Female Headship in the Dominican Republic: Alternative Definitions and Implications for Food Consumption and Nutrition

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Executive Summary

Female headship has been identified as a possible indicator of economic vulnerability among households in developing countries. Female headship is thought to pose special problems for the woman and her family because of possible discrimination against women in the labor force: access to worse jobs at lower pay. Female household heads may face additional difficulties because of the time and resource pressures of their dual role as economic provider as well as child and family caretaker. Implicit in this line of reasoning is the perception that female headship implies the absence of adult males, that is, that female-headed households by definition have no male provider.

At the same time, female headship is thought to have some positive impact on the welfare of family members. Resources under women's control are widely thought to translate more directly into the fulfillment of basic needs such as nutrition, health, and shelter, than are comparable resources under the control of men. Once again, there is an implicit assumption in this logic which holds that by definition, female-headed households are those in which women have control over a substantial proportion of the household's resources, either because no adult male is present to assert control (as above), or because women earn much of the household's income and thereby gain decision-making power.

Implicitly, then, reasoning about the economic and welfare consequences of female headship depends on alternative definitions of such headship.

The issue is policy relevant because economic and social welfare interventions, which result in resource transfers to poor households, may achieve greater effect if they are designed with an understanding of the dynamics of resource allocation in different kinds of households. Female-headed households may face different constraints and require different types of interventions, and the likely impact of a given program may vary depending on headship.

This study uses information on households in the Dominican Republic to investigate the degree to which alternative definitions of female headship identify the same households as female-headed. It explores whether such households are more likely to be low-income or economically vulnerable than male-headed households, and it tests whether female-headed households, by any definition, show different preferences for spending on basic needs or different resource allocation patterns leading to better welfare outcomes, specifically, nutritional status of children.

Six alternative definitions of female headship are investigated: The household's own self-definition; absence of adult males; woman as major earner (earning over 50 percent of wage income) or major income contributor (earning over 50 percent of total income); woman as wage earner or as worker in any market enterprise.

The overlap among definitions is very imperfect; no definition fully captures the household's own criteria for defining itself as female-headed. But both absent-male and earnings-related definitions of female headship

are very significantly related to the household's self-definition. A household female-headed by one definition is far more likely to be female headed by another than are households in general.

By each definition, female-headed households have some characteristics which make them quite distinct from male-headed ones. Female-headed households are smaller and have fewer earners; they are far more dependent on transfers (gifts of cash from absent family members or others) and less so on wages and other earned income. Except for Absent-Male households, they are disproportionately urban, and so have less food from home production. Their heads are older, with fewer young children, reflecting differences in life cycle. Absent-Male household heads are fully 10 years older than those of households with adult males.

By no definition are female-headed households more likely to fall into lower income groups (measured by per capita total expenditure). Households with women working are slightly more likely to be in the higher income classes. Their dependence on transfers, though, may indicate greater economic vulnerability and less ability to maintain their status over time.

The evidence on differential spending preferences is weak. Female headed households by all definition spend proportionally no more - in some cases slightly less - on food than male-headed households in the same expenditure quartile. They tend to buy more expensive foods (indicated by a lower caloric return per peso of expenditure), including a higher proportion of meat, poultry and fish, and other animal-origin food; while male-headed households tend to buy somewhat more of the cheap, bulky staples - rice and beans. As a result, household calorie consumption per adult equivalent (adjusted for the age/sex composition of the household) is somewhat lower in female-headed households, and female-headed households by most definitions are more likely to fall into the risk category of calorie consumption less than 75% of recommended levels. This pattern may reflect a preference of female-headed households for higher quality foods. Dietary diversity and the proportion of animal-origin foods are both recognized as important contributors to improved nutritional status. Calories alone, especially measured at the household level, are not an accurate predictor of nutrition and health outcomes.

In fact, children in female-headed households, in spite of lower available calories, achieve the same levels of nutritional status (measured by height/age and weight/height) as those in male-headed households. In Absent Male female-headed households, children's growth is significantly above that of male-headed households. This suggests that the allocation of available foods in female-headed households may be more favorable to children.

Multivariate analysis was performed to determine whether sex of head itself, or the other household characteristics associated with headship, affect food expenditure, caloric (and protein) adequacy, and nutritional status of children. The results are clear. Once all other characteristics distinguishing female-headed households from male-headed households are controlled, headship itself adds little explanatory power to the determination of these outcomes: food expenditure, calorie and protein adequacy, anthropometric status. However, a number of characteristics of

female-headed households are important determinants. For example, caloric adequacy is positively associated with home produced food and farm sales, and with household size, and negatively with transfer income, and adult-equivalent ratio, all effects which operate against female-headed households by most definitions. At the same time, nutritional status is positively associated with protein density of the diet (effect operates indirectly through illness), and negatively with number of children and adult-equivalent ratio. These relationships operate in favor of female-headed households.

This study provides some support for the hypothesis that female-headed households allocate resources differently from male-headed households. The expenditure elasticity of food demand is generally lower in female-headed households than male-headed households, but Absent-Male female-headed households appear to allocate more of any marginal income increase to food spending. Among Major Earner female-headed households, marginal calorie increases are more positively associated with weight for height than in male-headed households, though female headship itself is negatively associated with this outcome. These effects are quite small. More persuasive is the observation that lower levels of caloric adequacy produce the same or better growth outcomes among female-headed households.

Overall the conclusions to be drawn are first, that the significance of female headship depends heavily on the specific definition of headship used. Second, there is no evidence that female-headed households by any definition are disproportionately low income, but female-headed households at all income levels are more dependent on transfers and less on their own earnings capacity than male-headed households. Third, female-headed households have a number of characteristics which clearly distinguish them from male-headed households, and these characteristics are related to food expenditure, dietary adequacy, and nutritional outcomes of children. It appears that headship operates through these characteristics to result in female-headed households spending proportionally less on food, obtaining lower levels of caloric adequacy, higher levels of protein density and dietary quality (measured in terms of cost), and achieving equal or even slightly superior nutritional outcomes for their children.

These results are specific to the Dominican Republic, a middle-income developing country where women's participation in the labor force is quite widely accepted, and women have good access to education and employment. These results are consistent with some other studies in the Caribbean, but there is no reason to expect generalizability to other regions of the world.

The policy implications of the study for the design of intervention programs is that female headship alone is not a good basis for program targeting or program design, but that the particular characteristics of households, some of which vary by sex of head, need to be explicitly accomodated in the development of such programs.

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Female headship of households is widely recognized to be on the increase in developing countries (Buvinic and Youssef, 1978; Buvinic, Lycette, McGreevey, 1983). The significance of this trend has received considerable attention in the past decade. This attention is due in part to the assumption that female headed households in poor countries are economically stressed and nutritionally vulnerable to a greater degree than households headed by men. At the same time, it is widely asserted that female-headed households manage their resources differently, because, it is argued, women place a higher priority than men on basic needs such as food and health care; and female heads have the opportunity to enforce these priorities in the allocation of household resources. Review of existing empirical literature reveals, not surprisingly, that the situation is somewhat more complicated than that. The economic and welfare implications of female headship depend on the cultural setting and on a wide variety of other factors.

Furthermore, the very concept of female headship is an elusive one. Historically, censuses and surveys have implicitly allowed the respondent to define headship. Typically these questionnaires simply begin the list

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of household members with the question, "Who is the head of this household". Respondents are not asked to explain their basis for selecting a particular individual. In many surveys, the purpose of the headship question is simply to provide a reference point for defining relationships among household members, so the lack of a concrete definition is unimportant. But for analysis of the differential economic conditions and resource allocation of female and male headed households, the definition of headship is critical. Recent research has demonstrated that the consequences of female headship depend on the type of female-headed household in question (Kennedy et al., forthcoming.)

It is often asserted that female-headed households are more likely to devote their resources to basic needs such as food, and thus that children's welfare is benefitted in such households, all else equal. This is based on the understanding that resources are more likely to be under women's control in female headed households. Considerable anecdotal evidence from a wide variety of field situations has been marshalled in support of this assertion (Burfisher & Horenstein, 1982; Blumberg, 1991). A number of empirical, data-based studies have also provided support for the hypothesis. These empirical studies are a bit more mixed in their results however, and many of them are subject to criticism on the basis of their analytic methods, because of often unavoidable problems in the data.

There are several elements to the hypothesis that households headed by women disproportionately devote their resources to food and basic needs, and to the production of child health and welfare. Each of these poses its own methodological problems. The mixed results of the various empirical

studies may be based in part on the varying meanings attributed to female headship, either by the interviewers and the survey designers, or by the respondents themselves. Furthermore, it is not reasonable to assume the same cultural meaning of headship, nor the same behavioral consequences, in all cultures and in all socioeconomic settings. Culturally normative roles of women are enormously varied; the acceptability of women assuming economic responsibility or full decision-making power over their households similarly varies. It would in fact be quite surprising to find that female headship carried similar behavioral consequences in all regions of the world.

Implicit in the hypothesis that female headship alters household consumption patterns in favor of nutrition and other basic needs is the assumption that female headship carries with it increased control over decisions. This is reasonable, but not necessarily true. The process of household decisionmaking is complex and not well understood. Where no adult males are present in the household, women by definition are in control of all household decisions, unless a male family member living outside the household exercises control. But where headship is defined in terms of economic contribution, for example, the degree of decision-making power conferred by a woman's economic contribution to the household is likely to be determined by cultural norms and by how that contribution is perceived, as well as by the size of the contribution. Even if it is true that women's earnings are directly related to their decision-making power, (and of course a causal relationship is virtually impossible to demonstrate empirically), the starting point in different cultures may be so different that no general prediction regarding the end point can be made.

The second implicit assumption is that increased female decision-making power automatically translates into a higher priority placed on food and other basic consumption needs. This once again is plausible, since women are most often directly responsible for the care of children and therefore perhaps more aware of their needs. Not every study has supported this assumption however. (See Horton & Miller, n.d.)

One serious problem in attempting to test these assumptions regarding the effects of female headship on expenditure and consumption patterns and on children's welfare is that female-headed households are often different in many respects from their male-headed counterparts, and these differences, rather than the fact of headship per se, may explain the different outcomes. For example, poorer households tend to spend a higher proportion of their incomes on food, and to have a higher income elasticity of demand for food as well. Some of the studies showing that women's earnings are disproportionately devoted to food were conducted in settings where women work only out of severe economic need. (For example, see Kumar's widely quoted study of Kerala, 1979.) In these cases, the explanation for the higher food demand associated with women's earnings may simply be the lower income level of these households. The present study finds that income sources differ significantly between male and female-headed households. To the extent that different income streams are allocated differently anyway, the role of headship is ambiguous at best.

By the same reasoning, if we observe that FHH have distinctly different age/sex composition and different income sources, it may be these differences rather than headship itself which account for any observed differences in expenditure and consumption patterns and in child welfare.

The present study uses data from the Dominican Republic to explore the relationship between headship as defined by survey respondents and headship according to selected alternative definitions. It seeks to describe female and male headed households according to these different definitions, and to examine and test the assumptions of economic vulnerability and differing expenditure patterns of these different household types. The consequences of female headship and its associated household characteristics for consumption, dietary adequacy, and children's nutitional status are then investigated.

1. Methods

1.1 Source of Data

The data for this study came from a nationally representative household income, expenditure and food consumption survey conducted in the Dominican Republic from January through November 1986.[1] Data were collected for a period of a week in each household. The survey covered household composition, occupations of household members, income by source and earner, and expenditure, including detailed information on food purchases by source. Food consumption was measured at the household level; no individual food consumption data were collected. Source of food was recorded, so that the value of food consumed from home production, gifts, in-kind pay, and other non-purchased sources could be included in the estimates of household income and consumption expenditure. Economic status of the households was measured by average per capita monthly expenditure including the value of food from unpaid sources. Expenditure is widely

recognized to be a more accurate measure of economic status than income because it fluctuates less than income and because respondents are more cooperative in reporting expenditures (Rogers, 1987). Households were assigned to expenditure quartiles and deciles based on the national distribution of per capita total expenditure.

Income shares by source were calculated based on the household's reported income, including the value of food consumed from unpaid sources. As is usual in surveys of this kind, there is some discrepancy between estimated household total income and expenditure, so that total expenditure could not be used as the base to calculate income percentages.

Calorie and protein consumption were estimated from the one-week household food consumption data.[2] Caloric and protein adequacy were estimated by comparing consumption levels with age- and sex-adjusted nutrient requirements of the household.[3]

A follow-up study on the same sample households conducted approximately six months later collected information on the heights and weights of all children ages six and under, along with information on the children's morbidity in the past two weeks, and the child's principal caretaker.[4] These data were used to calculate children's nutritional status by anthropometric criteria: height and weight for age and weight for height.[5]

1.2 Definitions of Headship

In the survey, household composition was measured with reference to the individual defined by the respondent as the household head. No definition was offered by the interviewers other than the question, "Who is the head of this household?"

One purpose of the present analysis is to see whether it is possible to determine what might be the empirical meaning of this self-definition of headship. To explore the question, five alternative ways of categorizing households in terms of women's roles were tested.

One possibility considered was that households might define themselves as female-headed only in cases where no adult male was present to fill the role of head. According to this "Absent Male" definition, households were categorized as female headed only if they contained no males between 18 and 60 years of age (inclusive). Note that this definition is not symmetrical. Households defined as MHH by this definition may contain adult women, while FHH contain no adult men.

Another way of looking at headship is in terms of the relative economic contribution of members. For the purposes of this study, a reference woman in each household was identified, who was either the self-defined household head if this person was female, or the female spouse of the self-defined head if male. Then two definitions of female headship were tested based on the role of the reference woman as major earner: if she contributed 50 percent or more of household earnings ("Major Earner"), and if she contributed, through her earnings, 50 percent or more of total household income from all sources, including those other than wages ("Major Income Contributor").

For comparison, we also categorized households by whether or not the reference woman earned any wage income at all ("F Earns Wages"), and by whether or not she worked at any market work ("F Works"). These latter two definitions are different because, in the first case, the reference woman earns an identifiable cash wage; in the second definition, work is defined

to include unpaid work in a family enterprise or in her own small business.[6] These two definitions were included in the study to investigate whether women's work roles, irrespective of the relative size of their economic contribution, in some way alter household income earning and spending behavior. The six definitions of headship considered in this paper are: (1) Self-Defined; (2) Absent Male; (3) Major Earner; (4) Major Income Contributor; (5) F. Earns Wages; and (6) F. Works. For reference, Table 1 summarizes the six definitions related to headship explored in this study.

2. Overlap Among Definitions

Table 2 shows the percentage of female-headed households (FHH) by each definition which are also female-headed according to all the other definitions. The most striking thing about this table is how imperfect the overlap among definitions is, except (of course) for those which must overlap by definition. None of the alternative definitions proposed in this paper accurately reflect a household's own self-definition of female headship. Only about half of self-defined female-headed households have no adult males present; this means that about 48% of self-defined female-headed households do contain adult males -- possibly grown children or the elderly father of the female head. Similarly, in fewer than half the self-defined female headed households (42%) is the reference woman a major earner, and in far fewer is she the major income contributor.

Nonetheless, a household defined as female headed by any one of our alternative definitions is far more likely to be female-headed by another than are households in the general population. Only six percent of

Table 1

Definitions of Female Headship

	Short Title	Definition
1.	Self-Defined	The person identified as household head by the survey respondent is female
2.	Absent Male	No adult male aged 18 to 60 lives in the household
3.	Major Earner	Reference Woman (head or spouse of head) earns half or more of all wage income
4.	Major Income Contributor	Reference woman earns half or more of all household income
5.	F. Earns Wages	Reference woman earns some wage income
6.	F. Works	Reference woman engages in market work, either for wages, profits, or in a family enterprise

households have the reference woman as a major income contributor, for example, but 17.5% of self-defined FHH fall in this category. Only 21% of households in the population have no adult male, but over half the self-defined FHH are in this situation. Clearly, then, both the household composition definition and the female work role definitions of headship capture important components of what causes households to define themselves as female-headed. There is no way to determine what respondents themselves had in mind when identifying the household head.

Unlike some other cultural settings, the Dominican Republic is a country in which women's work is not uncommon. About 42% of households have a reference woman who works in some type of market production. Of these, 70% have women who work for wages, the rest working in their own or their families' businesses. Even among households with working women, though, only 14% have the reference woman as the major income contributor, and only 29% have the woman as the major earner.

It has been widely recognized that women who perform market work often do not identify themselves as workers. This is a serious problem for those wishing to use national census figures, for example, to quantify the economic roles of women (ICRW, 1980), since in many cases women who work will define themselves as housewives. This phenomenon is reflected here. The definition "F Works" was obtained from the list of household members, where each member was asked his or her primary and secondary activities. The definitions based on proportional contribution to earnings and income were derived from detailed questionnaires about jobs and wages of each member, in which the interviewers did considerable probing. It is interesting to note that in about ten percent of households in which women

Table 2

Percent of Households Defined as Female Headed by the Definition at the Top Which are also Female-Headed by the Definition at Left

	Self-Defined	Absent Male	Major Earner	Major Income Contributor	F. Earns Wages	F. Works	All
Self-Defined	100	63.3	63.2	71.2	35.9	33.0	25
Absent Male	52.4	100	46.9	47.0	22.8	22.7	20.7
Major Earner	42.1	45.4	100	98.0	37.5	28.9	149
Major Income Contributor	17.5	14.7	51.2	100	19.2	14.1	6.2
F. Earns Wages	43.2	34.0	100	100	100	70.1	30.5
F. Works	51.4	46.4	85.0	90.1	90.6	100	42.4
N	1400	1402	1060	1243	1383	1285	

contribute significantly to earned and total income, these women do not report market work as their primary or secondary activity. We observed this phenomenon in the field as well. Women would conduct small-scale sales during the interview while at the same time repeating that they did no market work. This has important implications for the role of work in affecting a woman's decision-making power in the household. If she herself does not recognize her own economic contribution, she also may not derive greater influence from it.

3. Socio Demographic Characteristics of Female-Headed Households

3.1 Geographic Distribution

Table 3 shows the distribution of FHH by geographic region of the country. There are striking regional differences in the frequency of female headship. Women are very significantly more likely to work for wages and to participate in market work in urban than in rural areas. They are least likely to work, whether for wages or in any market work, in the Frontier region. This is no doubt due to the fact that more employment opportunities exist for women in cities than in rural areas; it was our team's observation that many of the women in rural households who did work found employment in nearby cities. The Frontier is the most rural and relatively remote area of the country. It is mountainous, and less well served by roads and transportation than other areas. There are fewer opportunities for wage employment in the Frontier than elsewhere, and it is more difficult from there to reach urbanized areas where jobs might be available.

Few households have the reference woman as their major source of

income. Still, the distribution of such households parallels that of households in which the woman works. The distribution of households in which the reference woman is the major earner, however, is somewhat different: the lowest proportion of such households is in Santo Domingo, and the highest proportion is in "other urban" and "other rural" areas. This is not explained by differences in the proportion of household income which is earned; wages are 46% of total income, somewhat below average in importance in the "other rural" area, where farm sales (notably of rice) constitute a much more important source of income than in other regions. But wages represent 64% of income, above the average, in the "other urban" area, and neither farm sale nor business income is particularly high. The higher prevalence of households with a woman as major earner in urban areas outside the capital may simply reflect different employment opportunities.

Self-defined female-headed households are more common in urban than in rural areas, and far less common in the Frontier than in other regions. On average, 25% of Dominican households define themselves as female headed, compared with only about 11% in the Frontier.

In contrast to all the other definitions, households with no adult males are somewhat more common in rural than urban areas, possibly because of male migration to the city to work. The Frontier is an exception, having, as usual, the fewest Absent Male households.

These differences in prevalence of FHH by region are important because they may affect the interpretation of differences in earning and expenditure patterns, which of course also differ by region.

Table 3

Distribution of Female-Headed Households by Geographic Region

	Self-Defined	Absent Male	Major Earner	Major Income Contributor	F. Earns Wages	F. Works
STRATUM						
1. Urban Santo Domingo	29.0	17.4	10.0	6.5	42.9	48.5
2. Other urban	28.3	19.5	19.3	10.0	35.9	47.5
3. Rural Frontier	10.8	10.4	11.9	2.0	14.6	29.2
4. Sugar Cane/ Livestock	23.8	24.2	12.9	2.6	22.0	40.2
5. Other Rural (Rice)	21.0	23.3	17.5	4.8	22.3	35.0
ALL	25.0	20.7	14.9	5.2	30.5	42.4
N	1400	1402	1060	1243	1383	1285
P (Pearson χ^2)	.01214	.06824	.01655	.00337	.0000	.00055

3.2 Economic Status

It is often asserted that female-headed households are more subject to economic stress than joint- or male-headed households, because women are disadvantaged in their access to jobs as well as in their access to education and in rates of pay. Certainly, in many settings, female-headed households fall disproportionately into the lowest economic strata. (See for example, Rosenhouse, 1989 and the references cited therein.)

In this study, the measure of economic status is per-capita expenditure level, with expenditure including the value of food (but not other goods) received free of charge as gifts, transfers, or pay in-kind. Per capita expenditure was chosen as more reflective of actual consumption levels than total household expenditure, but this measure does not account for possible economies of scale in consumption which may be realized by larger households.

If per-capita expenditure is accepted as a reasonable measure of economic status, the results of this study are unequivocal. Self-defined female-headed households are evenly distributed among all expenditure quartiles. They are no more likely than other households to fall into the lower, nor into the higher economic classes. These results are shown in Table 4. Households with no adult male are also evenly distributed among the per capita expenditure quartiles. This is surprising, since one might assume such households have by definition fewer earners and thus lower earning potential than households with males. As shall be seen later, these households derive their income largely from sources other than earnings.

Significant differences do exist in the prevalence of female-headed households by per capita expenditure quartile according to three definitions related to work status: Major Income Contributor, F. Earns Wages, and F. Works. By these definitions, female headed households are more prevalent in the higher per capita expenditure quartiles. In the Dominican Republic, apparently, women's work is associated with improved economic status, presumably because of the additional earning power. This is in contrast to other regions of the world where women work in the market only when the household is in severe financial straits.

The picture is quite different if quartiles based on total household expenditure are used as a basis for judging economic status (Table 5). In this case, Self-Defined FHH and Absent Male FHH are more likely to fall into the lower quartiles, as are households in which the reference woman is the major earner. These results are not very informative, however. Female-headed households, by these three definitions, are significantly smaller than male-headed ones. The average differences in household size are about one member in Self-Defined and Major Earner FHH, and two members in Absent Male FHH. Therefore it is natural that total household expenditure should be lower in these households, and the significance in terms of individual welfare should not be overemphasized. It is striking that FHH by the F. Works definition are significantly more common in the higher quartiles even when measured by household expenditure.

These results are not altered if the sample is restricted to households containing children under 12 years.

Table 4

Percent of Households in Each Quartile of Per Capita Expenditure Which are Female-Headed By Each Definition

		Self-Defined	Absent Male	Major Earner	Major Income Contributor	F. Earns Wages	F. Works
Per Capita Expenditure Quartile							
Lowest	1.	27.4	21.7	16.2	5.9	27.2	40.6
	2.	22.3	18.4	9.7	3.0	24.7	35.8
	3.	26.2	20.2	16.1	8.4	35.7	47.7
Highest	4.	25.1	23.0	15.9	6.7	33.1	43.1
ALL		25.3	20.8	14.5	6.0	30.2	41.8
N		1284	1285	981	1155	1268	1176
P (Pearson X^2)		.48738	.52038	.10444	.05096	.00823	.02827

Table 5

Percent of Households in Each Household Expenditure Quartile Which are Female-Headed by Each Definition

		Self-Defined	Absent Male	Major Earner	Major Income Contributor	F. Earns Wages	F. Works
Household Expenditure Quartile							
Lowest	1.	39.0	38.5	18.3	7.4	25.4	36.8
	2.	26.0	18.0	19.2	7.2	32.7	40.1
	3.	17.4	12.7	11.4	3.6	33.7	44.9
Highest	4.	18.9	12.0	10.3	5.0	31.5	47.1
ALL		25.3	20.3	14.6	5.8	30.9	42.3
N		1286	1287	988	1163	1272	1182
P (Pearson X^2)		.0000	.0000	.00561	.14832	.10796	.05513

Table 6

Demographic Characteristics of Self-Defined Female and Male Headed Households, By Per Capita Expenditure Quartile

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
# Males, 12-60	1.74	1.09	.0000	1.97	1.14	.0000	1.42	.98	.002
# Females, 12-60	1.69	1.84	.0410	1.67	1.67	.9961	1.58	1.78	.166
# Infants under 2	.29	.18	.0002	.39	.21	.0117	.18	.09	.087
# Children, 2-12	1.53	1.12	.0000	1.91	1.47	.0356	1.19	.76	.009
# Elderly, 60+	.25	.27	.5959	.19	.31	.0546	.261	.25	.900
# Non-Relatives	.09	.11	.4726	.02	.03	.5033	.14	.21	.240
# Extended Family Members	.15	.20	.1648	.17	.21	.6275	.10	.09	.828
# Members	5.40	4.42	.0000	6.02	4.69	.0004	4.57	3.78	.005
Age of Head	46.05	49.26	.006	46.51	52.72	.0005	45.15	46.26	.580
# Economically Active	2.01	1.52	.0000	2.32	1.61	.0011	1.80	1.46	.013
Percent Dependent	59.10	63.66	.0047	58.52	65.70	.0314	54.39	59.22	.205

Table 7

Demographic Characteristics of Absent-Male Female and Male Headed Households, By Per Capita Expenditure Quartile

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	
# Males, 12-60	1.91	.30	.0000	2.13	.34	.0000	1.66	.15	.
# Females, 12-60	1.78	1.55	.0055	1.77	1.31	.0048	1.66	1.53	.
# Infants under 2	.29	.16	.0002	.37	.23	.0594	.17	.10	.
# Children, 2-12	1.53	1.00	.0000	1.92	1.32	.0081	1.20	.69	.
# Elderly 60+	.17	.58	.0000	.17	.42	.0001	.15	.61	.
# Non-Relatives	.09	.11	.5077	.02	.02	.9741	.13	.24	.
# Extended Family Members	.17	.14	.3702	.16	.26	.2293	.10	.08	.
# Members	5.54	3.66	.0000	6.19	3.72	.0000	4.73	3.17	.
Age of Head	45.01	54.41	.0000	46.92	53.41	.001	43.12	53.80	.
# Economically Active	2.09	1.13	.0000	2.33	1.36	.0000	1.96	.91	.
Percent Dependent	58.63	66.46	.0000	59.03	65.78	.0617	51.91	67.98	.

Table 8

Demographic Characteristics of Major Earner Male and Female Headed Households by Per Capita Expenditure Quartile

	All households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
# Males, 12-60	1.80	1.00	.0000	2.11	1.03	.0001	1.61	.85	.0001
# Females, 12-60	1.82	1.77	.5783	1.82	1.55	.2118	1.74	1.80	.7431
# Infants Under 2	.30	.18	.0113	.41	.16	.0195	.16	.14	.7107
# Children, 2-12	1.55	1.20	.0052	1.97	1.55	.1740	1.24	.91	.1452
# Elderly, 60+	.22	.16	.1865	.18	.15	.6174	.21	.07	.1030
# Non-Relatives	.09	.11	.4613	.02	.04	.3429	.15	.19	.6355
# Extended Family Members	.17	.17	.9865	.18	.21	.8119	.10	.13	.7610
# Members	5.58	4.24	.0000	6.36	4.39	.0003	4.89	3.69	.0022
Age of Head	45.61	43.51	.0879	46.96	45.24	.4860	44.42	41.28	.1816
# Economically Active	2.09	1.67	.0001	2.35	1.80	.0566	1.99	1.65	.0593
Percent Dependent	58.42	54.47	.0582	59.61	55.40	.3456	52.59	48.65	.3886

Table 9

Demographic Characteristics of Major Income Contributor of Male and Female-Headed Households by Per Capita Expenditure Quartile

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
# Males, 12-60	1.63	.92	.0000	1.84	.85	.0078	1.13	.51	.0003
# Females, 12-60	1.75	1.68	.6555	1.69	1.63	.8426	1.68	1.63	.8441
# Infants Under 2	.28	.17	.0601	.37	.22	.2668	.15	.05	.2683
# Children, 2-12	1.47	1.04	.0132	1.85	1.37	.2353	1.12	.63	.1057
# Elderly 60+	.26	.16	.1291	.23	.13	.4311	.24	.16	.4877
# Non-Relatives	.08	.10	.6931	.02	.00	.5337	.15	.16	.9763
# Extended Family Members	.17	.18	.9048	.18	.28	.5252	.10	.11	.9705
# Members	5.27	3.94	.0000	5.84	4.23	.0257	4.52	2.84	.0017
Age of Head	46	40	.003	45.28	41.54	.0621	45.37	39.47	.0973
# Economically Active	1.91	1.45	.0039	2.11	1.54	.1512	1.77	1.32	.0879
Percent Dependent	60.60	54.96	.0615	61.54	60.06	.8126	55.71	44.82	.1175

Table 10

Demographic Characteristics of Female and Male Headed Households by F. Earns Wages Definition

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
# Males, 12-60	1.60	1.55	.4873	1.80	1.66	.4420	1.35	1.27	.5341
# Females, 12-60	1.67	1.92	.0006	1.62	1.88	.0815	1.61	1.77	.2153
# Infants Under 2	.29	.22	.0256	.34	.36	.8046	.17	.13	.3576
# Children, 2-12	1.46	1.37	.2708	1.83	1.74	.6383	1.13	1.01	.4448
# Elderly 60+	.30	.17	.0001	.23	.18	.3482	.32	.12	.0025
# Non-Relatives	.08	.12	.0946	.01	.05	.0246	.14	.19	.2930
# Extended Family Members	.14	.21	.0514	.14	.27	.0824	.08	.14	.3308
# Members	5.22	5.10	.4535	5.69	5.71	.9661	4.55	4.16	.1368
Age of Head	48.04	43.94	.0000	48.76	46.32	.1784	47.24	41.51	.0016
# Economically Active	1.76	2.24	.0000	2.08	2.31	.3055	1.58	2.07	.0002
Percent Dependent	63.82	51.35	.0000	61.55	57.23	.1942	61.37	42.63	.0000

Table 11

Demographic Characteristics of Male and Female Headed Households by F Works Definition

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
# Males, 12-60	1.56	1.64	.3156	1.74	1.83	.6151	1.31	1.34	.8009
# Females, 12-60	1.72	1.96	.0004	1.61	2.11	.0004	1.83	1.70	.3171
# Infants Under 2	.33	.20	.0000	.37	.33	.6305	.20	.10	.0307
# Children, 2-12	1.43	1.54	.1740	1.73	2.12	.0460	1.30	.97	.0335
# Elderly 60+	.30	.18	.0002	.26	.18	.1528	.31	.16	.0295
# Non-Relatives	.08	.11	.2148	.01	.04	.0809	.14	.17	.6561
# Extended Family Members	.16	.18	.5295	.19	.19	.9847	.09	.11	.6389
# Members	5.23	5.37	.3561	5.56	6.41	.0168	4.89	4.19	.0072
Age of Head	47.28	45.29	.0169	49.31	46.89	.1545	46.03	43.08	.0977
# Economically Active	1.41	2.61	.0000	1.51	3.16	.0000	1.36	2.29	.0000
Percent Dependent	73.02	46.26	.0000	73.06	48.18	.0000	73.16	37.86	.0000

3.3 Household Composition of Female and Male Headed Households

Female and male-headed households differ in a number of respects in terms of their demographic make-up. We have already seen that FHH are significantly smaller, according to all definitions except F Earns Wages and F. Works. Tables 6 through 11 show the differences between male and female headed households on a number of characteristics. These are shown for all households, and then seperately for the lowest and highest quartiles of per capita expenditure.

3.3.1 Self-Defined

Self-Defined FHH are about one member smaller than their male-headed counterparts. This difference in size is larger (1.5 members) in poor households. The FHH have fewer adult males (not surprisingly), and also fewer children 12 and under, and fewer infants age 2 and under. We had thought that possibly FHH would cope with their economically vulnerable status by incorporating more non-relatives and extended family members into the household, but in fact there is no difference between FHH and MHH at any income level in the number of distant relatives or non-relatives living with the household. It is not surprising that FHH have fewer economically active members, since they have fewer members overall. But the proportion of household members who work is also significantly lower, (that is, the percent dependent is higher) in FHH. This is consistent with the fact that FHH receive a higher proportion of income from unearned sources.

3.3.2 Absent Male Households

Households with no adult male present are close to two members smaller

on average than those with adult males present. They contain, of course, significantly fewer males aged 12-60, but also significantly fewer females in this age range, as well as fewer infants and children. These households contain significantly more elderly members, and these include the household head. Self-defined heads of household in Absent Male FHH (note these may be male or female) are close to 10 years older (54.4 compared with 45) than in households where there are adult males, and these heads are significantly less likely to have a spouse living in the household, possibly because they are widowed (though this information was not available). Once again there is no difference in the number of extended family members and non-relatives living in Absent Male households versus those with adult males present. The percent of dependent members, however, is significantly higher in Absent-Male households.

3.3.3 Major Earner and Major Income Contributor

In households where the reference women is the major earner, there are fewer members (by slightly more than one person). There are fewer male adults in such households, which probably explains in part why female earnings are proportionately higher. There is no difference in the number of adult females, elderly, non-relatives or distant relatives, suggesting that FHH do not depend on expanding their households in order to be able to work outside the home. There are significantly fewer infants and children in households where the reference woman is the major earner, which is not surprising. One might guess that the presence of children would be a constraint to women's work force participation.

Major earner FHH have fewer economically active members, but the

households are also smaller. The percent of household members who are dependent is lower in such households than in MHH, as would be expected since by definition the reference woman is a dependent in MHH and works in FHH.

3.3.4 F. Earns Wages and F. Works

Households in which the reference woman works for wages do not show the same characteristics of those where she is the primary earner or income contributor. The households are not smaller (nor larger) than households in which she does not work for wages, though there are slightly fewer infants and more extended family members and working-aged women. The number of elderly members is much lower in these households, most likely reflecting the life cycle stages of economically active women. Naturally, the number of economically active members is higher, and the percent dependent lower, in households where the reference woman earns wage income.

These differences between FHH and MHH by the F. Earns Wages definition are very similar to those of households distinguished by the F. Works definition.

3.4 Sources of Income

Female and male headed households, as we have seen, are about equally distributed among per capita expenditure classes. There is no evidence that female-headed households, by any definition, are more likely to fall into the lower expenditure groups. Nonetheless, the sources of household income are radically different in the two types of household.

The categories of income considered in this section are wages (earned

income), business income, and income from farm sales, from rent (of rooms or houses), from pensions and social security, from interest and dividends, and from transfers. Transfers are simply gifts of cash which in the case of the Dominican Republic are usually payments from family members living away from home. Income from friends or neighbors providing cash support to a household in need is also considered transfer income. Wages are distinguished from other earned income because wages are paid to an individual in the household, and are a function of the time and skills of that individual. Business and farm income are also earned, but often these sources cannot be directly associated with one particular household member.

In addition to these cash income sources, the imputed (local retail price) value of income from food produced and consumed at home, and from food received as gifts, is reported. Home-produced food is a significant source of real income (that is, income in cash and in kind) in rural areas; gifts of food are quite important among households in the lowest quartile. Tables 12 through 17 show these results.

3.4.1 Self-Defined

Female-headed households are far more dependent on gifts and transfers than are male-headed households. Transfers of money from outside the household represent 31% of income in Self-Defined FHH, compared with about six percent in MHH. The difference is even greater in higher-income households, suggesting that transfers more than other sources make the difference for FHH in the economic status they achieve. Wages are a far more important source of income in MHH than in FHH, though this difference is not significant in the lowest quartile.

Table 12

Percent of Household Income From Each Source
By Self-Defined Female Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Earnings	63.34	46.11	.0000	50.55	42.98	.1537	72.01	44.74	.0000
Transfers	6.46	31.48	.0000	6.18	28.45	.0000	5.64	38.20	.0000
Farm Sales	12.83	3.76	.0000	20.29	5.40	.0002	8.68	3.66	.1043
Home Produced Food	4.86	2.25	.0007	7.69	4.37	.1175	2.22	.62	.0436
Own Business	3.12	3.81	.4311	4.59	1.78	.1138	2.55	1.67	.5706
Rental Income	1.18	2.05	.0607	2.06	1.50	.6702	1.29	1.33	.9609
Interest/Dividends	.39	.05	.1591	.01	.21	.1036	.48	.00	.2644
Pension	1.76	1.55	.7157	.57	.46	.8723	2.69	4.10	.4218
Other	.19	.15	.8385	.14	.00	.5493	.56	.65	.8982
In-Kind Income*	10.74	11.03	.8173	15.61	19.22	.2525	6.09	5.65	.7981
Gifts (food only)	2.57	4.26	.0041	3.39	5.26	.2320	2.05	5.13	.0046

*In-Kind Income Includes the value of food produced and consumed at home, received as gifts or pay, or obtained free from government programs.

Table 13

Percent of Household Income From Each
Source, by Absent Male Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Earnings	64.86	35.95	.0000	52.86	30.77	.0002	75.19	31.97	.000
Transfers	7.56	33.29	.0000	7.15	32.33	.0000	6.50	38.18	.000
Farm Sales	10.74	9.79	.5918	17.46	11.80	.2082	6.70	9.72	.342
Home Produced Food	4.48	3.07	.0901	7.56	3.73	.1043	1.83	1.75	.923
Own Business	3.30	3.25	.9562	4.27	2.10	.2726	2.87	.56	.149
Rental Income	1.13	2.46	.0082	1.32	4.36	.0376	1.13	1.86	.366
Interest/Dividends	.34	.18	.5392	.07	.00	.5992	.29	.61	.471
Pension	1.29	3.35	.0012	.42	1.02	.4176	1.51	8.10	.000
Other	.13	.35	.2510	.13	.00	.6228	.36	1.31	.190
In-Kind Income*	10.65	11.38	.5935	16.31	17.61	.7112	5.46	7.69	.204
Gifts (food only)	2.76	3.92	.0676	3.46	5.64	.2108	2.22	4.84	.019

*In-Kind Income Includes the value of food produced and consumed at home, received as gifts or pay, or obtained free from government programs.

Table 14

Percent of Household Income From Each Source
By Major Earner Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	
Earnings	77.60	61.16	.0000	69.93	59.66	.0683	81.54	64.37	.0
Transfers	6.03	16.51	.0000	7.11	10.06	.3076	4.43	19.09	.0
Farm Sales	4.65	9.53	.0011	8.30	13.45	.2179	2.58	8.94	.0
Home Produced Food	2.28	2.90	.3452	3.61	5.65	.3023	1.89	.17	.1
Own Business	1.96	1.84	.8770	2.73	2.20	.7772	1.63	.82	.5
Rental Income	1.04	.94	.7998	1.05	1.12	.9055	1.24	.42	.4
Interest/Dividends	.24	.26	.9474	.09	.00	.6626	.52	.00	.4
Pension	1.37	1.17	.7543	.51	.24	.7473	1.69	.73	.5
Other	.18	.47	.2842	.17	.00	.6625	.59	1.32	.4
In-Kind Income*	6.92	8.11	.2991	10.11	13.28	.3026	5.78	4.31	.5
Gifts (food only)	2.32	2.64	.6014	2.99	2.81	.9151	2.53	2.38	.9

*In-Kind Income Includes the value of food produced and consumed at home, received as gifts or pay, or obtained free from government programs.

Table 15

Percent of Household Income From Each Source
By Major Income Contributor Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Earnings	57.95	83.91	.0000	47.00	84.07	.0002	63.94	86.51	.0
Transfers	12.55	8.71	.1781	12.09	4.49	.1927	14.33	9.03	.4
Farm Sales	11.19	.34	.0002	17.55	1.03	.0297	7.39	.20	.1
Home Produced Food	4.48	.5316	.0046	7.31	.54	.0913	1.94	.16	.2
Own Business	3.43	.6738	.0800	3.90	.00	.2305	2.51	.00	.3
Rental Income	1.38	.54	.2853	1.66	.55	.5950	1.34	.79	.6
Interest/Dividends	.33	.00	.4514	.06	.00	.7885	.39	.00	.6
Pension	1.75	.89	.4191	.58	.00	.6428	3.18	1.36	.5
Other	.17	.29	.7163	.11	.00	.8017	.62	.00	.6
In-Kind Income*	11.25	4.65	.0043	17.04	9.86	.2283	6.29	2.10	.1
Gifts (food only)	3.06	2.21	.4289	3.85	4.64	.7885	3.01	.54	.1

*In-Kind Income Includes the value of food produced and consumed at home, received as gifts or pay, or obtained free from government programs.

Table 16

Percent of Income From Each Source By F. Earns Wages

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Earnings	51.66	76.31	.0000	40.59	70.95	.0000	58.38	79.14	.000
Transfers	14.02	8.68	.0003	12.91	8.44	.1435	17.04	8.02	.00
Farm Sales	13.31	4.60	.0000	20.26	7.27	.0010	8.70	3.46	.05
Home Produced Food	5.36	1.86	.0000	8.14	3.80	.0382	2.57	.39	.002
Own Business	4.12	1.44	.0010	4.51	1.57	.0849	2.84	1.38	.31
Rental Income	1.49	.97	.1988	1.78	1.12	.5474	1.36	1.20	.32
Interest/Dividends	.35	.22	.5512	.08	.00	.5008	.46	.18	.49
Pension	1.85	1.36	.3718	.72	.10	.3370	3.76	1.71	.207
Other	.09	.37	.0813	.14	.00	.5286	.21	1.30	.094
In-Kind Income*	13.10	6.04	.0000	19.01	10.55	.0064	7.25	3.61	.020
Gifts (food only)	3.34	2.29	.0563	4.21	3.09	.4681	3.02	2.52	.623

*In-Kind Income Includes the value of food produced and consumed at home, received as gifts or pay, or obtained free from government programs.

Table 17

Percent of Income From Each Source By F. Works

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Earnings	54.16	65.94	.0000	43.27	54.86	.0192	60.57	71.90	.017
Transfers	15.56	8.44	.0000	13.54	9.95	.2294	19.37	7.40	.000
Farm Sales	12.46	7.79	.0017	19.31	14.72	.2450	6.25	6.46	.934
Home Produced Food	5.76	2.59	.0000	9.49	3.93	.0068	2.80	.66	.004
Own Business	1.37	5.85	.0000	1.93	6.01	.0134	.07	5.86	.000
Rental Income	1.73	.76	.0129	1.98	.67	.1874	1.65	1.10	.467
Interest/Dividends	.27	.24	.8823	.01	.15	.2468	.27	.20	.322
Pension	1.80	1.47	.5364	.42	.33	.8675	3.98	1.48	.115
Other	.11	.30	.2471	.19	.00	.4112	.27	1.12	.212
In-Kind Income*	12.52	9.20	.0051	19.37	13.30	.0441	7.56	4.48	.058
Gifts (food only)	3.12	2.66	.3814	4.47	2.45	.1314	3.43	2.22	.243

*In-Kind Income Includes the value of food produced and consumed at home, received as gifts or pay, or obtained free from government programs.

Farm sales are significantly more important as an income source in MHH. This is, in part, a function of the fact that FHH are disproportionately urban. (In Absent Male households, which are disproportionately located in rural areas, there is no difference in the proportion of farm income between households that do and do not have adult males, in spite of the difference in available family farm labor. This fact tends to confirm that geographic rather than household composition differences are responsible for the lower proportion of farm income in self-defined FHH.)

3.4.2 Absent Male

Wages are far less important, and transfers far more important as income sources among households with no adult male present. As with self-defined FHH, the differences are greater in the highest expenditure quartile.

Consistent with the observation that household heads are almost ten years older in Absent Male FHH, income from pensions is significantly more important where no adult male is present. The difference in the proportion of pension income is not significant in quartile 1 but is very significant in the highest quartile. This suggests that the availability of pension income may be one factor responsible for these households' higher income. Households with a history of stable, formal-sector employment, those most likely to have pensions, are also most likely to be those in the higher income brackets to begin with.

3.4.3 Major Earner and Major Income Contributor

In households where the reference woman earns 50% or more of all wage income, wages are significantly less important as a source of income than in households where she earns proportionally less. This difference is greater in higher-income households. In households where a woman earns the majority of earned income, income from transfers and from farm sales is significantly higher. This suggests that it is easier for women to achieve "Major Earner" status where total earnings are lower. The results in Table 14 show that these differences are much greater in higher income households. In quartile 1, none of the differences (in earnings, transfers, or farm sales) is significant at the 5% level.

In contrast, wage earnings are a far more important income source in households where a woman earns 50% or more of total household income. This is reasonable, since by definition these households include only those where wages (from anyone) constitute more than half of all income. Since wages are a more important income source in urban areas, it is not surprising that these households derive significantly less of their income from farm sales and consumption of home-produced food.

3.4.4 Reference Women Earns Wages or Works in the Market

Wage employment is more common in urban than rural areas. Households in which the reference woman works for wages receive a higher percentage of their income from wages than other households, and less from farm sales and home produced food. Such households receive less in transfers than households in which the reference woman does not work for wages. Recall that these households are in an earlier lifecycle stage, as evidenced by

the fact that the age of the (self-defined) household head is signifanctly lower, by almost six years. If transfers are most likely to come from grown children who have moved out of the home, then one would expect less transfer income in younger households.

In households where the reference woman works (more than 40% of all households in the Dominican Republic), wages are more important, and transfers less so, than where she does not. Once again, the lower proportion of farm and home production income reflects the greater urban concentration of these households. In contrast to households where women work for wages, however, business income is very significantly higher in these "F. Works" households because much of the work women engage in is small enterprises.

4. Expenditure and Consumption Patterns of Female Headed Households

4.1 Description

4.1.1 Expenditure Patterns

One of the most widely repeated assertions regarding women-headed households is that their expenditure patterns differ from those of male-headed households. In particular, it is often argued (eg. Blumberg, 1979) that in FHH, a higher proportion of household resources is devoted to basic needs such as food and health care. The reasons cited relate to women's closer connection with, and therefore greater awareness of their children's well-being. The significance of this issue for policy is that, in cases where the argument is upheld, development programs which put

resources in the hands of women may result in a greater impact on nutritional status and health. Conversely, programs which raise household income at the cost of shifting its control away from women may have the unintended effect of mitigating the degree to which the additional income contributes to household members' well-being and fulfillment of basic needs.

4.1.1.1 Food Consumption Expenditure

These data from the Dominican Republic do show some differences between FHH and MHH in their expenditure patterns, but these differences are rather inconsistent, and they do not in general support the contention that households headed by women have a higher preference for spending on food.

Tables 18 through 23 show the proportions of household expenditure devoted to each category of consumption, according to the various definitions of headship.

Among self defined FHH, food expenditure is on average no different from that of MHH. It is marginally higher (p=.06) in quartile 4, but this may not have any welfare implication, since high income households are generally not at risk of inadequate food consumption.

Food purchases are of course related to the availability of food from unpaid sources (home production, gifts and in-kind pay). By most of the definitions tested in this paper, FHH are disproportionately urban, therefore one would expect to see higher, rather than lower cash expenditure on food in these households, since unpaid sources of food are less available in urban areas. To see whether unpaid food affects these results, we include in the tables information on the value of all food

(paid and unpaid) as a proportion of total consumption expenditure, including unpaid food. (The value of in-kind transfers other than food was not measured in this study.) Here again, there is no difference between MHH and FHH.

These results are consistent with those for Absent-Male FHH. There are no differences between Absent Male FHH and MHH in the proportion of either cash expenditure or total consumption devoted to food.

Even more surprising is the evidence that, in households which are defined as female headed in terms of the reference woman's earnings, it is in male-headed households that food represents a larger share of the value of consumption. In households where the reference woman accounts for half or more of the earned income, there is no difference in proportion of cash expenditure on food. The proportion is slightly (not significantly) lower among FHH in the bottom quartile and slightly (not significantly) higher in the top quartile. However, there is no difference on average between FHH and MHH in food consumption as a proportion of total consumption; in the lowest quartile, consumption of food (in value terms) is significantly lower in FHH.

Among households defined in terms of Major Income Contributor, the proportion of both cash expenditure and total consumption accounted for by food is significantly lower in FHH than in MHH, on average and in the lowest quartile. Female headship by this definition is quite uncommon, and the numbers are small. Nonetheless, the results are consistent.

No difference in food expenditure were observed between households in which reference women worked, either for wages or in any market work, and these where they did not.

Table 18

Percent of Household Cash Expenditure Devoted to Each Consumption Item, By Self-Defined Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Lodging	2.69	3.25	.2244	1.34	.82	.3504	3.21	7.65	.00
Utilities	2.55	3.21	.0356	1.83	2.92	.0089	2.99	3.18	.5
Cooking Fuel	3.10	4.00	.0002	3.24	5.09	.0033	2.98	3.25	.55
Hygiene	5.50	5.76	.5236	5.90	6.64	.3221	5.23	4.89	.7
Domestic Help	1.01	.72	.1115	.16	.08	.4974	2.35	1.80	.24
Recreation and Gambling	11.18	8.13	.0020	10.05	8.27	.2600	6.86	4.00	.00
School Expense	1.41	1.37	.8048	1.65	1.16	.2113	6.76	5.15	.25
Clothing	5.67	6.04	.3459	5.95	6.38	.6659	1.32	1.08	.49
Household Linens	.81	.64	.0474	.76	.66	.6608	6.13	5.61	.49
Transportation	5.77	4.76	.0607	5.24	5.37	.9126	.87	.73	.41
Purchased Food	57.78	59.27	.2092	61.15	58.35	.2867	7.62	6.27	.23
Unpaid Food*	8.65	7.75	.2851	13.61	15.14	.4719	50.74	54.85	.06
All Food**	61.57	62.50	.4087	67.38	65.97	.4997	4.65	3.67	.34
"Basic Needs"***	66.88	70.72	.0003	69.22	69.13	.9678	52.76	55.94	.15

* Percent of total expenditure, including food from unpaid sources, which is food from unpaid sources.
** Value of all food consumed (paid and unpaid) as a percent of total expenditure.
*** Lodging, utilities, cooking fuel, and food.

Table 19

Percent of Household Cash Expenditure Devoted to Each Consumption Item, by Absent Male Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Lodging	2.75	3.16	.4078	1.39	.48	.1366	4.08	5.25	.33
Utilities	2.40	3.99	.0000	2.04	2.43	.3927	2.92	3.47	.22
Cooking Fuel	3.19	3.86	.0110	3.57	4.35	.2607	2.87	3.70	.08
Hygiene	5.33	6.54	.0061	5.80	7.24	.0786	4.84	6.23	.14
Domestic Help	1.02	.61	.0387	.17	.005	.1626	2.40	1.53	.07
Recreation and Gambling	10.88	9.28	.0625	10.06	7.47	.1506	6.87	3.51	.00
School Expense	1.47	1.09	.0316	1.58	1.23	.4856	5.83	8.22	.10
Clothing	5.85	5.41	.2994	5.86	6.85	.3661	1.32	1.05	.45
Household Linens	.76	.76	.9381	.66	1.03	.1354	6.45	4.38	.00
Transportation	5.74	4.59	.0474	5.58	4.06	.2488	.82	.90	.66
Purchased Food	58.19	58.05	.9137	60.61	59.63	.7337	7.70	5.77	.14
Unpaid Food*	8.190	9.33	.2118	13.34	16.65	.1548	51.31	53.48	.35
All Food**	61.61	62.62	.4073	66.76	67.97	.5978	4.19	5.15	.37
"Basic Needs"***	67.43	69.76	.0517	69.27	68.86	.8834	52.90	55.93	.20

* Percent of total expenditure, including food from unpaid sources, which is food from unpaid sources.
** Value of all food consumed (paid and unpaid) as a percent of total expenditure.
*** Lodging, utilities, cooking fuel, and food.

Table 20

Percent of Cash Expenditure Devoted to Each Consumption Item, By Major Earner Headship

	All Households			Quartile 1			Quartile 4	
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head
Lodging	2.86	4.26	.0315	1.48	1.52	.9688	4.10	6.24
Utilities	2.35	2.81	.1647	2.09	2.49	.5252	2.92	2.98
Cooking Fuel	3.31	3.65	.2704	4.03	4.12	.9262	2.86	3.30
Hygiene	5.27	6.03	.1155	5.81	5.54	.7220	4.80	5.24
Domestic Help	.94	.63	.1662	.18	.23	.8092	2.42	1.28
Recreation and Gambling	11.32	7.90	.0008	9.23	11.18	.3223	6.84 6.06	3.72 4.50
School Expense	1.54	1.22	.1726	1.79	1.25	.3592	1.44	1.10
Clothing	5.98	6.14	.7790	6.18	6.79	.6901	6.54	6.03
Household Linens	.75	.71	.7225	.59	.77	.5196	.85	.92
Transportation	5.88	5.74	.8611	5.15	6.14	.5821	7.91	8.38
Purchased Food	57.96	58.68	.6395	61.41	56.11	.1221	51.04	54.81
Unpaid Food*	6.80	6.41	.6911	11.97	10.81	.6892	3.90	4.27
All Food**	60.95	61.07	.9325	67.39	60.41	.0111	52.60	56.33
"Basic Needs"***	67.20	70.50	.0180	70.57	68.10	.4419		

* Percent of total expenditure, including food from unpaid sources, which is food from unpaid sources.
** Value of all food consumed (paid and unpaid) as a percent of total expenditure.
*** Lodging, utilities, cooking fuel, and food.

Table 21

Percent of Household Cash Expenditure Devoted to Each Consumption Item By Major Income Contributor Headship

	All Households			Quartile 1			Quartile 4	
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head
Lodging	2.73	5.87	.0005	1.15	2.40	.2535	3.98	8.96
Utilities	2.62	2.78	.7938	2.01	1.13	.1963	3.05	2.65
Cooking Fuel	3.15	4.01	.0321	3.33	5.27	.0485	2.84	3.92
Hygiene	5.27	7.60	.0008	6.18	6.70	.7308	4.77	6.46
Domestic Help	.86	1.01	.6395	.14	.00	.4968	2.14	2.36
Recreation and Gambling	10.78	7.71	.0323	9.38	10.11	.7859	6.29 6.45	3.70 3.70
School Expense	1.42	1.23	.5496	1.56	1.37	.8152	1.25	.68
Clothing	5.69	7.28	.0282	5.84	9.48	.0640	5.90	7.05
Household Linens	.77	.93	.3423	.77	1.11	.4521	.33	1.22
Transportation	5.32	6.35	.1230	5.06	9.56	.0574	7.21	8.27
Purchased Food	59.12	53.78	.0126	61.89	52.89	.0517	52.64	50.04
Unpaid Food*	8.25	4.73	.0230	13.05	10.70	.5338	4.25	1.15
All Food**	62.48	55.68	.0011	67.52	57.04	.0074	54.24	50.66
"Basic Needs"***	68.27	63.29	.0934	69.83	65.62	.3223		

* Percent of total expenditure, including food from unpaid sources, which is food from unpaid sources.
** Value of all food consumed (paid and unpaid) as a percent of total expenditure.
*** Lodging, utilities, cooking fuel, and food.

Table 22

Percent of Cash Expenditure on Each Consumption Item, By F. Earns Wages Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Lodging	2.38	3.87	.0005	1.18	1.31	.8227	3.20	6.65	.001
Utilities	2.79	2.47	.2681	2.09	2.25	.7006	3.03	3.06	.935
Cooking Fuel	3.18	3.59	.0736	3.51	4.08	.3647	3.07	3.11	.929
Hygiene	5.45	5.35	.7709	6.09	6.12	.9769	5.13	4.45	.347
Domestic Help	.97	.85	.4648	.13	.15	.8846	2.29	2.12	.696
Recreation and Gambling	11.02	9.49	.0277	9.13	9.86	.5959	6.73 7.47	5.12 4.36	.070 .016
School Expense	1.27	1.71	.0047	1.43	1.81	.3312	1.09	1.62	.094
Clothing	5.86	5.66	.5770	6.28	5.77	.6093	5.93	6.02	.895
Household Linens	.82	.65	.0370	.83	.53	.1750	.82	.84	.896
Transportation	5.27	6.15	.0805	5.50	4.93	.6362	6.19	9.39	.006
Purchased Food	58.15	58.50	.7454	60.04	61.46	.5757	52.54	50.45	.303
Unpaid Food*	9.57	5.97	.0000	15.53	10.02	.0086	4.78	3.79	.304
All Food**	62.44	60.72	.0967	67.72	65.17	.2092	54.48	51.98	.227
"Basic Needs"***	67.53	68.76	.2119	68.55	70.94	.3056			

* Percent of total expenditure, including food from unpaid sources, which is food from unpaid sources.
** Value of all food consumed (paid and unpaid) as a percent of total expenditure.
*** Lodging, utilities, cooking fuel, and food.

Table 23

Percent of Cash Expenditure on Each Consumption Item, By F. Works Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Lodging	2.25	3.78	.0003	1.01	1.68	.2226	3.54	5.88	.029
Utilities	3.06	2.27	.0055	2.40	1.78	.1063	3.23	2.84	.317
Cooking Fuel	3.26	3.44	.4052	3.66	3.86	.7398	3.19	2.93	.553
Hygiene	5.53	5.27	.4099	6.35	5.95	.5709	4.90	4.45	.459
Domestic Help	.87	.84	.8240	.10	.11	.8851	2.09	1.96	.733
Recreation and Gambling	10.78	9.41	.0367	9.74	8.62	.3879	6.14 6.56	5.80 5.56	.708 .420
School Expense	1.22	1.71	.0013	1.10	2.13	.0059	1.17	1.49	.328
Clothing	5.66	5.88	.5471	5.80	6.67	.3635	6.00	5.88	.862
Household Linens	.78	.74	.5490	.82	.71	.6144	.75	.87	.409
Transportation	5.38	5.82	.3765	5.17	5.53	.7607	6.70	8.42	.147
Purchased Food	58.90	58.51	.7141	61.30	60.15	.6337	53.33	50.63	.187
Unpaid Food*	9.17	7.80	.0784	14.95	13.31	.4173	4.63	4.61	.971
All Food**	62.90	61.77	.2600	68.21	66.40	.3455	55.11	52.60	.227
"Basic Needs"***	68.32	68.30	.9781	70.17	68.15	.3548			

* Percent of total expenditure, including food from unpaid sources, which is food from unpaid sources.
** Value of all food consumed (paid and unpaid) as a percent of total expenditure.
*** Lodging, utilities, cooking fuel, and food.

4.1.1.2 "Basic Need" Expenditure

Food is, of course, not the only consumption item which relates directly to the basic day-to-day needs of households. To test whether significant differences in all such spending exist between MHH and FHH, expenditures on food, lodging, cooking fuel, and utilities were combined into a single variable. The interpretation of this variable is not straightforward, because all of the terms in the variable, including food, have both a luxury and a necessity component. Shelter is a necessity, but the quality of housing varies widely; electricity and cooking fuel may be viewed as relative necessities, but the costs of a telephone or a modern stove are luxuries in the Dominican context.

The results show a significantly higher expenditure on "basic needs" in self-defined FHH, those with absent males, and those in which the reference woman earns half or more of wage income. By the other definitions, no differences are observed between MHH and FHH. The welfare implications of these differences are not obvious, especially since the differences are not even marginally significant in the lowest expenditure quartile, where fulfillment of basic needs may be assumed to be at greatest risk.

4.1.1.3 Gambling and Recreation

Expenditures on gambling and recreational activities are significantly lower in FHH than in MHH by every definition tested. These differences are due mostly to differences in recreation; gambling alone does not differ by headship.

These differences are not significant among low-income households by any measure of headship. Self-defined and absent male FHH in the lowest

quartile do spend proportionally less than MHH on these "frivolous" items; such expenditures are actually higher among low-income major-earner and major income contributor FHH.

Interpretation of these results is ambiguous. They may reflect different spending priorities of women, or different kinds of recreational activities in FHH.

4.1.1.4 Schooling

School expenditures are of policy interest because they represent investment in the human capital of the next generation. The differences observed in expenditure on schooling are most likely due to life cycle stage of the households, however, rather than to different priorities in MHH and FHH. Among Self-Defined FHH, school expenditure is no different than in their male-headed counterparts. School expense is lower in Absent Male FHH, no doubt because of the older heads and fewer children in these households. By Major Earner and Major Income Earner criteria, no difference in school expense was observed. School expenditure is higher in FHH by the F Earns and F Works definitions, probably because of the lower age of household heads in the FHH, and (in the case of households where F. Works), the greater number of school-aged children.

4.1.2 Food Consumption Patterns

Food expenditure and food consumption as a proportion of total expenditure and consumption respectively, do not show pronounced or consistent differences based on headship. Where significant differences are observed, it is in MHH where food represents the larger share of

consumption. However, it is possible that food expenditures are devoted to different types of foods in MHH and FHH, such that similar levels of expenditure obtain different levels of nutrients. To explore this issue, we looked first at the proportions of dietary calories obtained from certain food sources. These results are shown in Tables 24-29. Then we looked at the differences between MHH and FHH in terms of the calories and protein obtained for one peso of expenditure on food. (This calculation included purchased foods only.) These results are shown in Table 30.

The results suggest that FHH tend to purchase foods with the consumption patterns of relative luxuries, such as meat, chicken, and fish, and foods from animal sources (including dairy products and eggs). Self-defined FHH obtain a significantly higher proportion of their dietary calories from the meat group (including chicken and fish), and from all animal sources. These differences, while not large, are significant in both the lowest and the highest expenditure quartiles. The proportion of calories from starchy staples (roots, tubers and plantain) is lower in these FHH.

In Absent Male FHH,proportion of calories from animal sources is also higher than in MHH. This difference is (surprisingly) greater in the lowest quartile, in which both the meat group and milk products provide a greater proportion of calories in the FHH.

In households distinguished by headship defined in terms of major earnings contribution, there are no significant differences between FHH and MHH in dietary patterns, except that rice and beans provide a greater proportion of calories in MHH. In FHH, the proportion of animal calories is higher, but not significantly so ($p=.1$). A similar pattern is observed

Table 24

Percent of Calories Consumed From Selected Sources, by Self-Defined Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Source									
Rice	30.77	30.30	.5264	34.43	35.83	.3873	27.28	23.99	.0181
Beans	4.83	4.56	.2487	5.69	5.00	.2109	4.30	3.77	.1731
Starchy Roots	17.85	15.72	.0054	17.39	14.81	.1422	18.45	17.17	.3995
Meat	7.11	7.84	.0254	4.92	6.43	.0086	9.03	10.93	.0150
Milk and Dairy	5.96	6.32	.4326	4.75	5.72	.2837	6.90	7.56	.4422
All Animal Sources	13.64	14.77	.0481	9.96	12.39	.0239	16.83	19.33	.0428
Private Sector Purchase	78.09	79.12	.5147	69.69	65.26	.2223	82.56	88.36	.0532
Home Production	7.02	2.21	.0000	10.91	4.65	.0013	4.28	1.58	.0395

Table 25

Percent of Calories Consumed From Selected Sources, by Absent Male Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Source									
Rice	30.94	29.55	.0803	34.84	34.70	.9349	27.01	24.57	.0905
Beans	4.74	4.86	.6433	5.42	5.33	.4871	4.25	3.87	.3422
Starchy Roots	17.27	17.50	.7824	16.78	16.36	.8243	17.50	20.24	.0822
Meat	7.28	7.40	.7430	5.04	6.37	.0316	9.45	9.70	.7561
Milk and Dairy	5.84	6.85	.0368	4.63	6.39	.0718	6.94	7.51	.5156
All Animal Sources	13.66	14.94	.0391	9.93	13.12	.0059	17.30	18.00	.5865
Private Sector Purchase	79.51	73.99	.0012	70.72	60.44	.0084	85.72	78.31	.0167
Home Production	6.17	4.38	.0380	9.66	7.60	.3307	3.46	4.08	.6449

Table 26

Percent of Calories From Selected Sources, by Major Earner Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Source									
Rice	31.22	28.72	.0131	35.86	32.92	.2028	26.90	25.42	.3907
Beans	4.72	4.13	.0453	5.45	4.04	.0541	4.16	3.72	.3908
Starchy Roots	16.57	17.47	.3564	14.56	16.52	.3746	18.23	18.07	.9353
Meat	7.34	8.08	.0882	5.25	6.54	.1059	9.08	10.07	.2889
Milk and Dairy	5.93	6.33	.5419	4.97	4.41	.6845	6.95	7.33	.7292
All Animal Sources	13.84	15.16	.1010	10.46	11.56	.4812	16.97	18.37	.3693
Private Sector Purchase	82.20	80.82	.4869	75.07	68.59	.1879	86.57	84.38	.5388
Home Production	3.92	4.73	.3870	6.50	10.06	.1636	2.69	2.32	.3150

Table 27

Percent of Calories From Selected Sources, by Major Income Contributor Headship

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Source									
Rice	30.88	25.90	.0003	34.47	30.43	.1865	26.59	25.24	.5959
Beans	4.71	3.70	.0111	5.25	2.59	.0049	4.17	3.29	.2159
Starchy Roots	17.49	16.34	.4409	16.90	15.33	.6515	18.58	14.70	.1654
Meat	7.02	9.35	.0001	4.98	7.65	.0136	9.41	10.59	.4136
Milk and Dairy	6.06	7.23	.1823	5.28	5.24	.9825	6.93	8.37	.3521
All Animal Sources	13.66	17.24	.0011	10.60	12.88	.2935	17.20	20.20	.1811
Private Sector Purchase	78.87	83.67	.1019	70.28	70.65	.9571	84.51	88.68	.4425
Home Production	6.10	1.15	.0016	9.54	2.90	.0851	3.53	.16	.1554

Table 28

Percent of Calories From Selected Sources, by F. Farms Wages

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Source									
Rice	31.27	29.32	.0048	35.00	34.35	.6856	27.22	24.71	.0491
Beans	4.92	4.23	.0006	5.80	4.34	.0061	4.23	3.99	.5081
Starchy Roots	17.66	16.76	.2124	16.96	16.00	.5880	18.71	17.46	.3699
Meat	6.95	8.07	.0002	5.37	5.22	.8035	9.10	10.44	.0646
Milk and Dairy	6.14	5.91	.5870	5.13	4.84	.7532	7.12	7.14	.9795
All Animal Sources	13.61	14.65	.0534	10.73	10.48	.8191	17.09	18.52	.2093
Private Sector Purchase	75.93	84.01	.0000	66.07	76.23	.0048	83.03	86.75	.1723
Home Production	7.00	3.34	.0000	10.35	6.62	.0590	4.50	1.93	.0344

Table 29

Percent of Calories from Selected Sources, by F. Works

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Source									
Rice	30.91	30.44	.4731	34.27	35.79	.3014	26.34	25.94	.7441
Beans	4.94	4.28	.0004	5.70	4.83	.0757	4.10	3.97	.7031
Starchy Roots	17.26	17.58	.6426	16.12	17.95	.2688	18.41	18.13	.8295
Meat	7.03	7.70	.0190	5.58	5.11	.3859	9.27	10.22	.1872
Milk and Dairy	6.08	5.72	.3074	5.56	4.26	.1301	7.34	6.95	.5927
All Animal Sources	13.65	14.07	.3833	11.38	9.73	.1073	17.57	18.04	.6711
Private Sector Purchase	78.78	78.66	.9295	69.44	69.45	.9937	86.12	83.12	.2450
Home Production	6.70	4.69	.0061	9.96	8.33	.3765	4.01	3.07	.4269

Table 30

Calories and Protein Obtained Per Peso of Expenditure, by Male and Female-headed Households (All Definitions)

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Self-Defined									
Calories/peso	1192	1174	.5187	1470	1380	.1556	986	956	.565
Protein/peso	26.84	26.81	.9614	31.69	31.11	.6341	23.28	22.70	.508
Absent Male									
Calories/peso	1195	1152	.1728	1483	1284	.0057	973	998	.657
Protein/peso	26.89	26.56	.5770	31.81	30.37	.2958	22.92	23.93	.277
Major Earner									
Calories/peso	1176	1118	.1318	1460	1340	.1846	969	954	.818
Protein/peso	26.68	2589	.2653	32.03	30.42	.3535	22.69	22.81	.916
Major Income Contributor									
Calories/peso	1203	1055	.0068**	1460	1317	.2525	990	887	.286
Protein/peso	26.95	2507	.0582*	31.51	29.22	.3334	23.23	21.51	.284
F. Earns Wages									
Calories/peso	1212	1134	.0038**	1432	1480	.4421	1012	901	.020
Protein/peso	27.15	25.88	.0086**	31.28	31.84	.6397	23.59	21.94	.037
F. Works									
Calories/peso	1212	1149	.0154	1419	1466	.4357	1001	912	.062
Protein/peso	26.98	26.18	.0833	30.76	31.74	.3791	23.31	22.01	.091

among households distinguished by major income contributor: MHH obtain significantly more calories from rice and beans, while FHH obtain more from meat and all animal sources.

Meat group and animal calories are higher, and calories from rice and beans lower in FHH defined by the reference woman earning wages, though these differences are not large, and generally are not significant in the separate quartiles. Similar but not significant trends are seen in FHH defined by F. Works.

Apparently households in which it may be assumed that women have a greater influence on consumption patterns show a preference for higher quality foods (quality as culturally, not necessarily nutritionally defined), while households in which males may exercise more influence prefer calories which provide greater dietary bulk.

Given that FHH obtain a higher proportion of their calories from relatively more expensive sources, it should not be surprising that in the few cases where significant differences exist, it is in FHH that lower levels of calories and protein are obtained per peso of expenditure. (See Table 30.) This is the case for calories purchased per peso by Absent Male FHH in the lowest quartile, and for protein and calories purchased by Major Income Contributor FHH. Significantly, lower purchases of calories and protein per peso are observed in households where the reference woman works for wages, or works at all.

These results for FHH defined by women's work roles may possibly be explained by the higher time constraints on women in such households. The time dimension is critical to working women, and perhaps they are trading off convenience in purchase or preparation against finding less expensive

food sources. This explanation, however, would not apply in Absent Male households. Another possibility is that women place a higher priority on the perceived quality and taste of the diet, and so purchase relatively more expensive foods when they control the budget.

Calorie consumption is often used as a marker of overall dietary adequacy in food consumption surveys. However, a number of studies (Sigman et al., 1989; Golden, 1988; Dwyer et al., 1982; Kemmer, 1989) have shown that the amount of food of animal origin in the diet may be an important determinant of nutritional status in both children and adults, even if calories are adequate. Thus the observed pattern of expenditure in FHH, in which the calorie efficiency of food expenditure is traded against greater consumption of animal foods, may be nutritionally desirable.

4.1.3 Household Dietary Adequacy

Dietary adequacy in this study was estimated by calculating the caloric and protein content of all food consumed in the household or prepared at home for consumption outside. Nutrient content was adjusted for edible portion. Minor fruits and vegetables were not included in the quantity estimates. Average daily consumption of calories and protein was estimated and then compared with the number of adult-equivalent units in the household. Adult-equivalents were computed separately for calories and protein.

Note that no adjustments were made for intrahousehold distribution of food, nor for the number of people eating. (The average of the number of persons consuming each meal was slightly over the number of household members, but this figure could not be used because age and sex were not recorded for the persons eating.)

Table 31

Caloric and Protein Intake Per Adult Equivalent Unit, and Percent of Recommended Levels, by Headship (All Definitions)

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head	P
Self-Defined									
Calories/Ad. Eq.	2612.24	2419.32	.0027	2425.23	1971.32	.0013	2787.70	2767.84	.8861
Caloric Adequacy (Percent)	113.58	105.19	.0027	105.44	85.71	.0013	121.20	120.34	.8861
Protein gms/Ad. Eq.	58.76	52.87	.0004	51.85	43.36	.0118	65.87	62.61	.3739
Protein Adequacy (Percent)	111.92	100.71	.0004	98.76	82.59	.0118	125.46	119.26	.3739
Absent Male									
Calories/Ad. Eq.	2545.49	2645.75	.1595	2299.01	2314.91	.9219	2768.70	2833.94	.6601
Caloric Adequacy (Percent)	110.67	115.03	.1595	99.96	100.65	.9219	120.38	123.21	.6601
Protein gms/Ad. Eq.	57.63	56.10	.4065	49.10	51.45	.5408	65.95	61.61	.2670
Protein Adequacy (Percent	109.77	106.86	.4065	93.52	98.01	.5408	125.62	117.35	.2670
Major Earner									
Calories/Ad. Eq.	2480.81	2649.48	.0460	2176.79	2286.51	.5688	2715.04	2876.84	.3262
Caloric Adequacy (Percent)	107.86	115.19	.0460	94.41	99.41	.5688	118.05	125.08	.3262
Protein gms/Ad. Eq.	56.47	58.69	.3270	47.87	51.38	.4831	64.42	62.61	.6880
Protein Adequacy (Percent)	107.57	111.79	.3270	91.19	97.37	.4831	122.70	119.26	.6880
Major Income Contributor									
Calories/Ad. Eq.	2561.86	2487.04	.5378	2341.91	2049.62	.2875	2779.63	2846.70	.7911
Caloric Adequacy (Percent)	111.39	108.13	.5378	101.82	89.11	.2875	120.85	123.77	.7911
Protein gms/Ad. Eq.	56.92	57.23	.9207	50.37	45.23	.4446	64.67	62.71	.7657
Protein Adequacy (Percent)	108.43	109.02	.9207	95.94	86.15	.4446	123.19	119.44	.7657
F. Earns Wages									
Calories/Ad. Eq.	2616.97	2483.92	.0269	2410.58	2102.54	.0280	2804.34	2781.65	.8586
Caloric Adequacy (Percent)	113.78	108.00	.0269	104.81	91.41	.0280	121.93	120.94	.8586
Protein gms/Ad. Eq.	58.25	55.67	.0950	51.99	44.97	.0315	65.49	65.14	.9181
Protein Adequacy (Percent)	110.96	106.03	.0950	99.03	85.32	.0315	124.74	124.08	.9181
F. Works									
Calories/Ad. Eq.	2600.71	2525.12	.1804	2498.52	2113.41	.0031	2698.12	2867.22	.1563
Caloric Adequacy (Percent)	113.07	109.79	.1804	108.63	91.89	.0031	117.31	124.66	.1563
Protein gms/Ad. Eq.	57.62	56.53	.4558	54.26	44.54	.0020	62.85	67.11	.1782
Protein Adequacy (Percent)	109.75	107.67	.4558	103.36	84.83	.0020	119.71	127.83	.1782

Table 31 shows daily calories and protein consumed per adult-equivalent unit, and the same consumption as a percentage of WHO/FAO recommended consumption levels, for MHH and FHH by each definition. The results are inconsistent. Self-defined FHH, on average and in the lowest quartile, achieve lower levels of calorie and protein adequacy than MHH. The differences are large and statistically significant. However, no such differences are observed among Absent Male MHH and FHH; adjusted for the age/sex composition of the household, macronutrient consumption levels are the same in these two types of households. These comparisons are important because they bear on comparisons of nutritional status of children in these households, discussed below.

In Major Earner FHH, caloric consumption adequacy, (but not that of protein) is significantly above that of MHH. This is surprising, because such households spend proportionally no more on food than do MHH; they do not obtain higher levels of nutrients for their expenditure.

Households in which the reference woman works for wages have lower caloric adequacy, and marginally ($p=.09$) lower protein adequacy than in households in which she earns no wage income. These differences are greater and more significant in the lowest quartile. Similarly lower levels of calorie and protein adequacy are observed in the low-income (Quartile 1) households of women who work.

These same data are presented slightly differently in Tables 32 and 33, where the proportion of households falling into each category of nutrient adequacy (less than 75%, 75 to 100%, over 100%) is shown for MHH and FHH. Average levels of adequacy are informative, but it is also useful to know whether the differences in average intake bring substantial numbers of

Table 32

Proportion of Female and Male Headed Households Falling In Each Category of Caloric Adequacy

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	Total	Male Head	Female Head	Total	Male Head	Female Head	Total
Self-Defined Percent of Caloric Needs									
Over 100%	59.8	47.7	56.8	48.6	28.6	43.2	69.0	61.9	67.1
100-75%	24.9	24.9	24.9	23.5	24.6	23.8	20.9	23.4	21.6
Below 75%	15.3	27.4	18.3	27.9	46.8	33.1	10.1	14.7	11.3
Significance (Tau)		.00018			.00555			.17557	
Absent Male									
Over 100%	56.7	57.3	56.8	43.3	42.5	43.2	68.1	63.6	67.1
100-75%	26.4	18.4	24.9	25.3	17.4	23.8	23.0	16.3	21.6
Below 75%	16.9	24.3	18.3	31.4	40.1	33.1	8.9	20.1	11.3
Significance (Tau)		.01783			.38945			.14858	
Major Earner									
Over 100%	54.1	58.2	54.7	37.6	42.1	38.2	66.3	66.5	66.3
100-75%	27.6	25.9	27.4	27.4	31.2	27.9	25.5	18.6	24.4
Below 75%	18.2	15.9	17.9	35.1	26.7	33.8	8.2	15.0	9.3
Significance (Tau)		.59883			.67048			.54725	
Major Income Contributor									
Over 100%	57.2	45.6	56.5	43.9	30.3	43.1	66.8	66.7	66.8
100-75%	24.2	37.0	25.0	24.3	36.6	25.1	21.6	22.2	21.7
Below 75%	18.5	17.4	18.5	31.7	33.0	31.8	11.6	11.1	11.6
Significance (Tau)		.03255			.46002			.99799	
F. Earns Wages									
Over 100%	58.9	53.9	57.3	47.7	33.7	43.7	67.4	68.4	67.3
100-75%	22.9	28.6	24.7	20.0	34.5	24.1	22.1	20.1	21.4
Below 75%	18.2	17.5	18.0	32.3	31.8	32.2	10.5	11.6	10.9
Significance (Tau)		.06491			.02819			.91996	
F. Works									
Over 100	59.9	54.6	57.6	53.6	31.9	44.5	65.0	71.8	67.9
100-75%	22.6	28.1	25.0	19.3	32.9	25.0	25.9	17.3	22.1
Below 75%	17.5	17.2	17.4	27.2	35.2	30.5	9.2	10.9	9.9
Significance (Tau)		.04896			.00072			.17992	

Table 33

Proportion of Female and Male-Headed Households Falling in Each Category of Protein Adequacy

	All Households			Quartile 1			Quartile 4		
	Male Head	Female Head	Total	Male Head	Female Head	Total	Male Head	Female Head	Tot.
Self-Defined Percent of Protein Needs									
Over 100%	53.6	44.9	51.4	41.5	30.9	38.6	62.7	65.2	63.
100-75%	25.1	22.2	24.4	23.6	14.4	21.1	24.0	13.9	21.
Below 75%	21.3	32.9	24.2	34.9	54.6	40.2	13.3	20.9	15.
Singificance (Tau)		.00001			.00131			.41458	
Absent Male									
Over 100%	51.7	50.5	51.5	37.3	44.3	38.6	63.7	62.0	63.
100-75%	26.1	16.7	24.4	24.2	8.2	21.1	23.7	12.9	21.
Below 75%	22.1	32.8	24.2	38.5	47.5	40.2	12.6	25.1	15.
Singificance (Tau)		.00143			.07156			.07674	
Major Earner									
Over 100%	49.9	54.7	50.6	32.8	46.5	34.8	61.4	62.1	61.
100-75%	25.9	23.2	25.5	23.6	22.1	23.4	25.3	24.3	25.
Below 75%	24.2	22.0	23.9	43.5	31.4	41.7	13.4	13.6	13.
Singificance (Tau)		.50500			.26966			.99096	
Major Income Contributor									
Over 100%	51.1	53.2	51.3	38.4	36.6	38.3	62.1	66.7	62.
100-75%	24.2	22.0	24.1	21.5	24.1	21.7	22.9	11.1	22.
Below 75%	24.7	24.8	24.7	40.1	39.3	40.0	15.0	22.2	15.
Singificance (Tau)		.90654			.97665			.51630	
F. Earns Wages									
Over 100%	53.1	48.7	51.7	44.2	26.3	39.2	62.6	66.6	63.
100-75%	23.3	27.0	24.4	18.6	28.5	21.4	22.6	19.7	21.
Below 75%	23.6	24.4	23.8	37.2	45.2	39.4	14.9	13.7	14.
Singificance (Tau)		.21723			.01364			.72604	
F. Works									
Over 100%	52.9	50.3	51.8	47.7	28.2	39.5	60.2	70.3	64.
100-75%	24.2	25.0	24.6	20.2	23.2	21.5	25.2	16.1	21.
Below 75%	22.9	24.6	23.6	32.1	48.6	39.0	14.7	13.6	14.
Singificance (Tau)		.62026			.00121			.09395	

households into the "at-risk" category, below 75% of recommended intakes.

Female-headed households, both Self-Defined and by the Absent Male definition, are significantly more likely to fall into the high-risk category for both protein and calories. In the case of Self-Defined FHH the differences are highly significant in the lowest quartile as well. This is despite the fact that, for Absent Male FHH, average intakes showed no significant differences by headship.

Even though average calorie intake is higher in Major Earner FHH, there is no difference in the proportion of households falling into each adequacy category.

Among households in which the reference woman works for wages or in any market work, low-income FHH are more likely to fall into the high risk category for protein, and by the F. Works definition, FHH are also more likely to be at risk of caloric inadequacy.

In the highest quartile, there are no significant differences in caloric or protein adequacy between male and female-headed households by any definition, suggesting that at high income levels, constraints on food consumption are loosened and that the behavioral factors implied by headship are less important.

4.2 Multivariate Results: Food Expenditure and Food and Nutrient Consumption

4.2.1 Analytic Methods

To explore the differences between MHH and FHH, it is essential to control for the systematic differences already known to exist between them.

It was mentioned that in some settings, income differences alone might explain observed differences in the share of expenditure devoted to food. In the Dominican Republic, FHH are not disproportionately low-income, but, depending on the definition used, FHH are smaller, with fewer infants and children; household heads are older; in the case of Absent Male households, a full 10 years older -- in some cases the dependency ratio is higher, and in some the number of economically active members lower. By self-definition, and by definitions relating to earnings, FHH are disproportionately urban. Furthermore, FHH have very significantly different sources of income from MHH. In particular, Self-Defined and Absent Male FHH get far less income from earnings, farming, and home-consumed food, and far more from transfers than MHH. Households in which women's wages are a significant income source (Major Earner and Major Income Contributor FHH) get far more of their income from earnings, and less from other sources than MHH by these definitions.

To the extent that these factors affect food expenditure, food consumption, and children's nutritional status, a simple comparison of male and female headed households may be misleading, if the results are interpreted in terms of men's and women's bargaining power and consumption preferences.

In order to control for these variables, a series of regression analyses was performed, with food expenditure and calorie and protein consumption (adjusted for age/sex composition, but measured at the household level) as the dependent variables. The basic model was as follows.

$$LNFOOD = \alpha + B_1\ LNPCEXP + B_2\ LNPCEXP^2 +$$
$$B_3 STONE + \sum_i B_4\ P_i + B_5\ AUTOPCT +$$
$$B_6\ FARMPCT + B_7\ TRANPCT + B_8\ EARNPCT +$$
$$\sum_j B_9\ STRATUM_j + B_{10}\ HHSIZE + B_{11}\ HEADAGE +$$
$$B_{12}\ HIGHED = B_{13}\ ECACT + B_{14}\ LCADERAT + e$$

where

LNFOOD = Food expenditure in pesos per month per household (logarithimic form)

LNPCEXP = Per capita total expenditure in pesos per month, including the value of food consumed from unpaid sources (log form)

STONE = A measure of inflation calculated based on prices for a basket of goods in each month in each cluster. This variable is introduced so that the expenditure and price variables represent real rather than nominal values

P_i = A vector of prices for the ten most important foods in the Dominican diet. These are: common rice, sugar, red beans, milk, vegetable oil, pasta, plantain, chicken, beef, and yuca (cassava)

AUTOPCT = Percent of household real income (including the value of food consumed from unpaid sources) derived from home-produced and consumed food

FARMPCT = Percent of household real income derived from farm sales (crops, animal products, animals)

TRANPCT = Percent of household real income derived from transfer payments

EARNPCT = Percent of household real income derived from wages

$STRATUM_j$ = A vector of dummy variables representing four of the five strata in the survey sample. The reference case is the capital, Santo Domingo. The other strata are:

Stratum 2 = Other urban areas

Stratum 3 = Frontier

Stratum 4 = Rural cane-growing and livestock-producing regions

Stratum 5 = Other rural areas, mainly the rice growing regions

HHSIZE = The number of persons present full time in the household

HEADAGE = Age (in years) of self-defined household head

HIGHED = Years of formal education of the most highly educated member of the household

LCADERAT = The ratio of the number of adult-equivalents (based on FAO/WHO recommended caloric intake) to persons in the household. This variable is a measure of the caloric requirements of the household, controlling for household size. This ratio approaches 1.0 if more members are adults. (It could conceivably exceed 1.0 if all household members were pregnant or lactating women, but of course this was not observed.)

A similar equation was estimated using LCALPA, the natural log of daily calories consumed per adult-equivalent, and LPROPA, the same for protein.

These equations were estimated to determine which variables are significant determinants of the dependents (food expenditure, calorie and protein consumption), before introducing the headship variables. Three additional models were investigated to explore the effect of female headship.

Model 2 adds to the basic model a dummy variable for female headship,

which has the value of 0 if the household is male-headed, and 1 if it is female-headed by the definition in question. In addition an interaction term of female-headship with expenditure (INTFHEXP) is introduced to see if, controlling for income level and for headship, income is used differently with respect to the three dependent variables in FHH.

Model 3 is identical to Model 1, except that the percent of income from wages is broken into two components, wage income earned by males, and that earned by females. This is to test the hypothesis that the earner's sex determines the uses of earnings.

Model 4 is identical to Model 2, except that two additional interaction terms are introduced: The interaction of the female headship dummy variable with the percent of income from wages and from transfers. This is to test whether households of different headship treat these income sources - which differ significantly in importance by headship - differently.

The log log quadratic form was chosen for the total expenditure variables because it appeared to offer the best fit with the data. Food expenditure and food consumption increase at a declining rate with rising household income. Expenditure elasticity is a measure of the degree to which food spending or food consumption vary with changes in total household expenditure (our proxy for income). Specifically, the expenditure elasticity of food spending measures the percentage change in spending which would result from a one percent change in total expenditure. Similarly, the expenditure elasticity of calorie consumption measures the percentage change in calories consumed as a result of a one percent change in expenditure. This form allows the expenditure elasticity of food spending, and of demand for calories and protein to vary with income level.

The interaction term with female headship in Model 2 permits the elasticity to vary by headship as well. Use of the logarithm is due to the fact that as income rises, it takes larger absolute increments of income to have an equal effect on consumption.

In addition to these analyses, Model 1 was run separately on the two populations -- male and female headed households -- and a Chow test was performed (Gujarati, 1988, p. 445) to see if the model is different for these different households. Interpretation of these results is somewhat ambiguous, because the variances of some of the independent variables are different between MHH and FHH; nonetheless, the results are discussed here for comparative purposes.

4.2.2 Food Expenditure

Without accounting for headship, the level of food expenditure is quite significantly affected by several variables which are associated with headship. Food expenditure levels are positively affected by the proportion of income from transfers, and (marginally significant at $p = .06$) from earnings. Of course, consumption of home produced food reduces food expenditure, since, all else equal, home production reduces the need to purchase food. Number of members naturally raises household food expenditure. The number of economically active household members (controlling for household size and per capita expenditure level) shows a negative association with food expenditure, possibly because a household which requires more members working to achieve the same level of income is, in real terms, worse off than households with fewer working members.

The introduction of the female headship variables adds very little

explanatory power to the regression. Neither the dummy variable for female headship nor the interaction term with expenditure is significant for any definition of headship except the Absent Male definition. Absent Male FHH show lower food expenditure on average (that is, the coefficient of the dummy variable for female headship is significant and negative) but additional income is marginally significantly more likely to be devoted to food ($p = .069$). However, the additional explanatory power of the regression, as measured by the R^2, is extremely small. These results suggest that it is not possible to separate the effects of female headhsip, if any, from the effects of those cha.acteristics associated with female headship, which do affect food expenditure. Once known differences between MHH and FHH are controlled, headship itself provides little additional information.

It does appear that in households where the reference woman accounts for 50% of wage or total income, transfer income is more likely to be used for food expenditure, as indicated by the significant, positive coefficient of the interaction term between female headship and the percent of income from transfers. These terms are not significant in the regressions based on other FHH definitions. Major Income Contributor FHH, though, also appear to devote more of earned income to food, though in this model the coefficient of the FHH dummy variable is significantly negative. This possibly supports the idea that wage income earned by women is disproportionately devoted to food, but one should not make too much of these relationships either way. The magnitude of the negative effect of female headship on food expenditure is about the same as the positive effect of female headship on the use of earned and transfer income for

food. Further, none of these variables adds very much to the explanatory power of the regression, compared to the basic model which includes no headship information.

In Model 3, the percent of income from men's earnings has a significant positive coefficient with food expenditure, while that of women's earnings is not significantly different from zero.

The detailed results of these regressions are shown in Tables 34 through 37. In all the tables two sets of coefficients are presented. The B column shows the coefficients of the variables in the units in which they were measured. The Beta coefficients are in standard deviation units. These are shown to permit comparison of the magnitude of effect of the variables.

The Chow Tests for the differences between MHH and FHH in their determinants of food expenditure were significant for Self-Defined, Absent-Male, and Major Earner ($p = .01$) and for F. Earns Wages ($p = .05$). In Self-Defined MHH, responsiveness of food expenditure to changes in total expenditure is noticeably higher than in FHH (elasticities of 1.40 versus 1.13 at the population mean of per capita expenditure). That is, MHH appear to increase their food expenditure more in response to a change in total expenditure (our proxy for income) than FHH. Home produced and consumed food is significant in determining food expenditure in MHH, but not in FHH -- hardly surprising, since this is a much less important income source in FHH.

Absent-Male FHH and MHH do not appear to have very different levels of responsiveness to changing income. As with Self-Defined MHH and FHH, the proportion of income from home-produced food is a significant determinant of food expenditure only in Absent-Male MHH, presumably for the same reason.

TABLE 34
RESULTS OF ESTIMATION OF MODEL 1
FOR FOOD EXPENDITURE

Indep Vars.	Dep. Var: Log of Household Food Expenditure B	Beta	Sig T
Per Cap Expend	1.8517	2.0658	.0000
Per Cap Expend Squared	-.1167	-1.2010	.0000
Stone Index of Inflation	-.0001	-.0086	.7252
Rice Price	-.0030	-.0001	.9799
Sugar Price	.1466	.0494	.0620
Beans Price	.0917	.0395	.1021
Milk Price	-.0554	-.0237	.5024
Oil Price	.2130	.0456	.0734
Pasta Price	-.3671	-.0769	.0528
Plantain Price	-.0179	-.0114	.6700
Chicken Price	.2418	.0412	.1065
Beef Price	-.1437	-.0463	.1841
Yuca Price	.0237	.0130	.7205
Percent of Income from Home-Produced Food	-.0022	-.0455	.0382
Percent of Income from Farm Sales	+.0000	.0098	.7174
Percent of Income from Transfers	.0019	.0779	.0036
Percent of Income from Wages	.0001	.0613	.0600
Other Urban	-.0455	-.0350	.2489
Frontier	-.0827	-.0498	.2540
Sugar Cane/Livestock	-.1055	-.0671	.0639
Other Rural	-.0882	-.0575	.0876
Household Size	.9302	.8714	.0000
Age of Self-Def Head	+.0000	.0045	.8147
Highest Educ in HH	-.0042	-.0308	.1631
No. Ec. Active Members	-.0240	-.0572	.0119
Adult-Equivalent Ratio	.1442	.0313	.1322
Constant	-2.0213	--	.0001

R^2 = .72466
Adj R^2 = .71673
F = 91.30741
Sig F = .0000
N = 929

TABLE 35
RESULTS OF THE ESTIMATION OF MODEL 2
FOR HOUSEHOLD FOOD EXPENDITURE

Dep. Var.: Log of Household Food Expenditure

Headship Defn:	Self-Defined			Absent Male			Major Earner		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8131	2.0228	.0000	1.8275	2.0389	.0000	1.8472	2.1509	.0000
Per Cap Expend Squared	-.1144	-1.773	.0000	-.1159	-1.1924	.0000	-.1213	-1.3062	.0000
Fem. Head x Per Cap Exp	.0357	.1234	.3223	.0738	.2200	.0687	.0650	.1901	.2042
Female Headship	-.2393	-.1808	.1441	-.3814	-.2452	.0406	-.3370	-.2129	.1524
Stone Index of Inflation	-.0013	-.0133	.5889	-.0013	-.0137	.5776	.0038	.0398	.1535
Rice Price	-.0109	-.0023	.9257	+.0000	+.0000	.9995	.1016	.0224	.4072
Sugar Price	.1540	.0519	.0491	.1407	.0474	.0728	.0992	.0349	.2433
Beans Price	.0977	.0421	.0804	.0999	.0430	.0753	.0783	.0341	.1862
Milk Price	-.0519	-.0222	.5287	-.0526	-.0225	.5238	.0111	.0051	.8988
Oil Price	.1960	.0419	.0987	.2079	.0445	.0801	.3319	.0766	.0080
Pasta Price	-.3114	-.0653	.1008	-.3542	-.0742	.0615	-.6914	-.1488	.0011
Plantain Price	-.0111	-.0071	.7920	-.0146	-.0093	.7273	-.0434	-.0293	.3427
Chicken Price	.2715	.0463	.0697	.2497	.0425	.0932	.0218	.0039	.8901
Beef Price	-.1305	-.0420	.2265	-.1481	-.0477	.1705	-.2838	-.0940	.0138
Yuca Price	.0183	.0100	.7813	.0237	.0130	.7206	.0091	.0052	.8983
Percent of Income from Home-Produced Food	-.0026	-.0524	.0168	-.0024	-.0486	.0286	-.0040	-.0633	.0100
Percent of Income from Farm Sales	-.0000	-.0032	.9070	.0000	.0051	.8524	.0001	.0234	.4061
Percent of Income from Transfers	.0024	.0962	.0005	.0020	.0816	.0029	.0011	.0309	.2636
Percent of Income from Wages	-.0001	.0523	.1086	.0001	.0531	.1035	.0001	.0494	.1498
Other Urban	-.0488	-.0375	.2151	-.0458	-.0352	.2454	-.0245	-.0200	.5478
Frontier	-.0968	-.0584	.1813	-.0863	-.0520	.2335	-.0508	-.0302	.5106
Sugar Cane/Livestock	-.1062	-.0675	.0613	-.1016	-.0646	.0741	-.0925	-.0611	.1192
Other Rural	-.0945	-.0616	.0664	-.0895	-.0583	.0825	.0159	.0102	.7698
Household Size	.9139	.8561	.0000	.9209	.8627	.0000	.8783	.8338	.0000
Age of Self-Def Head	+.0000	.0067	.7268	.0000	.0082	.6752	.0000	.0216	.3127
Highest Educ in HH	-.0034	-.0247	.2646	-.0039	-.0287	.1940	-.0001	-.0060	.8044
No. Ec. Active Members	-.0230	-.0548	.0164	-.0250	-.0597	.0091	-.0103	-.0239	.3432
Adult-Equivalent Ratio	.1209	.0262	.2087	.1077	.0234	.2918	.0600	.0136	.5703
Constant	-1.7987	--	.0004	-1.8630	--	.0002	-2.4241	--	.0000
R^2	.72746			.72626			.72920		
Adj R^2	.71899			.71774			.71875		
F	85.79739			85.27621			69.81828		
Sig F	.0000			.0000			.0000		
N	929			929			755		

TABLE 33 (Continued)
RESULTS OF THE ESTIMATION OF MODEL 2
FOR HOUSEHOLD FOOD EXPENDITURE

Dep. Var.: Log of Household Food Expenditure

Headship Def:	Major Income Contributor			F. Earns Wages			F. Works		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8306	2.0321	.0000	1.8608	2.0859	.0000	1.8045	1.9759	.0000
Per Cap Expend Squared	-.1151	-1.1902	.0000	-.1169	-1.2085	.0000	-.1133	-1.1250	.0000
Fem. Head x Per Cap Exp	.0907	.1716	.1874	-.0252	-.0967	.4545	.0018	.0072	.9587
Female Headship	-.3432	-.2167	.0947	.1014	.0843	.5081	.0010	.0001	.9947
Stone Index of Inflation	-.0001	-.0072	.7713	-.0001	-.0087	.7248	-.0014	-.0145	.5717
Rice Price	-.0083	-.0017	.9432	-.0081	-.0017	.9450	-.0001	-.0000	.9947
Sugar Price	.1539	.0521	.0496	.1478	.0500	.0604	.1324	.0454	.1037
Beans Price	.0887	.0383	.1131	.0903	.0390	.1087	.1195	.0518	.0413
Milk Price	-.0671	-.0287	.4200	-.0465	-.0199	.5758	-.0125	-.0055	.8835
Oil Price	.2307	.0496	.0521	.2186	.0470	.0666	.1993	.0421	.1024
Pasta Price	-.4060	-.0855	.0323	-.3613	-.0761	.0571	-.2824	-.0595	.1445
Plantain Price	-.0133	-.0085	.7524	.0172	-.0110	.6340	-.0242	-.0158	.5783
Chicken Price	.2292	.0392	.1253	.2439	.0418	.1042	.2890	.0503	.0590
Beef Price	-.1542	-.0499	.1546	-.1431	-.0463	.1889	-.1665	-.0544	.1360
Yuca Price	.0263	.0144	.6913	.0306	.0168	.6456	.0344	.0191	.6118
Percent of Income from Home-Produced Food	-.0022	-.0447	.0425	-.0021	-.0435	.0494	-.0025	-.0521	.0240
Percent of Income from Farm Sales	+.0000	.0111	.6832	.0000	.0128	.6393	3.0000	.0171	.5486
Percent of Income from Transfers	.0019	.0758	.0046	.0020	.0785	.0035	.0020	.0834	.0033
Percent of Income from Wages	.0011	.0707	.0316	.0011	.0696	.0378	.0001	.0673	.0493
Other Urban	-.0413	-.0219	.2938	-.0429	-.0331	.2774	-.0503	-.0393	.2102
Frontier	-.0809	-.0490	.2641	-.0779	-.0472	.2840	-.0924	-.0560	.2117
Sugar Cane/Livestock	-.1106	-.0705	.0526	-.1034	-.0659	.0706	-.0989	-.0629	.0901
Other Rural	-.0855	-.0560	.0980	-.0834	-.0546	.1078	-.0918	-.0618	.0831
Household Size	.9204	.8628	.0000	.9268	.8688	.0000	.9313	.8568	.0000
Age of Self-Def Head	+.0000	.0047	.8069	+.0000	.0056	.7727	+.0000	.0040	.8421
Highest Educ in HH	-.0036	-.0264	.2334	-.0041	-.0302	.1747	-.0045	-.0335	.1454
No. Ec. Active Members	-.0241	-.0577	.0114	-.0222	-.0532	.0240	-.0306	-.0757	.0055
Adult-Equivalent Ratio	.1186	.0258	.2210	.1324	.0288	.1732	.2866	.0582	.0080
Constant	-1.9788	--	.0001	-2.0630	--	.0001	-1.7422	--	.0014
	R^2 = .72509			R^2 = .72277			R^2 = .71835		
	Adj R^2 = .71652			Adj R^2 = .71412			Adj R^2 = .70897		
	F = 84.59036			F = 83.61346			F = 76.51693		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		
	N = 927			N = 927			N = 869		

TABLE 36
RESULTS OF THE ESTIMATION OF MODEL 4
FOR HOUSEHOLD FOOD EXPENDITURE

Dep. Var.: Log of Household Food Expenditure

Headship Defn:	Self Defined			Absent Male			Major Earner		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8200	2.0305	.0000	1.8296	2.0412	.0000	1.8410	2.1436	.0000
Per Cap Expend Squared	-.1152	-1.1855	.0000	-.1161	-1.1951	.0000	-.1208	-1.3011	.0000
Fem. Head x Per Cap Exp	.0374	.1291	.3045	.0767	.2285	.0649	.0759	.2220	.1482
Female Headship	-.2117	-.1599	.2143	-.3787	-.2435	.0440	-.3288	-.2077	.1626
Stone Index of Inflation	-.0014	-.0143	.5610	-.0014	-.0144	.5611	.0040	.0413	.1355
Rice Price	-.0135	-.0028	.9080	-.0060	-.0012	.9595	.0673	.0148	.5811
Sugar Price	.1581	.0532	.0438	.1460	.0492	.0643	.1257	.0442	.1383
Beans Price	.0990	.0426	.0767	.0994	.0428	.0770	.0664	.0289	.2600
Milk Price	-.0546	-.0233	.5085	-.0575	-.0246	.4874	-.0118	-.0054	.8916
Oil Price	.1952	.0418	.1008	.2102	.0450	.0778	.3637	.0839	.0036
Pasta Price	-.3019	-.0633	.1128	-.3454	-.0724	.0697	-.7039	-.1515	.0008
Plantain Price	-.0083	-.0053	.8430	-.0131	-.0083	.7562	-.0425	.0287	.3493
Chicken Price	.2775	.0473	.0641	.2596	.0442	.0842	.0456	.0081	.7716
Beef Price	-.1309	-.0422	.2251	-.1418	-.0457	.1909	-.2758	-.0926	.0144
Yuca Price	.0202	.0110	.7604	.0213	.0117	.7495	-.0043	-.0025	.9509
Percent of Income from Home-Produced Food	-.0025	-.0500	.0250	-.0023	.0775	.0319	-.0040	-.0642	.0087
Percent of Income from Farm Sales	.0000	.0014	.9611	.0000	.0067	.8076	.0001	.0215	.4438
Percent of Income from Transfers	.0020	.0783	.0704	.0018	.0715	.0436	-.0001	-.0204	.5289
Percent of Income from Wages	.0001	.0643	.0850	.0001	.0587	.0937	.0012	.0576	.1002
Fem. Head x Pct. Inc. from Wages	-.0001	-.0316	.4666	-.0000	-.0171	.6063	-.0017	-.0725	.1602
Fem. Head x Pct. Inc. from Transfers	.0000	.0141	.7715	.0000	.0111	.7881	.0039	.0774	.0220
Other Urban	-.0510	-.0392	.1961	-.0476	-.0366	.2282	-.0397	-.0324	.3314
Frontier	-.1018	-.0613	.1616	-.0932	-.0561	.2021	-.0794	-.0472	.3051
Sugar Cane/Livestock	-.1113	-.0708	.0508	-.1067	-.0679	.0627	-.1139	-.0753	.0551
Other Rural	-.0985	-.0642	.0566	-.0941	-.0613	.0703	-.0017	-.0011	.9744
Household Size	.9129	.8551	.0000	.9205	.8622	.0000	.8778	.8333	.0000
Age of Self-Def Head	.0000	.0106	.5879	.0000	.0100	.6139	.0013	.0332	.1229
Highest Educ in HH	-.0033	-.0240	.2792	-.0038	-.0280	.2061	.0000	.0030	.9022
No. Ec. Active Members	-.0224	-.0534	.0203	-.0250	-.0596	.0092	-.0130	-.0301	.2309
Adult-Equivalent Ratio	.1228	.0267	.2032	.1083	.0235	.2897	.0721	.0163	.4939
Constant	-1.8094	--	.0004	-1.8754	--	.0002	-2.4881	--	.0000
	R^2 = .72783			R^2 = .72646			R^2 = .73387		
	Adj R^2 = .71873			Adj R^2 = .71732			Adj R^2 = .72285		
	F = 80.04540			F = 79.49638			F = 66.55010		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		
	N = 929			N = 929			N = 755		

TABLE 36(Continued)
RESULTS OF THE ESTIMATION OF MODEL 4
FOR HOUSEHOLD FOOD EXPENDITURE

Dep. Var.: Log of Household Food Expenditure

Headship Defs:	Major Income Contributor			F. Earns Wages			F. Works		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8430	2.0659	.0000	1.8557	2.0802	.0000	1.7836	1.9531	.0000
Per Cap Expend Squared	-.1165	-1.2046	.0000	-.1161	-1.2009	.0000	-.1105	-1.0974	.0000
Fem. Head x Per Cap Exp	.0407	.0770	.5719	-.0279	-.1070	.4160	-.0057	-.0230	.8702
Female Headship	-.9995	-.3989	.0114	.0763	.0634	.6288	-.0274	-.0241	.8628
Stone Index of Inflation	.0001	-.0094	.7043	-.0001	-.0080	.7473	-.0015	-.0152	.5525
Rice Price	-.0118	-.0024	.9198	-.0116	-.0024	.9214	.0061	.0013	.9595
Sugar Price	.1516	.0513	.0526	.1523	.0515	.0532	.1401	.0480	.0856
Beans Price	.0838	.0384	.1120	.0848	.0366	.1333	.1133	.0491	.0533
Milk Price	-.0636	-.0272	.4445	-.0512	-.0219	.5384	-.0080	-.0035	.9255
Oil Price	.2274	.0489	.0552	.2202	.0474	.0649	.2036	.0430	.0981
Pasta Price	-.3898	-.0821	.0396	-.3713	-.0782	.0510	-.3086	-.0650	.1130
Plantain Price	-.0099	-.0063	.8143	-.0178	-.0114	.6739	-.0220	-.0143	.6137
Chicken Price	.2369	.0406	.1137	.2437	.0417	.1046	.2900	.0505	.0580
Beef Price	-.1548	-.0501	.1523	-.1447	-.0468	.1841	-.1713	-.0560	.1249
Yuca Price	.0242	.0133	.7151	.0289	.0159	.6644	.0294	.0163	.6661
Percent of Income from Home-Produced Food	-.0023	-.0467	.0338	-.0027	-.0446	.0442	-.0028	-.0591	.0125
Percent of Income from Farm Sale	.0000	.0055	.8396	.0000	.0108	.6955	.0000	.0072	.8056
Percent of Income from Transfers	.0017	.0686	.0109	.0016	.0653	.0227	.0013	.0533	.1116
Percent of Income from Wages	.0001	.0630	.0566	.0001	.0656	.0629	.0001	.0405	.3408
Fem. Head x Pct. Inc. from Wages	.0073	.2434	.0416	.0000	.0206	.7230	.0001	.0447	.3557
Fem. Head x Pct. Inc. from Transfers	.0096	.0612	.0304	.0017	.0321	.1934	.0020	.0432	.0876
Other Urban	-.0412	-.0318	.2965	-.0442	-.0341	.2637	-.0519	-.0406	.1956
Frontier	-.0816	-.0494	.2614	-.0796	-.0482	.2736	-.0896	-.0543	.2254
Sugar Cane/Livestock	-.1087	-.0693	.0569	-.1039	-.0663	.0693	-.0927	-.0589	.1126
Other Rural	-.0853	-.0558	.0998	-.0849	-.0556	.1015	-.0916	-.0617	.0838
Household Size	.9179	.8604	.0000	.9274	.8693	.0000	.9301	.8559	.0000
Age of Self-Def Head	.0000	.0043	.8225	.0000	.0069	.7237	.0003	.0038	.8501
Highest Educ in HH	-.0036	-.0267	.2279	-.0041	-.0302	.1763	-.0045	-.0333	.1484
No. Ea. Active Members	-.0241	-.0578	.0111	-.0220	-.0528	.0252	-.0291	-.0722	.0087
Adult-Equivalent Ratio	.1158	.0252	.2310	.1396	.0303	.1516	.2788	.0567	.0099
Constant	-1.9659	--	.0001	-2.0577	--	.0001	-1.6637	--	.0023
R^2	.72678			.72333			.71935		
Adj R^2	.71763			.71406			.70930		
F	79.44541			78.08299			71.59716		
Sig F	.0000			.0000			.0000		
N	927			927			869		

TABLE 37
RESULTS OF THE ESTIMATION OF MODEL 3
FOR HOUSEHOLD FOOD EXPENDITURE

	Dep. Var: Log of Household Food Expenditure		
Indep Vars.	B	Beta	Sig T
Per Cap Expend	1.8502	2.0642	.0000
Per Cap Expend Squared	-.1168	-1.2023	.0000
Stone Index of Inflation	-.0001	-.0095	.6999
Rice Price	-.0000	-.0000	.9978
Sugar Price	.1501	.0506	.0556
Beans Price	.0953	.0410	.0892
Milk Price	-.0599	-.0256	.4684
Oil Price	.2135	.0457	.0724
Pasta Price	-.3735	-.0783	.2426
Plantain Price	-.0148	-.0094	.7245
Chicken Price	.2444	.0416	.1024
Beef Price	-.1381	-.0445	.2014
Yuca Price	.0217	.0119	.7429
House hold Size	.9177	.8596	.0000
Percent of Income from Home-Produced Food	-.0021	-.0429	.0503
Percent of Income from Farm Sales	.0000	.0113	.6762
Percent of Income from Transfers	.0020	.0804	.0026
Percent of Income from Men's Wages	.0011	.0751	.0246
Percent of Income from Women's Wages	.0000	.0110	.6653
Other Urban	-.0413	-.0317	.2957
Frontier	-.0846	-.0510	.2426
Sugar Cane/Livestock	-.1085	-.0690	.0565
Other Rural	-.0896	-.0584	.0822
Age of Self-Def Head	.0000	.0059	.7605
Highest Educ in HH	-.0031	-.0228	.3112
No. Ec. Active Members	-.0203	-.0484	.0369
Adult-Equivalent Ratio	.1060	.0230	.2787
Constant	-2.0218	--	.0001

R^2 = .72571
Adj R^2 = .71749
F = 88.28857
Sig F = .0000
N = 929

In contrast to the Self-Defined households, Major Earner MHH seem to be much less responsive to changing income than FHH; Major Earner FHH are more likely to respond to increasing household income by increasing their food expenditure. Once again, this may tend to support the hypothesis that females devote their own earnings to food. Tables 38 through 41 show the results of the regressions run separately for MHH and FHH by the Self-Defined, Absent Male, Major Earner, and F Earns Wages definitions, with total food expenditure as the dependent variable.

Of course, differences in food expenditure itself are of interest only to the extent that they may indicate differential preference for food as a consumption item among FHH and MHH. Food expenditure is correlated with nutrient consumption to some degree, but by no means does it necessarily imply a given level of nutrient intake or dietary adequacy. Therefore, in the following section, differences between MHH and FHH in consumption of calories and protein are explored.

4.2.3 Calorie and Protein Consumption

The dependent variables discussed in this section are average daily calorie and protein consumption per adult-equivalent, measured at the household level, based on seven consecutive days of dietary recall. Note that although the measures are adjusted for age/sex composition of the household, they are not measures of individual intake. Note also that they are adjusted for household membership, not for the number of people consuming a particular meal. (That is, no account is taken of visitors, nor of family members absent at mealtime.)

The results of the estimation of Model 1, shown in Table 42, indicate

TABLE 38
RESULTS OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR MALE AND FEMALE HEADED HOUSEHOLDS (SELF-DEFINED)

Chow F = 1.6133
X = .05

Dep. Var.: Log of Household Food Expenditure

Headship Def:	All			Self-Defined Fem. Head			Self-Defined Male Head		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8517	2.0658	.0000	1.4008	1.4352	.0001	2.0181	2.3979	.0000
Per Cap Expend Squared	-.1167	-1.2010	.0000	-.0674	-.6239	.0853	-.1368	-1.5102	.0000
Stone Index of Inflation	-.0001	-.0086	.7252	.0027	.0222	.7012	-.0013	-.0137	.5927
Rice Price	-.0030	-.0001	.9799	.2727	.0493	.3668	-.1149	-.0258	.3401
Sugar Price	.1466	.0494	.0620	-.1302	-.0371	.5180	.2129	.0783	.0094
Beans Price	.0917	.0395	.1021	.2269	.0764	.1421	.0641	.0308	.2593
Milk Price	-.0554	-.0237	.5024	-.2206	-.0807	.3339	.0100	.0046	.9058
Oil Price	.2130	.0456	.0734	.1736	.0277	.6006	.2093	.0506	.0842
Pasta Price	-.3671	-.0769	.0328	-1.0031	-.1652	.0603	-.1710	-.0393	.3772
Plantain Price	-.0179	-.0114	.6700	-.0457	-.0242	.6867	-.0098	-.0069	.8186
Chicken Price	.2418	.0412	.1065	.2786	.0407	.4687	.2310	.0429	.1383
Beef Price	-.1437	-.0463	.1841	-.2310	-.0613	.4059	-.1226	-.0433	.2708
Yuca Price	.0237	.0130	.7205	-.1042	-.0476	.5502	.0660	.0396	.3321
Percent of Income from Home-Produced Food	-.0022	-.0455	.0382	-.0021	-.0220	.6402	-.0026	-.0631	.0110
Percent of Income from Farm Sales	+.0000	.0098	.7174	-.0021	-.0376	.4138	.0000	.0125	.7018
Percent of Income from Transfers	.0019	.0779	.0036	.0023	.1192	.0844	.0020	.0504	.0397
Percent of Income from Wages	.0001	.0613	.0600	.0000	.0233	.7463	.0012	.0825	.0257
Other Urban	-.0455	-.0350	.2489	-.1020	-.0731	.2920	-.0236	-.0191	.5718
Frontier	-.0827	-.0498	.2540	-.2160	-.0813	.2606	-.0459	-.0320	.5410
Sugar Cane/Livestock	-.1055	-.0671	.0639	-.2096	-.1162	.1389	-.0586	-.0404	.3278
Other Rural	-.0982	-.0575	.0876	-.0779	-.0417	.5645	-.0771	-.0554	.1492
Household Size	.9302	.8714	.0000	.9134	.8386	.0000	.8997	.8397	.0000
Age of Self-Def Head	.0000	.0045	.8147	-.0013	-.0317	.4617	.0012	.0329	.1457
Highest Educ in HH	-.0042	-.0308	.1631	-.0094	-.0614	.2506	-.0014	-.0109	.6511
No. Ec. Active Members	-.0240	-.0572	.0119	-.0178	-.0342	.5487	-.0214	-.0556	.0256
Adult-Equivalent Ratio	.1442	.0313	.1322	.5686	.0999	.0441	.0317	.0076	.7497
Constant	-2.0213	--	.0001	-1.7881	--	.1906	-2.1967	--	.0000
	R^2 = .72466			R^2 = .67657			R^2 = .75403		
	Adj R^2 = .71673			Adj R^2 = .63575			Adj R^2 = .74437		
	F = 91.30741			F = 16.57392			F = 78.87871		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		
	N = 929			N = 233			N = 696		

TABLE 39
RESULT OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR MHH AND FHH (ABSENT MALE)

Chow F = 1.889
X < .01

Dep. Var.: Log of Household Food Expenditure

Headship Defs:	All			Absent Male Fem. Head			Absent Male Male Head		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8517	2.0658	.0000	1.8592	1.9349	.0000	1.8703	2.1870	.0000
Per Cap Expend Squared	-.1167	-1.2010	.0000	-.0971	-.9313	.0133	-.1236	-1.3327	.0000
Stone Index of Inflation	-.0001	-.0086	.7252	-.0035	-.0283	.6208	.0000	.0050	.8603
Rice Price	-.0030	-.0001	.9799	.1056	.0184	.7544	.0429	.0096	.7300
Sugar Price	.1466	.0494	.0620	-.0319	-.0091	.8825	.1575	.0567	.0626
Beans Price	.0917	.0395	.1021	-.0085	-.0027	.9616	.1189	.0560	.0437
Milk Price	-.0554	-.0237	.5024	-.1788	-.0640	.4867	-.0168	-.0077	.8472
Oil Price	.2130	.0456	.0734	.5534	.0816	.1774	.2074	.0490	.0962
Pasta Price	-.3671	-.0769	.0528	-.3847	-.0587	.5419	-.4534	-.1038	.0230
Plantain Price	-.0179	-.0114	.6700	.0491	.0255	.6780	-.0384	-.0264	.3924
Chicken Price	.2418	.0412	.1065	1.1781	.1548	.0092	.0818	.0152	.6093
Beef Price	-.1437	-.0463	.1841	.1175	.0325	.6845	-.2110	-.0725	.0726
Yuca Price	.0237	.0130	.7205	-.3667	-.1684	.0554	.0923	.0562	.1992
Percent of Income from Home-Produced Food	-.0022	-.0455	.0382	-.0025	-.0336	.5281	-.0024	-.0538	.0343
Percent of Income from Farm Sales	.0000	.0098	.7174	-.0025	-.0736	.2036	.0000	.0131	.6833
Percent of Income from Transfers	.0019	.0779	.0036	.0034	.1785	.0126	.0016	.0484	.0669
Percent of Income from Wages	.0001	.0613	.0600	.0011	.0586	.4096	.0001	.0513	.1668
Other Urban	-.0455	-.0350	.2489	-.2199	-.1463	.0467	-.0196	-.0161	.6408
Frontier	-.0827	-.0498	.2540	-.4865	-.2041	.0237	-.0053	-.0035	.9456
Sugar Cane/Livestock	-.1055	-.0671	.0639	-.1699	-.0974	.2999	-.0853	-.0574	.1623
Other Rural	-.0882	-.0575	.0876	-.1279	-.0722	.4086	-.0774	-.0538	.1586
Household Size	.9302	.8714	.0000	1.1264	1.0162	.0000	.8616	.7853	.0000
Age of Self-Def Head	.0000	.0045	.8147	.0000	.0124	.7966	.0001	.0152	.5128
Highest Educ in HH	-.0042	-.0308	.1631	-.0237	-.1448	.0111	-.0011	-.0085	.7314
No. Ec. Active Members	-.0240	-.0572	.0119	-.0001	-.0013	.9816	-.0216	-.0550	.0327
Adult-Equivalent Ratio	.1442	.0313	.1322	.3198	.0490	.3091	.0428	.0101	.6931
Constant	-2.0213	--	.0001	-3.9989	--	.0078	-1.8271	--	.0009
R^2	.72466			.79670			.70607		
Adj R^2	.71673			.75407			.69589		
F	91.30741			18.69005			69.38520		
Sig F	.0000			.0000			.0000		
N	929			151			778		

TABLE 40
RESULTS OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR MHH AND FHH (MAJOR EARNER)

Chow F = 2.2977
X < .01

Dep. Var.: Log of Household Food Expenditure

Headship Defs:	All			Major Earner FHH			Major Earner MHH		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8614	2.1674	.0000	2.7870	2.9197	.0001	1.8420	2.2011	.0000
Per Cap Expend Squared	-.1218	-1.3116	.0000	-.2287	-2.1790	.0044	-.1196	-1.3251	.0000
Stone Index of Inflation	.0039	.0407	.1447	.0153	.1472	.1477	.0027	.0287	.3182
Rice Price	.0872	.0192	.4755	.3423	.0688	.4575	.0499	.0113	.6860
Sugar Price	.1010	.0355	.2351	-.0335	-.0109	.9176	.1488	.0535	.0837
Beans Price	.0733	.0319	.2158	.3199	.1194	.2016	.0281	.0126	.6341
Milk Price	.0133	.0061	.8789	.3375	.1332	.3257	-.0233	-.0110	.7924
Oil Price	.3259	.0752	.0092	1.0043	.1963	.0238	.3009	.0719	.0193
Pasta Price	-.6764	-.1456	.0014	-1.7805	-.3375	.0199	-.5294	-.1175	.0145
Plantain Price	-.0431	-.0290	.3465	-.3133	-.1885	.0551	.0037	.0039	.9034
Chicken Price	.0205	.0036	.8967	-.3318	-.0522	.5623	.1079	.0198	.5022
Beef Price	-.2705	-.0895	.0187	-.3306	-.1112	.4410	-.2110	-.0703	.0717
Yuca Price	.0023	.0013	.9740	.0841	.0447	.7591	-.0326	-.0192	.6478
Percent of Income from Home-Produced Food	-.0042	-.0670	.0063	-.0036	-.0789	.4422	-.0044	-.0647	.0089
Percent of Income from Farm Sales	.0001	.0252	.3714	.0014	.0533	.6309	.0001	.0247	.3873
Percent of Income from Transfers	.0010	.0292	.2844	.0013	.0528	.6576	-.0000	-.0103	.6993
Percent of Income from Wages	.0011	.0563	.0987	-.0012	-.0622	.6355	.0013	.0621	.0660
Other Urban	-.0298	-.0244	.4626	.2376	.1990	.1275	-.0651	-.0531	.1177
Frontier	-.0512	-.0304	.5079	.6475	.3286	.0380	-.1366	-.0840	.0849
Sugar Cane/Livestock	-.0904	-.0598	.1280	.0376	.0221	.8623	-.1199	-.0816	.0495
Other Rural	.0140	.0090	.7964	.3237	.2196	.0799	-.0459	-.0294	.4187
Household Size	.8832	.8385	.0000	.8398	.8862	.0000	.8914	.8184	.0000
Age of Self-Def Head	.0001	.0249	.2431	.0000	.0045	.9523	.0001	.0258	.2502
Highest Educ in HH	-.0010	-.0081	.7384	-.0100	-.0741	.4127	.0010	.0080	.7463
No. Ec. Active Members	-.0102	-.0237	.3437	-.1602	-.2945	.0032	-.0028	-.0067	.7966
Adult-Equivalent Ratio	.0733	.0166	.4790	.6565	.1256	.1463	.0253	.0059	.8150
Constant	-2.5175	--	.0000	-6.2558	--	.0101	-2.3345	--	.0000
	R^2 = .72805			R^2 = .67807			R^2 = .75797		
	Adj R^2 = .71834			Adj R^2 = .56937			Adj R^2 = .74788		
	F = 74.95934			F = 6.23779			F = 75.15923		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		

TABLE 41
RESULTS OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR MHH AND FHH (F EARNS WAGES)

Chow F = 1.6884
X < .05

Dep. Var.: Log of Household Food Expenditure

Headship Defn:	All			Female Earns Wages-Female Head			Female Earns Wages-Male Head		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.8469	2.0704	.0000	2.3886	2.7250	.0000	1.6681	1.8506	.0000
Per Cap Expend Squared	-.1162	-1.2013	.0000	-.1826	-1.9063	.0000	-.0946	-.9725	.0000
Stone Index of Inflation	-.0001	-.0077	.7546	.0093	.0919	.0321	-.0059	-.0619	.0438
Rice Price	-.0148	-.0031	.8994	.2138	.0453	.2666	-.1144	-.0233	.4567
Sugar Price	.1502	.0508	.0560	-.1099	-.0375	.4211	.2541	.0844	.0100
Beans Price	.0888	.0383	.1141	.1606	.0667	.1000	.0673	.0301	.3323
Milk Price	-.0445	-.0190	.5921	.2045	.0858	.1780	-.1150	-.0483	.2692
Oil Price	.2191	.0471	.0657	.5741	.1212	.0039	.0634	.0138	.6757
Pasta Price	-.3624	-.0763	.0560	-1.0865	-.2070	.0018	.0000	.0000	.9998
Plantain Price	-.0187	-.0121	.6536	-.1583	-.0992	.0429	.0413	.0266	.4152
Chicken Price	.2413	.0413	.1072	.0380	.0062	.8807	.4272	.0739	.0235
Beef Price	-.1492	-.0483	.1690	-.2400	-.0742	.2519	-.0788	-.0256	.5424
Yuca Price	.0302	.0166	.6493	-.0495	-.0255	.7014	.0519	.0287	.5059
Percent of Income from Home-Produced Food	-.0022	-.0447	.0429	-.0034	-.0549	.2124	-.0019	-.0420	.1077
Percent of Income from Farm Sales	.0000	.0116	.6706	.0024	.0687	.1216	-.0000	-.0130	.7000
Percent of Income from Transfers	.0019	.0775	.0039	.0028	.0865	.0699	.0019	.0823	.0117
Percent of Income from Wages	.0000	.0647	.0493	.0016	.0785	.1752	.0001	.0666	.0851
Other Urban	-.0438	-.0338	.2672	.0028	.0023	.9643	-.0349	-.0257	.5055
Frontier	-.0772	-.0467	.2879	.1188	.0574	.3832	-.1330	-.0866	.1465
Sugar Cane/Livestock	.1006	-.0641	.0778	-.0804	-.0452	.4130	-.0875	-.0584	.2324
Other Rural	-.0822	.0538	.1124	.0783	.0476	.3769	-.1287	-.0868	.0507
Household Size	.9304	.8722	.0000	.8977	.8515	.0000	.9276	.8653	.0000
Age of Self-Def Head	.0000	.0056	.7706	.0017	.0390	.2366	-.0001	-.0160	.4990
Highest Educ in HH	-.0043	-.0315	.1555	-.0076	-.0570	.1337	.0000	.0001	.9805
No. Ec. Active Members	-.0238	-.0570	.0125	-.0482	-.1076	.0115	-.0135	-.0326	.2414
Adult-Equivalent Ratio	.1431	.0311	.1364	.3968	.0807	.0285	.0492	.0110	.6721
Constant	-2.0185	--	.0001	-4.9517	--	.0000	-.8825	--	.1453
R^2	.72252			.72800			.73967		
Adj R^2	.71450			.70370			.72804		
F	90.13255			29.95575			63.60134		
Sig F	.0000			.0000			.0000		
N	927			318			609		

TABLE 42
RESULT OF THE ESTIMATION OF MODEL 1 FOR CALORIES AND PROTEIN

Headship Defs:	Dep. Var: Log of Cal. Consumption per Adult Equivalent Per Day			Dep. Var: Log of Pro. Consumption Per Adult Equivalent Per Day		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2298	1.7966	.0000	1.2735	1.6873	.0000
Per Cap Expend Squared	-.0930	-1.2398	.0000	-.0923	-1.1167	.0000
Stone Index of Inflation	.0016	.0213	.5775	-.0000	-.0000	.9976
Rice Price	.2704	.0717	.0579	.4279	.1029	.0053
Sugar Price	-.1738	-.0748	.0696	-.2304	-.0900	.0253
Beans Price	-.0429	-.0237	.5303	-.0607	-.0304	.4081
Milk Price	.0123	.0067	.9031	-.1162	-.0576	.2839
Oil Price	-.3154	-.0861	.0303	-.1914	-.0474	.2214
Pasta Price	-.1368	-.0367	.5537	.0260	.0063	.9166
Plantain Price	-.0374	-.0305	.4641	-.0455	-.0337	.4076
Chicken Price	.1790	.0391	.3278	.0623	.0123	.7514
Beef Price	-.3353	-.1378	.0113	-.3720	-.1386	.0089
Yuca Price	-.0325	-.0227	.6878	.0339	.0215	.6969
Percent of Income from Home-Produced Food	.0054	.1409	.0000	.0039	.0694	.0358
Percent of Income from Farm Sales	.0018	.0998	.0163	.0010	.0530	.1902
Percent of Income from Transfers	-.0001	-.0415	.3131	-.0019	-.0910	.0235
Percent of Income from Wages	.0000	-.0207	.6777	-.0001	-.0593	.2206
Other Urban	-.0074	-.0073	.8786	-.0318	-.0284	.5406
Frontier	-.1556	-.1198	.0801	-.2458	-.1716	.0101
Sugar Cane/Livestock	.1565	.1274	.0248	.0054	.0040	.9427
Other Rural	.0234	.0196	.7105	-.0843	-.0639	.2135
Household Size	.1217	.1478	.0005	.1130	.1243	.0039
Age of Self-Def Head	.0018	.0585	.0517	.0016	.0493	.1096
Highest Educ in HH	-.0013	-.0125	.7137	.0065	.0550	.1022
No. Ec. Active Members	-.0109	-.0335	.3479	-.0183	-.0511	.1423
Adult-Equivalent Ratio	-.5432	-.1506	.0000	-.7431	-.2610	.0000
Constant	3.8445	--	.0000	.2053	--	.7377
R^2	.31761			.35092		
Adj R^2	.29822			.33247		
F	16.37967			19.02615		
Sig F	.0000			.0000		
N	942			942		

that, naturally, the household's per capita expenditure level is a highly significant determinant of calorie and protein consumption, as are certain food prices. These variables are not systematically different between MHH and FHH. Several variables observed to be different in MHH and FHH are also observed to be significant determinants of nutrient consumption. Consumption of home produced food, higher in MHH by most definitions, is significantly positively associated with both calorie and protein intake; income from farm sales, alsc higher in MHH, is positively associated with calorie consumption. Transfer income, much higher in FHH, is negatively associated with protein consumption. This means that, at any given expenditure level, if more of household income comes from transfers, protein intakes will be lower.

The number of economically active members (controlling for household size), lower in Self-Defined and Absent Male FHH and higher in the other FHH, is significantly negatively associated with food expenditure (after income level is controlled), but shows no significant association with calories and protein consumed per adult-equivalent. The adult-equivalent ratio is highly significant and negative for both calorie and protein consumption, suggesting that it is harder for households of a given size and income level to achieve calorie and protein adequacy as these nutrient needs increase. Controlling for this ratio, household size is significant and positive: the more members, the higher the level of macronutrient adequacy achieved. Recall that FHH are smaller than MHH, with fewer infants and children (whose nutrient needs are low), by all definitions except F. Earns Wages and F. Works. This suggests that, controlling for per capita income, additional members represent a productive resource for

households, possibly because of their work in home-based productive tasks and perhaps also because of economies of scale in consumption.

4.2.3.1 Self-Defined

In the Model 2 estimates, in which a dummy variable for female headship is introduced, only the variable for Self-Defined FHH is significant in altering calorie consumption. According to these parameter estimates, controlling for all the other variables included in this model, self-defined female headship is very significant and positive. The magnitude of the effect of this variable (indicated by the standardized Beta coefficients) is exceeded only be the expenditure variables. A similar effect is observed for protein consumption: all else equal, Self-Defined FHH has a higher level of protein adequacy. However, and this is an important caveat, female headship significantly reduces the degree to which additional income is devoted to additional calories or protein. The interaction term of female headship with expenditure is highly significant and negative. At any given expenditure level, the expenditure elasticity of demand for calories and for protein is lower in FHH. This effect is large enough to more than cancel out the positive effect of female headship. (That is, this model separates the effect of female headship into two components. Taken together, the net effect on calorie and protein adequacy appears to be negative.) At the population means of per capita expenditure, the expenditure elasticity of demand for calories is 0.43 for MHH and 0.29 for FHH. At the level of the poorest quartile, the figures are .53 for MHH and .39 for FHH. Results are shown in Table 43.

These results are confirmed by the separate estimates of Model 1 for

Self-Defined MHH and FHH (Table 44). According to these estimates, the elasticities for calories are 0.44 for MHH and 0.24 for FHH at the mean; they are 0.52 for MHH and 0.35 for FHH in the bottom quartile. (The sets of parametere for the two populations are significantly different at p = .05.) The estimates of protein expenditure elasticities are quite similar as well.

One difference between Self-Defined MHH and FHH is in the role of household composition in affecting calorie and protein adequacy. Neither household size nor adult-equivalent ratio shows a significant effect in FHH, while they are both highly significant (size positive, adult-equivalent ratio negative) in MHH. This gives support to the hypothesis that food allocation practices among members may be different in these two types of households, as is frequently asserted in the literature on female headship.

4.2.3.2 Absent Male

The results of the separate regressions for Absent Male MHH and FHH show similar results, though the differences are not quite so dramatic. Absent Male FHH show lower expenditure elasticities of demand for calories (.34 versus .40 at the mean; .49 versus .57 in the lowest quartile), and for protein (.30 versus .47 at the mean; .46 versus .54 in Quartile 1).

In the estimation of Model 2 using a dummy variable for Absent Male headship, headship does not show up as a significant determinant of calorie adequacy, nor does it significantly alter the expenditure elasticity. (The coefficient is negative, but not significant.) It is quite significant in its effect on protein consumption, however, the effects being similar to those for Self-Defined headship: the coefficient of the dummy variable for

TABLE 43
RESULTS OF THE ESTIMATION OF MODEL 2
FOR SELF-DEFINED MHH AND FHH, FOR CALORIE AND PROTEIN CONSUMPTION

Indep Vars.	Dep. Var: Calories B	Beta	Sig T	Dep. Var: Protein B	Beta	Sig T
Per Cap Expend	1.3592	1.9856	.0000	1.4480	1.9185	.0000
Per Cap Expend Squared	.1028	-1.3707	.0000	-.1036	-1.2774	.0000
Fem. Head x Per Cap Exp	-.1372	-.6047	.0012	-.1873	-.7487	.0000
Female Headship	.5709	.5543	.0030	.7812	.6879	.0001
Stone Index of Infla	.0022	.0289	.4489	.0001	.0096	.7965
Rice Price	.2661	.0706	.0607	.4239	.1020	.0053
Sugar Price	-.1751	-.0754	.0662	-.2352	-.0918	.0212
Beans Price	-.0389	-.0215	.5677	-.0528	-.0265	.4681
Milk Price	.0297	.0162	.7672	-.0908	-.0450	.3985
Oil Price	-.3276	-.0895	.0239	-.2090	-.0518	.1784
Pasta Price	-.1588	-.0426	.4916	-.0060	-.0015	.9807
Plantain Price	-.0472	-.0385	.3556	-.0593	-.0439	.2780
Chicken Price	.1652	.0361	.3652	.0403	.0080	.8365
Beef Price	-.3463	-.1423	.0086	-.3872	-.1443	.0061
Yuca Price	-.0368	-.0257	.6482	.0277	.0176	.7481
Percent of Income from Home-Produced Food	.0056	.1455	.0000	.0031	.0740	.0247
Percent of Income from Farm Sales	.0017	.0983	.0187	.0001	.0509	.2099
Percent of Income from Transfers	-.0000	-.0165	.6983	-.0013	-.0604	.1447
Percent of Income from Wages	-.0000	-.0177	.7222	-.0001	-.0576	.2319
Other Urban	-.0001	-.0001	.9885	-.0223	-.0200	.6652
Frontier	-.1435	-.1104	.1057	-.2272	-.1586	.0168
Sugar Cane/Livestock	.1593	.1297	.0216	.0088	.0065	.9052
Other Rural	.0265	.0221	.6730	-.0796	-.0603	.2368
Household Size	.1082	.1314	.0024	.0998	.1098	.0110
Age of Self-Def Head	.0019	.0614	.0401	.0017	.0509	.0954
Highest Educ in HH	-.0018	-.0166	.6263	.0056	.0477	.1542
No. Ec. Active Members	-.0057	-.0174	.6261	-.0130	-.0362	.2965
Adult-Equivalent Ratio	-.5840	-.1620	.0000	-.7465	-.2622	.0000
Constant	3.4059	--	.0000	-.3733	--	.5542
R^2	.32646			.36453		
Adj R^2	.30581			.34504		
F	15.80472			18.70447		
Sig F	.0000			.0000		
N	942			94		

TABLE 44
RESULTS OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR FHH AND MHH (SELF-DEFINED)
FOR CALORIE AND PROTEIN CONSUMPTION

Chow F = 1.758
X < .05

	Dep. Var. Calories								
	All			Self-Defined FHH			Self-Defined MHH		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2298	1.7966	.0000	1.4012	1.9982	.0000	1.2412	1.8470	.0000
Per Cap Expend Squared	-.0930	-1.2398	.0000	-.1301	-1.6349	.0007	-.0885	-1.2201	.0000
Stone Index of Inflation	.0016	.0213	.5775	.0017	.0180	.8260	.0025	.0358	.4168
Rice Price	.2704	.0717	.0579	.4864	.1151	.1394	.1879	.0524	.2268
Sugar Price	-.1738	-.0748	.0696	-.3752	-.1396	.0931	-.1151	-.0526	.2738
Beans Price	-.0429	-.0237	.5303	-.0132	-.0059	.9381	-.0646	-.0387	.3769
Milk Price	.0123	.0067	.9031	-.0818	-.0390	.7458	.0711	.0411	.5128
Oil Price	-.3154	-.0861	.0303	-.6903	-.1429	.0613	-.2140	-.0644	.1710
Pasta Price	-.1368	-.0367	.5537	.0790	.0172	.8920	-.2465	-.0713	.3233
Plantain Price	-.0374	-.0305	.4641	-.0842	-.0582	.4965	-.0201	-.0175	.7170
Chicken Price	.1790	.0391	.3278	.5687	.1088	.1814	-.0036	-.0001	.9857
Beef Price	-.3353	-.1378	.0113	-.7123	-.2458	.0202	-.1810	-.0794	.2079
Yuca Price	-.0325	-.0227	.6878	.2485	.1471	.1936	-.1474	-.1098	.0935
Percent of Income from Home-Produced Food	.0054	.1409	.0000	.0086	.1137	.0862	.0051	.1526	.0001
Percent of Income from Farm Sales	.0018	.0998	.0163	.0010	.0236	.7187	.0015	.0979	.0543
Percent of Income from Transfers	-.0001	-.0415	.3131	.0000	.0068	.9445	-.0012	-.0372	.3383
Percent of Income from Wages	-.0000	-.0207	.6777	-.0000	-.0104	.9189	-.0000	-.0421	.4638
Other Urban	-.0074	-.0073	.8786	-.0442	-.0415	.6809	.0172	.0174	.7483
Frontier	-.1556	-.1198	.0801	-.4152	-.2078	.0506	-.0876	-.0758	.3665
Sugar Cane/Livestock	.1565	.1274	.0248	.1702	.1233	.2761	.1626	.1397	.0336
Other Rural	.0234	.0196	.7105	-.1443	-.0997	.3344	.0846	.0762	.2181
Household Size	.1217	.1478	.0003	.0639	.0769	.4000	.1022	.1206	.0142
Age of Self-Def Head	.0018	.0585	.0517	.0017	.0574	.3534	.0019	.0638	.0788
Highest Educ in HH	-.0013	-.0125	.7137	.0075	.0641	.3936	-.0052	-.0515	.1819
No. Ec. Active Members	-.0109	-.0335	.3479	-.0205	-.0513	.5334	-.0028	-.0091	.8204
Adult-Equivalent Ratio	-.5432	-.1506	.0000	-.1163	-.0266	.7068	-.6866	-.2041	.0000
Constant	3.8445	--	.0000	4.6493	--	.0005	3.3783	--	.0000
	R^2 = .31761			R^2 = .31374			R^2 = .36003		
	Adj R^2 = .29822			Adj R^2 = .22957			Adj R^2 = .33541		
	F = 16.37967			F = 3.72771			F = 14.62661		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		

TABLE 44 (Continued)
RESULTS OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR FHH AND MHH (SELF-DEFINED)
FOR CALORIE AND PROTEIN CONSUMPTION

Chow F = 2.489
X < .01

	Dep. Var. Protein								
	All			Self-Defined FHH			Self-Defined MHH		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2657	1.6770	.0000	1.7398	2.2552	.0000	1.1454	1.5524	.0000
Per Cap Expend Squared	-.0914	-1.1054	.0000	-.1691	-1.9320	.0001	-.0713	-.8947	.0007
Stone Index of Inflation	-.0000	-.0029	.9394	.0026	.0247	.7630	-.0000	-.0045	.9165
Rice Price	.4048	.0974	.0092	.7118	.1531	.0501	.2863	.0727	.0843
Sugar Price	-.2338	-.0913	.0251	-.5647	-.1910	.0222	-.1046	-.0436	.3511
Beans Price	-.0581	-.0291	.4350	.0165	.0066	.9300	-.0951	-.0519	.2224
Milk Price	-.1084	-.0537	.3237	-.0475	-.0206	.8643	-.0915	-.0481	.4293
Oil Price	-.2102	-.0521	.1848	-.4927	-.0927	.2243	-.1633	-.0447	.3268
Pasta Price	.1160	.0282	.6446	.1661	.0329	.7955	.0557	.0147	.8342
Plantain Price	-.0453	-.0335	.4161	-.1362	-.0855	.3183	-.0122	-.0097	.8363
Chicken Price	.0711	.0141	.7211	.4874	.0848	.2980	-.0990	-.0209	.6432
Beef Price	-.3660	-.1364	.0111	-.7245	-.2272	.0318	-.2005	-.0801	.1908
Yuca Price	.0237	.0150	.7883	.2454	.1320	.2437	-.0874	-.0593	.3508
Percent of Income from Home-Produced Food	.0030	.0710	.0342	.0095	.1155	.0871	.0024	.0653	.0868
Percent of Income from Farm Sales	.0013	.0646	.1154	.0013	.0272	.6784	.0001	.0505	.3058
Percent of Income from Transfers	-.0022	-.1029	.0115	-.0001	-.0600	.5421	-.0018	-.0524	.1658
Percent of Income from Wages	-.0001	-.0513	.2980	-.0001	-.0584	.5701	-.0001	-.0668	.2316
Other Urban	-.0307	-.0274	.5602	-.0433	-.0370	.7144	-.0112	-.0103	.8446
Frontier	-.2584	-.1803	.0077	-.3925	-.1786	.0930	-.2277	-.1794	.0279
Sugar Cane/Livestock	.0024	.0018	.9743	.0541	.0356	.7529	-.0065	-.0051	.9368
Other Rural	-.0820	-.0621	.2328	-.1764	-.1108	.2843	-.0449	-.0368	.5395
Household Size	.1647	.1813	.0000	.0886	.0970	.2895	.1107	.1190	.0128
Age of Self-Def Head	-.0001	-.0027	.9287	-.0000	-.0098	.8743	.0000	.0110	.7553
Highest Educ in HH	.0037	.0318	.3463	.0168	.1303	.0842	-.0001	-.0060	.8737
No. Ec. Active Members	-.0264	-.0736	.0370	-.0151	-.0344	.6767	-.0163	-.0485	.2135
Adult-Equivalent Ratio	-.7383	-.1857	.0000	-.3453	-.0719	.3112	-.9583	-.2595	.0000
Constant	.2644	--	.6705	-.2361	--	.8702	.3398	--	.6273
	R^2 = .33368			R^2 = .31178			R^2 = .39648		
	Adj R^2 = .31474			Adj R^2 = .22737			Adj R^2 = .37326		
	F = 17.62335			F = 3.69387			F = 17.08040		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		
	N = 942			N = 239			N = 703		

female headship is positive, but the interaction term with expenditure is negative, suggesting that households containing adult males start at lower levels, but are more likely to devote increases in income to increasing protein consumption. This is noteworthy because, as we shall see below, the protein density of the household diet appears to have a positive effect on children's health, indicated by its negative, significant relationship with days of morbidity. Results are shown in Tables 45 and 46.

4.2.3.3 Definitions Related to Women's Earnings and Market Work

None of the dummy variables for headship defined in terms of the reference woman's earnings and market work shows a significant effect on calorie or protein consumption. The results of separate estimations for FHH and MHH shows no significant differences according to the Chow test comparing the whole model in the two populations. The variables which do show a significant impact are those already observed to be significant in Model 1: the proportion of income from home-produced and consumed food has a consistently positive effect on calories and protein; the proportion from farm sales is consistently positive, and significant for calories but not for protein. The proportion of income from transfers shows a consistently negative relationship with calories and protein, which is statistically significant in only two of the model estimations. Tables 47-50 show the detailed results of the estimations.

These results are useful in interpreting the simple comparison of mean calorie and protein consumption per adult-equivalent in MHH and FHH. It appears that the significant differences observed according to the Major Earner and F Earns Wages definitions, and according to the F Earns Wages

TABLE 45
RESULTS OF THE ESTIMATION OF MODEL 2
FOR ABSENT MALE MHH AND FHH
FOR CALORIES AND PROTEIN

Indep Vars.	Dep. Var: Calories B	Beta	Sig T	Dep. Var: Protein B	Beta	Sig T
Per Cap Expend	1.2602	1.8409	.0000	1.3432	1.7796	.0000
Per Cap Expend Squared	-.0946	-1.2622	.0000	-.0965	-1.1667	.0000
Fem. Head x Per Cap Exp	-.0716	-.2742	.1193	-.1511	-.5249	.0021
Female Headship	.2428	.2029	.2485	.5758	.4365	.0107
Stone Index of Inflation	.0018	.0239	.5325	.0001	.0069	.8523
Rice Price	.2711	.0719	.0569	.4306	.1036	.0047
Sugar Price	-.1753	-.0755	.0668	-.2370	-.0926	.0205
Beans Price	-.0510	-.0282	.4559	-.0735	-.0369	.3145
Milk Price	.0106	.0058	.9160	-.1163	-.0577	.2799
Oil Price	-.3194	-.0872	.0280	-.2005	-.0497	.1971
Pasta Price	-.1505	-.0404	.5138	-.0018	-.0000	.9943
Plantain Price	-.0343	-.0279	.5024	-.0429	-.0317	.4322
Chicken Price	.1672	.0365	.3600	.0362	.0072	.8531
Beef Price	-.3264	-.1341	.0134	-.3552	-.1324	.0119
Yuca Price	-.0401	-.0280	.6202	.0201	.0127	.8166
Percent of Income from Home-Produced Food	.0054	.1404	.0000	.0029	.0682	.0383
Percent of Income from Farm Sales	.0017	.0944	.0235	.0001	.0463	.2520
Percent of Income from Transfers	-.0000	-.0189	.6533	-.0013	-.0592	.1481
Percent of Income from Wages	-.0000	-.0259	.6061	-.0001	-.0661	.1741
Other Urban	-.0135	-.0134	.7792	-.0414	-.0371	.4226
Frontier	-.1567	-.1206	.0776	-.2414	-.1685	.0110
Sugar Cane/Livestock	.1548	.1260	.0261	.0014	.0010	.9852
Other Rural	.0213	.0178	.7353	-.0861	-.0653	.2008
Household Size	.0989	.1201	.0074	.0899	.0990	.0251
Age of Self-Def Head	.0021	.0697	.0227	.0020	.0608	.0502
Highest Educ in HH	-.0016	-.0152	.6568	.0055	.0465	.1648
No. Ec. Active Members	-.0077	-.0238	.5064	-.0156	-.0436	.2084
Adult-Equivalent Ratio	-.6335	-.1757	.0000	-.7726	-.2713	.0000
Constant	3.7213	--	.0000	-.0650	--	.9169
R^2	.32189			.36165		
Adj R^2	.30110			.34208		
F	15.47849			18.47344		
Sig F	.0000			.0000		
N	942			942		

TABLE 46
RESULT OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR MALE MHH AND FHH
FOR CALORIES AND PROTEIN

Chow F = 2.4849
X < .01

	Dep. Var. Calories								
	All			Absent Male-MHH			Absent Male-MHH		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2298	1.7966	.0000	1.7979	2.2419	.0001	1.0353	1.6036	.0000
Per Cap Expend Squared	-.0930	-1.2398	.0000	-.1619	-1.8000	.0016	-.0706	-1.0051	.0001
Stone Index of Inflation	.0016	.0213	.5775	-.0083	-.0766	.4222	.0052	.0738	.0716
Rice price	.2704	.0717	.0579	.4235	.0805	.4069	.2317	.0679	.0976
Sugar Price	-.1738	-.0748	.0696	-.4032	-.1277	.2225	-.1037	-.0490	.2753
Beans Price	-.0429	-.0237	.5303	.3102	.1104	.2469	-.1169	-.0726	.0775
Milk Price	.0123	.0067	.9031	-.2740	-.1086	.4811	.0093	.0056	.9247
Oil Price	-.3154	-.0861	.0303	-.8487	-.1374	.1733	-.2325	-.0722	.0978
Pasta Price	-.1368	-.0367	.5537	.3074	.0511	.7464	-.3037	-.0916	.1748
Plaintain Price	-.0374	-.0305	.4641	-.0893	-.0511	.6179	-.0171	-.0155	.7332
Chicken Price	.1790	.0391	.3278	1.0217	.1500	.1306	.0114	.0028	.9497
Beef Price	-.3353	-.1378	.0113	-.9122	-.2738	.0416	-.1320	-.0596	.3167
Yuca Price	-.0325	-.0227	.6878	.4067	.2031	.1632	-.1716	-.1323	.0338
Percent of Income from Home-Produced Food	.0054	.1409	.0000	.0126	.1838	.0394	.0039	.1144	.0021
Percent of Income from Farm Sales	.0018	.0998	.0163	.0071	.2282	.0190	.0001	.0327	.4831
Percent of Income from Transfers	-.0001	-.0415	.3131	.0028	.1596	.1704	-.0019	-.0754	.0509
Percent of Income from Wages	-.0000	-.0207	.6777	.0024	.1459	.2135	-.0013	-.1159	.0306
Other Urban	-.0074	-.0073	.8786	.0312	.0232	.8532	-.0259	-.0280	.5838
Frontier	-.1556	-.1198	.0801	-.3990	-.2711	.0680	-.1024	-.0895	.2380
Sugar Cane/Livestock	.1365	.1274	.0248	-.0483	-.0304	.8464	.1517	.1344	.0275
Other Rural	.0234	.0196	.7105	-.3252	-.2046	.1650	.0594	.0543	.3356
Household Size	.1217	.1478	.0005	.1617	.1632	.1357	.0630	.0755	.1079
Age of Self-Def Head	.0018	.0585	.0517	.0031	.1024	.2148	.0022	.0713	.0378
Highest Educ in HH	-.0013	-.0125	.7137	-.0032	-.0219	.8181	.0001	.0066	.8547
No. Ea. Active Members	-.0109	-.0335	.3479	-.0120	-.0207	.8276	-.0104	-.0330	.3567
Adult-Equivalent Ratio	-.5432	-.1506	.0000	-.6130	-.1053	.1904	-.6504	-.1959	.0000
Constant	3.8443	--	.0000	4.0911	--	.0366	3.7505	--	.0000
	R^2 = .31761			R^2 = .38690			R^2 = .33352		
	Adj R^2 = .29822			Adj R^2 = .26613			Adj R^2 = .33128		
	F = 16.37967			F = 3.20376			F = 15.90003		
	Sig F = .0000			Sig F = .0000			Sig F = .0000		
	N = 942			N = 159			N = 783		

TABLE 46 (Continued)
RESULT OF THE ESTIMATION OF MODEL 1
SEPARATELY FOR MALE MHH AND FHH
FOR CALORIES AND PROTEIN

Chow F = 2.4849
X < .01

	Dep. Var. Protein								
	All			Absent Male-FHH			Absent Male-MHH		
Indep Vars.	B	Beta	Sig T	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2657	1.6770	.0000	1.9276	2.2984	.0001	1.0873	1.5039	.0000
Per Cap Expend Squared	-.0914	-1.1054	.0000	-.1816	-1.9313	.0011	-.0677	-.8607	.0005
Stone Index of Inflation	-.0000	-.0029	.9394	-.0144	-.1269	.2008	.0051	.0655	.1053
Rice Price	.4048	.0974	.0092	.7984	.1451	.1507	.3127	.0818	.0381
Sugar Price	-.2338	-.0913	.0251	.5821	-.1753	.1053	-.1293	-.0545	.2065
Beans Price	-.0581	-.0291	.4350	.3258	.1109	.2624	-.1518	-.0841	.0334
Milk Price	-.1084	-.0537	.3237	-.2977	-.1128	.4806	-.1388	-.0747	.1906
Oil Price	-.2102	-.0521	.1848	-.5553	-.0859	.4107	-.1313	-.0364	.3853
Pasta Price	.1160	.0282	.6446	.2323	.0369	.8218	-.0799	-.0215	.7401
Plaintain Price	-.0453	-.0335	.4161	-.0692	-.0378	.7217	-.0234	-.0189	.6655
Chicken Price	.0711	.0141	.7211	.8714	.1223	.2340	-.1054	-.0230	.5871
Beef Price	-.3660	-.1364	.0111	-.8942	-.2567	.0654	-.1189	-.0479	.4021
Tuna Price	.0237	.0150	.7883	.4482	.2141	.1567	-.1463	-.1007	.0921
Percent of Income from Home-Produced Food	.0030	.0710	.0342	.0085	.1180	.2002	.0016	.0419	.2411
Percent of Income from Farm Sales	.0013	.0646	.1154	.0050	.1471	.1426	.0000	.0125	.7801
Percent of Income from Transfers	-.0022	-.1029	.0115	.0012	.0673	.5767	-.0033	-.1151	.0021
Percent of Income from Wages	-.0001	-.0513	.2980	.0012	.0693	.5683	-.0016	-.1274	.0131
Other Urban	-.0307	-.0274	.5602	-.0158	-.0112	.9314	-.0314	-.0495	.3131
Frontier	-.2584	-.1803	.0077	-.5626	-.2434	.1137	-.2272	-.1772	.0151
Sugar Cane/Livestock	.0024	.0018	.9745	-.1716	-.1033	.5260	-.0167	-.0132	.8211
Other Rural	-.0820	-.0621	.2328	-.2851	-.1715	.2613	-.0817	-.0567	.2191
Household Size	.1647	.1813	.0000	.1802	.1739	.1256	.0720	.0771	.0881
Age of Self-Def Head	-.0000	-.0027	.9287	.0015	.0475	.5783	.0013	.0383	.2466
Highest Educ in HH	.0037	.0318	.3463	.0066	.0426	.6657	.0042	.0380	.2721
No. Eq. Active Members	-.0264	-.0736	.0370	-.0232	-.0383	.6975	-.0199	-.0396	.1021
Adult-Equivalent Ratio	-.7383	-.1857	.0000	-1.0620	-.1745	.0375	-.9581	-.2577	.0001
Constant	.2644	--	.6705	.4871	--	.8171	-.1797	--	.7771
	R^2 = .33368 Adj R^2 = .31474 F = 17.62335 Sig F = .0000 N = 942			R^2 = .33989 Adj R^2 = .20987 F = 2.61410 Sig F = .0002 N = 159			R^2 = .40168 Adj R^2 = .38110 F = 19.52032 Sig F = .0000 N = 783		

TABLE 47
RESULT OF THE ESTIMATION OF MODEL 2
FOR MAJOR EARNER MHH AND FHH
FOR CALORIES AND PROTEIN

Indep Vars.	Dep. Var: Calories B	Beta	Sig T	Dep. Var: Protein B	Beta	Sig T
Per Cap Expend	1.2180	1.8727	.0000	1.1920	1.6518	.0000
Per Cap Expend Squared	-.0916	-1.2903	.0000	-.0814	-1.0338	.0000
Fem. Head x Per Cap Exp	-.0308	-.1161	.6169	-.0823	-.2799	.2094
Female Headship	.1357	.1107	.6312	.3465	.2547	.2510
Stone Index of Inflation	.0020	.0270	.5314	.0001	.0113	.7862
Rice Price	.1932	.0552	.1899	.3705	.0954	.0190
Sugar Price	-.1307	-.0595	.2003	-.1625	-.0667	.1365
Beans Price	-.1069	-.0605	.1335	-.1202	-.0613	.1146
Milk Price	-.0621	-.0367	.5534	-.1589	-.0847	.1568
Oil Price	-.3085	-.0921	.0399	-.1812	-.0487	.2586
Pasta Price	-.1163	-.0325	.6455	.0001	.0000	.9984
Plantain Price	-.0177	-.0150	.7533	-.0124	-.0097	.8320
Chicken Price	.1810	.0416	.3412	.0981	.0203	.6296
Beef Price	-.1850	-.0792	.1797	-.2305	-.0889	.1183
Yuca Price	-.0801	-.0595	.3460	-.0447	-.0299	.6232
Percent of Income from Home-Produced Food	.0053	.1083	.0044	.0023	.0419	.2515
Percent of Income from Farm Sales	.0001	.0370	.3924	.0000	.0176	.6728
Percent of Income from Transfers	-.0025	-.0933	.0285	-.0032	-.1046	.0109
Percent of Income from Wages	-.0018	-.1159	.0272	-.0019	-.1131	.0252
Other Urban	-.0155	-.0164	.7517	-.0328	-.0313	.5320
Frontier	-.1835	-.1414	.0490	-.2751	-.1910	.0058
Sugar Cane/Livestock	.1398	.1197	.0508	.0099	.0077	.8968
Other Rural	.0297	.0248	.6483	-.0659	-.0496	.3449
Household Size	.0784	.0964	.0461	.0638	.0707	.1418
Age of Self-Def Head	.0021	.0701	.0359	.0015	.0454	.1745
Highest Educ in HH	-.0011	-.0107	.7732	.0064	.0577	.1100
No. Ec. Active Members	-.0189	-.0573	.1455	-.0177	-.0483	.2047
Adult-Equivalent Ratio	-.4720	-.1381	.0002	-.7690	-.2829	.0000
Constant	3.9112	--	.0000	.2713	--	.6863
R^2	.33065			.38532		
Adj R^2	.31335			.36181		
F	13.38643			16.38828		
Sig F	.0000			.0000		
N	761			761		

TABLE 48
RESULTS OF THE ESTIMATION OF MODEL 2
FOR MAJOR INCOME CONTRIBUTOR MHH AND FHH
FOR CALORIES AND PROTEIN

Indep Vars.	Dep. Var: Calories			Dep. Var: Protein		
	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2271	1.8074	.0000	1.2668	1.6894	.0000
Per Cap Expend Squared	-.0931	-1.2523	.0000	-.0916	-1.1154	.0000
Fem. Head x Per Cap Exp	-.1322	-.3196	.1170	-.1332	-.2916	.1412
Female Headship	.6008	.3063	.1313	.5797	.2676	.1754
Stone Index of Inflation	.0012	.0159	.6785	-.0000	-.0021	.9562
Rice Price	.2975	.0794	.0368	.4462	.1079	.0036
Sugar Price	-.1627	-.0706	.0884	-.2184	-.0859	.0334
Beans Price	-.0301	-.0167	.6589	-.0526	-.0265	.4730
Milk Price	-.0210	-.0116	.8359	-.1543	-.0768	.1578
Oil Price	-.3232	-.0891	.0259	-.1906	-.0476	.2217
Pasta Price	-.1435	-.0389	.5336	.0075	.0018	.9761
Plantain Price	-.0215	-.0177	.6745	-.0290	-.0216	.5982
Chicken Price	.2125	.0468	.2441	.1028	.0205	.6002
Beef Price	-.2949	-.1222	.0257	-.3342	-.1254	.0187
Yuca Price	-.0420	-.0295	.6032	.0212	.0135	.8073
Percent of Income from Home-Produced Food	.0051	.1330	.0001	.0027	.0641	.0543
Percent of Income from Farm Sales	.0015	.0841	.0454	.0001	.0421	.3028
Percent of Income from Transfers	-.0012	-.0638	.1237	-.0023	-.1096	.0068
Percent of Income from Wages	-.0001	-.0451	.3743	-.0001	-.0730	.1372
Other Urban	-.0162	-.0161	.7361	-.0438	-.0394	.3983
Frontier	-.1671	-.1298	.0597	-.2606	-.1833	.0063
Sugar Cane/Livestock	.1471	.1202	.0349	-.0078	-.0058	.9171
Other Rural	.0046	.0038	.9423	-.1034	-.0790	.1273
Household Size	.1047	.1267	.0035	-.1003	.1098	.0119
Age of Self-Def Head	.0018	.0584	.0532	.0016	.0468	.1298
Highest Educ in HH	-.0001	-.0052	.8798	.0074	.0632	.0610
No. Ec. Active Members	-.0108	-.0335	.3494	-.0181	-.0508	.1451
Adult-Equivalent Ratio	-.5455	-.1520	.0000	-.7508	-.2648	.0000
Constant	3.9262	--	.0000	.2268	--	.7113
R^2	.31601			.35101		
Adj R^2	.29494			.33102		
F	14.99855			17.55824		
Sig F	.0000			.0000		
N	938			938		

TABLE 49
RESULTS OF THE ESTIMATION OF MODEL 2
FEMALE EARNS WAGES MHH AND FHH
FOR CALORIES AND PROTEIN

Indep Vars.	Dep. Var: Calories			Dep. Var: Protein		
	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.2343	1.8180	.0000	1.2709	1.6949	.0000
Per Cap Expend Squared	-.0925	-1.2441	.0000	-.0915	-1.1137	.0000
Fem. Head x Per Cap Exp	-.0616	-.3023	.1300	-.0384	-.1707	.3799
Female Headship	.2846	.3030	.1233	.1580	.1523	.4266
Stone Index of Inflation	.0012	.0158	.6812	-.0000	-.0017	.9645
Rice Price	.3100	.0828	.0299	.4536	.1096	.0032
Sugar Price	-.1679	-.0729	.0785	-.2263	-.0890	.0277
Beans Price	-.0302	-.0168	.6587	-.0505	-.0255	.4913
Milk Price	-.0234	-.0128	.8172	-.1491	-.0742	.1708
Oil Price	-.3324	-.0916	.0219	-.1990	-.0497	.2022
Pasta Price	-.1387	-.0376	.5464	.0108	.0026	.9653
Plantain Price	-.0204	-.0168	.6899	-.0292	-.0217	.5968
Chicken Price	.2092	.0461	.2515	.0897	.0179	.6478
Beef Price	-.2901	-.1202	.0284	-.3382	-.1269	.0177
Yuca Price	-.0405	-.0285	.6158	.0264	.0168	.7618
Percent of Income from Home-Produced Food	.0050	.1322	.0001	.0027	.0641	.0548
Percent of Income from Farm Sales	.0015	.0849	.0436	.0000	.0429	.2947
Percent of Income from Transfers	-.0012	-.0640	.1228	-.0023	-.1087	.0073
Percent of Income from Wages	-.0001	-.0454	.3774	-.0001	-.0702	.1587
Other Urban	-.0145	-.0144	.7637	-.0407	-.0366	.4333
Frontier	-.1640	-.1275	.0642	-.2551	-.1794	.0075
Sugar Cane/Livestock	.1469	.1201	.0348	-.0053	-.0039	.9437
Other Rural	.0056	.0047	.9291	-.1008	-.0770	.1373
Household Size	.1093	.1323	.0023	.1038	.1137	.0093
Age of Self-Def Head	.0018	.0598	.0477	.0016	.0472	.1274
Highest Educ in HH	-.0001	-.0050	.8852	.0075	.0640	.0583
No. Ec. Active Members	-.0119	-.0368	.3179	-.0171	-.0480	.1795
Adult-Equivalent Ratio	-.5335	-.1486	.0000	-.7484	-.2639	.0000
Constant	3.8878	--	.0000	.2160	--	.7254
R^2	.31588			.34980		
Adj R^2	.29481			.32977		
F	14.98972			17.46532		
Sig F	.0000			.0000		
N	938			938		

TABLE 50
RESULTS OF THE ESTIMATION OF MODEL 2
FOR FEMALE WORKS MHH AND FHH FOR CALORIES AND PROTEIN

Indep Vars.	Dep. Var: Calories			Dep. Var: Protein		
	B	Beta	Sig T	B	Beta	Sig T
Per Cap Expend	1.3518	1.9518	.0000	1.3967	1.8122	.0000
Per Cap Expend Squared	-.1087	-1.4082	.0000	-.1081	-1.2581	.0000
Fem. Head x Per Cap Exp	-.0346	-.1806	.3988	-.0107	-.0503	.8097
Female Headship	.1828	.2065	.3265	.0681	.0692	.7360
Stone Index of Inflation	.0022	.0293	.4392	.0000	.0032	.9339
Rice Price	.3043	.0819	.0353	.4531	.1096	.0039
Sugar Price	-.1574	-.0693	.1093	-.2222	-.0879	.0372
Beans Price	-.0358	-.0200	.6122	-.0458	-.0230	.5496
Milk Price	-.0282	-.0158	.7843	-.1540	-.0777	.1682
Oil Price	-.4110	-.1113	.0059	-.2939	-.0715	.0694
Pasta Price	-.1836	-.0498	.4318	-.0294	-.0072	.9076
Plantain Price	-.0445	-.0371	.3978	-.0488	-.0386	.3923
Chicken Price	.2835	.0635	.1256	.1673	.0337	.4045
Beef Price	-.2871	-.1202	.0336	-.3432	-.1291	.0192
Yuca Price	-.0580	-.0413	.4785	.0118	.0075	.8946
Percent of Income from Home-Produced Food	.0047	.1253	.0004	.0024	.0572	.0986
Percent of Income from Farm Sales	.0017	.1002	.0219	.0001	.0494	.2464
Percent of Income from Transfers	-.0012	-.0647	.1369	-.0024	-.1150	.0067
Percent of Income from Wages	-.0000	-.0428	.4126	-.0010	-.0801	.1153
Other Urban	-.0000	-.0000	.9946	-.0295	-.0267	.5770
Frontier	-.1631	-.1269	.0693	-.2536	-.1773	.0093
Sugar Cane/Livestock	.1417	.1155	.0453	.0037	.0027	.9614
Other Rural	.0066	.0057	.9184	-.0948	-.0739	.1730
Household Size	.1044	.1242	.0048	.1062	.1135	.0109
Age of Self-Def Head	.0016	.0525	.0959	.0012	.0348	.2825
Highest Educ in HH	.0000	.0001	.9799	.0087	.0740	.0333
No. Ec. Active Members	-.0191	-.0611	.1502	-.0248	-.0713	.0821
Adult-Equivalent Ratio	-.4195	-.1094	.0013	-.7097	-.2440	.0000
Constant	3.5952	--	.0000	-.0560	--	.9314
R^2	.30992			.34404		
Adj R^2	.28721			.32246		
F	13.64959			15.94057		
Sig F	.0000			.0000		
N	880			880		

and F Works definitions in Quartile 1, are in fact due to the systematic differences in household composition, location, and income sources, and not to headship per se. This suggests either that headship by these earnings - related definitions does not imply greater control over decision making, or that greater decision-making power by women does not necessarily result in increased nutrient consumption.

4.2.3.4 Men's and Women's Earnings

Model 3 investigates the effect of men's and women's wage income on calorie and protein consumption. Neither the percent of income from men's wages nor the percent of income from women's wages shows a significant influence on calorie or protein consumption, after the effects of other factors are controlled (See Table). The coefficient of women's income in the protein equation, which might be considered marginally significant ($p = .07$), is in any case negative, thus failing to support the hypothesis that income earned by women is disproportionately devoted to food.

4.2.3.5 Effect of Headship on the Use of Income From Earnings and Transfers

The interaction of the female-headship dummy variables with proportion of income from earnings and transfers proved to be statistically insignificant for all definitions of headship and for both calories and protein.

TABLE 51
RESULTS OF ESTIMATION OF MODEL 3
FOR CALORIES AND PROTEIN

Indep Vars.	Dep. Var: Calories B	Beta	Sig T	Dep. Var: Protein B	Beta	Sig T
Per Cap Expend	1.2304	1.7974	.0000	1.2732	1.6869	.0000
Per Cap Expend Squared	-.0931	-1.2423	.0000	-.0926	-1.1199	.0000
Stone Index of Inflation	.0016	.0208	.5858	-.0000	-.0001	.9846
Rice Price	.2721	.0722	.0565	.4319	.1039	.0049
Sugar Price	-.1724	-.0742	.0720	-.2294	-.0896	.0258
Beans Price	-.0410	-.0226	.5494	-.0560	-.0280	.4463
Milk Price	.0099	.0054	.9216	-.1194	-.0592	.2703
Oil Price	-.3153	-.0861	.0304	-.1917	-.0475	.2205
Pasta Price	-.1405	-.0377	.5429	.0181	.0044	.9419
Plantain Price	-.0357	-.0291	.4851	-.0427	-.0316	.4371
Chicken Price	.1805	.0394	.3240	.0634	.0126	.7470
Beef Price	-.3323	-.1366	.0120	-.3667	-.1367	.0099
Yuca Price	-.0338	-.0236	.6764	.0314	.0199	.7179
Percent of Income from Home-Produced Food	.0055	.1428	.0000	.0030	.0717	.0302
Percent of Income from Farm Sales	.008	.101	.0151	.0011	.0546	.1770
Percent of Income from Transfers	-.0001	-.0396	.3368	-.0019	-.0877	.0292
Percent of Income from Men's Wages	-.0000	-.0107	.8341	-.0001	-.0445	.3678
Percent of Income from Women's Wages	-.0001	-.0318	.4115	-.0014	-.0680	.0717
Other Urban	-.0052	-.0051	.915[illegible]	-.0277	-.0248	.5942
Frontier	-.1567	-.1206	.078[illegible]	-.2465	-.1721	.0099
Sugar Cane/Livestock	.1549	.1261	.02[illegible]	.0024	.0018	.9742
Other Rural	.0225	.0188	.7207	-.0856	-.0649	.2064
Household Size	.1152	.1399	.0014	.1037	.1141	.0090
Age of Self-Def Head	.0018	.0594	.0485	.0017	.0501	.1041
Highest Educ in HH	-.0001	-.0071	.8384	.0074	.0628	.0658
No. Ec. Active Members	-.0089	-.0275	.4507	-.0157	-.0439	.2121
Adult-Equivalent Ratio	-.5638	-.1564	.0000	-.7514	-.2639	.0000
Constant	3.8385	--	.0000	.2066	--	.7360
R^2	.31811			.35225		
Adj R^2	.29796			.33311		
F	15.79205			18.40854		
Sig F	.0000			.0000		
N	942			942		

5. Nutritional Status of Children

Our interest in food consumption pattern and dietary adequacy stems from a concern about the welfare consequences of female headship. The underlying question is whether female headed households manage their resources differently, so that the same endowment results in different welfare outcomes for members.

In this study, data are available on the nutritional status of children under age six, as measured by anthropometric status: height for age and weight for height. These measures are commonly used to assess nutritional status in populations although it is widely recognized that dietary adequacy, morbidity, and genetic factors interact to produce a particular growth outcome. Nutritional status is a more direct measure of welfare than income or particular possessions, since it is culture-free and carries the same meaning for everyone. Height for age (HAZ) is generally considered an indicator of long-term nutritional adequacy. Weight for height (WHZ) is an indicator of short-term nutritional status; low WHZ scores indicate the child is excessively thin.

In this study, anthropometric measurements were taken about six months after the income, dietary intake, and household composition data were collected. We are assuming that dietary adequacy and economic and headship status reflect relatively long-term conditions, so that the relationship between headship and income at one time and nutritional status some months later will still be meaningful.

5.1 Comparisons of Nutritional Status in MHH and FHH

In fact, the results, shown in Table 52, are quite striking. Although

Table 52

Anthropometric Status of Children Aged Six and Under in a Male and Female-Headed Household (All Definitions)

Headship Definition	All Households			Quartile 1			Quartile 4	
	Male Head	Female Head	P	Male Head	Female Head	P	Male Head	Female Head
Self Defined								
Height/Age	-.97	-.98	.9715	-1.30	-1.29	.9402	-.49	-.91
Weight/Age	-.59	-.64	6228	-.99	-.84	.4295	-.01	-.51
Weight/Height	.06	-.02	.3752	-.21	-.02	.2099	.44	.07
Absent Male								
Height/Age	-1.01	-.81	.1337	-1.31	-1.26	.8049	-.56	-.58
Weight/Age	-.65	-.41	.0420	-1.03	-.67	.0731	-.09	-.14
Weight/Height	.02	.15	.1724	-.26	.18	.0062	.39	.31
Major Earner								
Height/Age	-1.00	-.88	.4414	-1.34	-1.04	.4064	-.61	-.49
Weight/Age	-.63	-.60	.8234	-1.00	-.68	.3053	-.10	-.03
Weight/Height	.04	-.04	.5251	-.19	.01	.4120	.40	.41
Major Income Contributor								
Height/Age	-.98	-.91	.7255	-1.36	-.52	.0802	-.58	-.42
Weight/Age	-.60	-.60	.9773	-.97	-.56	.3336	-.13	.24
Weight/Height	.05	-.01	.7361	-.15	-.26	.7420	.35	.70
F. Earns Wages								
Height/Age	-.96	-.99	.8458	-1.30	-1.29	.9499	-.59	-.51
Weight/Age	-.57	-.67	.3124	-.91	-1.04	.4950	-.22	.18
Weight/Height	.08	-.05	.0917	-.11	-.28	.2420	.24	.69
F. Works								
Height/Age	-.99	-.93	.5654	-1.27	-1.30	.8438	-.66	-.42
Weight/Age	-.60	-.61	.9573	-.88	-1.06	.3002	-.22	.07
Weight/Height	.06	.001	.4630	-.09	-.28	.1589	.29	.50

by several measures female-headed households obtain lower levels of calories and protein, and more of such households fall into high-risk categories of dietary adequacy, children in such households show achieved growth which is no worse, and in a few cases significantly better than their male-headed counterparts. In the one case (that of FHH by the Major Earner definition) where FHH consumed more calories and protein per adult equivalent, there is still no difference between MHH and FHH in the achieved growth of children. Recall, though, that Major Earner FHH were no less likely to fall into the high-risk adequacy category for calories or protein.

In Self-Defined FHH, where our measure of caloric and protein adequacy is significantly lower than in MHH, anthropometric status of children is no different by any measure, neither in the whole population nor in low-income households.[7] Similarly, in FHH defined by the reference woman working for wages or in any market work, calorie and protein adequacy are lower among low income households than in MHH, but the anthropometric status of children is no different.

In households with no adult male present, children actually appear to have superior nutritional status by some measures. In low-income households, children in Absent-Male FHH have significantly higher weight-for-height. This is similar to results reported in Johnson and Rogers (forthcoming). There we suggested that in the absence of adult males who may (for a number of possible reasons) command a higher proportion of the food resources of a household, food may be more equitably distributed among household members according to nutritional need. It is also possible that the higher proportion of animal food in the diets of FHH

may be related to the achievement of better growth outcomes for the absolute amounts of calories and protein consumed.

It does appear that differences in available calories and protein at the household level do not automatically result in comparable differences in the nutritional status of individual members. (Compare, for example, Garcia and Pinstrup-Andersen, 1990). The process of allocation among the individuals is, obviously, one factor which is critical to the outcome.[8] The fact that male and female-headed households achieved similar nutritional outcomes for their children in the face of somewhat different, usually lower levels of food availability suggests that the needs of children may be met in a variety of circumstances. Possibly the lower levels of available food in FHH (by F Works and F Earns Wages, for example) are disproportionately directed to children, compared with the larger quantities in MHH. Thus, these higher levels of household food consumption may be indicative of the household's priorities in meeting the somewhat larger perceived food needs of the male heads.

This discussion is, of course, entirely speculative. More detailed studies of whether the dynamics of intrahousehold food allocation differ in FHH and MHH would be needed to explore the question further.

5.2 Nutritional Status by Headship With Other Factors Controlled

As with food expenditure and food consumption, to understand how headship affects nutritional outcomes it is important to see whether the effects of headship can be explained by the various characteristics associated with MHH and FHH. Recall that, depending on the definition, FHH are smaller, with fewer young children and fewer adult males. There are

significant differences in the sources of household income and in the dependency ratio of MHH and FHH. All these are factors which might account for observed nutritional outcomes.

If headship proves insignificant in predicting nutritional outcomes once the characteristics associated with headship are controlled, we cannot assert that headship does not matter; an alternative interpretation is that headship may operate on nutritional status through these intervening variables.

5.2.1 Analytic Methods

Nutritional status was measured in terms of height for age (that is, age at the time of measurement, of course), and weight for height, expressed as standard scores. The age variable which appears in these equations is the age of the child at the time of the household interview. For this reason, a dummy variable for the age of highest risk of morbidity due to ingestion of dirty non-food items (about 9 months to 2 1/2 years) was computed using age 6 months to 2 years. This is a rough approximation, since the time between the household interviews and the child-level data collection was variable.

The analytic approach used here is to estimate a model to predict children's nutritional status, and then add to the model variables representing female headship, to see whether they represent a significant influence after controlling for other factors. The basic model to predict nutritional status is the following.

$$\left.\begin{matrix} HAZ \\ \\ WHZ \end{matrix}\right\} = \alpha + B_1\ LCALPA = B_2\ PROTDENS + B_3\ ILLNESS + B_4\ AGE + B_5\ HIRISK + B_6\ MOMED + B_7\ HHSIZE + B_8\ NKIDS + B_9\ CADEQRAT + \sum_i B_{10}\ STRATUM_i + E$$

Where

HAZ = Height for age (standard score)

WHZ = Weight for height (standard score)

LCALPA = Average daily calories per adult-equivalent consumed in the household

PROTDENS = Grams of protein per 100 calories consumed (household level). Protein density was used because protein consumed is so highly collinear with calories consumed.

ILLNESS = Total days of illness from diarrhea, fever, and/or respiratory infection in the 14 days prior to the child-specific interview.

AGE = Age of child in years

HIRISK = A dummy variable equal to 1 if the child was between 6 months and 2 years of age when the first (household) interview occurred. This variable is intended to account for the higher risk of illness and inadequate nutritional status during the period from nine months to a little over 2 years. This age poses special risks for two reasons. Breast milk ceases to be adequate to support child growth after about 6 months, but children this young need frequent feedings of supplementary food because of their small stomach capacity, and they may have less access to family food because they are less mobile and less able to compete. In terms of illness, this is the age at which children are able to move around and put things in their mouths, a high risk age for illness.

MOMED = Educational level of child's mother (years of formal education)

HHSIZE = Number of household members present full time in the household, a measure of food demand

NKIDS = Number of children under 6 in the household, a measure of demand for caretaker attention

CADEQRAT = The ratio of adult-equivalents to members. This is measure of relative caloric requirements. (While this variable is somewhat redundent with household size and number of children, a model which omitted this variable had a lower R^2 and F, and showed no lower condition number.)

$STRATUM_i$ = Dummy variables representing the sample regions other than Santo Domingo, as explained in Section 2

The headship model included all these variables, as well as a dummy variable representing headship by each definition, and an interaction term between headship and calories (INTFHCALS) to test whether calorie availability has a different effect on children's nutritional status in female and in male-headed households.

In addition, a model was estimated including the sex of the child, to see whether girls and boys have different nutritional outcomes in MHH or in FHH. Two models were tested. One included headship and sex as dummy variables, with KIDSEX set equal to 0 for male and 1 for female children. The second model also included an interaction term between headship and sex of the child. A significant positive coefficient for this interaction term would indicate that girls do better than boys in FHH, all else equal.

There is an econometric problem with the models as specified. It is well known that illness, in particular diarrheal illness, fevers, and respiratory infections, are associated with weight loss or with reduced velocity of weight gain. Typically, infection is one of the main precipitating factors which cause children to fall off their trajectory of growth. However, poorly nourished children are more prone to infections as well; the causality runs in both directions. Low nutritional status contributes to illness duration and prevalence as much as illness contributes to poor growth.

This creats an econometric problem of endogeneity. Endogeneity exists when there is a correlation between the error in the prediction of the dependent variable and the stochastic error in one of the independent variables. One way of dealing with this problem is to use two-stage least-squares estimation (2SLS). In the first stage, the endogenously-determined variable (illness in this case) is predicted; this predicted value of illness duration is used in place of the actual value in the second stage of the estimation. This can be viewed as the variable "purged" of the error which is causing the problem.

To test the endogenity, Hausman's test (Hausman, 1975) was performed for all three dependent variables using the basic model (that is, without any of the female headship variables), and this test showed a very significant problem of endogeneity with the illness duration variable in both equations. The two-stage least squares approach was therefore used.

The resulting variable, predicted illness, was included in all the equations for nutritional status in place of actual illness. The correlation between the predicted and the actual illness variable was .35, significant at $p<.0000$. However, the adjusted R^2 for the equation predicting illness was only .12, suggesting that significant variation in illness was not captured. It was decided to use the 2SLS estimates in any case. Where the results regarding female headship differ substantially between the 2SLS estimates and those of the ordinary least squares (OLS) equation using actual illness, this is noted. Equations using the actual illness variable gave a better fit and a higher R^2, as would be expected.

The model used to obtain the predicted illness variable is as follows

$$ILLNESS = \alpha + B_1 LCALPA + B_2 PROTDENS + B_3 AGE + B_4 HIRISK + B_5 MOMED + B_7 NKIDS + B_8 HHSIZE + B_9 CADEQRAT + B_{10} LNPCEXP + B_{11} LNPCEXP^2 + B_{12} STONENDX + B_{13} CLEANWAT + B_{14} MOMED + \sum_i B_{15_i} STRATUM_i + \sum_j B_{16_j} CARETAKER_j + e$$

where

CLEANWAT = a dummy variable set equal to 0 if the household's water source is unprotected, 1 if it is piped water (whether inside or outside the house)

CARETAKER = a set of dummy variables such that GRANANT = 1 if the child's principal caretaker is an aunt or grandmother; SISTER = 1 if the child's principal caretaker is a sister, and OTHRCARE = 1 if the principal caretaker is someone else other than the mother.

Income level (represented by expenditure) was included in the illness equation as a proxy for access to medical services (although stratum is probably an important factor as well). Income was not included in the nutritional status equations because it was felt the main effects of income would be through calories and protein. (A model for nutritional status which included income was tested, but the income variable was not significant and the adjusted R^2 was actually reduced.)

However, we did run each model separately for the bottom quartile only, to see whether some relationships are more important in poor households than in the general population.

5.2.2 Results of the Basic Model

Table 53 shows the results of the estimation of the model to predict duration of illness. A few points are worth noting, since predicted

TABLE 53
RESULTS OF THE ESTIMATION OF THE FIRST STAGE
PREDICTING DAYS OF ILLNESS IN PREVIOUS TWO WEEKS

Dep. Var: ILLNESS

	All			Quartile 1		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	-.7846	-.0523	.2371	-2.5044	-.1524	.0271*
PROTDENS	-1.7249	-.1350	.0026*	-1.9048	-.1412	.0384*
HHSIZE	-.3794	-.1619	.0013*	-.2186	-.0987	.1577
NKIDS	.4197	.0710	.1722	.2486	.0455	.5122
CADEQRAT	-6.5036	-.0681	.1337	-2.2170	-.0206	.7696
AGE	-.4285	-.1091	.0181*	-.5052	-.1272	.0584
HIRISK	-.5910	-.0427	.3462	-1.7740	-.1228	.0624
MOMED	.0083	.0056	.9083	.1227	.0638	.3501
CLEANWAT	.6537	.0501	.3067	-1.2435	-.1016	.2030
GRAN/AUNT	2.7116	.1146	.0039*	4.2256	.1881	.0016*
SISTER	.5135	.0146	.7128	.3310	.0104	.8590
OTHRCARE	-.4007	-.0130	.7471	-1.4376	-.0289	.6102
LNPCEXP	5.6479	.6134	.0253*	8.3976	.7004	.1979
$LNPCEXP^2$	-.7371	-.6401	.0182*	-1.1208	-.5756	.2878
STONENDX	-.1045	-.0985	.0198*	-.1432	-.1424	.0375*
Other Urban	-2.8953	-.1938	.0000*	-4.6544	-.2686	.0004*
Frontier	-2.9353	-.1981	.0004*	-5.8416	-.4289	.0000*
Sugar Cane/ Livestock	-2.5665	-.1345	.0056*	-6.0359	-.3795	.0000*
Other Rural	-3.9622	-.2463	.0000*	-6.1825	-.4153	.0000*
R^2	.1445			.2755		
Adj R^2	.1170			.2182		
F	5.25			4.80		
Sig F	.0000			.0000		
N	610			260		

illness is a significant determinant of nutritional status in the second stage of the model. Calorie availability is not significant in determining illness duration, but a higher protein density of the diet, controlling for calories, is very significantly associated with shorter illness duration. (Recall that, by several measures, the diets in FHH contain more animal protein sources than those of MHH.) Controlling for the number of children, household size shows negative association with illness duration, possibly because more adults are available to take care of the children. Also, children whose principal caretaker is an aunt or grandmother have significantly longer illnesses. FHH are very significantly more likely to have their children cared for by a grandmother or aunt, by all definitions except Major Earner. As children get older, they are ill less, but the high-risk period is not significantly associated with illness. In contrast to other studies, these data show no relation of water source, number of other children, or mother's education with illness, though the latter two show the expected relationships with nutritional status.

In the lowest expenditure quartile, most of the same relationships hold, but both calories available and protein density are significant in predicting shorter or no illness. In all these results, the region dummy variables are quite significant. There is less and shorter-duration illness in all regions compared with Santo Domingo.

Tables 54 and 55 show the results of the second stage estimation of nutritional status, first for the whole population and then for Quartile 1. Once again, this is presented as a basis for comparison with the models which introduce the headship variables.

A number of factors which distinguish MHH and FHH have a significant

TABLE 54
RESULTS OF THE ESTIMATION OF THE BASIC MODEL
PREDICTING HEIGHT-FOR-AGE, WEIGHT-FOR-AGE, AND WEIGHT-FOR-HEIGHT
(ALL HOUSEHOLDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.2554	.0854	.0457*	.0233	.0104	.8102
PROTDENS	.0735	.0289	.5474	-.0970	-.0507	.2992
ILLNESS	-.0285	-.0546	.4830	-.1217	-.3087	.0001*
HHSIZE	.0137	.0295	.5810	-.0330	-.0942	.0825
NKIDS	-.2212	-.1896	.0003*	-.0734	-.0839	.1175
CADEQRAT	-.5735	-.0306	.5275	-1.6272	-.1151	.0190*
AGE	-.0016	-.0021	.9678	-.0558	-.0948	.0740
HIRISK	.0094	.0034	.9412	-.2788	-.1345	.0043*
MOMED	.0454	.1529	.0010*	.0470	.3178	
Other Urban	-.0169	-.0057	.9244	-.3824	-.1711	.0052*
Frontier	-.1687	-.0568	.3696	-.4241	-.1908	.0031*
Sugar Cane/ Livestock	-.1928	.0508	.3666	-.5629	-.1978	.0006*
Other Rural	-.2706	-.0847	.2299	-.5492	-.2293	.0014*
R^2	.1045			.0668		
Adj R^2	.0850			.0465		
F	5.34			3.30		
Sig F	.0000			.0001		
N	609			614		

TABLE 55
RESULTS OF THE ESTIMATION OF THE BASIC MODEL
PREDICTING NUTRITIONAL STATUS (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.3138	.0940	.1331	-.1593	-.0667	.3049
PROTDENS	.0290	.0107	.8719	-.1936	-.0984	.1521
ILLNESS	-.1414	-.2674	.0386	-.1340	-.3489	.0080*
HHSIZE	-.0691	-.1537	.0581*	-.0263	-.0812	.3345
NKIDS	-.2685	-.2416	.0008*	-.1102	-.1375	.0645
CADEQRAT	-1.033	-.0491	.5148	-4.2454	-.2780	.0004*
AGE	-.0275	-.0341	.6637	.0202	.0346	.6708
HIRISK	-.1092	-.0614	.3759	-.1213	-.0575	.4241
MOMED	.0656	-.1688	.0183*	.0426	.1512	.0405*
Other Urban	-.6341	-.1833	.0575*	-.2554	-.1014	.3040
Frontier	-.7109	-.2551	.0295*	-.1328	-.0664	.5805
Sugar Cane/ Livestock	-.2243	-.0699	.5172	-.4388	-.1894	.0903
Other Rural	-1.0106	-.3341	.0131*	-.6733	-.3100	.0244*
R^2	.1834			.0979		
Adj R^2	.1400			.0508		
F	4.20			2.08		
Sig F	.0000			.0200		
N	257			263		

influence on measures of nutritional status. Household-level caloric availability is positively associated with HAZ. Calories are not significantly related to WHZ. This is not as odd as it seems, since the calorie measure used does not reflect the time immediately preceeding the measurement of WHZ. Illness in the 14 days prior to the nutritional status measurement has a significant negative effect on the measure of nutritional status involving weight. Protein density, not significant in any of the nutritional status equations, significantly reduces illness days, and so has an indirect effect on nutritional outcome. The total number of children six and under in the household, smaller in FHH by most definitions, is negatively associated with nutritional status (HAZ), as is the ratio of adult-equivalents to members, suggesting children may lose in the household competition for available nutrients.

Adding child's sex to the equations did not noticeably alter the observed relationships. Child's sex itself was not statistically significant in either the HAZ or the WHZ equations.

The region variables are all negative, and they are statistically significant in the WHZ equation. Although illness duration was significantly shorter outside the capital city, nutritional status appears to be lower, after controlling for illness and other factors. Introducing income as a control variable in an earlier model did not reduce the significance of the region dummies. These must be standing in for some other systematic differences not captured elsewhere in the model.

The relationships in Quartile 1 are not appreciably different from those in the population as a whole.

5.2.3 Effect of Headship

In none of the two-stage least squares models tested does the effect of headship on HAZ or WHZ prove to be significant, either in the whole population or in the lowest expenditure quartile. The addition of the headship variables to the model adds very little to the explanatory power of the equations, with the exception of the models using the Major Earner definition. In these models (for the whole population and for Quartile 1 only), the two headship variables approach statistical significance in the HAZ equation. Female headship is negative, while the interaction with calories is positive. The OLS regression using true illness duration rather than the predicted value found both Major Earner headship variables to be statistically significant at better than p = .05, with coefficients similar in direction and of the same or greater absolute magnitude as those reported here. Results of the estimations for each definition of headship, run on the whole sample and on quartile 1 households only, may be found in Tables 56-67.

As with the household-level models, though, interpretation of these results is quite ambiguous. The headship variable is strongly negative, while the interaction with calories is strongly positive. This suggests that FHH do allocate calories differently within the household, in such a way as to promote child growth. Female headship itself, though, shows a negative association with child growth, for which the allocation of calories compensates. Where only the headship dummy is entered, without the calorie interaction term, it is not statistically significant, presumably because it then incorporates both the apparent negative effect of female headship and the apparent positive effect of headship through the use of calories, which cancel each other out. Recall that total household

TABLE 56
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR SELF-DEFINED FHH AND MHH (ALL HOUSEHOULDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.3042	.1017	.0414*	.0780	.0348	.4909
PROTDENS	.0876	.0344	.4758	-.0975	-.0509	.3001
ILLNESS	-.0201	-.0385	.6246	-.1201	-.3045	.0001*
HHSIZE	.0178	.0383	.4773	-.0326	-.0933	.0887
NKIDS	-.2361	-.2024	.0002*	-.0700	-.0799	.1523
CADEQRAT	-.5896	-.0314	.5264	-1.5125	-.1069	.0337*
AGE	-.0016	-.0021	.9687	-.0558	-.0949	.0743
HIRISK	.0637	.0013	.9770	-.2805	-.1353	.0043
MOMED	.0451	.1518	.0011*	.0103	.0460	.3291
Other Urban	.0090	.0030	.9601	-.3816	-.1708	.0058*
Frontier	-.1455	-.0490	.4408	-.4174	-.1878	.0038*
Sugar Cane/ Livestock	.2232	.2152	.3002	-.5631	-.1979	.0007*
Other Rural	-.2401	-.0751	.2918	-.5536	-.2311	.0015*
Female Head	2.4095	.6997	.2929	1.660	.6413	.3442
INTFHCALS	-.3374	-.7308	.2678	-.2175	-.6265	.3511
R^2	= .1075			R^2	= .0682	
Adj R^2	= .0849			Adj R^2	= .0448	
F	= 4.76			F	= 2.918	
Sig F	= .0000			Sig F	= .0002	
N	= 609			N	= 614	

TABLE 57
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
BY SELF-DEFINED MHH AND FHH, (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.4539	.1360	.0737	-.2188	-.0916	.2422
PROTDENS	.0496	.0182	.7893	-.2206	-.1121	.1122
ILLNESS	-.1327	-.2509	.0591*	-.1443	-.3759	.0055*
HHSIZE	-.0673	-.1497	.0662	-.0283	-.0874	.3021
NKIDS	-.2701	-.2430	.0014	-.0986	-.1230	.1171
CADEQRAT	-.7478	-.0355	.6452	-4.3210	-.2829	.0004*
AGE	-.0260	-.0322	.6819	.0203	.0348	.6699
HIRISK	-.1897	-.0647	.3539	-.1077	-.0511	.4807
MOMED	.0638	.1642	.0223	.0439	.1561	.0353*
Other Urban	-.6102	-.1765	.0736	-.2940	-.1167	.2467
Frontier	-.6977	-.2503	.0356*	-.1610	-.0806	.5096
Sugar Cane/ Livestock	-.2151	-.0670	.5450	-.4754	-.2052	.0735
Other Rural	-.9961	-.3293	.0167*	-.7141	-.3287	.0195*
Female Head	3.6423	1.1348	.3027	-2.114	-.9125	.4253
INTFHCALS	-.4911	-1.1248	.3033	.2977	.9444	.4059
R^2	= .1870			R^2	= .1014	
Adj R^2	= .1364			Adj R^2	= .0469	
F	= 3.69			F	= 1.86	
Sig F	= .0000			Sig F	= .0278	
N	= 257			N	= 262	

TABLE 58
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR ABSENT-MALE FHH AND MHH (ALL HOUSEHOLDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.2939	.0983	.0430*	.0558	.0249	.6110
PROTDENS	.0650	.0255	.5964	-.1101	-.0575	.2399
ILLNESS	-.0318	-.0608	.4397	-.1289	-.3268	.0000*
HHSIZE	.0128	.0275	.6083	-.0356	-.1017	.0619
NKIDS	-.2089	-.1790	.0012*	-.0487	-.0556	.3181
CADEQRAT	-.3120	-.0166	.7452	-1.1879	-.0840	.1047
AGE	-.0031	-.0040	.9392	-.0388	-.0999	.0599
HIRISK	.0065	.0023	.9599	-.2816	-.1358	.0041*
MOMED	.0456	.1535	.0010	.0113	.0503	.2856
Other Urban	-.0395	-.0182	.8279	-.4274	-.1913	.0021*
Frontier	-.1770	-.0596	.3486	-.4428	-.1993	.0021*
Sugar Cane/ Livestock	.1648	.0435	.4461	-.6100	-.2144	.0002*
Other Rural	-.2985	-.0934	.1916	-.5988	-.2499	.0006*
Female Head	.7362	.1830	.7520	.0256	.0084	.9885
INTFHCALS	-.0785	-.1460	.791[illegible]	.0305	.0751	.8974
R^2	.1057			.0722		
Adj R^2	.0634			.0489		
F	4.671			3.10		
Sig F	.0000			.0001		
N	609			614		

TABLE 59
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR ABSENT MALE FHH AND MHH (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.3016	.0904	.2265	-.2475	-.1036	.1763
PROTDENS	.0039	.0014	.9829	-.2074	-.1054	.1280
ILLNESS	-.1592	-.3010	.0227*	-.1527	-.3978	.0029
HHSIZE	-.0747	-.1660	.0424	-.0325	-.1003	.2350
NKIDS	-.2239	-.2015	.0102	-.0643	-.0803	.3170
CADEQRAT	-.2095	-.0100	.9029	-3.4966	-.2289	.0064*
AGE	-.0315	-.0391	.6196	.0184	.0315	.6976
HIRISK	-.1870	-.0637	.3596	-.1191	-.0565	.4319
MOMED	.0689	.1773	.0141*	.0474	.1683	.0234*
Other Urban	-.7558	-.2185	.0298*	-.3896	-.1547	.1298
Frontier	-.7656	-.2747	.0205*	-.1702	-.0852	.4813
Sugar Cane/ Livestock	-.2964	-.0923	.3999	-.4950	-.2136	.0588*
Other Rural	-1.0939	-.3616	.0081*	-.7436	-.3423	.0136*
Female Head	-1.5169	-.4386	.6755	-3.6145	-1.4353	.1816
INTFHCALS	.2468	.5265	.6151	.5258	1.5407	.1515
R^2	.1891			.1122		
Adj R^2	.1386			.0583		
F	3.75			2.08		
Sig F	.0000			.0114		
N	257			262		

TABLE 60
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR MAJOR EARNER FHH AND MHH (ALL HOUSEHOLDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.0692	.0206	.6835	-.0352	-.0151	.7717
PROTDENS	-.0750	-.0267	.6316	-.1113	-.0536	.3494
ILLNESS	-.0881	-.1700	.0734	-.1086	-.2818	.0038*
HHSIZE	.0166	.0352	.5453	-.0235	-.0672	.2615
NKIDS	-.2702	-.2342	.0001*	-.1144	-.1344	.0258*
CADEQRAT	-1.7671	-.0929	.0897	-1.7653	-.1247	.0265*
AGE	-.0181	-.0228	.0001*	-.0386	-.0653	.2736
HIRISK	.0223	.0079	.8766	-.3298	-.1579	.0027*
MOMED	.0486	.1647	.0012*	.0123	.0563	.2797
Other Urban	-.1943	-.0228	.6954	-.3668	-.1700	.0190*
Frontier	-.2206	-.0693	.3090	-.4272	-.1812	.0098*
Sugar Cane/ Livestock	.2055	.0540	.4054	-.4017	-.1429	.0335*
Other Rural	-.6309	-.1782	.0226*	-.6300	-.2420	.0026*
Female Head	-5.2453	-1.3254	.0882[a]	-1.6764	-.5696	.4742[a]
INTFHCALS	.6815	1.3132	.0910[a]	.2343	.6070	.4454[a]
R^2	.1306			.0787		
Adj R^2	.1034			.0501		
F	4.81			2.75		
Sig F	.0000			.0004		
N	496			499		

[a] Significant in model using true illness value rather than predicted.

TABLE 61
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
MAJOR EARNER FHH AND MHH (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	-.0128	-.0037	.9626	-.3192	-.1322	.1209
PROTDENS	-.1308	-.0430	.6187	-.0448	-.0214	.8203
ILLNESS	-.2646	-.5004	.0040*	-.0836	-.2272	.2198
HHSIZE	-.0993	-.2217	.0150*	.0001	.0016	.9869
NKIDS	-.2692	-.2486	.0017*	-.1222	-.1637	.0555*
CADEQRAT	-2.2974	-.1092	.2251	-4.2333	.2885	.0035*
AGE	-.0676	-.0815	.3531	.0441	.0766	.4219
HIRISK	-.1336	-.0441	.5568	-.1400	-.0664	.4182
MOMED	.0759	.1961	.0098*	.0327	.1218	.1410
Other Urban	-.9720	-.2926	.0150*	-.0929	-.0402	.7556
Frontier	-.9289	-.3088	.0151	-.0929	-.0447	.7442
Sugar Cane/ Livestock	-.3527	-.1084	.4229	-.0782	-.0349	.8138
Other Rural	-1.6954	-.5159	.0014*	-.5387	-.2403	.1636
Female Head[b]	-7.8489	-2.0678	.0871	-3.3925	-1.2830	.3276
INTFHCALS	1.0504	2.0814	.0856	.4623	1.3150	.3166
R^2	.2692			.1091		
Adj R^2	.2102			.0387		
F	4.57			1.55		
Sig F	.0000			.0913		
N	202			206		

[b] Model using actual illness variable not run separately on low-income households

TABLE 62
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR FEMALE EARNS WAGES FHH AND MHH (ALL HOUSEHOLDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.1941	.0650	.1829	-.0072	-.0032	.9481
PROTDENS	.0912	.0359	.4622	-.0874	-.0456	.3571
ILLNESS	-.0262	-.0501	.5259	-.1169	-.2964	.0002*
HHSIZE	.0153	.0329	.5427	-.0303	-.0865	.1155
NKIDS	-.2238	-.1918	.0003	-.0776	-.2242	.0019*
CADEQRAT	-.6377	-.0340	.4840	-1.6522	-.1168	.0177*
AGE	-.0001	-.0012	.9814	-.0524	-.0891	.0958
HIRISK	.0119	.0043	.9262	-.2770	-.1336	.0048*
MOMED	.0442	.1489	.0017*	.0123	.0548	.2558
Other Urban	-.0150	-.0051	.9334	-.3655	-.1636	.0082*
Frontier	-.1672	-.0563	.3745	-.4196	-.1888	.0035*
Sugar Cane/ Livestock	.2015	.0532	.3469	-.5533	-.1944	.0009*
Other Rural	-.2649	-.0829	.2416	-.5371	-.2242	.0019*
Female Head	-1.8591	-.6967	.2685	-.8462	-.4208	.5919
INTFHCALS	.2472	.7101	.3577	.1015	.3871	.6209
R^2	.1060			.0681		
Adj R^2	.0834			.0448		
F	4.69			2.91		
Sig F	.0000			.0002		
N	609			614		

[a] Significant in model using actual rather than predicted illness.

TABLE 63
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR FEMALE EARNS FHH AND MHH (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.4024	.1206	..106	-.1329	-.0556	.4750
PROTDENS	-.0057	-.0021	.9756	-.1827	-.0928	.1884
ILLNESS	-.1509	-.2853	.0307*	-.1269	-.3306	.0136*
HHSIZE	-.0747	-.1660	.0439*	-.0258	-.0796	.3560
NKIDS	-.2620	-.2358	.0012*	-.1104	-.1378	.0664
CADEQRAT	-.9616	-.0457	.5470	-4.2091	-.2756	.0004*
AGE	-.0326	-.0405	.6088	.0227	.0389	.6357
HIRISK	-.1950	-.0665	.3432	-.1311	-.0622	.3923
MOMED	.0630	.1623	.0253*	.0464	.1648	.0277*
Other Urban	-.6486	-.1875	.0535*	-.2343	-.0930	.3472
Frontier	-.7308	-.2622	.0264*	-.1093	-.0547	.6510
Sugar Cane/ Livestock	-.2524	-.0756	.4700	-.4308	-.1859	.0984
Other Rural	-1.0403	-.3438	.0113*	-.6603	-.3040	.0282*
Female Head[b]	2.1288	.7800	.5260	.6841	.3478	.7851
INTFHCALS	-.2726	-.7503	.5402	-.1121	-.4279	.7363
R^2	.1893			.1042		
Adj R^2	.1346			.0500		
F	3.65			1.916		
Sig F	.0000			.0222		
N	237			263		

[b] Model using actual rather than predicted illness not run separately on low-income households.

TABLE 64
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR MAJOR INCOME CONTRIBUTOR MHH AND FHH (ALL HOUSEHOLDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.1714	.0370	.2002	-.0149	-.0066	.8853
PROTDENS	.0806	.0322	.5150	-.1076	-.0568	.2580
ILLNESS	-.0386	-.0756	.3542	-.1312	-.3380	.0000*
HHSIZE	.0166	.0360	.5099	-.0342	-.0976	.0774
NKIDS	-.2290	-.1972	.0004	-.0584	-.0663	.2348
CADEQRAT	-.8631	-.0458	.3628	-1.7070	-.1194	.0189*
AGE	-.0045	-.0058	.9147	-.0496	-.0842	.1151
HIRISK	.0227	.0083	.8623	-.2782	-.1349	.0059*
MOMED	.0498	.1545	.0015*	.0127	.0564	.2532
Other Urban	-.0312	-.0108	.8646	-.4212	-.1922	.0028*
Frontier	-.1960	-.0672	.3089	-.4597	-.2092	.0019*
Sugar Cane/ Livestock	.1557	.0380	.4932	-.4904	-.1573	.0052*
Other Rural	-.2443	-.0759	.2975	-.5706	-.2350	.0015*
Female Head	-.4113	-.0629	.9365	-4.4388	-.8870	.2649
INTFHCALS	-.0127	-.0148	.9849	.5842	.8945	.2611
R^2	.1002			.0696		
Adj R^2	.0760			.0447		
F	4.13			2.79		
Sig F	.0000			.0003		
N	572			576		

TABLE 65
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR INCOME EARNERS MHH AND FHH (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.0903	.0278	.6752	-.2644	-.1114	.1045
PROTDENS	-.0174	-.0067	.9235	-.1963	-.1024	.1531
ILLNESS	-.1691	-.3373	.0148	-.1438	-.3881	.0055*
HHSIZE	-.0623	-.1454	.0893	-.0278	-.0883	.3168
NKIDS	-.2465	-.2289	.0033*	-.0898	-.1129	.1557
CADEQRAT	-1.6158	-.0787	.3279	-3.8887	-.2568	.0081*
AGE	-.0049	-.0063	.9391	.0296	.0516	.5433
HIRISK	-.1284	-.0454	.5309	-.1372	-.0664	.3759
MOMED	.0612	.1613	.0349*	.0449	.1605	.0409*
Other Urban	-.7322	-.2224	.0297*	-.2645	-.1085	.2964
Frontier	-.8081	-.3026	.0148*	-.1278	-.0656	.6047
Sugar Cane/ Livestock	-.3604	-.1058	.3054	-.2801	-.1111	.2920
Other Rural	-1.1367	-.3866	.0061*	-.6547	-.3052	.0329*
Female Head	-13.0855	-1.5564	.1262	-8.0583	-1.2923	.2184
INTFHCALS	1.7715	1.5996	.1169	1.0680	1.3001	.2166
R^2	.1813			.1065		
Adj R^2	.1257			.0472		
F	3.2624			1.79		
Sig F	.0001			.0364		
N	237			242		

TABLE 66
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FOR FEMALE WORKS FHH AND MHH (ALL HOUSEHOLDS)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.1975	.0649	.2100	-.0433	-.0191	.7162
PROTDENS	.0545	.0214	.6033	-.0770	-.0403	.4178
ILLNESS	-.0335	-.0643	.4189	-.1237	-.3151	.0001*
HHSIZE	.0140	.0301	.5945	-.0319	-.0917	.1084
NKIDS	.2412	.2078	.0002*	-.0776	-.0893	.1143
CADEQRAT	-1.4016	-.0682	.1802	-1.8378	-.1189	.0203*
AGE	.0648	.0061	.9082	-.0634	-.1082	.0442
HIRISK	.0378	.0137	.7729	-.2803	-.1349	.0050*
MOMED	.0408	.1361	.0046*	.0142	.0629	.1957
Other Urban	-.0737	-.0248	.6880	-.3933	-.1754	.0049*
Frontier	-.2000	-.0676	.2934	-.4349	-.1968	.0026*
Sugar Cane/ Livestock	.2049	.0537	.3439	-.5930	-.2073	.0003*
Other Rural	-.3134	-.0972	.1732	-.5818	-.2412	.0009*
Female Head	-1.5006	-.5884	.4488	-1.7439	-.9108	.2433
INTFHCALS	.2034	.6142	.4291	.2192	.8811	.2589
R^2	.1057			.0762		
Adj R^2	.0823			.0523		
F	4.52			3.19		
Sig F	.0000			.0000		
N	590			595		

TABLE 67
RESULTS OF THE ESTIMATION OF THE HEADSHIP MODEL
FEMALE WORKS FHH AND MHH (QUARTILE 1 ONLY)

Dep. Vars:	HAZ			WHZ		
Indep. Vars:	B	Beta	Sig T	B	Beta	Sig T
LCALPA	.4274	.1272	.1192	-.2369	-.0986	.2448
PROTDENS	.0235	.0087	.8982	-.1539	-.0787	.2644
ILLNESS	-.1453	-.2755	.0350	-.1272	-.3326	.0126*
HHSIZE	-.0775	-.1731	.0400*	-.0231	-.0717	.4139
NKIDS	-.2595	-.2338	.0022*	-.1111	-.1390	.0776
CADEQRAT	-.7792	-.0340	.6678	-3.9496	-.2383	.0035*
AGE	-.0280	-.0348	.6618	.0179	.0307	.7104
HIRISK	-.2351	-.0799	.2545	-.1392	-.0659	.3679
MOMED	.06 3	.1657	.0226*	.0456	.1625	.0316
Other Urban	-.7146	-.2030	.0360*	-.2171	-.0848	.3928
Frontier	-.7398	-.2661	.0252*	-.1243	-.0624	.6105
Sugar Cane/ Livestock	-.2055	.06371	.5565	-.4418	-.1900	.0923
Other Rural	-1.0498	-.3481	.0105*	-.6512	-.3011	.0312*
Female Head	2.2355	.8771	.4753	-1.5878	-.8658	.4900
INTFHCALS	-.2926	-.8662	.4807	.1865	.7663	.5467
R^2	.1920			.0977		
Adj R^2	.1408			.0420		
F	3,75			1.75		
Sig F	.0000			.0421		
N	243			259		

calories per adult equivalent were generally lower in FHH, and that household calories do significantly affect nutritional outcome. The fact that the interaction term of Major Earner headship with calories is positive once again points to the need to investigate the dynamic patterns of intrahousehold allocation of food to understand why and how various definitions of headship do (or do not) affect nutritional outcomes for children.

The overall explanatory power of these regressions is not great. Of course, much of the variation in children's size is due to factors not included in this model, including stochastic variation, individual metabolism, actitvity levels, genetics, health status beyond the 14-day retrospective measure, and, of course, individual food consumption (not measured in this study). More work could be done to refine this model using the present data set, but more informative results might be obtained from studies explicitly designed to investigate intrahousehold dynamics by looking at individual behavior. Further, the dynamics by which households become female headed, or shift from one headship status to another would be worth investigating to see whether over time there is greater economic vulnerability in FHH.

6. Summary

Based on this description of the characteristics of female-headed households, several conclusions may be drawn. First, the factors which cause a household to identify itself as female-headed include those explored in this paper: the absence of adult males in the household, and the active economic contribution of female household members. Nonetheless, none of these characteristics perfectly defines female-headship as reported

by the survey respondents themselves.

Female-headed households are smaller than others; self-defined FHH are disproportionately urban, but this is not consistently true of all the definitions tested here. Female heads tend to be older than male heads, but households in which the reference woman makes an economic contribution tend to have younger heads. Households with no adult male have self-defined household heads fully ten years older than those with males present.

Female-headed households are evenly distributed among per-capita expenditure classes; they are no more likely to be poor (by this criterion) than other households. This is the case even considering only households containing children. However, by most of the definitions we consider in this paper, female-headed households are far more dependent on gifts and transfers from persons outside the household, and far less reliant on their own wage-earning capacity than are male-headed households. Reliance on transfers may possibly translate into greater economic vulnerability over time, but these cross-sectional data do not permit an assessment of this hypothesis.

By all the definitions tested here, female-headed households do not devote more of their resources to food, nor to other basic needs, than do male-headed households. In fact where differences between FHH and MHH do esist, the higher proportion of spending on food is in MHH. Further, FHH obtain somewhat lower quantities on protein and calories per peso of food expenditure than do MHH. Consumption of food in FHH includes (in some definitions) higher proportions of relative "luxury" foods such as meat and poultry, and somewhat lower proportions of the cheaper bulky staples such

as rice, beans, and starchy roots and plantain. This higher proportion of animal foods may be nutritionally benefical.

Calorie and protein adequacy (measured at the household level but adjusted for the age/sex composition of the household) is lower in FHH than in MHH, where significant differences exist.

In spite of this, anthropometric data on children aged six and under in the sample households suggest that these children grow no worse than children in MHH (by all definitions). Patterns of intrahousehold allocation of food within the household, which were not measured in this study, may account for the fact that in both MHH and FHH, children achieve comparable nutritional status as measured by anthropometry, despite systematic differences in the availability of calories and protein at the household level. The only exception to this is in the case of Absent Male FHH, where children achieved significantly higher anthropometric status than in MHH by some measures.

In multivariate analysis, a number of factors associated with female headship were found to affect food expenditure, food consumption, and children's nutritional status. The proportion of household income from transfers is positively associated with food expenditure, but negatively associated with protein consumption. Proportion of income from home-produced food and from farm sales is negatively associated with food expenditure, but positively associated with calorie and protein consumption.

Headship information adds little explanatory power to these equations, even though headship variables are significant in a few cases. The results provide some support for the hypothesis that the process of allocation of

food is different in FHH. Among Self-Defined FHH, household composition variables do not affect calorie and protein consumption, while in MHH, both size and adult-equivalent ratio are significant.

The data do not support the conclusion that FHH have a higher preference for spending on food or for food consumption. The expenditure elasticity of demand for food is higher among FHH only by the Major Income Contributor definition. By all other definitions, the expenditure elasticity of demand for food (measured by expenditure) and for calories and protein is no different, or is lower in FHH.

Headship information adds little to the ability to explain variations in nutritional status. This result is noteworthy, because there are significant differences between MHH and FHH in food availability at the household level. The results suggest that, controlling for calories and for protein density, headship does not significantly affect nutritional status of children. These results are not affected by the sex of the child.

6.1 Generalizability

These data contradict some widely held assumptions about the economic vulnerability of female-headed households, and about the presumed higher preference for food expenditure and food consumption in such households. However, they are consistent with other studies in the region (eg., Horton and Miller, n.d., for Jamaica). These data clearly demonstrate the importance of considering the implications of female headship separately in each particular cultural and geographic setting. The Dominican Republic is a "middle-income" poor country, and even in the lowest income groups, consumption patterns are not those of absolute or ultra-poverty, such as

one sees in the Sahel, for example. Also, the Dominican Republic experienced a period of relative economic prosperity within recent memory. Proportional expenditure on food, a reliable general indicator of welfare, has risen from an average of 39% in 1976-77 to 59% in this survey, indicating a significant drop in the standard of living (Rogers and Swindale, 1988). It is reasonable to expect that people's current consumption patterns (such as the relatively high proportion of calorie consumption from animal foods) reflect habits and preferences dating from that period.

Another relevant characteristic of the Dominican Republic is that in general it is a society in which women's status is relatively good (compared, for example, with the poor countries of Asia such as Bangladesh). Women's labor force participation is common and is not negatively viewed. Women and men have similar levels of literacy and similar access to education, and women are not secluded or constrained from participation in the wider social and economic world. Perhaps therefore it should not be too surprising that there appear to be few if any marked differences in behavior between male and female-headed households.

6.2 Policy Significance

It appears that female household headship in the Dominican Republic is not a discriminator of economically vulnerable households. As a group, FHH do not disproportionately fall into the lower income groups, although they may face different constraints and opportunities because of their smaller size, distinct household composition, and different locations. However, this study has demonstrated that the interpretation of female headship and

its consequences depends on the specific type or definition of FHH being considered, and that the dynamics of food allocation within these different types of households may well differ.

In these analyses we have controlled for those factors known to vary systematically by headship, in order to determine whether headship has an independent effect on food consumption and nutritional status beyond that attributable to household composition, demographic factors, food consumption, and so on. From a policy perspective, however, it may be more important to know that FHH have certain characteristics which affect diet and nutrition than to know whether it is female headship itself or those characteristics associated with headship which produce the outcomes.

Nonetheless, these data do not provide strong support for the notion that female-headed households as a group behave very differently from male-headed households, whether by Self-Defined, Absent Male, or earnings-related definitions. Policies to affect dietary adequacy and nutritional and other welfare outcomes need to take into account the particular constraints of different kinds of households: those with fewer members, proportionally more workers, different age structures, and different levels of access to resources -- all factors we have shown to differ significantly between MHH and FHH. Headship alone does not appear to be a useful basis for program design.

Footnotes

1. The survey was conducted by the Tufts University School of Nutrition under a cooperative agreement with the Office of Nutrition, U.S. Agency for International Development, (Grant #DAN-1275-A-00-4085-00) for the purpose of investigating the consumption effects of price and income changes. A complete description of the survey methods may be found in Rogers and Swindale, 1988.

2. Food consumption was measured by successive 24 and 48-hour recalls covering seven consecutive days. Quantities were estimated volumetrically using food models. Local measures and household containers were converted to standard weights. Calorie and protein content of food was estimated from available food tables (USDA, 1975 a,b; INN, 1983; SESPAS, 1984). Edible portion information was obtained from the tables or calculated directly from measurements of a sample of the foods.

3. Household members were assigned to one of 14 age/sex categories. For each category, the protein and calorie needs were calculated as a fraction of the needs of an adult male weighing 45 kg, of moderate activity, based on FAO/WHO recommendations (FAO, 1985).

4. The survey was conducted by F. Cate Johnson of the Tufts University School of Nutrition with funding from the Office of Health, Population and Nutrition, USAID Mission to the Dominican Republic, Santo Domingo. A complete description of the methods may be found in Johnson, 1987.

5. Height and weight for age and weight for height were converted to standard scores representing deviations from the median of the NCHS standards (WHO 1983).

6. It was common for women in the Dominican Republic to engage in very small business enterprises such as selling ice cubes, or buying a large bottle of shampoo and selling it in individual portions.

7. These results differ slightly from those reported in Johnson and Rogers, forthcoming, on the same topic. One reason is that for the present study we have limited our sample to those children (about two thirds of those in Johnson & Rogers) who were part of the original survey. More important, in this study case weights were adjusted so that households with more children were down-weighted, since the sample was originally designed to be representative of households, not of individual members. Nonetheless, the results reported here, particularly regarding Self-Defined and Absent Male FHH, are fully consistent with those in Johnson and Rogers.

8. This is in no way meant to suggest that dietary adequacy is not a good indicator of nutritional risk, if more direct measures are not available. Individual measures, if available, are clearly better, though.

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