore recommended that future studies target the rural consumers so as to give a better understanding of the patterns and demand elasticities for small ruminants' meat in Kenya.

References

Barrett, C.B., F. Chabari, D. Bailey, D.L/ Coppock, and P.D. Little 2003. "Livestock Pricing in the Northern Kenyan Rangelands." Journal of African Economics 12 (2) 127-155

Barrett, C.B., S. Osterloh, P.D. Little, and J. McPeak. 2004. Constraints Limiting Marketed Livestock Off take Rates among Pastoralists. Global Livestock Collaborative Research

Delgado, C.L., M. Rosegrant, H. Steinfeld, S. Ehui and C. Courbois. 1999. Livestock to 2020: The next food revolution 2020. Food, Agriculture and the Environment Discussion Paper 28. IFRI/FAO/ILRI. International Food Policy Research Institute, Washington D.C., U.S.A.

Njanja, J.C., J.M. Gathuma, G.K. Gitau, F.M. Njeruh and R.N. Kinuthia 2003. 'Pastoralists' Perception of Livestock Production Systems and Opportunities for Improvement in South western Marsabit, Kenya. Livestock Research for Rural Development 15 (7) 2003.

Steinfeld, H., 2004. The livestock revolution- a global veterinary mission. Veterinary Parasitology,125:19-41

Gamba, P., (2005) Urban Domestic Consumption Patterns for Meat: Trends and Policy Implications. Working Paper, Tegemeo Institute of Agricultural Policy and Development, Egerton University.

Government of Kenya. 2006. Economic survey 2006. Ministry of Livestock and Fisheries Development, Nairobi. Kariuki J. G and A.M Muthee. 2004. Livestock Sub-sector and Market Analysis (CARE 2004)

Appendices

Table 3.2: Marshallian and Hicksian own and cross price and expenditure elasticity for households in income group 1 (YG 1)

	Beef		Chevon		Mutton		Pork		Fish		Chicken	
	M	H	M	H	M	H	M	H	M	H	M	H
Beef	-1.63	-3.21	2.26	1.46	3.37	1.45	4.01	2.89	0.97	0.78	1.51	1.37
Chevon	4.46	4.87	-3.10	-2.97	3.23	2.09	0.89	1.02	-0.24	1.78	1.48	1.79
Mutton	27.00	6.76	0.87	0.68	-2.87	-2.64	4.21	3.67	10.03	11.54	13.56	15.02
Pork	13.59	4.06	2.80	1.70	0.86	0.45	-2.67	-1.97	6.39	6.69	-3.44	3.24
Fish	1.76	2.43	3.4	0.78	5.37	5.01	5.34	3.33	-0.67	-0.58	0.11	0.43
Chicken	3.94	3.50	1.21	1.12	1.07	1.32	0.98	0.74	2.45	2.21	-2.89	-3.02
Expenditure elasticity	2.4		1.94		10.00		3.52		2.05		1.23	

Data source: Own survey, 2010

Table 3.3: Marshallian and Hicksian own and cross price and expenditure elasticity for households in income group 2 (YG2)

	Beef		Chevon		Mutton		Pork		Fish		Chicken	
	M	H	M	H	M	H	M	H	M	H	M	H
Beef	-0.90	-0.16	0.10	0.01	0.65	0.37	- 1.27	1.23	0.58	0.70	-0.09	0.01
Chevon	3.51	6.56	-4.80	-5.48	1.33	3.22	-2.45	1.74	-1.14	0.31	-5.31	1.91
Mutton	30.21	2.68	1.34	1.02	-4.68	-4.30	0.92	1.04	8.23	6.23	10.56	12.24
Pork	-0.13	0.50	-0.45	0.05	-0.00	0.23	-2.45	- 2.28	0.34	0.22	0.00	0.22
Fish	-2.72	2.23	1.68	1.35	0.85	1.67	0.45	1.02	-0.74	-0.48	-0.25	0.35
Chicken	0.50	0.47	1.57	1.57	0.97	0.72	1.36	2.76	0.57	0.82	-1.04	-0.60
Expenditure elasticity	2.4		6.54		3.41		1.00		1.03		1.28	

Data source: Own survey, 2010

Table 3.4: Marshallian and Hicksian own and cross price and expenditure elasticity for households in income group 3 (YG 3)

	Beef		Chevon		Mutton		Pork		Fish		Chicken	
	M	H	M	H	M	H	M	H	M	H	M	H
Beef	-0.67	-0.42	1.42	1.49	1.03	1.34	1.45	0.23	0.17	0.35	-0.56	0.36
Chevon	-4.35	5.52	-6.32	-3.20	1.89	2.65	-2.78	2.45	-3.95	4.27	4.27	4.08
Mutton	4.51	3.69	1.18	1.05	-5.00	-4.32	3.65	2.15	1.23	1.04	1.06	1.40
Pork	-8.08	7.53	11.07	5.76	1.94	0.56	-0.67	0.56	-6.64	6.37	0.02	1.35
Fish	-1.43	0.89	2.45	3.56	2.02	1.24	3.05	0.45	-2.50	-1.54	-5.09	5.01
Chicken	0.33	0.89	0.43	0.56	0.76	0.50	0.46	0.52	0.80	0.62	-5.18	-0.35
Expenditure elasticity	1.09		3.46		7.29		6.44		1.30		1.89	

Data source: Own survey, 2010

Table 3.5: Marshallian and Hicksian own and cross price and expenditure elasticity for households in income group 4 (YG 4)

	Beef		Chevon		Mutton		Pork		Fish		Chicken	
	M	H	M	H	M	H	M	H	M	H	M	H
Beef	-3.11	-1.97	1.40	1.27	0.53	0.23	0.83	0.87	0.14	0.06	0.72	0.26
Chevon	-4.43	3.13	-4.61	- 3.36	1.43	0.79	1.52	1.06	3.94	4.48	-1.47	1.28
Mutton	8.14	8.01	0.96	1.93	-4.11	-3.67	2.05	3.54	1.03	0.76	0.56	0.24
Pork	-4.48	4.33	4.41	4.64	1.05	1.03	-4.23	-3.56	-4.42	4.14	-3.24	3.05
Fish	4.21	4.27	2.97	1.75	3.60	2.52	1.68	0.56	-1.63	-0.93	- 0.23	0.01
Chicken	0.58	1.28	0.12	0.15	0.34	0.56	0.73	0.51	0.93	0.92	-2.23	-1.00
Expenditure elasticity	1.91		1.26		30.14		9.10		1.31		2.66	

Data source: Own survey, 2010

H denotes Hicksian price elasticity

M denotes Marshallian price elasticity