EXPENDITURE PATTERNS OF AGRICULTURAL HOUSEHOLDS IN LEBOWA AND VENDA: EFFECTS OF THE FARMER SUPPORT PROGRAMME ON FOOD SECURITY

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Uittreksel

Bestedingspatrone van landbouhuishoudings in Lebowa en Venda: Die effek van die "Farmer Support Programme" op voedselsekerheid

Die doel van hierdie referaat is om aan te toon hoe die bepaling van bestedingspatrone van huishoudings in landelike gebiede aangewend kan word om faktore wat voedselsekerheid van huishoudings bevorder, te evalueer. Die referaat gee kortliks 'n oorsig van bestedingspatrone van huishoudings wat deelneem aan die Farmer Support Programme in Lebowa en Venda. Vanuit die resultate is dit duidelik dat 'n groot deel van die landelike huishoudings in Lebowa en Venda 'n mate van voedsel onsekerheid ondervind. Die resultate dui verder daarop dat die voorsiening van ondersteunende dienste en infrastruktuur aan bestaansboere die bevolking se voedselsekerheid in hierdie gebiede sal verbeter.

Abstract

The specific objective of this paper is to determine expenditure patterns of rural households with a view to evaluating factors which make households more food secured. Expenditure patterns of households participating in the Farmer Support Programme of DBSA were analysed and compared with no-participants in two areas, Lebowa and Venda. It is evident from the results of this study that a high proportion of rural households in Lebowa and Venda food insecured. Results also show that the provision of support services to subsistence farmers will help alleviate food insecurity.

1.   Introduction

Household expenditure information is useful for development planning purposes. The information is used primarily for preparing demand projections. Since the mid-eighties, when most Sub-Saharan African countries initiated structural adjustment programs (SAPs), there has been a critical need for information on household expenditure behaviour as evidenced by the numerous living standards projects. In this article, household expenditure patterns are analyzed for the Phokoane area of Lebowa, and the Khakhu and Mashamba wards of Venda. Cross-sectional survey data are used for this purpose.

Beginning with Engel's study in 1895, several scholars have tried to explain the relationship between income and household expenditures on food (Allen & Bowley, 1935; Stone, 1954; Prais & Houthakker, 1955; Houthakker, 1957; Cramer, 1971; and Goreaux, 1978). Studies by Kaneda & Johnston (1961), Edinburg University (1964), and Acquach (1977) have used data from Ghana to analyze the relationship between income and food expenditures. Their studies draw on the methodologies suggested in existing literature and attempt to verify

some of the elasticities obtained by authors in previous studies.

The basic proposition by Engel was that, "the proportion of income spent on food declines as income rises". This has been the fundamental premise for almost all studies on household expenditure. The differences in the various studies lie in either the data used to verify the proposition (time series versus cross-section), or the types of variables used in conjunction with income, or the type of functional form employed, to estimate the relationship between variables. The latter two issues, the variables used, and the functional form need further comment.

Engel's Law refers to the relationship between income and food consumption, so the appropriate dependent variable must be the proportion of income spent on food. For various reasons, it is common to find the proportion of total household expenses on a particular item used as the dependent variable instead of the proportion of income. Houthakker (1957) argues that there are both theoretical and practical reasons for preferring expenditures to income as a dependent variable. For example, the elasticities calculated, based on the expenditure measure reflect both the increase in physical quantities and the increase in "quality". Furthermore, researchers

have found the measurement of income less accurate than that of expenditures. Thus, the decision to use the proportion of household expenditures as the dependent variable in this study was dictated primarily by the latter reason.

The problem of functional form is less settled. The major candidate functions are the linear, double-log, semi-log, log-inverse, hyperbolic, inverse, and log-normal (Goreaux, 1978; Houthakker, 1957). There have been some attempts to employ flexible functional forms such as Box-Cox (Haque, 1988). The theoretical and practical considerations for choosing a functional form are well summarized by Goreaux (1978) and need no repetition. The choice of functional form is an empirical question, even though theoretical considerations play a role where the empirical evidence is less conclusive.

Houthakker (1957) used the double-logarithmic function, because it allows more freedom in dealing with multiple currencies, and it permits an easier introduction of the effects of family size. Sinha (1966) used a log-log inverse function with data from India based on "goodness-of-fit, absence of auto-correlation, and ease of economic interpretation of the function." Acquah (1977), using survey data from Ghana, employed an inverse function because it avoids the problem of having to take the log of zero values as would be required with a log function, and the fact that expenditures by households decline as household total expenditure decreases.

The log-linear functional form was chosen in this study for its simplicity, even though there are several cautions in the literature regarding its suitability for demand studies (Goreaux, 1978; and Houthakker, 1957). Food consumption is expressed in terms of expenditures rather than quantities (Houthakker, 1957). Finally family size was introduced as an additional explanatory variable to take account of differences in households. By measuring variables on a per capita basis and introducing family size as an additional variable, it is possible to account for economies of scale in consumption for larger families (Haque, 1988).

The general form of the functional model fitted is as follows:

$$Y_i = a + bX_1 + cX_2 + e_i$$

where
Y_i = household expenditure on the ith group of item
X_1 = household total expenditure
X_2 = family size
e_i = random error term assumed
a, b, c are parameters to be estimated

Expenditure measures are on a per capita basis. The natural logarithms of values of variables are used in the log-linear estimation.

2.   The Farmer Support Programme

The stated objective of the Farmer Support Programme (FSP) is to promote structural change away from subsistence agricultural production to commercial production (DBSA, 1986). The programme is based on the premise that this change can be achieved by supplying comprehensive agricultural support services to emerging farmers - primarily in selected areas where the potential for development is good.

This programme was developed so that rural communities eventually can help themselves to eliminate poverty and hunger by increasing income and productivity. This is done through the appropriate assistance of institutions, providing adequate extension, access to credit, inputs, etc. For households to efficiently produce food through a labour intensive process, appropriately designed institutions and support services should be available and effectively used by communities. Without adequate food production, more of rural household income will be used to purchase food, which reduces funds available for other purposes. Data from households participating in the FSP was analysed to determine expenditure and income patterns.

3.   Surveys and data

Two areas were selected to determine the expenditure patterns of agricultural households, i.e. Lebowa and Venda. Due to the expected low level of literacy of farmers, data were collected by means of well designed questionnaires, completed by enumerators.

In order to determine the expenditure patterns, a sample size of 75 households for Lebowa and 80 for Venda seemed to be appropriate. Surveys in Lebowa were conducted during June 1991 and April to August 1991 in Venda. Respondents include both FSP and Non-FSP farmers.

4.   Expenditure patterns of rural farming households

Table 1 presents expenditure patterns (mean value and contribution to total expenditure) among FSP and Non-FSP farmers in Lebowa and Venda.

4.1   Lebowa

The mean total expenditure values are above R4 500 for both groups. Households in the FSP group spend more on other food (15.26%) but very little on maize meal (2.99%). Expenditures on clothing, savings, farm expenses and household durables are relatively high. However, expenditures on transport (4.39%) and education (6.58%) are fairly low.

The relatively low expenditure on maize meal supports the fact that the FSP group produces comparatively more maize on their farms as compared to the Non-FSP group. Table 1 reveals that the Non-FSP group spends more on maize meal (8.62%) and comparatively less on other food (9.93%). The group also spends comparatively less on household durable goods (11.91%), but more on farm expenses (14.82%), than the FSP group.

The considerably higher expenditure on maize meal, the major staple, by the Non-FSP group increases the probability of a food insecure situation, i.e. under-nutrition or famine, in this group. This could happen in cases of short supply of staples due to drought or lack of income, e.g. due to a decline in wage employment. The possibility of a food insecure situation is therefore linked to the fact that the Non-FSP households do not produce enough of the major staples to ensure a secure food supply to the household for at least 18 months.

4.2   Venda

Mean expenditure values are above R700 per household in both groups.

Table 1: Mean expenditure values for FSP and non-FSP farmers in Lebowa and Venda, 1991

Expenditure item	Lebowa						Venda					
	FSP			Non-FSP			FSP			Non-FSP		
	Mean Value R	Std Dev	Contribution to total expenditure %	Mean Value R	Std Dev	Contribution to total expenditure %	Mean Value R	Std Dev	Contribution to total expenditure %	Mean Value R	Std Dev	Contribution to total expenditure %
FOOD/GROCERIES:												
Maize meal	154.16	316.96	2.95%	402.18	360.27	8.62%	-	-	-	-	-	-
Other food	801.56	1218.82	15.26%	463.73	380.06	9.93%	-	-	-	-	-	-
Food/Groceries	-	-	-	-	-	-	122.29	91.96	17.26%	195.64	145.65	19.60%
Household expenses	332.26	596.69	6.33%	116.45	112.53	2.49%	-	-	-	-	-	-
Personal (cosmetics, soap, etc.)	-	-	-	-	-	-	56.54	114.29	7.98%	42.05	37.68	4.22%
Transport	230.71	295.63	4.39%	111.82	80.23	2.39%	34.62	23.49	4.88%	54.09	91.28	5.43%
Clothing	639.96	623.09	12.19%	436.45	544.94	9.35%	122.04	140.77	17.23%	155.45	154.21	15.61%
Savings	1147.53	4.39	21.85%	-	-	-	119.06	197.49	16.81%	158.18	228.79	15.88%
Durable household expenditures	959.66	2598.88	18.27%	522.36	932.21	11.19%	30.04	50.55	4.24%	88.55	209.48	8.89%
Farm expenses	640.05	1261.55	12.19%	691.00	1443.31	14.82%	-	-	-	-	-	-
Instalments	-	-	-	-	-	-	65.91	141.47	9.42%	134.82	239.09	13.53%
Education	345.39	245.74	6.58%	1923.81	5996.90	41.21%	108.46	128.13	15.31%	94.14	96.66	9.45%
Medical	-	-	-	-	-	-	45.68	69.99	6.87%	72.91	118.82	7.39%
Total Expenditure	5251.28	2462.89	100.00%	4667.80	2631.93	100.00%	708.00	643.67	100.00%	995.83	1023.41	100.00%

Table 2: Ordinary least squares estimates of elasticities for selected expenditure items for FSP and non-FSP clients in Lebowa and Venda, 1991

Item	Lebowa			Venda		
	FSP	Non-FSP	Pooled	FSP	Non-FSP	Pooled
Maize Meal						
β_1	-0.08	-0.72	-0.24	0.99**	0.22	0.91**
	-(0.24)	-(0.63)	-(0.71)	(5.07)	(0.42)	(5.49)
β_2	0.65	0.15	0.72	1.22**	1.59	1.29**
	(0.78)	(0.03)	(0.87)	(3.48)	1.57	(4.09)
R^2	0.10	0.15	0.11	0.45	0.20	0.39
Other Food						
β_1	0.94**	0.72	0.88**	0.78**	0.80**	0.80**
	(40.92)	(1.64)	(4.88)	(8.99)	(7.09)	(12.06)
β_2	-0.41	-5.83**	-0.72	0.17	0.22	0.06
	-(0.91)	-(3.47)	-(1.61)	(1.14)	(0.97)	(0.44)
R^2	0.24	0.62	0.36	0.60	0.84	0.64
Household						
β_1	1.29**	0.17	1.14**	1.10**	1.37**	1.14**
	(4.79)	(0.29)	(4.62)	(7.53)	(4.00)	(9.11)
β_2	0.17	0.28	0.29	-0.69	-0.14	-0.53*
	(0.26)	(0.13)	(0.28)	-(2.64)	-(0.20)	-(2.25)
R^2	0.33	0.02	0.29	0.64	0.62	0.49
Transport						
β_1	0.94**	-0.18	0.79**	1.58**	1.81**	1.66*
	(4.72)	-(0.66)	(4.38)	(6.19)	(3.41)	(8.08)
β_2	-0.72	0.12	-0.68	0.45	-1.26	0.09
	-(1.53)	(0.11)	-(1.52)	(0.99)	-(1.21)	(0.25)
R^2	0.43	0.05	0.29	0.42	0.56	0.44
Clothing						
β_1	0.80**	0.92	0.84**	1.10**	1.66**	1.15**
	(3.49)	(1.66)	(3.99)	(4.73)	(4.43)	(6.03)
β_2	0.02	1.93	0.11	-1.16**	1.05	-0.75*
	(00.04)	(0.90)	(0.22)	(-2.78)	(1.42)	-(2.06)
R^2	0.24	0.36	0.26	0.27	0.69	0.30
Savings						
β_1	2.39**		2.14**	0.77**	0.98*	0.92**
	(60.99)		(6.69)	(3.62)	(2.43)	(5.26)
β_2	0.22		0.05	-0.54	1.27	-0.34
	(0.28)		(0.07)	-(1.42)	(1.60)	-(1.02)
R^2	0.39		0.34	0.17	0.47	0.24
Durable household expenditure						
β_1	2.33**	2.17*	2.32**	0.79**	0.25	0.64**
	(6.29)	(2.47)	(6.85)	(6.64)	(1.65)	(6.27)
β_2	-1.11	3.19	-0.84	0.18	0.05	0.18
	(-1.27)	(0.95)	-(1.01)	(0.85)	(0.16)	(0.93)
R^2	0.34	0.52	0.35	0.44	0.22	0.33
Farm Expenses						
β_1	0.75**	0.58	0.75**	0.94	1.11*	0.94**
	(4.79)	(0.84)	(4.79)	(4.65)	(3.92)	(5.92)
β_2	-0.03	1.75	0.04	-0.89	-0.25	-0.81**
	-(0.08)	(0.66)	(0.10)	(2.46)	-(0.45)	-(2.69)
R^2	0.23	0.15	0.21	0.26	0.61	0.30
Education						
β_1	0.81	1.28	0.89**	1.27**	1.30*	1.34**
	(4.69)	(1.43)	(4.91)	(4.54)	(2.60)	(5.81)
β_2	1.79**	0.60	1.69**	0.53	1.89	0.61
	(4.41)	(0.18)	(3.79)	(1.06)	1.92	(1.39)
R^2	0.37	0.22	0.32	0.29	0.52	0.32

* = coefficient is significant at 5% level; ** = coefficient is significant at 1% level; β_1 = Expenditure Elasticity; β_2 = Household Size Elasticity; Numbers in parentheses are t-statistics

The Non-FSP households spend more on food/groceries (19.60%) than the FSP group (17.26%). The FSP members spend more on education and personal items (cosmetics, soap, etc) than the Non-FSP members, and *vice versa* for all other expenditure items.

Overall total expenditures are, however, higher with the Non-FSP group. This could to some extent be contributed to higher average income earned through casual or migratory work. This also partly explains why the Non-FSP group spends more on goods/groceries, as they are more absent from their land/homestead. They have a bigger income to purchase more foodstuffs. This does not necessarily imply that the households in the Non-FSP group are food insecure, but as explained in Section 4.1 above, there is a greater possibility for a food insecure situation in this group due to the dependence of these households on surplus production and wage income.

5. The effect of household income and family size

5.1   General

The total effect of household size on expenditures is a combination of two effects: "a specific effect" and an "income effect". The "specific effect" results from the increase in the "need" for various commodities when family size increases. The increase in need is usually less than proportional to the increase in size because of economies of scale in large households. On the other hand, the increase in family size does not increase the need for every commodity in the same proportion and may indeed reduce the need for some. Thus an increase in family size makes people relatively poorer. This is known as the "income effect". Depending on the relative sizes of the positive "specific effect" and the negative "income effect" the estimated effect of household size may be positive or negative. The survey data used in this study will not permit a decomposition of these separate effects, and only broad generalisations are possible. Table 2 summarises the elasticities for both FSP and Non-FSP farmers in Lebowa and Venda based on the log-linear model. Each equation was estimated using the Ordinary Least Squares (OLS) procedures.

5.2   Lebowa

There is no consistency in the pattern of the effect of family size on the expenditure categories. In some cases, the "specific effect" dominates, leading to a positive and statistically significant coefficient, while in other cases the "income effect" dominates leading to a positive and statistically significant coefficient.

Both the individual group and pooled results confirm Engel's Law. The estimated food expenditure elasticities are less than one. The results show that the FSP clients are able to spend more on other food as compared to the Non-FSP clients. The estimated expenditure elasticities for maize were, however, higher with the Non-FSP clients (-0.72) than the FSP clients (-0.08), which show that the FSP clients spend less on maize meal than the Non-FSP clients.

The negative signs of the estimated elasticities for maize meal indicate that as household expenditures increase, households tend to spend less on maize meal. Non-FSP farmers tend to spend proportionally much less on maize meal. This finding is not surprisingly taking cognisance of the fact that about 80 per cent of the Non-FSP farmers are net consumers of maize.

The expected positive relationship between household expenditures, farm expenses and education is confirmed by the estimated elasticities of 0.75 and 0.89, respectively.

The elasticity estimate on the effect of family size on other food is negative and highly significant. The income effect therefore dominates, meaning that an increase in family size of the Non-FSP farmers makes the group relatively poorer to the extent that other food becomes a luxurious item to buy.

Estimated elasticities of the effect of family size on education are significant for the pooled (1.69) and FSP group (1.79) The positive sign indicates that the "specific effect" dominates, which means there is an increase in the need for education expenditures as family size increases. Since the estimated elasticities are greater than 1, education is also considered a luxury good. None of the estimates of the effect of family size on the other expenditures are significant.

If one were to focus on the pooled results, a cautious conclusion would be that the specific effect is dominant; that is, there is an increase in the "need" for various commodities when family size increases. This conclusion is based on the observation that most of the pooled coefficients for the family size are positive, although not significant.

5.3   Venda

Engels' law is again confirmed by the individual group and pooled results. All the estimated food/groceries expenditure elasticities are less then one and significant. The expenditure elasticity for food/groceries for Non-FSP group was 0.80 and highly significant (t = 7.09) on the other hand the estimated food/groceries elasticity for the FSP group was slightly lower (0.78), but also highly significant (t = 8.99). The pooled expenditure elasticity was 0.80, also highly significant (t = 5.49) at both levels. These results show that the Non-FSP group spend more on food/groceries than the FSP group. The pooled elasticity expenditure for food/groceries for both groups indicate that, in general, rural households in Venda have relatively high expenditure elasticity for food, indicating that food security may be a problem.

The pooled elasticity estimate for clothing, savings and transportation are all significant. Pooled elasticity estimates are: clothing 1.14 (t = 9.11), savings 1.66 (t = 8.09) and transportation 1.15 (t = 6.03). The fact that the elasticity estimates for clothing, savings and transportation exceed one indicates that clothing, savings and transportation are luxury items. The non-FSP households spend more on clothing, savings and transportation than the FSP households.

The income effect dominates in the relationship between family size and expenditures on clothing, transportation, household durable and medical expenditures. The pooled results, however, lead to negative and highly significant coefficients, except for household durables. However, the "specific effect" dominates in the relationship between family size and expenditures on all the remaining expenditure items with the pooled results leading to positive but not significant coefficients, except with education expenditure elasticity. This means that there is an increase in need for educational expenses as family size increases. The estimated expenditure elasticity estimate of 1.29 for the pooled results shows that with increase in family size, education becomes a luxurious need.

However, in general, there is no clear consistency in the pattern of the effect of family size on the expenditure categories. In some cases the "specific effect" dominates, leading to a positive value coefficient, while in other cases the "income effect" dominates leading to a negative coefficient. None of the estimates of the effect of family size on food/groceries expenditures is significant.

Focusing on the pooled results, a cautious conclusion would be that the income effect is dominant; that is "an increase in family size makes people relatively poorer" (Houthakker, 1957).

6. Conclusions

Africa is known to be the only continent in the world where per capita food production has declined over the past decades. Africa's rapidly growing population has also aggravated the food problem. Much concern exists about food security in Africa if focused on national availability and affordability of food to rural communities. This is an integral part of the ultimate objective of policy-makers described as growth and equity, or the provision of the opportunities for full human and social development.

The specific objective of this paper was to determine expenditure patterns with a view to evaluating factors which make households more food secured. Expenditure patterns of households participating in the Farmer Support Programme of DBSA were analysed and compared with non-participants in two areas, Lebowa and Venda.

Results obtained revealed that households with access to support services (FSP) significantly produced and consumed more maize, as well as spent more on other goods than households without access to support services (Non-FSP). The Non-FSP group consisted of a larger proportion of net consumers than the FSP households. Estimated elasticity expenditures show that the FSP group spent less on maize meal, but more on other food, durable household goods and farm expenses, than the Non-FSP group. These results put the FSP clients in a comparatively better position as far as food security is concerned than the Non-FSP clients. In the light of these findings, it is believed that the provision of support services to subsistence farmers will help improve the food security situation in rural areas.

It is evident from the results of this study that a high proportion of rural households in Lebowa and Venda are food insecure. Although the study did not embrace other less developed areas of Southern Africa, the implication is that the food security situation in those areas is similar to what pertains in Lebowa and Venda.

Food security cannot be reached overnight. Policy objectives to alleviate food insecurity requires a complex and time-consuming development of institutions and of the rural population. Actions often run counter to the real interests of the poor. The primary cause of malnutrition and insufficient food consumption is not the lack of supplies, but low income or poverty, resulting in inefficient demand. The solution for the rural poor is not only to add to the supply of food but also to raise the incomes of the poor so that they can buy the food that is available. The FSP programme of DBSA supports both these premises and addresses both sides of the "hunger equation". Not only does it increase household food supply through increasing food production, but because food expenditure is a major portrait of total household expenditure, it also increases the real income of householdes through freeing funds for other purposes, eg. savings. In this manner it makes a positive contribution towards the food security of rural households with access to agricultural land.

In the long run, the communities must help themselves to eliminate poverty and hunger by increasing income and productivity. This should be supported by appropriate assistence of institutions, providing adequate extension (production methods), access to credit, inputs, etc.

Note

This paper is based on a MSc (Agric) dissertation by Kwadwo Dankwa in the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria.

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