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**GENDER BIAS IN THE ALLOCATION OF RESOURCES  
WITHIN HOUSEHOLDS IN BURKINA FASO:  
A DISAGGREGATED OUTLAY EQUIVALENT ANALYSIS**

by

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## **GENDER BIAS IN THE ALLOCATION OF RESOURCES WITHIN HOUSEHOLDS IN BURKINA FASO: A DISAGGREGATED OUTLAY EQUIVALENT ANALYSIS**

**Summary:** Discrimination in favour of boys in household resource allocation has been shown in a number of studies in South Asia; yet a lack of this discrimination has been shown in the few studies that have addressed this issue in Sub-Saharan Africa. None of these studies have examined the issue differentiating rural and urban, agroecological zone, and income stratum, yet there is theoretical reason to believe intrahousehold resource allocation would differ by these stratifiers. This paper addresses the issue using those stratifiers for data from Burkina Faso. 'Outlay equivalent' analysis is used. Despite the stratification, the study supports the earlier findings of lack of discrimination in favour of boys.

### **I. INTRODUCTION**

In the past decade, considerable attention has focussed on the measurement and determinants of differences in individual welfare across members of the same household [Behrman, 1990]. As well as the obvious short-run welfare concerns raised by inequality within the household (particularly for children), there are longer-term efficiency implications of an allocation of resources within the household that is determined solely by a household member's age, gender, or relationship to household head rather than the ability of the member to perform a given task. Moreover, if these inequalities exist and they are ignored, the very effectiveness of public policy is likely to be undermined [Haddad and Kanbur, 1990a].

For South Asia, a compelling body of evidence has been assembled which shows boys favoured over girls in terms of both the household resources allocated to them as well as outcome measures such as mortality levels and growth achievements [Behrman, 1990].

For Sub-Saharan Africa, the evidence is more scarce. Svedberg [1990] compared the mean standardised levels of male and female anthropometric indicators over 50 data sets from Sub-Saharan Africa (for adults and children) and concluded that females were not at a nutritional disadvantage. Thomas [1991: 2] noted that the anthropometric standards used by Svedberg were different for boys and girls, and so "gender differences can only be identified *relative* to the standards."

One method of analysis which avoids this constraint is Deaton's [1989] outlay equivalent approach, which is purely inferential in its detection of gender discrimination within households. The essence of the approach is to examine whether parents alter their expenditures on adult goods differently for boys rather than girls.

In Deaton [1989], the outlay equivalent technique was introduced and applied to one year (1985/6) of data from Côte d'Ivoire. Haddad and Hoddinott [1990] repeated this exercise

for the following year of data. Both sets of results do not differ in essence from those of Svedberg; there was no compelling evidence of a pro-male or pro-female bias in the allocation of household resources. Yet, a similar outlay equivalent analysis in India [Subramanian and Deaton, 1990] found parental expenditures skewed towards boys. Why is there apparent discrimination in South Asia, but not in Sub-Saharan Africa? Below, we discuss two possible explanations (one related to differences across agroecological zones and the other related to differences across income strata in a given agroecological zone). Both lead us to specific hypotheses, which we proceed to test in an outlay equivalent analysis that is more disaggregated than has been previously attempted, using data from urban and rural Burkina Faso.

### Across Agroecological Zones

First, perhaps there truly is much less discrimination in terms of nutrition outcomes because of the greater participation of women in agricultural as well as nonfarm activities in Sub-Saharan Africa. Svedberg poses (but does not test) the hypothesis that the Sub-Saharan Africa/South Asia dichotomy is related to the labour contribution of women in agriculture. Building on a body of literature initiated by Boserup [1970] and developed by Rosenzweig and Schultz [1982], this line of reasoning is as follows: because Sub-Saharan African women's labour is a scarce factor in agricultural production (a bride-price is one explicit manifestation of this scarcity), women and female children in Sub-Saharan Africa can be expected to fare better in terms of resources dedicated to their nutrition than their South Asian counterparts.

We find Svedberg's point plausible. We extend his reasoning in two ways, however. On one hand, the degree and nature of women's participation in agriculture would vary by agroecological zone within a given country (along with Binswanger and Rosenzweig's [1986] 'production relations' and the farming systems). Presumably, this would mean that the effect of women's agricultural contribution on household resource allocation would then vary by agroecological zone. On the other hand, rural households in the West African semi-arid tropics are very substantially engaged in non-cropping activities in both the more northern arid and the more southern fertile zones [Reardon, Delgado, and Matlon, forthcoming].

Women are also engaged very substantially in these nonfarm activities, but the degree and type of their involvement varies greatly by zone (increasing rapidly as one goes from north to south, along with the importance of activities upstream and downstream from local agriculture; see Gabre-Madhin and Reardon [1989]). Hence, it is appropriate to consider women's contribution to the household economy in terms both of their farm and nonfarm activities. The different contributions over agroecological zones, and their implicit economic value to household income generation, thus comprises both farm and nonfarm activities. This is an extension both of Boserup's and Svedberg's reasoning beyond the agricultural domain.

Hence, we would want to test, with data from a single country, a first hypothesis that discrimination varies across agroecological zones, decreasing with increasing opportunities

for women within and outside of agriculture.

### Within a Given Agroecological Zone

Second, within a given agroecological zone, true discrimination effects at either end of the income distribution may be canceling each other out, resulting in few apparent discrimination effects for the sample as a whole. This possible explanation rests on two bodies of literature: one related to the relation between household income, bargaining, and resource allocation, and the other to household income or wealth, and risk aversion. These are restated briefly below and related to the issue of differences in allocation discrimination across household income strata.

On the one hand, there is a body of literature that describes the effects of scale on intrahousehold inequality [Haddad and Kanbur 1990b, 1990c]; it poses the hypothesis that for a given set of economic opportunities for men and women, the extent of intrahousehold inequality will decrease with the overall welfare level of the household. The bargaining approach states that as the size of the cake to be bargained over increases, bargaining becomes less important and households can afford to invest equally in all household members.

On the other hand, a second body of literature on risk aversion and efficiency wage theories can also be used to explain the importance of household income level in explaining the extent of inequality across gender within households. Specifically, Newbery and Stiglitz [1981] argue that households are more likely to be less risk averse at higher incomes or with greater wealth. Hence, compared to low income households, higher income households may well view the possibly riskier investment in girls as less onerous. Underlying the riskiness of investments in girls for poor households is their low discretionary income, and the effective labour schedule which postulates effective labour as an increasing function of scarce health and nutrition resources.

Hence, we would want to test the second hypothesis, that there are differences in inequality within a given agroecological zone in Burkina Faso, across income strata.

The above arguments suggest a disaggregated analysis to be relevant to a study of inequality in Sub-Saharan Africa. Previous applications of the outlay equivalent method in Africa have all been for Burkina Faso's relatively wealthy neighbor, Côte d'Ivoire [Deaton, 1989; Haddad and Hoddinott, 1990]. The applications have covered populations aggregated over urban and rural sectors and aggregated over various agroecological zones. Location effects have been captured solely with intercept-shifting dummy variables. Furthermore, there has been no stratification of these analyses by income group. Hence, differences in the effect of demographic structure in different locations (urban versus rural, and over different agroecological zones) and income groups has not been undertaken.

### Approach

This paper uses an outlay equivalent approach, disaggregated by urban and rural, by

agroecological zone, and by income stratum, to address three main questions. First, is there a gender bias in the allocation of household resources in Burkina Faso? Second, does the extent of the gender bias (if any) differ by the level of economic activity *across* different ecological zones within Burkina Faso? Third, within zones, does the extent and pattern of the gender bias (if any) differ by the level of economic activity (income)?

Although our approach will not shed any light on which of the underlying theoretical paradigms is most responsible for observed inequality, our main goal is to more accurately and rigorously detect whatever inequality exists, and determine if the patterns are at least consonant with the suggested explanations. If we find gender discrimination, and it varies by zone and/or by income group, this has obvious implications for the targeting of public policy.

The paper proceeds as follows: section 2 formalises the testable hypotheses discussed in this introductory section in the context of theory and past empirical work; section 3 presents the outlay equivalent method; section 4 describes the data and study context; section 5 describes expenditure patterns across zones and income groups; section 6 discusses regression results for the outlay-equivalent analysis; and section 7 draws some conclusions.

## II. HYPOTHESES AND ANALYTICAL FRAMEWORK

Our hypotheses are as follows. The extent of male-female biases in intrahousehold resource allocation varies according to:

1. interzone differences: by distribution of economic opportunities across gender;
2. intrazone differences: by the overall level of welfare of the household (operationalised in this paper by household income per adult equivalent).

Both hypotheses can be derived from either a common preference or an individual preference analytical view of the household. In a common preference or productivity-based model, more economic opportunities for a woman (as reflected in the higher opportunity cost of her time) will lead to the household deciding to allocate her more resources. In a bargaining model, increased economic opportunities for the woman can be thought of as improving her fallback position or threat point. In short, if a woman has a poorer resource allocation outcome, is that due to her inferior bargaining power, or is it simply an efficient allocation of resources towards individuals (i.e., men) who can best raise the welfare of the household as a whole?

Similarly, both the common preference model and the individual preference model are consistent with the hypothesis that inequality varies by household welfare (operationalised in this paper by household income). For example, Haddad and Kanbur [1990b] show that intrahousehold inequality and household welfare will display an inverse-u shape for a household welfare function with a labour supply function dependent on consumption (with an increasing returns portion).

This type of relationship between intrahousehold inequality and household welfare is also consistent within a conflictual framework of the household. Haddad and Kanbur [1990c] show that under certain conditions, both two-person cooperative and noncooperative bargaining models predict an inverse-u relationship between intrahousehold inequality and household well-being. In addition, Haddad and Kanbur [1990c] find tentative empirical support for the inverse-u hypothesis for a sample of Philippine households.

#### Interzone Determinants of Intrahousehold Resource Allocation

Our maintained hypothesis is that when the future value (to the household) of a child increases, more resources are allocated in the present to that child -- hence, a simple vision of returns to investment. This is because we assume that the adults (that control current resource allocation) expect to gain in the future from enhanced income stream of their children (interdependent, inter-temporal utility function).

Hence, location differences that significantly affect expected gains (level and riskiness of future income) to current resource allocation to children, say to girls, should also affect intrahousehold resource allocation. Specifically, where the potential for income earning is higher for girls, we expect sacrifices to be made to benefit them.

This potential (both in the agricultural and in the nonagricultural sectors, as discussed in the introduction) rises with the agroclimatic level and the degree of urbanization. In the Burkina Faso case, this means it rises, from zone 1 (low potential) to zone 2 (agroclimatically-favourable rural) to urban. Women also earn progressively more as one moves through that set. Hence, resource allocation to them is higher in a way parallel to the wage paid to a labourer with marginal higher productivity is higher. Note that the 'value of women' is recuperated specifically by the household that makes investments in them (bride-price, labour in their fields before marriage), by the household that 'receives' them via marriage (and then 'captures rents' via the woman's on- and off-farm income-generating activities), and generally by the community whose wealth is increased through the women's activity.

#### Intrazone Determinants of Intrahousehold Resource Allocation

Long- and short-run considerations are brought to bear here. The long-run consideration reposes on investment theory. Given the zone (hence, the agroclimatic level, the price and market structure, and the level of production and income risk), investment theory [Newbery and Stiglitz, 1981] predicts that households with higher wealth have lower risk aversion and are, thus, more willing to make risky investments. Assuming that investments in children, specifically in girls, are risky, wealthier households would be willing to allocate more resources (via adult good sacrifices) to girls.

The 'short-run consideration' is that wealthier households have more 'supernumerary income' (above subsistence levels) that is available both for luxury expenditure and longer-term investments, such as in children. Hence, theory would predict more direct investment in children among the wealthy.

### III. METHOD AND MODEL

The outlay equivalent technique is based on the studies that have looked at the effects of household composition on household consumption patterns [Deaton, Ruiz-Castillo, and Thomas, 1989] (DRT). The technique relies upon the identification of goods that are unrelated to (*demographically separable* from) children's characteristics. Goods that satisfy this criterion can be termed *adult goods*. DRT [1989: 181] reason that since "Babies are not born with cash supplements," the impact of children on the consumption of adult goods will be akin to that of a pure income effect. For food, for example, the cost of raising an extra child could reduce food spent on adults, but this effect would not be directly observed in a household survey because of the food's 'fungibility' among household members.

More formally, Deaton [1989] describes an outlay equivalent as the effect of a demographic group ( $r$ ) on the expenditure of an adult good ( $j$ ), standardised by the effect of total expenditure on the expenditure of that good. The general form of the outlay equivalents,  $\pi_r$ , is given by:

$$(1) \pi_r = ((\delta \text{exp}_j / \delta n_r) / (\delta \text{exp}_j / \delta \text{texpc})) \cdot (n / \text{texpc}),$$

where  $\text{exp}_j$  = household expenditure on the  $j$ th adult good,  $n_r$  = the number of individuals in the  $r$ th household demographic group,  $\text{texpc}$  = per capita total household expenditure, and  $n$  = household size.

The outlay equivalent is akin to an elasticity in that it is unit-free. For example, a  $\pi_r$  value of -0.3 has the following interpretation: an additional individual in the  $r$ th household demographic group has the same effect on the household's expenditure on adult good  $j$  as would a reduction of 30% in household per capita expenditure.

Outlay equivalents are based on estimated parameters of the standard Engel function:

$$(2) w_j = p_j q_j / x = \alpha_j + B_j \ln(x/n) + \Omega_j \ln(n) + \sum_r \gamma_r (n_r/n) + \delta \cdot z + u$$

where  $x$  is total household expenditure,  $w_j$  is the budget share of the  $j$ th adult good,  $n$  is household size, and  $z$  is a vector of remaining regressors for survey round and household demographic characteristics, as in Deaton [1989].

Tests for equality of outlay equivalents for the  $j$ th adult good across two demographic groups are equivalent to tests across the estimated coefficients of various demographic groups in the Engel function.

Thereafter, a disaggregation of the Deaton approach along the lines suggested by theory (i.e., by agroecological zone and income group) can be undertaken by calculating the matrices for different household groupings.

The first step in the estimation is to test the adequacy of the *candidate* adult goods. Expenditure on each candidate adult good and a composite candidate adult good is regressed on total expenditure for all candidate adult goods and other standard Engel-curve regressors. F-tests are performed for the exclusion of the variables describing the numbers of individuals in various child and adult groupings. We would have most confidence in candidate adult goods for which we could reject the null hypothesis that the child, but not the adult variables, are jointly insignificant.

The second step is to test for the equality of  $\pi_r$  values across gender, within the age groups of interest (preschoolers and children).

#### IV. DATA AND STUDY CONTEXT

##### Rural

The rural data used to estimate the models come from the farm household survey in Burkina Faso conducted by International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).<sup>1</sup> The survey covered four harvest-years (1981/82 - 1984/85, a period comprising both good and poor harvests); only 1984/85 is used here because that set alone covered all product groupings (including all adult good candidates).

The sample included 150 households; 25 per village, with two villages per zone, in the following three agroecological zones: the Sahelian, in the northwest; the Sudanian, in the Central Plateau; and the Guinean, in the southwest. The Sahelian zone is very poor agroclimatically, with the lowest and most variable rainfall and yields of all the zones. Off-farm work by women is relatively low (compared to the southern zone) as is their share of agricultural income. By contrast, the share of off-farm income in total household income exceeds half in most years; it is relatively 'extroverted' -- based in activities outside the zone to reduce the vulnerability of the household to local fluctuating cropping incomes.

The Sudanian zone is poor-to-intermediate agroclimatically, with low-medium rainfall that is less variable than the Sahelian zone's. Coarse grains are the main products; livestock husbandry is less important than in the other two zones. Off-farm work by women is relatively low (compared to the southern zone) but higher than the Sahelian zone, as is their share of agricultural income. By contrast, the share of off-farm income in total household income is less than half in most years -- the typical household economy in this zone is relatively autarkic and vulnerable to local fluctuating cropping incomes.

The Guinean zone, by contrast to the other two, is moderately-favoured agroclimatically, with medium-to-high rainfall (for the WASAT) that is much less variable than in the other zones, and, hence, cropping is much less risky. Like the other zones, the Guinean zone produces coarse grains and pulses, but also produces substantial amounts of cotton as a cash crop. Off-farm work by women is relatively high (compared to the other two zones), based mostly in activities 'upstream' and 'downstream' from the more dynamic local cropping, but higher than the Sahelian zone, as is their share of agricultural income. The share of off-farm income in total household income is, like the Sahelian zone, more than

half in most years, and is relatively 'introverted' -- based on local off-farm activities [Gabre-Madhin and Reardon, 1989; Reardon, Delgado, and Matlon, 1992].

The per adult equivalent (AE) real incomes (average for 1981/82 - 1984/85) were: for the Sahelian zone, \$100; for the Guinean zone, about \$120; and for the Sudanian zone, only about \$60.

In the analysis here, the Sahelian and Sudanian zones are grouped into one low potential or 'agroclimatically-poor' zone, while the Guinean zone is the high potential or 'agroclimatically-favourable' rural zone. For the low potential zone, the per cent of household income generated by women is 6, while for the high potential zone, it is 10%.

### Urban

The urban data used to estimate the models come from the household survey in Burkina Faso conducted by International Food Policy Research Institute and the Centre for Economic and Social Research, University of Ouagadougou. The survey covered one harvest-year (1984/85, a period starting with a poor harvest).

The sample included 125 households, randomly selected from the city's population. The average total expenditure per capita for the sample is \$179. The gap between poor and rich, however, is large. The highest decile's average total expenditure per capita is about fifteen times higher than the average income of the lowest decile. The richest tercile in the best-off of the three rural zones, the Guinean, earns an average of \$318 per capita. This is almost 15% below the average income of the upper tercile in Ouagadougou.

Yet half the urban sample households have incomes below the national average, and one-fifth have income more than half below it, means that the urban sample contains a substantial amount of very poor households. The poorest two deciles in Ouagadougou earned less than the average income in the rural Sahelian zone, and the poorest urban tercile less than the average income in the rural Guinean zone.

In the urban sample, 61% of the households have wives who work outside the home. This is most pronounced among the poor -- 74% of these households have working wives. The majority of women who work outside the home are involved in commerce. Overall, the wives in the richest households work outside of the household relatively less frequently than do the wives in the poorer households. When the wives from the richest households work, it is more probable that they are salaried, and less probable that they are working in commerce [Reardon, Thiombiano, and Delgado, 1988].

On balance, then, the sample households in the rural and urban areas are headed almost exclusively by men. In general, the typical rural household is, relative to the typical urban household, bigger, the household head more frequently is polygamous, the household is more frequently 'complex' (plural conjugal units), has a higher dependency ratio, and is much less formally-educated.

Comparing across rural zones, and between urban and rural, one finds that the higher the overall level of economic activity, the greater the participation of women in the labour market. One also finds, as mentioned above, that comparing across rural zones, the better the agricultural base, the higher the incomes earned by women and the higher the participation rate (due to growth-linkages between agriculture and nonagriculture). But within a given zone or region, say with the urban area, the participation rate can be higher in a given tercile of the population without the individual women earning higher incomes, on average. For example, in Ouagadougou, more lowest tercile women work than in the upper tercile, but this does not imply that the average wage of those that work is greater in the lowest tercile. The opposite is the case, as the upper tercile women are more likely to have a formal sector, salaried position (that usually pays higher than petty commerce). Moreover, a woman that does not work can be better off in the sense of consuming more in an upper tercile household than does a working woman in a lower tercile household. For the urban sample as a whole, women generate 31% of total household income.

In summary, of the total 275 households, 125 are classified as urban, 100 of the 150 rural are classified as agroclimatically-poor rural (Sahelian and Sudanian), and 50 are classified as agroclimatically-favourable rural (Guinean). Each household has 12 rounds of information.<sup>2</sup> In addition, we stratified each of the three zones into two income groups, those households above and below median per capita total expenditure.

## **V. EXPENDITURE PATTERNS AND CANDIDATE ADULT GOODS**

### Candidate Adult Goods and Demographic Groupings

The candidate adult goods are:

1. 'meals out' (eaten at street stalls or restaurants);
2. stimulants (cigarettes, kola nuts, coffee, tea);
3. alcoholic and nonalcoholic drinks<sup>3</sup>
4. adult clothing (urban only)

The demographic groupings used are the following:

1. male infants, 0 to less than 5 years;
2. female infants, 0 to less than 5 years;
3. male children, 5 to less than 16 years;
4. female children, 5 to less than 16 years;
5. male adults, 16 to less than 60 years;
6. female adults, 16 to less than 60 years;
7. male elders, greater than 60 years;
8. female elders, greater than 60 years.

### Expenditure Patterns

Table 1 shows expenditure shares for the candidate adult-goods groupings, the eight demographic groups, and other Engel-curve regressors for each of the zone stratifications. The shares shown are average shares of total expenditure over all rounds.

Per capita total expenditures rise across the rural agroclimatically-poor zone, the rural agroclimatically-favourable zone, to be highest in the urban zone. There is little overlap across the three zones in terms of per capita total expenditures. Even after splitting up the rural region into a agroclimatically-poor and agroclimatically-favourable zone, urban zone households are wealthier than rural agroclimatically-favourable zone households.

The total budget share of the candidate adult goods is higher in the urban zone (15%) than in either of the rural zones (9-10%). Within zones, the total budget share to candidate adult goods shows little variation over income strata although the composition of that total does. Most importantly, for the urban group the share of 'meals out' is much higher than for either of the rural groups, and particularly so for the poor groups. This phenomenon is due to the poor's employment patterns. In particular, working men need to have a cheap and tasty meal at noon near their workplace, given the high transaction costs of returning home for lunch and the propensity of poor household's women to work away-from-home at midday as petty merchants. By contrast, men in the upper income group are much more likely to have types of jobs and vehicles that allow them time and ability to return home for lunch. Women from this group are less likely to work outside the home, and if they do, they are more likely to have a salaried position that allows them the time and vehicle to return home for lunch (see [Reardon, Thiombiano, and Delgado, 1988] for further discussion).

For the rural group, the budget share of meals out is close to zero. This is not surprising because, although rural men and women do very substantial amounts of off-farm activity, it is usually either in the village (close to home to return home for lunch) or migratory (data on meals-out eaten on migration were not collected).

Although per capita expenditure on stimulants is roughly the same across all three zones, they account for a much larger budget share in the agroclimatically-poor rural zone and in the lower-stratum households within that zone. The beverages candidate adult good has the highest budget share in the rural agroclimatically-favourable zone (5%), although the budget share drops as incomes rise within that zone. Note that the beverage share is much higher in the 'high potential' than the low potential zone. This is due to the much higher share of Moslems in the population in the latter zone. For the urban zone, a fourth candidate adult good, adult clothing, was identified as accounting for 4% of the total household budget.

The demographic composition of households in the sample differs markedly across zones and income groups within zones. While share of adult females is constant across zones, the urban zone has a higher per cent of adult men (30%) than either the agroclimatically-poor or the agroclimatically-favorable zones (both 20%). Correspondingly, the proportion of preschool children is lowest in the urban areas (13%) and highest in the rural areas (20-21%). These compositional changes are reflected by the mean age of household members, which is substantially higher for the urban households.

## VI. REGRESSION RESULTS

Table 2 presents summary results for the outlay equivalents analyses. The first step is to identify which of the candidate adult goods satisfy demographic separability. If we can

identify suitable adult goods, the second step is to test whether outlay equivalents are significantly different across gender for preschoolers and for children.

#### Testing for Adult Goods

For a given level of total adult goods expenditures, demographic separability requires the *disposition* of that total among various individual adult goods to be affected by adults in the household but unaffected by children and infants in the household. As Table 2 shows, not many of our candidate adult goods passed this test.<sup>4</sup> In fact, for some of the zones, there are no candidate adult goods that are demographically separable. Since we have chosen our candidate goods with some care, this may cast doubt on the outlay equivalent technique and serve as a comment on why it has not been applied to more than three or four data sets.

Nevertheless, we do have some adult goods to work with: adult clothing and meals-out in the urban zone, stimulants in the rural agroclimatically-poor zone, and meals-out in the low income group of the agroclimatically-favourable rural zone.

#### Testing Outlay Equivalents Across Gender

Outlay equivalent matrices were calculated for the urban and rural zones and for each of the income subgroups.<sup>5,6</sup> For every legitimate adult good, Table 2 presents the relevant results of F-tests across gender for infants and children. The results indicate little gender discrimination in any of the agroecological zones or income groups. This is consistent with the aggregate-level findings of Svedberg [1990], Deaton [1989], and Haddad and Hoddinott [1990].

Interzone comparisons show few differences before they are disaggregated by income group. For adult clothing in the all-urban group, girls are favoured more than boys in the sense that the adults reduce their expenditure on this item more for girls than for boys. For stimulants in the agroclimatically-poor rural zone, boys are favoured over girls. In the agroclimatically-favourable rural zone, no suitable adult good could be found to test for gender differences. Within zones, only the urban zone has an adult good in both income groups. Here there are two gender differences in the lower income group (out of a possible two) compared to none in the upper income group. The biases are, however, in opposite directions. For meals-out, male infants are favoured over female children, but female children are favoured over male children.

### **VII. CONCLUSIONS**

The disaggregated outlay equivalent analysis finds little gender discrimination by agroecological zone or income group in Burkina Faso. We are unable to reject the null hypotheses that discrimination varies by the level of agricultural and nonagricultural economic opportunities for women or by the level of household wealth. It would appear that discrimination, at least in terms of adult expenditure sacrifices made to infants and children, is not that serious in Sub-Saharan Africa.

In light of this, other questions spring to mind for future research. Does it matter if we mix up adult male goods and adult female goods? Does it matter who controls the expenditure on the adult good? What are the sacrifices that parents make for their children actually transformed into? Do equal sacrifices for a boy and a girl have an equal impact on their welfare? Why cannot the outlay equivalent technique pick up observed differences in school expenses across gender?

This study has examined gender discrimination in a more rigorous manner than most other studies with Sub-Saharan data, and has found little evidence of direct discrimination against females. It would seem that the burden of proof remains with those who claim that household resources are skewed away from girls in Sub-Saharan Africa.

TABLE 1

## EXPENDITURE PATTERNS ACROSS REGIONS AND INCOME GROUPINGS

Variable	Urban Zone			Rural Low Zone			Rural High Zone		
	Low	High	All	Low	High	All	Low	High	All
log of per capita total exp.	8.52	9.22	8.88	6.67	7.22	6.95	7.33	7.82	7.58
log of pc tot.exp. omitted months	8.59	9.28	8.94	6.97	7.43	7.20	7.44	7.93	7.69
tot candid adlt good budget shre	0.16	0.15	0.15	0.10	0.08	0.09	0.11	0.10	0.10
meals out, budget proportion	0.07	0.03	0.05	0.00	0.01	0.00	0.01	0.01	0.01
stimulants, budget proportion	0.02	0.02	0.02	0.09	0.07	0.08	0.04	0.04	0.04
alcohol/non-alcohol budget prop.	0.03	0.04	0.04	0.01	0.01	0.01	0.06	0.04	0.05
adult clothes, budget proportion	0.04	0.05	0.04	-	-	-	-	-	-
pc exp on all adult cand'd goods	14820	14426	14620	1412	1395	1654	2234	4469	3393
pc expenditure on meals out	6867	2380	4590	26	426	226	214	651	441
pc expenditure on stimulants	1507	1604	1556	1241	1243	1242	703	2024	1388
pc expenditure on alc/non alc	2563	4416	3504	145	225	185	1317	1760	1547
pc expenditure on adult clothing	3883	6026	4971	-	-	-	-	-	-
log of household size	2.56	2.16	2.36	2.35	2.25	2.30	2.37	2.62	2.50
pct males, 0 ≤ 5 yrs in hh	0.06	0.07	0.06	0.12	0.12	0.12	0.09	0.09	0.09
pct females, 0 ≤ 5 yrs in hh	0.06	0.09	0.07	0.08	0.09	0.09	0.09	0.12	0.11
pct males, 5 ≤ 16 yrs in hh	0.16	0.13	0.14	0.16	0.16	0.16	0.15	0.14	0.14
pct females, 5 ≤ 16 yrs in hh	0.16	0.12	0.14	0.17	0.10	0.14	0.16	0.11	0.13
pct males, 16 ≤ 60 yrs in hh	0.27	0.33	0.30	0.17	0.22	0.20	0.22	0.19	0.20
pct females, 16 ≤ 60 yrs in hh	0.26	0.24	0.25	0.26	0.26	0.26	0.22	0.29	0.26
pct males, > 60 yrs in hh	0.02	0.01	0.02	0.02	0.03	0.02	0.03	0.03	0.03
pct females, > 60 yrs in hh	0.01	0.01	0.01	0.02	0.02	0.02	0.05	0.03	0.04
no. of males, 0 ≤ 5 yrs in hh	0.99	0.73	0.26	1.50	1.39	1.44	1.16	1.56	1.37
no. of females, 0 ≤ 5 yrs in hh	1.09	0.80	0.94	1.33	1.09	1.21	1.20	2.15	1.69
no. of males, 5 ≤ 16 yrs in hh	2.50	1.46	1.97	1.86	1.67	1.77	1.84	2.66	2.26
no. of females, 5 ≤ 16 yrs in hh	2.11	1.32	1.71	2.00	1.13	1.57	1.88	2.33	2.11
no. of males, 16 ≤ 60 yrs in hh	3.87	3.04	3.45	1.96	2.31	2.14	2.48	3.10	2.80
no. of females, 16 ≤ 60 yrs in hh	3.90	2.53	3.21	3.12	2.95	3.04	2.72	4.70	3.75
no. of males > 60 in hh	0.27	0.12	0.19	0.19	0.23	0.21	0.24	0.48	0.36
no. of females > 60 in hh	0.19	0.08	0.13	0.21	0.33	0.27	0.48	0.52	0.50
survey round 1 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 2 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 3 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 4 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 5 dummy	0.08	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 6 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 7 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 8 dummy	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
survey round 10 dummy	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08
survey round 11 dummy	0.09	0.09	0.09	0.08	0.09	0.09	0.08	0.08	0.08
survey round 12 dummy	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08
log of mean age of hh members	3.85	3.70	3.77	2.30	2.37	2.34	2.41	2.40	2.40
1-Christian, 0-Moslem	0.32	0.57	0.45	-	-	-	-	-	-
1-simple conjugal, 0-complex	0.74	0.88	0.81	-	-	-	-	-	-
Number of Observations	614	633	1247	471	942	300	323	623	

TABLE 2  
SUMMARY OF OUTLAY EQUIVALENT RESULTS

Zone	Income Group	Acceptable Adult Goods	Outlay Equivalents, When Signif. Different	
Urban	All	Adult Clothing	male children 0.125	female children -0.747
Urban	Lower	Meals Out	male children 2.48	female children 0.415
			male infants -2.78	female infants -0.87
Urban	Upper	Adult Clothing	---none---	
Rural Low	All	Stimulants	male children -0.85	female children 1.64
Rural Low	Lower	---none---		
Rural Low	Upper	Stimulants	---none---	
Rural High	All	---none---		
Rural High	Lower	Meals out	---none---	
Rural High	Upper	---none---		

#### NOTES

1. International Food Policy Research Institute (IFPRI) provided technical support during its last year of the survey, and IFPRI subsequently undertook a two-year cleaning and aggregating process for a good part of the data used in the analysis here. See Matlon [1988] for details of survey methods.
2. The exception is in the rural area, where only 100 of the 125 households have 12 (monthly) rounds; the other 25 only have 3 rounds.
3. 'Nonalcoholic drinks' are primarily consumed by adults in Moslem households, and are not usually consumed by children.
4. A complete listing of F-tests is provided in an appendix available from the authors.
5. For space reasons, the nine outlay equivalent matrices are not presented here, but are available from the authors. The two-stage least squares estimates the outlay equivalents are based on are also available from the authors. The identifying instrument for total expenditure in one survey round is the mean total expenditure from all other rounds.
6. F-tests within zones reject equality of coefficients across income strata [F, urban = 4.99 (df = 23, 1201); F, low potential zone = 2.32 (df = 23, 425); F, upper potential zone = 1.732 (df = 23, 577)].

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