Analysis of Various Household Expenditures at Urban Households in the Republic of Uganda: A Multivariate Tobit Approach

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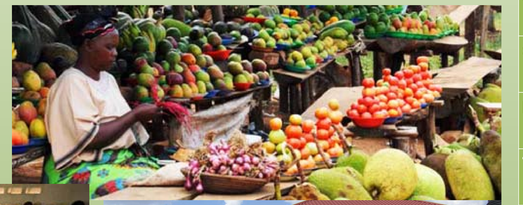
Abstract

Variations in different household expenditures across urban households in the Republic of Uganda are studied using a survey data. Multivariate Tobit estimation method is employed to quantify the effects of various factors, including household income. Expenditure elasticities of income vary across different categories of expenditures. Location and other factors such as education influence the expenditure decisions.

Introduction

The household consumption contribution to GDP composition by end-use is about 86.3% in Uganda (CIA Fact book, 2012). This percentage is higher than that of two neighboring East African countries, Kenya and Tanzania, as well as most other countries in the world. The average share of food expenditures is nearly 50% of the total expenditures, but varies across the country and is higher in the northern region than in the central region. The expenditures on fuel, rent, and power range from 16% in the northern to 20% in the central region (UBS, 2003). Similarly, health and other expenditures are also highest in the central (7%) and lowest in the northern region (5%). From the perspective of domestic policy, the differences in expenditure across regions need recognition and adoption of a modified approach, especially if the food expenditure variation is a potential signal of food insecurity. This poster presents a study of the pattern of household expenditures on various food and non-food categories across the urban population segments from five towns in Uganda.



Objective

This poster examines variation in food and non-food expenditures across urban households in Uganda as determined by socio-economic and demographic factors. The non-food expenditures are classified into five categories, i.e., fuel, clothing, education, transportation, and others (medical, entertainment, etc.). The quantified effects of consumer and household features including income elasticities are used to develop profiles of population groups differentiated by spending on various categories. The identified differences provide insights about households that can be targeted by private sector marketers or require monitoring and, possibly, assistance to assure they are food secure. Results of the study are, therefore, of interest to private and public policy-makers although each sector targets a different group of urban households.

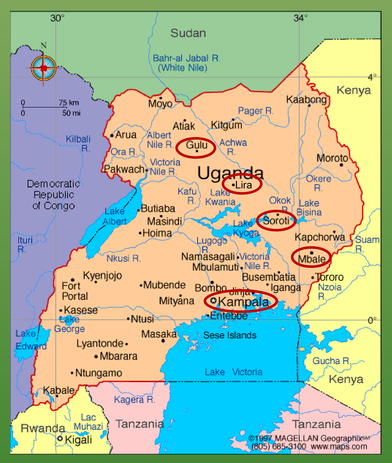


Figure 1. Map of Uganda showing cities where the survey was conducted

Data and Estimation

- Survey data collected from 1646 households at five urban centers in the Republic of Uganda, Kampala from the central region, Gulu and Lira from the northern region, and Soroti and Mbale from the eastern region
- Information on socioeconomic and demographic characteristics, shopping behavior, food preparation time, etc. were collected
- Descriptive statistics are in Table 1
- Six equations are estimated, each with a dependent variable that represents the per-capita monthly expenditures on a particular category, i.e., food, fuel, clothing, education, transportation, and others
- Per-capita expenditures are calculated based on adult equivalence scale following the OXFORD/OECD method proposed in 1982 (Deaton, 1997)

- Many of the households did not report expenditures during the survey period, which may lead to sample selection bias
- A Tobit model would be a better estimation technique compared to OLS under such circumstances (Tobin, 1958)
- Different household expenditures may occur simultaneously ((Fan and Lewis, 1999), leading to correlation of errors across six equations to be estimated, and this is confirmed in this study by the Breusch-Pagan test
- A multivariate Tobit regression method is preferred over the OLS under these conditions (Huang, 1999; Trivedi and Zimmer, 2005), and is adopted in this study as well
- Multivariate tobit method estimates M-equation tobit models using the maximum simulated likelihood (MSL) method (Cappellari and Jenkins, 2006)

Table 1. Descriptive statistics of variables

Variable	Mean	Std. Dev.	Min	Max	Description
Dependent					
Foodexp	31.716	39.689	0	740.133	Per-capita monthly food expenditure in $
Fuelexp	4.664	8.505	0	162.602	Per-capita monthly fuel expenditure in $
Clothexp	4.039	9.2051	0	154.859	Per-capita monthly expenditure on clothing in $
Educexp	48.5	103.859	0	1192.412	Per-capita monthly education expenses in $
Transpexp	3.453	13.186	0	406.504	Per-capita monthly transportation expenditure in $
Otherexp	16.65	27.229	0	427.41	Per-capita monthly expenditure on other categories in $
Independent					
Headgend	0.709599	0.4540854	0	1	Gender of the household head 1=male; 0=female
Respgend					Gender of the respondent 1=male; 0=female
Age	35.33911	12.35561	17	89	Age of the respondent in years
Permanent	0.1342649	0.3410403	0	1	Permanent job
Self	0.3718104	0.483435	0	1	Self employed
Others	0. 4914945	0. 5000796	0	1	Other jobs*
Education	0. 345079	0. 4755385	0	1	1=upper secondary or above, 0 =otherwise
Soutrading	0.3013366	0.458978	0	1	Main source of income is trading
Sousalary	0.3037667	0.4600229	0	1	Main source of income is salary
Souother	0.3657351	0.4817821	0	1	Main source is others*
Totalincome	214.0692	320.5724	0	5613.627	Total monthly household income in $
Child3dum	0.7503038	0. .8690472	0	10	=1 if a household has children below 3 years of age
Child12dum	1.332928	1.276763	0	9	=1 if a household has children of age between 4 and 12 years
Child18dum	0.9356015	1.280476	0	9	=1 if a household has children of age between 13 and 18 years
Shopdist	573.0996	1925.962	0	50000	Distance to the nearest shopping center in meters
Gulu	0.1215067	0.3268145	0	1	Residence in Gulu (=1)
Lira	0.1221142	0.3275172	0	1	Residence in Lira(=1)
Mbale	0.1215067	0.3268145	0	1	Residence in Mbale(=1)
Soroti	0.1172539	0.3218204	0	1	Residence in Soroti(=1)
Kampala	0.5152625	0.4999196	0	1	Residence in Kampala (=1)*

*** Reference category**

Results

***Food expenditures*:** Income elasticity is 0.22. Households with self- or permanently employed respondents have higher food expenditures than those with unemployed respondents. Educated respondents tend to increase food expenditures. Gulu, Lira, Soroti, and Mbale households have lower food expenditures than those in Kampala, with the highest difference in Lira and lowest in Mbale.

***Fuel expenditures*:** Income elasticity is 0.89, the second largest after education expenditures. Households with self-employed respondents spend more on fuel than those with "other" categories (retired people, students, casual laborers, and farmers). Education of the respondent has a positive effect on fuel expenditures. Gulu, Lira, Soroti, and Mbale households have lower fuel expenditures than those in Kampala.

***Education expenditures*:** Income elasticity is 0.93, the highest among all expenditure categories. Education expenditures are higher in Soroti and Mbale, compared to Kampala.

***Clothing expenditures*:** Income elasticity is 0.39. Permanent employment increases expenditures, whereas increase in age decreases them. In Gulu and Soroti these expenditures are higher than in Kampala.

***Transportation expenditures*:** Income elasticity is 0.63. Households with self- employed or higher-educated respondents spend more on clothing, whereas those with married respondents spend less. Households in Lira and Mbale spend less compared to those in Kampala.

***Other expenditures*:** Income elasticity is 0.62. If the main income source of a household is trading, these expenditures tend to decrease. As the number of children between the ages of 4 and 12 increases, these expenditures increase.

Conclusions and Implications

The results from this study will benefit policy-makers by way of providing a clearer picture of the segments of population where interventions are required to balance the various household expenditures. The income elasticity of expenditure is the lowest in food and highest in education expenditures. The overall progression to income elasticity indicates a rather inelastic demand for food implying potential sensitivity to price increases, especially in towns other than the capital. The outlying areas appear to be more vulnerable to the consequences of food price increases than Kampala households. The expenditures vary across different urban centers. For example, food and fuel expenditures are lower, while clothing and education expenditures are higher in Soroti than those in Kampala, offering insights into the effects of income increase on a particular category. The relatively higher income elasticity in the case of education expenditure suggests relatively higher benefits from increasing income and school access outside the capital.

Knowledge about the expenditures on education and its interaction with other expenditure categories is very important because academic achievements are not that promising, even after the introduction of universal primary education in the Republic of Uganda in 1997 (Acham et al., 2012). The food vs. education issue is important for Ugandan households and, from the standpoint of the environmental impact, the expenditures on fuel are also relevant because the primary fuel is wood-based charcoal. Finally, there is a relatively large demand for expenditures in the "other" category, which offers wide opportunities for stimulating regional economies because those expenditures are relatively more important to urban households outside Kampala.

Table 2. Results from Multivariate Tobit estimation

	Foodexp	Fuelexp	Clothexp	Transexp	Educexp	Otherexp
lninc	0.22***	0.89***	0.39*	0.63***	0.93***	0.62***
	(0.0507)	(0.101)	(0.178)	(0.141)	(0.129)	(0.0812)
lnage	-0.473***		-2.286***	-0.252		-0.940***
	(0.107)		(0.508)	(0.393)		(0.190)
headsex	-0.230**	-0.122	-0.576	0.119	-0.315	-0.190
	(0.101)	(0.250)	(0.432)	(0.345)	(0.335)	(0.164)
respgend	0.0696	-0.239	0.875**	0.147	0.0756	0.0796
	(0.0826)	(0.203)	(0.350)	(0.283)	(0.272)	(0.134)
married	-0.0520	-0.502**	-0.468	-0.403	-0.446	-0.246
	(0.0928)	(0.230)	(0.394)	(0.317)	(0.310)	(0.152)
permanent	0.238**	0.290	0.928**	0.727*	0.180	0.343
	(0.109)	(0.272)	(0.465)	(0.384)	(0.365)	(0.178)
selfemploy	0.124	0.543***	0.433	0.547*	0.630**	0.296**
	(0.0766)	(0.190)	(0.325)	(0.281)	(0.256)	(0.125)
education	0.148*	0.681***	1.311*	0.546	0.559**	0.316**
	(0.0772)	(0.192)	(0.720)	(0.472)	(0.258)	(0.126)
sousalary	0.140	0.579**	-0.0700	1.149***	-0.0318	0.197
	(0.0931)	(0.229)	(0.394)	(0.317)	(0.308)	(0.151)
soutrading	0.0918	-0.0367	-0.611	0.689**	-0.0616	-0.165
	(0.0856)	(0.212)	(0.362)	(0.292)	(0.285)	(0.139)
Gulu	-0.641***	-1.098***	0.852	0.0940	-0.443	-0.0151
	(0.117)	(0.304)	(0.480)	(0.390)	(0.377)	(0.185)
Lira	-0.669***	-0.813***	0.309	-1.033***	0.162	-0.0795
	(0.106)	(0.296)	(0.447)	(0.365)	(0.352)	(0.172)
Mbale	-0.333***	-1.484***	0.822	-0.836**	0.456	-0.133
	(0.106)	(0.246)	(0.426)	(0.348)	(0.331)	(0.164)
Soroti	-0.333***	-1.788***	1.351***	0.249	0.587*	0.262
	(0.106)	(0.254)	(0.441)	(0.360)	(0.344)	(0.169)
Child12dum			-0.0693	-0.280	3.986***	-0.106
			(0.309)	(0.253)	(0.269)	(0.115)
Child18dum			-0.362	-0.0536	1.604***	-0.0762
			(0.301)	(0.236)	(0.238)	(0.109)
_cons	8.879***	-0.438	10.46***	-0.421	-3.631**	8.407***
	(0.693)	(1.541)	(3.460)	(2.050)	(1.650)	(1.112)
R-squared	0.1755	0.2211	0.0656	0.1318	0.3031	0.1384

Note: Standard errors are in parentheses. *, **, and * denote significance at 10%, 5% and 1% levels**

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