Orphans and Discrimination in Mozambique: An Outlay Equivalence Analysis

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Abstract:

The present study employs Deaton's outlay equivalence approach to analyze potential discrimination in resource allocation within households against children who are not the biological descendant of the household head in Mozambique. High HIV prevalence in Mozambique motivates the study. The projected 800,000 AIDS related adult deaths over the period 2004-2010 will leave significant numbers of orphans in their wake. Of these, many will reside in families where the household head is not their biological parent. Results point to discrimination in the intra-household allocation of resources against children that are not direct biological descendants of the household head *in poor households*. This discrimination is identified at the national, rural, and urban levels In non-poor households, resource allocations between biological and non-biological children do not differ significantly.

1. Introduction

The issue of how resources are allocated within households has become an important focus of poverty analysis. Unfortunately, intra household resource allocations are very difficult to measure directly; and standard household consumption surveys rarely attempt to do so. To counter this difficulty, indirect measures have been developed. In particular, Deaton (1989a) proposed a method, labeled 'outlay equivalence', whereby spending on children is measured indirectly via spending on adult goods. The intuition is that the addition of a child should imply increased spending on goods for children. If total consumption levels are inflexible, the budget constraint must then imply reduced spending on adult goods. Since, particularly in developing countries, pure adult goods are much easier to identify than pure children's goods, the method has become popular.

Application has often focused on whether female children displace the same volume of expenditure on adult goods as their male counterparts. Failure to do so would indicate discrimination of girls relative to boys in intra-household resource allocation. Using this approach, evidence from Asia often shows that girls are at a disadvantage relative to boys in the allocation of family resources (Miller, 1981; Deaton, 1989b; Behrman, 1990; Faverau, 1990; Gibson and Rozelle, 2004; and Kingdon, 2005). On the other hand, studies in African countries tend not to find statistically significant evidence of discrimination against girls (Deaton, 1989b; Haddad and Reardon, 1993).

The present study employs Deaton's outlay equivalence approach to analyze potential discrimination in resource allocation within households against children who are not the biological descendant of the household head in Mozambique. Specifically, this study seeks to:

1) Identify goods that are demographically separable from children. These goods could be labeled adult goods that children do not consume.
2) Test for discrimination against children that are not the biological descendant of the household head in the intra-household allocation of consumption.[1]

The remainder of this paper is structured as follows. Section 2 presents background information. Section 3 discusses the data and methods employed. Section 4 presents results. The final section presents conclusions.

2. Background

High HIV prevalence in many parts of Africa motivates the study. For example, in Mozambique, the prevalence of HIV among adults aged 15-45 years in 2005 is estimated to be about 16.2 percent and is projected to climb (INE et al, 2004). Figure 1 illustrates estimated annual and cumulative adult AIDS deaths from 1991 to 2010. As shown in the figure, nearly 400,000 Mozambican adults are estimated to have died of AIDS related causes by 2003. Worse, AIDS deaths are projected to grow rapidly through the rest of the decade. In fact, more than twice as many adults are projected to die in the period 2004-2010 compared with all cumulative AIDS related adult deaths up to 2003.

[1] It is recognized that a child within a household who is not the direct descendant of the household head is not necessarily an orphan. This issue is discussed in greater detail in the following section.

Due to the tendency of the pandemic to strike young adults, AIDS related deaths leave significant numbers of orphans in their wake. A demographic and health survey (DHS) carried out in 2003 found that, for children under 15 years of age, approximately one child in ten had been orphaned (paternal, maternal, or dual) (INE, 2004). Demographic projections based on a time series of HIV prevalence data estimate an orphaning rate of more than 16% in 2003 for children under 18 years of age (INE et al., 2004). The difference in age categories (0-14 versus 0-17) explains part, but not all, of the difference in the rates. Reluctance on the part of surveyed households to admit to the death of the biological mother of the child could account for the remaining difference and would explain the relatively low ratio of maternal to paternal orphans in the DHS data relative to the demographic projections. Overall, despite some differences in the quantity and nature of orphaning, both sources of data point to significant orphaning. Furthermore, the number of orphans appears set to climb dramatically.

Mozambican national policy specifically favors the integration of orphans into substitute or extended families (GM, 2004). This mirrors policy in other highly afflicted African countries such as Botswana, Zimbabwe, Zambia, and Uganda (UNUSIDA, 1999). The approach has the advantage that orphans remain integrated within a family. This approach to coping with orphaning also implies that the resources available to families that accept orphans and the allocation of those resources within the household become of policy interest.

Generally, resources are exceedingly tight within Mozambican households. In 1996-97, 72% of children (aged 0-17) lived in households characterized as absolutely poor using a consumption based metric. By 2002-03, this share had improved considerably but remained very high with

58% of all children living in households characterized as absolutely poor. As is logical after a moments reflection, non-biological children tend to concentrate in households that are on average slightly better off (Nhate 2004). Nevertheless, resource availability remains distinctly limited. Because of the severe limitation of available resources, difficult decisions regarding resource distribution have to be made. Hamilton´s rule indicates that the biological bond is very important in the distribution of resources within the household implying the potential for discrimination against non-biological children in the allocation of limited available family resources (Hamilton, 1964). Some evidence of discrimination has already been found. Nhate (2004) found that children that are not biological descendants of the household head were significantly less likely to attend school in both rural and urban areas holding constant other factors.

It is important to point out that, similar to Nhate (2004), this analysis compares children who are biological versus non-biological descendants of the household head rather than orphans specifically. The available database on consumption does not permit the separation of orphans specifically. For the age group 15 and under, about one child in four is not the biological descendant of the household head. For an unknown but likely substantial fraction of these children, the circumstance of being fostered reflects stress, such as the death of a parent, resulting in placement of the child with another family. We hypothesize that these children are at risk of being discriminated against. The AIDS pandemic can be expected to add considerably to this group of children over the next decade.

Nevertheless, an important subset of children who are not the biological descendant of the household head is not likely to be at risk for discrimination. In particular, weak geographic coverage of complete primary school causes some families living in areas without access to primary school to send children to live with relatives or friends in areas where primary school is available. It may be plausibly assumed that children who are sent by their parents to live with another family in order to attend school are less likely to be discriminated against than the target group of interest children, such as orphans, who are forced into fostering due to some negative shock. As we are not capable of distinguishing between these two groups of children in our sample, the results obtained here could be viewed as a lower bound on the degree of discrimination within families against the target group of interest.

3. Data and Methodology

3.1. Data

The data used in this study comes from the national household survey about living conditions (IAF) undertaken by the National Institute of Statistics (INE). This survey is representative at the national, provincial, and rural/urban levels. The survey was conducted between July 2002 and June 2003. The year long interview period was programmed in order to capture potential seasonality in household consumption. The survey covered 8,700 households corresponding to about 44,000 individuals. Enumerators visited each household at least three times over the period of a week to collect consumption and other information.

The survey collected expenses on 863 different goods (food and non-food). These goods can be grouped in different ways depending on the interests of each researcher. For this specific case, we are interested in identifying adult goods. These are goods that children do not consume. If this is indeed the case, the addition of a child (with the concomitant expenses necessary to support that child) acts in a manner analogous to a reduction in income with respect to spending on adult goods. For the case of normal goods, consumption should decline. Six candidate adult goods were identified including: adult clothes; alcoholic beverages (inside and away from home); personal care (hair treatment, nail products, lipstick, "mulala", lotion, etc,); public and private transportation services; tobacco; and food and soft drinks away from home.

Table 1 presents relevant data for this study. The analysis will be conducted both at the national level and by rural and urban zones in order to capture differential characteristics of rural and urban families. Furthermore, the analysis will also be performed separately for poor and non-poor household. Poor household are defined as those living below a poverty line that reflects basic needs (Ministry of Planning and Development et al, 2004). Resource constraints in these households living below the poverty line are severe and may influence intra-household resource allocation decisions. Finally, following general practice, 1046 households without any children and 538 households with only a single household member were excluded from the sample leaving a total of 7116 households with at least one child present in the final sample.

The average budget share of these candidate adult goods as a group is 13 percent. Tobacco and adult clothes are the goods that have the highest share among all adult goods. Each of these two goods represents about 4 percent in total of expenditure. The groups "food and soft drinks

consumed away from home" and "personal care" represent small shares of total expenditures (0.2 and 0.6 percent, respectively). Generally, budget shares for adult goods are higher in urban than in rural areas. In urban areas, these goods represent 15 percent of total expenditures compared with 11 percent in rural areas. Differences between rural and urban are most marked with respect to transportation and personal care products.

Overall, the shares for adult goods observed in Mozambique are similar to values found in other developing countries. In Burkina Faso, for example, Haddad et al. (1993) found that these goods represented 15 percent of total expenditures. In Papua New Guinea, Gibson and Rozelle (2004) found that candidate adult goods represented 12 percent of total of expenditure.

Average total household expenditure measured as a proportion of the poverty line is 1.28, with urban households consuming on average more than rural households (1.53 versus 1.16 respectively). Average household size is 4.8 with urban households being slightly larger than rural households (5.2 versus 4.7 respectively). The largest demographic category is biological children aged 0-5 years in rural areas. Of the total rural population, nearly 17 percent are biological children aged 0-5 years old. In urban areas, the same group represents about 13 percent of the total population. Non-biological children in the same age group represent only about 4 percent of the total population. The proportion of people in subsequent demographic groups decrease compared to the first category. As one would expect, biological children represent a higher proportion on average compared to non-biological children for each age group.

In the study sample, about 25 percent of the households are headed by women with a slightly higher percentage in urban areas compared to rural areas (27 and 24 percent respectively). In terms of productive activities, 76 percent of the active population worked at least part-time in agriculture and fishing. Agriculture and fishing utterly dominates activities in rural areas with 98% of the active population engaged at least part-time in this sector. Agriculture remains important in urban areas with 50 percent of active individuals identifying it as a primary activity. In urban areas, 31 percent of the active population also reported working in trading/commerce and 27 percent in services activities.

3.2. Analytical Methodology

Analysis of orphan discrimination follows the methodology developed by Deaton et al (1989a). As indicated earlier, rather than study intra-household allocation of resources in terms of gender, the comparison considered here is between children who are direct descendants of the household head (labeled 'biological') and those who are not (labeled 'non-biological').

Since the central objective of this study is to analyze the possible discrimination of non-biological descendants of the household head within the household, it was necessary to first categorize household members into one of 10 groups. The first six groups, comprised of people under 15 years of age, are the ones of primary interest for this study. The remaining four groups include adults that are used for the confirmation of the presence of adult goods. The groups were divided in the following way: biological children aged 0-5 years (group 1), non-biological children aged 0-5 years (group 2), biological children aged 6-10 years (group 3), non-biological children aged 6-10 years (group 4), biological children aged 11-15 years (group 5), non-

biological children aged 11-15 years (group 6). For the rest of the age groups, the categorizations were as follows: people aged 16-20 years (group 7), people aged 21-25 years (group 8), people aged 26-59 years (group 9), people 60 years and older (group 10).

The next step consisted of the identification of adult goods. For the analysis of demographic separability of goods, we used the linear model of Deaton et al, 1998a:

$$p_i q_i = \alpha_{0i} + \alpha_{1i} X_G + \sum c_{ij} n_j + d_i . z + \varepsilon_i \qquad (1)$$

Where:

$p_i q_i$ - expenditure on the candidate adult good,

X_G - total expenditures on adult goods,

n_j - number of members in each demographic category,

z - a vector of other explanatory variable included in the model, and

ε_i - the error term.

Given total expenditures on adult goods, children should not influence the distribution of spending across adult goods.[2] If the goods included are really adult goods, children will not have any affect in equation (1). Therefore, the coefficients, c_{ij}, should be insignificantly different from zero, both individually and jointly, for demographic groups related to children in order for demographic separability to hold.

Following the test of existence of adult goods using equation (1), we calculate the "ratio of equivalent expenditures". The "ratio of equivalent expenditure (ρ_{ir})" for a normal adult good *i* and demographic category *r*, can be calculated as:

$$\rho_{ir} = \frac{\partial(p_i q_i)/\partial n_r}{\partial(p_i q_i)/\partial x} * \frac{n}{x} \qquad (2)$$

where ρ_{ir} measures the effect of the addition of a member of type *r* on total expenditure on good *i* measured in terms of the change in total expenditure that would be necessary to produce the same effect on demand with this change presented as a share of per capita expenditure. For adult goods, one would expect a reduction in expenditure given an additional child and hence a negative value for ρ_{ir}.

Following Deaton, (1989a), the equivalent expenditure ratios in (2) can be calculated using the coefficients estimated from a standard Engle curve, specified in the following way:

$$w_i = \frac{p_i q_i}{x} = \alpha_i + \beta_i \ln(\frac{x}{n}) + \theta_i \ln n + \sum_{j=1}^{j-1} \gamma_{ij} (\frac{n_j}{n}) + \delta_i . z + \mu_i \qquad (3)$$

where w_i is the budget share of the i[th] adult good, *x* is the value of household total expenditure, *n* is the household size, n_j is the number of people in demographic group *j*, and *z* is a vector of control variables.

The estimated parameters in equation (3) can be used to calculate:

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[2] In the actual regressions, total expenditure on adult goods, X_G, was instrumented by total household

$$\pi_{ir} = \frac{(\theta_i - \beta_i) + \gamma_{ir} - \sum_{j=1}^{j} \gamma_{ij} \left(\frac{n_j}{n}\right)}{\beta_i + w_i} \quad . \qquad (4)$$

These estimated ratios are obtained by substituting the parameters with their respective estimates (from equation 3) and substituting for w_i and the fraction $\frac{n_j}{n}$ by the mean values in the sample. After calculating the π´s, we can test the hypothesis of equal treatment between the biological and non-biological children in each age group and for all adult goods, as shown below:

$$Ho : \pi_{ij} = \pi_{ik} \qquad (5)$$

where *j* refers to biological children and *k* to non-biological children in the same age group.

Using the calculated π´s, a second test for demographic separability was performed providing a robustness check for the selection of adult goods using equation (1). If demographic separability holds, the values for the estimated π ratios across goods for the same demographic group (r) should be insignificantly different from one another. This test is implemented for a group of v goods by testing the following null hypothesis for i = 1, 2,3, 4, ……v:

$$H_o : \Delta_{ir} = \pi_{ir} - \sum_j \frac{\pi_{jr}}{u} = 0 \quad . \qquad (6)$$

consumption.

Alternative approaches to deriving standard errors for the π ratios are described in Deaton et al. (1998a). Here, the standard errors for the π ratios were derived using the bootstrap methodology. The bootstrap method involves drawing synthetic samples of the same size as the original sample by sampling *with replacement* from the original sample.[3] Hence, an arbitrary observation from the original sample may appear not at all, once, or multiple times within a given synthetic sample. Regressions using equation (3) were run on 1000 synthetic samples and the π ratios were calculated in each instance. Standard errors are then easily calculated from this sample of 1000 π ratios. The bootstrap approach has the advantage of accommodating the non-linear nature of the π ratios as a function of the estimated parameters. Nevertheless, to confirm the validity of the bootstrap approach, standard errors were calculated using the linear approximation method suggested by Deaton (1989a) with similar results.

4. Results

The analysis was performed at the national, rural, and urban levels with households further divided by socio-economic status (poor and non-poor households) resulting in six sets of results.[4]

4.1 Analysis for poor households

4.1.1 Identification of adult goods

Table 2 presents results of the tests for identification of adult goods based on equation (1) for the sub-set of poor households. The results for this sub-set of population indicate that all six

[3] The method for drawing synthetic samples paralleled the approach for drawing the original sample.

candidate adult goods qualify. Table 3 presents the results of separability test across goods (equation (6)), which gives similar results.

4.1.2 Measuring Discrimination

Tables 4 and 5 present π- ratios and standard errors for the analysis conducted at the national, rural, and urban levels respectively for poor households. As stated above, negative π ratios indicate compression of expenditure on the associated adult good due to the addition of a child in a given age group. There are seven goods (the six adult goods plus the results for all six goods combined) and three age classes resulting in 21 comparisons at each of the three analysis levels (national, rural, urban) or 63 comparisons overall. However, the crucial comparison is with respect to the aggregate of all six adult goods. For this case, the relationship is as hypothesized (greater compression of expenditure on adult goods with respect to biological children) in eight of nine instances.

Table 6 presents the results of F-tests for equality of π ratios between biological and non-biological children at the national, rural, and urban levels respectively. Again, the crucial tests are the ones for all six goods combined. For this aggregate, the greater compression of expenditure on adult goods with respect to biological children was found to be statistically significant for four of the eight possible cases. Muddying the waters somewhat, the one case with an unexpected sign (more compression of household expenditures for non-biological children than biological in the case of children from 0-5 years old in urban areas) is also statistically significant at the 10% level.

[4] The analysis was also performed with poor and non-poor households combined. These results are available from the authors on request.

As a further robustness check, χ^2 tests were performed on the aggregate good to test the hypothesis that π ratios are equal jointly for each of the three age groups (e.g., three linear restrictions). The results reject the hypothesis of equal π ratios between biological and non-biological children at the rural, urban and national levels. In the case of urban areas, the direction of the sign of the difference in π ratios is counter to expectation rendering the joint test inadmissible.

Despite the one counterintuitive result, the weight of evidence indicates discrimination in intra-household resource allocation against children that are not the biological descendant of the household head.

4.2 Analysis for non-poor households

4.2.1 Identification of adult goods

Table 7 presents results of the tests for identification of adult goods based on equation (1) for the sub set of non-poor households. Three out of the six candidate adult goods fail to pass this test, namely adult clothing, tobacco and transportation. Because we cannot continue the analysis with non-adults goods, the analysis preceded using only the three goods (alcohol, Meal/drink away from home and personal care) that qualified as adult goods (Table 7). Table 8, presents the test of separability across adults goods. The results confirm separability of these three goods.

4.2.2 Measuring Discrimination

Tables 9 and 10 present π- ratios and standard errors for the analysis conducted at the national, rural, and urban levels for non-poor households. There are four goods (the original three plus the results for all 3 goods combined) and three age classes resulting in 12 comparisons at each analysis of the three analysis levels (national, rural, urban) or 36 comparisons overall. Again, the crucial comparison is with respect to the aggregate good. Compression of expenditures on adult goods is greater for biological than non-biological children in five out of 9 instances.

Table 11 presents the results of t-tests for equality of π ratios between biological and non-biological children at the national, rural, and urban levels respectively. For the sub-set of non-poor households, this test fails to find discrimination between biological and non-biological children at all levels (national, rural and urban). Similar to the analysis of poor households, a c^2 test examining joint significance was performed and also fails to find significant differences in ratios among biological and non-biological children.

5 Conclusions

The weight of evidence points to discrimination in the intra-household allocation of resources against children that are not direct biological descendants of the household head in poor households. Discrimination is significant for younger children (aged 0-10) in rural households and older children (aged 11-15) in urban households.

There is no evidence that non-poor households discriminate against children that are not the biological descendant of the household head. There are two likely reasons underpinning the

dichotomy of results between poor and non-poor households. First, resources are more severely constrained in poor versus non-poor households forcing more difficult choices in resource allocation. Non-biological children may experience discrimination under these harsher economic conditions. Second, our inability to identify the reason for the presence of a non-biological child within a family may also play a role. The available evidence indicates that wealthier households are more likely to host children in order for them to attend school (Nhate, 2004). Hence, the bias from mixing together children that are likely to be discriminated against (AIDS orphans for example) with children that are not (those living with friends or relatives in order to attend school) under a single rubric "non-biological children" may be substantially more profound in the non-poor sub-set of the population. As indicated earlier, the results obtained are likely a lower bound on the discrimination against the target group of children.

Unfortunately, AIDS is likely to aggravate the problem over the next five to ten years by substantially increasing the number of children requiring care from neighbors, friends, and/or relatives due to the death of one or more of their parents. As the overall burden on communities grows, few would hypothesize that the tendency for non-biological children to reside in better off households would become more pronounced or the degree of discrimination against non-biological children would decline. Rather, the inverse seems more likely.

If one wishes to target some assistance at particularly disadvantaged groups, then children living in poor households that are not the biological descendant of the household head, especially those that do not attend school or attend school only sporadically, would appear to be a logical choice. The results also indicate that the policy of placing orphans in families of neighbors, friends or

relatives likely functions less well, in terms of the interests of the orphans, than would occur in a world free of discrimination. Further, the policy may perform even more poorly as the burden grows. Nevertheless, the result does not necessarily imply that the policy should be abandoned. This decision can only be reached through comparison with potential substitute policies. While the analysis of potential substitute policies merits further attention, the available evidence indicates that attractive substitute policies are few to non-existent. Despite discrimination, the current policy may be the best available alternative.

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7 Figures and Tables

Figure 1: Adult AIDS deaths in Mozambique.

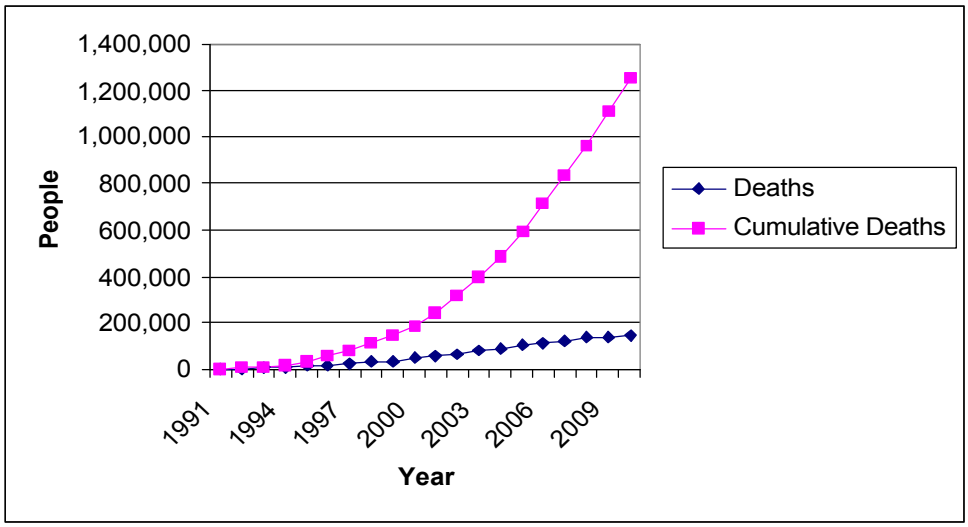

Table 1: Description of the data using the mean values of each variable.

Variables	National	Urban	Rural
Proportion of candidates to adult goods	0.125	0.153	0.114
Proportion of Alcohol in total expenditure	0.010	0.011	0.010
Proportion of tobacco in total expenditure	0.043	0.049	0.041
Proportion of adult clothes in total expenditure	0.043	0.043	0.043
Proportion of transportation in total of expenditures	0.022	0.035	0.016
Proportion of food and soft drinks consumed away from home in total of expenditures	0.002	0.004	0.001
Proportion of personal care in total of expenditures	0.006	0.011	0.004
Log of total household expenditures	9.151	9.496	8.851
Log of household size	1.556	1.632	1.491
Proportion of biological children aged 0-5 years	0.150	0.128	0.170
Proportion of non biological children aged 0-5 years	0.040	0.042	0.038
Proportion of biological children aged 6-10 years	0.104	0.098	0.109
Proportion of non biological children aged 6-10 years	0.032	0.032	0.032
Proportion of biological children aged 11-15 years	0.079	0.082	0.076
Proportion of non biological children aged 11-15 years	0.031	0.035	0.028
Proportion of people aged 16-20 years	0.110	0.130	0.092
Proportion of people aged 21-25 years	0.075	0.087	0.065
Proportion of people aged 26-59 years	0.320	0.320	0.319
Proportion of people with more than 60 years of age	0.059	0.045	0.072
Proportion of households headed by women	0.252	0.266	0.239
Educational level of household head	1.106	1.884	0.432
The mean age of the household head	42.937	42.696	43.146
Proportion of people in agriculture and fishing	0.756	0.503	0.976
Proportion of people in commerce	0.180	0.313	0.0065
Proportion of people in the services sector	0.142	0.270	0.030

Poor Households

Table 2: Test of excluding children demographic groups- poor households.

Candidates to adult goods	Biological 0-5	Non-biological 0-5	Biological 6-10	Non-biological 6-10	Biological 11-15	Non-biological 11-15	Join test of excluding all children groups
				P- value			
				National			
Alcohol	0.032	0.749	0.092	0.058	0.461	0.022	0.284
Tobacco	0.065	0.453	0.01	0.32	0.012	0.027	0.055
Adult cloth	0.807	0.378	0.592	0.761	0.781	0.273	0.850
Transportation	0.337	0.074	0.136	0.923	0.286	0.056	0.219
Meal and soft drink away home	0.571	0.529	0.673	0.689	0.012	0.152	0.158
Personal care	0.108	0.488	0.892	0.311	0.251	0.901	0.135
				Urban			
Alcohol	0.223	0.163	0.865	0.418	0.411	0.767	0.831
Tobacco	0.273	0.221	0.704	0.477	0.243	0.072	0.514
Adult cloth	0.452	0.370	0.510	0.532	0.280	0.670	0.827
Transportation	0.875	0.163	0.873	0.05	0.954	0.548	0.169
Meal and soft drink away home	0.192	0.494	0.468	0.172	0.15	0.036	0.207
Personal care	0.527	0.458	0.715	0.539	0.876	0.963	0.925
				Rural			
Alcohol	0.058	0.501	0.079	0.085	0.315	0.016	0.379
Tobacco	0.185	0.839	0.008	0.241	0.024	0.099	0.060
Adult cloth	0.469	0.255	0.423	0.518	0.997	0.217	0.813
Transportation	0.261	0.202	0.108	0.412	0.305	0.069	0.624
Meal and soft drink away home	0.329	0.548	0.519	0.443	0.038	0.96	0.420
Personal care	0.21	0.177	0.86	0.22	0.151	0.585	0.113

Table 3: Wald tests for equality of p-ratios across adult goods- poor households.

Age and Child Status	National		Rural		Urban	
	Test	P- Value	Test	P- Value	Test	P- Value
Biological (0-5)	8.404	0.209	8.262	0.220	1.861	0.928
Non-biological (0-5)	10.256	0.097	8.377	0.211	2.066	0.913
Biological (6-10)	2.759	0.853	3.359	0.789	3.002	0.828
Non-biological (6-10)	1.057	0.972	1.410	0.956	1.403	0.956
Biological (11-15)	5.222	0.555	8.957	0.169	6.225	0.429
Non-biological (11-15)	9.089	0.160	8.313	0.216	4.491	0.650
General category (16-20)	13.088	0.024	9.663	0.126	6.717	0.371
General category (21-24)	15.460	0.006	7.048	0.335	11.374	0.057
General category (25-59)	9.715	0.123	8.491	0.202	4.958	0.590

Table 4: Outlay equivalence ratios for adult goods - poor households.

Adult goods	Biological 0-5	Non-biological 0-5	Biological 6-10	Non-biological 6-10	Biological 11-15	Non-biological 11-15	General 16-20	General 21-24	General 25-59
				National					
Alcohol	-0.643	-0.991	-0.518	*0.268*	-0.414	-0.952	-0.480	-0.931	0.350
Tobacco	0.369	0.911	-0.070	*0.212*	-0.251	*0.342*	0.913	-0.246	-0.110
Adult clothing	-0.037	*-0.035*	-0.169	*-0.037*	-0.194	*0.301*	-0.106	-0.474	-0.384
Transportation	-0.318	*-0.239*	-0.465	*0.324*	-0.268	-0.514	0.096	0.095	-0.035
Meal and drink away home	0.803	-0.565	0.005	0.020	-1.069	*-0.565*	-0.927	0.132	-0.213
Personal Care	-0.441	*-0.155*	-0.310	*0.418*	-0.596	*-0.125*	0.558	1.333	0.777
All 6 goods	-0.054	*0.065*	-0.238	*0.142*	-0.281	*0.002*	0.172	-0.246	-0.131
				Urban					
Alcohol	0.093	0.027	0.206	-0.216	1.199	0.094	-0.498	-1.168	-0.514
Tobacco	0.715	0.325	-0.216	-0.638	-0.723	*0.287*	1.184	0.109	0.164
Adult clothing	0.028	-0.496	-0.680	*0.144*	-0.886	*0.279*	-0.036	-0.516	-0.345
Transportation	0.027	-0.195	-0.512	*0.074*	-0.401	*-0.136*	0.414	-0.013	0.418
Meal and drink away home	-0.153	-0.620	0.028	-0.472	-0.382	-1.408	-0.456	0.236	0.695
Personal Care	-0.234	-0.488	-0.213	*-0.103*	-0.461	*0.079*	0.472	0.968	0.458
All 6 goods	0.180	-0.179	-0.418	*-0.168*	-0.580	*0.096*	0.393	-0.145	0.038
				Rural					
Alcohol	-0.745	*-1.014*	-0.591	*0.560*	-0.715	*-1.129*	-0.431	-0.906	0.412
Tobacco	-0.157	*0.919*	0.070	0.369	-0.092	*0.485*	0.391	-0.186	-0.146
Adult clothing	0.059	0.211	-0.032	*0.053*	0.032	0.260	-0.134	-0.516	-0.466
Transportation	-0.388	*-0.011*	-0.425	*0.662*	-0.111	-0.786	-0.171	0.068	-0.434
Meal and drink away home	1.991	-0.264	0.057	0.416	-1.887	*-0.028*	-2.075	-1.198	-2.163
Personal Care	-0.555	*0.043*	-0.387	*0.793*	-0.674	*-0.339*	0.551	1.697	1.083
All 6 goods	-0.168	*0.223*	-0.144	*0.300*	-0.152	*-0.025*	-0.028	-0.282	-0.254

Table 5: Standard errors for the ratios for adult goods - poor households.

Adult goods	Biological 0-5	Non-biological 0-5	Biological 6-10	Non-biological 6-10	Biological 11-15	Non-biological 11-15	General 16-20	General 21-24	General 25-59
				National					
Alcohol	0.340	0.382	0.340	0.636	0.387	0.399	0.364	0.372	0.353
Tobacco	0.484	0.524	0.315	0.466	0.333	0.516	0.508	0.808	0.575
Adult cloth	0.167	0.256	0.171	0.253	0.173	0.320	0.203	0.213	0.208
Transportation	0.223	0.336	0.215	0.355	0.276	0.296	0.292	0.359	0.375
Meal and soft drink away home	0.666	0.413	0.353	0.518	0.419	0.425	0.435	0.571	0.903
Personal care	0.154	0.420	0.175	0.777	0.208	0.389	0.310	0.525	0.352
All 6 goods	0.130	0.159	0.103	0.173	0.124	0.201	0.151	0.201	0.168
				Urban					
Alcohol	0.647	0.604	0.778	0.592	0.900	0.732	0.589	0.579	0.611
Tobacco	0.767	0.766	0.503	0.779	0.372	0.798	0.818	1.386	1.002
Adult cloth	0.309	0.299	0.303	0.404	0.269	0.637	0.246	0.334	0.299
Transportation	0.256	0.340	0.301	0.350	0.284	0.461	0.343	0.463	0.411
Meal and soft drink away home	0.449	0.668	0.654	0.672	0.645	0.669	0.465	0.595	0.993
Personal care	0.258	0.353	0.238	0.349	0.307	0.549	0.302	0.444	0.381
All 6 goods	0.200	0.245	0.187	0.259	0.149	0.310	0.219	0.369	0.310
				Rural					
Alcohol	0.395	0.453	0.389	0.827	0.423	0.504	0.470	0.518	0.439
Tobacco	0.346	0.550	0.386	0.580	0.434	0.632	0.459	0.525	0.447
Adult cloth	0.190	0.328	0.199	0.307	0.217	0.362	0.245	0.261	0.265
Transportation	0.316	0.486	0.292	0.527	0.388	0.390	0.422	0.574	0.538
Meal and soft drink away home	1.373	0.633	0.611	1.177	0.834	0.785	0.783	1.189	1.922
Personal care	0.247	0.718	0.259	1.416	0.332	0.559	0.533	1.040	0.633
All 6 goods	0.133	0.204	0.128	0.242	0.165	0.248	0.189	0.189	0.181

Table 6: T-tests for equality of π -ratios by children status- poor households

	National			Urban			Rural		
Adult goods	Children 0-5	Children 6-10	Children 11-15	Children 0-5	Children 6-10	Children 11-15	Children 0-5	Children 6-10	Children 11-15
					P- Value				
Alcohol	0.38	0.35	0.33	0.92	0.59	0.32	0.56	0.26	0.50
Tobacco	0.22	0.59	0.35	0.41	0.68	0.26	0.04**	0.60	0.38
Adult clothing	0.99	0.63	0.17	0.22	0.08*	0.10*	0.67	0.83	0.63
Transportation	0.86	0.05**	0.51	0.63	0.12	0.56	0.45	0.08*	0.23
Meal and soft drink away home	0.13	0.98	0.33	0.44	0.52	0.18	0.22	0.62	0.08*
Personal Care	0.45	0.33	0.25	0.54	0.73	0.28	0.29	0.37	0.57
All 6 goods	0.53	0.05**	0.24	0.06*	0.40	0.05**	0.09*	0.06*	0.71

** Results significant at 5% and * significant at 10%.

Non poor households

Table 7: Test of excluding children demographic groups- non poor households.

Adult goods	Biological 0-5	Non-biological 0-5	Biological 6-10	Non-biological 6-10	Biological 11-15	Non-biological 11-15	Join test of excluding all children groups
				P- value			
				National			
Alcohol	0.220	0.222	0.662	0.312	0.825	0.988	0.560
Meal and soft drink away home	0.031	0.124	0.214	0.345	0.735	0.386	0.386
Personal care	0.769	0.619	0.143	0.085	0.938	0.482	0.668
				Urban			
Alcohol	0.371	0.132	0.463	0.730	0.539	0.342	0.584
Meal and soft drink away home	0.185	0.187	0.492	0.089	0.535	0.311	0.275
Personal care	0.807	0.648	0.128	0.309	0.736	0.839	0.351
				Rural			
Alcohol	0.879	0.827	0.147	0.254	0.803	0.064	0.262
Meal and soft drink away home	0.077	0.662	0.949	0.377	0.240	0.981	0.525
Personal care	0.557	0.878	0.126	0.156	0.917	0.051	0.302

Table 8: Wald Tests for Equality of P-ratios across Adult Goods

Age and Child Status	National		Rural		Urban	
	Test	P- Value	Test	P- Value	Test	P- Value
Biological (0-5)	6.890	0.043	1.499	0.740	2.949	0.437
Non-biological (0-5)	0.304	0.962	2.214	0.586	0.894	0.863
Biological (6-10)	4.345	0.220	1.628	0.713	4.169	0.242
Non-biological (6-10)	4.953	0.155	4.207	0.237	3.150	0.400
Biological (11-15)	1.091	0.825	3.503	0.339	2.490	0.528
Non-biological (11-15)	0.631	0.910	3.170	0.396	0.008	0.999
General category (16-20)	4.361	0.218	0.301	0.962	5.160	0.137
General category (21-24)	5.440	0.115	2.476	0.531	3.155	0.399
General category (25-59)	3.207	0.390	1.813	0.673	3.209	0.389

Table 9: Outlay equivalence ratios for adult goods - non poor households.

Adult goods	Biological 0-5	Non-biological 0-5	Biological 6-10	Non-biological 6-10	Biological 11-15	Non-biological 11-15	General 16-20	General 21-24	General 25-59
				National					
Alcohol	-0.522	*-0.236*	-0.512	-0.800	0.161	0.194	-0.393	0.016	0.102
Meal and soft drink away home	-1.804	*0.638*	-0.926	-1.638	-0.527	*0.233*	-0.022	0.481	-0.283
Personal care	-0.533	*-0.404*	0.189	0.824	-0.236	*0.954*	0.742	2.168	1.781
All 3 goods	-0.712	*-0.150*	-0.418	-0.561	-0.050	*0.380*	-0.072	0.589	0.429
				Urban					
Alcohol	-0.472	*-0.096*	-0.715	*-0.566*	0.730	0.643	-0.892	-0.095	-0.480
Meal and soft drink away home	-2.050	*-1.345*	-1.159	-2.481	-0.323	*0.821*	-0.190	0.738	-0.448
Personal care	-0.576	-1.263	0.298	0.799	-0.564	*0.702*	0.604	1.916	2.390
All 3 goods	-0.865	*-0.747*	-0.543	-0.653	0.116	0.719	-0.328	0.653	0.272
				Rural					
Alcohol	-0.413	*-0.360*	-0.386	-1.107	-0.142	*-0.107*	0.133	0.131	0.482
Meal and soft drink away home	-1.609	*5.113*	-0.929	-1.909	-1.748	*-1.654*	0.185	-2.448	-0.964
Personal care	-0.493	*0.337*	0.154	0.354	-0.207	*1.166*	0.588	1.463	0.620
All 3 goods	-0.497	*0.125*	-0.312	-0.860	-0.254	*0.065*	0.252	0.260	0.416

Table 10: Standard errors for the ratios for adult goods - non poor households.

Adult goods	Biological 0-5	Non-biological 0-5	Biological 6-10	Non-biological 6-10	Biological 11-15	Non-biological 11-15	General 16-20	General 21-24	General 25-59
				National					
Alcohol	0.399	0.506	0.346	0.544	0.424	0.537	0.403	0.385	0.338
Meal soft drink out	0.431	1.756	0.602	0.610	0.582	1.663	0.837	1.222	0.676
Personal Care	0.245	0.705	0.277	0.922	0.255	0.786	0.344	0.843	0.977
All 3 goods	0.291	0.430	0.265	0.398	0.302	0.473	0.311	0.321	0.340
				Urban					
Alcohol	0.561	0.726	0.556	0.822	0.684	0.740	0.549	0.587	0.453
Meal soft drink out	0.814	1.663	0.825	1.368	0.853	2.037	1.116	1.125	1.115
Personal Care	0.431	1.276	0.366	1.325	0.472	0.818	0.383	1.003	1.548
All 3 goods	0.467	0.726	0.364	0.629	0.429	0.613	0.388	0.394	0.666
				Rural					
Alcohol	0.529	0.702	0.483	0.686	0.514	0.795	0.578	0.558	0.517
Meal soft drink out	0.891	3.815	0.741	0.901	0.773	0.890	1.069	2.532	1.034
Personal Care	0.344	0.865	0.475	0.754	0.368	1.545	0.620	1.088	0.666
All 3 goods	0.402	0.510	0.335	0.519	0.383	0.668	0.437	0.479	0.386

Table 11: T-tests for equality of π -ratios by children status- non poor households.

	National			Urban			Rural		
Adult goods	Children 0-5	Children 6-10	Children 11-15	Children 0-5	Children 6-10	Children 11-15	Children 0-5	Children 6-10	Children 11-15
					P- Value				
Alcohol	0.59	0.63	0.99	0.64	0.81	0.73	0.96	0.39	0.93
Meal drink away from home	0.11	0.35	0.77	0.65	0.34	0.67	0.16	0.19	0.84
Personal Care	0.98	0.44	0.14	0.45	0.61	0.27	0.35	0.77	0.28
All 3 goods	0.14	0.79	0.47	0.99	0.83	0.52	0.22	0.39	0.64