CALORIE INTAKE IN FEMALE-HEADED AND MALE-HEADED HOUSEHOLDS IN VIETNAM

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ABSTRACT:

In analyzing food consumption patterns it is important to have full knowledge of who allocates household resources. In that regard the gender of the head of the household is of significance. Female-headed households (FHH) have become an important unit of analysis. It is generally argued that FHH are poorer than MHH, and that poverty in FHH is often difficult to eliminate. The motivation of this paper is to investigate differences in consumption behaviors of FHH and MHH, in Vietnam, assuming that the locus of decision-making rests on the individual identified as the head of the household. Data from the Vietnamese Living Standards Survey (VLSS) are used. Calorie shares are estimated using instrumental variable (IV) regression. The results from the study confirm the general finding that FHH possess economic characteristics that are significantly different from those of MHH. The MHH in Vietnam tend to have larger families compared to FHH. The results also show difference in calorie intake and food poverty between FHH and MHH, in Vietnam. FHH in Vietnam pay slightly higher calorie prices compared to MHH. The results show that incomes in FHH and MHH lead to significantly different expenditure in Vietnam.

INTRODUCTION

The household is an important unit for economic analysis and modeling of production and consumption decision-making. In policy planning for improving nutrition and the targeting poverty in developing countries, the household represents the smallest social and economic unit of analysis of dietary intake and calorie distribution. It is recognized, however, that within a household, there are intra-household dynamics that arise from how the head of the household allocates resources and makes investment and consumption decisions. The rules used for allocating resources are not always clearly understood and may not always protect the most vulnerable household members. These rules for allocating resources depend on the gender of head of the household, her/his level of attachment to household members, as well as the relationships among members of the household. The different roles assumed by males and/or females in household headship affect intra-household food allocation and the bargaining power within the household.

Household headship is an important research problem because there are often discrepancies between what is being measured and how the concept of headship is operationalized. For example, in some socioeconomic household surveys, the term FHH have been used as a proxy for missing gender breakdowns. The research interest in household headship arises because of the perceived economic and social difference between FHH and MHH (Lvffler, 1999). FHH have become of concern because of the evidence of a high incidence of poverty (Gornick, 2004) and food insecurity observed in these households, and the difficulty in eliminating poverty in FHH. FHH have thus become a focus of economic and social policy both in developing and developed countries (Gornick, 2004). In analyzing food consumption patterns it is important to have full knowledge of who controls household resources, and recognize that relations with households are culture-specific and are constructed by society on the basis of gender, kinship and the relationship to the head of the household. In this paper households headed by females are referred to a female-headed households (FHH) and households headed by males and referred to as male-headed households (MHH). The locus of decision-making in FHH and MHH is examined by looking at the budget shares and calorie shares. The head in FHH and MHH is assumed to have perfect knowledge of the common set of preference for their respective households. A Beckerian household is therefore assumed. It is noteworthy that the definition of head of household used in this study does not require that a spouse be absent. This is certainly is the difference between the definitions of household headship used in this paper and those suggested by Northop (1990), among others. Of significance in this paper is that FHH are compared directly to MHH as opposed to simply comparing FHH to other-headed households (OHH).

A few research question regarding FHH and MHH emerge. These research questions include the following: Do households FHH have different calorie intake compared to MHH? What is the evidence on differences in the level of undernourishment in MHH and FHH? Are FHH more calorie-poor than MHH? What are the key determinants of budget shares and calorie shares in FHH and MHH? These research questions are addressing through examining the status of nutrition and poverty in FHH and MHH, using the Vietnamese Living Standards Survey (VLSS). It is of interest, therefore, to examine the key determinants of calorie shares in FHH and compare the results with those obtained from MHH. The objective of the study is therefore to analyze patterns of calorie intake in FHH and MHH. Although the literature often cites poverty as increasingly becoming a feminine problem (Peterson, 1987; Pressman, 1988; Buvinic and Gupta, 1997; Arias and Palloni, 1999; Wood, 2000), the evidence is rather inconclusive (Lvffler, 1999). This study is of significance because it provides additional evidence by comparing food poverty in MHH to that in FHH. Understanding calorie shares in FHH and MHH can in no doubt be enhanced by embedding theoretical models of household formation and decision-making. Evidence shows that FHH and MHH tend to have different expenditure patterns (Northop, 1990; Buvinic and Gupta, 1997; Arias and Palloni, 1999; Wood, 2000; Maitra and Ray, 2003; Gornick, 2004). It is reasonable, therefore, to ask the question whether similar results are obtainable in the case of another transition economy such as Vietnam. Understanding the dynamics of allocation resources and responsibilities within households in Vietnam is important for increasing the likelihood of success of any food security programs, within the context of either the unitary or non-unitary model of household decision-making.

LITERATURE REVIEW

In the context of this paper a household is defined as a group of people who live together, share a common source of food, reside within well-defined and observable locations, and function according to

family rules that are defined within culturally-specific socioeconomic boundaries. In the literature, the household head is defined as that person (i) in authority and is responsible for controlling, running, managing and maintaining the household, (ii) who provides the main financial support for the household's economy, and/or (iii) is nominated as the head of the household. The nomination can be self-nomination or as defined or perceived by other members of the households, but generally involves identifying that person that provides most effort and commitment on behalf of the household. Most other definitions of household headship are nested within any of the three definitions given above. Whichever definition is chosen, it is important to make sure that the identified head of household has (i) a hierarchical relationship with household members, (ii) regular presence in the home, and (iii) over-riding authority in important household matters. The analysis of decision-making in the household can therefore be looked at from any of these theoretical models of household decision-making: the Beckerian model, bargaining model and the collective (pluralistic) choice models. The general recommendation is that, in choosing a household definition and/or a theoretical model for household decision-making, neither definition nor model should dominate in developing countries because the cultural aspects of household expenditure.

The literature on gendered household headship certainly shows that FHH have become an important phenomenon world-wide (Barros, Fox and Mendonca, 1997; Arias and Palloni, 1999; Lvffler, 1999; Gornick, 2004; Anding, Osborne and Gorman, 2006). FHH have been an important unit of analysis in the literature and the results suggests that FHH are at an economic disadvantage (Peterson, 1987; Pressman, 1988; Rosenhouse, 1989; Buvinic and Gupta, 1997), and are more likely to be in poverty than MHH (Barros, Fox and Mendonca, 1997; Wood, 2000). It is suggested that the high incidence of poverty and food insecurity in FHH is primarily because: these households have lower earnings, or a lower number of earners per capita than MHH; and, the larger number of children in FHH tend to increase the probability of being poor Barros, Fox and Mendonca, 1997; Wood, 2000; Snyder and McLaughlin, 2004). In general, females are more likely than are males to spend income for the immediate food and health needs of their household members. Therefore, FHH tend to have a positive influence on the relative nutritional status of children than MHH. The difference in food expenditure patterns of FHH and MHH depend on cultural gender roles, biological attachment to household members, and economic hardship faced by the household. It is of interest to know, therefore, what set of characteristics of the household head matter when it comes to nutrition choices, dietary choice and household decision-making. It is clear that the concept of gendered household headship is central within the unitary and non-unitary models of household decision-making behavior. It is in that context that the analysis of calorie intake in FHH and MHH is undertaken. It is critical therefore to examine the type of consumption patterns that from results from FHH and MHH.

METHODOLOGY

The determinants of the overall calorie intake are identified by regressing logarithm of per capita calorie intake (log_pcci) on selected explanatory variables, using a multivariate ordinary least squares (OLS) regression model. The set of explanatory variables used includes: regional, rural and ethnic dummies. The household variables included are the education of head of household, the number of children and the number of adults, the logarithm of per capita food expenditure (log_pcfe), and headship (M_Head: 0-FHH & 1: MHH). The determinants of calorie intake for each of the eleven food classes are identified using instrumental variable (IV) regressions model. In this model observed calorie shares of all the food classes

are regressed on regional, ethnic and other demographic variables; and, instrumented by including other variables that represent different sources of income or spending power. A household headship dummy variable (M_Head) is incorporated into the IV regressions and used to distinguish the effects of gendered headship on IV regressions coefficients. Data from the 2002 Vietnamese Living Standards Survey (VLSS) are used. Household calorie intake from rice, wheat, other cereals, vegetables, fruits, meat, fish, dairy products, alcohol, eating out and the consumption of other products, is calculated and used in the multivariate OLS and IV regression models for calorie intake and calorie shares. The set of variables that appear in the estimation are:

log_pcci	Logarithm of per capita calorie intake
log_pcfe	Logarithm of per capita food expenditure
Redriver	Red River Delta (geographical region of Vietnam)
Northeast	North East Vietnam (geographical region of Vietnam)
Northwest	North West Vietnam (geographical region of Vietnam)
Northcentral	North Central Vietnam (geographical region of Vietnam)
Southcentral	South Central Vietnam (geographical region of Vietnam)
centralhigh	Central Highlands Vietnam (geographical region of Vietnam)
southeast	South East Vietnam (geographical region of Vietnam)
Kinh	Ethnic dummy (0=otherwise; 1=Kinh)
Tay	Ethnic dummy (0=otherwise; 1=Tay)
Chinese	Ethnic dummy (0=otherwise; 1=Chinese)
Khmer	Ethnic dummy (0=otherwise; 1=Khmer)
Muong	Ethnic dummy (0=otherwise; 1=Muong)
Nung	Ethnic dummy (0=otherwise; 1=Nung)
Rural	Ethnic dummy (0=urban; 1=rural)
Na	Number of adults in household
Nc	Number of children in household
hh_educ	Education of head of household
M_Head	Type of Household headship (0=FHH; 1=MHH)
_cons	Constant

These key variables used in regressions may be of particular interest to researchers and policy makers concerned with gendered caloric intake, include ethnicity, rural residence, family composition and education. These selected household characteristics are also included in the regressions equations that describe calorie shares in Vietnam.

RESULTS

The results in Table 1 show that household size in MHH is generally higher than that in FHH. In terms of calories, FHH have lower mean calorie intake than MHH, and tend to pay higher calorie prices that those paid by MHH. The general statistics also show that 47% of the population of FHH is widowed, and 38.89% are married. This is significant in terms of the generalized definition often provided for FHH. General per capita consumption of food items does not vary considerably between FHH and MHH in urban regions, except for alcohol consumption. A similar result is observed for households in rural areas. The big difference, though, is in the contrast in per capita consumption between urban and rural households. FHH in rural areas have larger values of per capita consumption compared to urban FHH. The same result is observed for MHH. The results in Table 2 show clearly that in the case of rice

consumption, urban FHH consume lower quantities than MHH. Rural FHH also consume less rice than their rural counterparts, even though rural FHH enjoy larger per capita consumption of rice than urban FHH. The results for the calorie shares for selected food classes: rice, meat, alcohol, and other consumption, are reported in Table 3. Calories from eating out are also included in Table 3. Results in Table 3 show significant differences in FHH and MHH rice calorie shares in the South East and North West. FHH calorie shares of alcohol are lower than those of MHH in the North East, South Central and South East. Calorie shares for eating out are larger in the Red River Delta, South Central and South East. Of particular interest is that FHH seem to enjoy higher calorie intake from eating out in all three urban regions.

Results for rural regions are reported in Table 4. The results show very little variation and difference in calorie shares for rice, except in the North West, where differences in calorie intake between FHH and MHH are observed across all selected food classes. FHH in the North West have larger calorie intake from meat, other consumption and eating out. The calorie intake from all food classes can be used as indicator of calorie-poverty. Households whose per capita daily calorie intake is less that 2100kCal are considered calorie-poor. The results reported in Table 5 show that more FHH than MHH are calorie-poor in rural regions of Vietnam, with the exception of the North East and Central Highlands regions. The proportion of FHH that are calorie poor in comparison to MHH is more pronounced in urban areas. In all but three regions (Red River Delta, North East and South East) calorie-poverty is higher in FHH than in MHH.

The results reported in Tables 3 through 5 give a view of regional differences in calorie intake and calorie-poverty. The picture of calorie intake in all Vietnam, including the budget the budget share as that support the observed levels of calorie intake, is portrayed in Table 6. The results in Table 6 show that all households have larger budget and calorie shares for rice. The budget shares in FHH are lower than those in MHH only for rice and alcohol. Clearly, at a national level, the calorie differences between FHH and MHH do not seen quite pronounced. A shown earlier in Tables 3 through 5, the calorie differences are discernible at regional and urban/rural levels. What then are the key determinants of calorie intake in FHH and MHH? Simple multivariate OLS regression results are reported in Table 7. The results show significant regional, ethnic and rural dummies for the FHH and MHH calorie equation. These findings support earlier results (Tables 3 through 6). The coefficient of log_pcfe suggest that calorie intake in FHH is likely to be more responsive to changes in income than calorie intake in MHH. The diagnostics reported are encouraging.

It is noteworthy that the results reported in Table 7 do not consider calorie intake for each of the eleven food classes. In addition, likely endogeneity may result from using per capita food expenditure in explaining calorie intake. Results for instrumental variable (IV) regression, reported in Tables 8a through 8d imbed all eleven food classes and also address the issue of endogeneity. Results reported in Table 8a through 8d show a significant negative coefficient of log_pcfe for rice and fish, and a positive significant coefficient of log_pcfe for all other food classes except vegetables. The dummy variable, M_Head [0: FHH, 1: MHH] is statistically significant for the following calorie share equations: rice, other cereals, alcohol and per capita calorie intake. The results suggests that calorie intake in MHH is statistically higher than that observed in FHH. The dummy variable M_Head is negative and significant for fruit, meat, dairy products, eating out and other food items. This suggests that FHH are more likely to boost calorie intake from these food classes. The dummy variable for gendered household headship (M_Head) is insignificant in explaining vegetable and fish calorie intake.

DISCUSSION AND CONCLUSION

The dynamics of allocating food in households are fairly complex and have a large bearing on poverty reduction strategies. Incorporating household headship in calorie analyses is important for the understanding of intra-household allocation of resources, and the design of nutrition and poverty alleviation policies. Policy makers can benefit immensely from an understanding of the link between intra-household resource distribution and gendered household headship. The results reported in this paper confirm that the differences in calorie intake between FHH and MHH. The FHH are more likely to be calorie-poor than MHH. The set of variables that explain these differences in calorie intake include variables such as family size, rural residence, ethnicity and per capita food expenditure. The results highlight the importance of looking at differences in calorie poverty in FHH and MHH across all regions of Vietnam. Given the definition of FHH and MHH used in this study, it clear the policy implications of be extended further by looking at the relative income contributions of males and females within the FHH and MHH household. An understanding of income pooling and expenditure bargaining within households would certainly enrich the analysis and interpretation presented in this paper.

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Table 1: Statistics for Female-Headed and Male-Headed Households in 2002[1]

	FHH		MHH
Sample size	6974		22555
Mean Number of children	1.82		2.44
	(1.33)		(1.47)
Mean Number of adults	1.90		2.28
	(1.05)		(0.79)
Mean log per capita total expenditure	8.4378		8.2744
	(0.6716)		(0.5829)
Mean log per capita food expenditure	7.7068		7.6206
	(0.5172)		(0.4407)
Mean log per capita calorie intake	7.8447		7.9300
	(0.3513)		(0.3021)
Mean calorie price	0.0030		0.00238
	(0.0077)		(0.0025)
Proportion choosing full FGP Groups	45.03		37.90
Proportion Below food poverty line	17.22		17.67
Proportion Below general poverty line	8.12		9.08
Proportion Without children	17.18		7.92
Proportion Widowed	47.00		3.25
Proportion Married	39.89		94.91
Proportion Never married	5.49		1.23

Notes:

1. The numbers in parentheses are standard errors

Table 2: Household per capita consumption (kg/month) in 2002

		FHH		MHH
	Urban	Rural	Urban	Rural
Rice	13.83	17.49	14.97	19.39
Wheat	0.87	0.42	0.69	0.38
Other Cereals	0.97	0.86	0.96	1.14
Vegetables	4.26	4.42	4.31	4.57
Fruit	1.69	1.30	1.62	1.23
Meat	2.58	1.68	2.54	1.70
Fish	1.89	1.88	1.94	1.72
Dairy	0.51	0.25	0.47	0.22
Alcohol	0.33	0.36	0.56	0.72
Other Consumption[1]	7.96	5.30	7.64	5.86

Notes:

1. Does not include eating out. Direct quantities of eating out are generally inaccurate

Table 3: Selected Calorie Shares (%) in FHH and MHH in Urban Vietnam in 2002

Residence	Head	Rice	Meat	Alcohol	Other	EatOut
Red River Delta	**FHH**	57.58	7.68	1.14	11.70	18.12
	MHH	59.01	7.67	1.90	10.40	17.18
North East	**FHH**	64.67	7.80	1.75	11.99	9.91
	MHH	65.49	7.90	2.88	10.83	8.90
North West	**FHH**	66.99	7.80	3.23	11.29	7.56
	MHH	69.95	7.37	3.78	9.54	6.91
North Central	**FHH**	68.16	5.39	1.44	8.35	11.39
	MHH	68.47	5.33	1.82	9.15	10.45
South Central	**FHH**	60.66	5.37	0.73	9.40	18.23
	MHH	61.87	5.19	1.21	8.95	17.08
Central Highlands	**FHH**	66.93	5.59	1.40	8.94	12.77
	MHH	66.68	5.58	2.14	8.75	12.24
South East	**FHH**	49.95	7.01	0.76	12.79	24.71
	MHH	53.23	6.71	1.27	12.60	21.52
Mekong River Delta	**FHH**	63.15	6.54	1.18	9.59	14.97
	MHH	65.13	5.99	1.84	8.58	14.07

Table 4: Selected Calorie Shares (%) in FHH and MHH in Rural Vietnam in 2002

	Head	Rice	Meat	Alcohol	Other	EatOut
Red River Delta	**FHH**	75.39	5.12	0.93	8.01	7.12
	MHH	76.09	4.79	1.93	6.79	7.29
North East	**FHH**	77.02	5.49	1.45	7.22	5.24
	MHH	77.09	4.63	2.63	5.28	2.61
North West	**FHH**	76.97	4.65	2.54	5.70	2.46
	MHH	78.26	3.45	4.35	3.56	1.25
North Central	**FHH**	79.66	3.65	1.04	6.42	4.50
	MHH	79.78	3.55	2.23	5.50	3.94
South Central	**FHH**	74.02	3.18	0.76	5.60	11.84
	MHH	74.07	3.15	1.76	5.10	10.73
Central Highlands	**FHH**	79.73	2.96	2.10	5.86	3.01
	MHH	79.38	3.06	3.11	4.63	2.53
South East	**FHH**	71.23	4.04	1.56	8.66	9.85
	MHH	73.43	3.82	2.18	7.76	7.86
Mekong River Delta	**FHH**	73.14	4.73	1.51	7.99	7.59
	MHH	74.70	4.06	2.56	7.02	6.99

Table 5: Proportion (%) of Calorie-Poor FHH and MHH in 2002

	FHH		MHH	
REGION OF VIETNAM	**Urban**	**Rural**	**Urban**	**Rural**
Red River Delta	4.28	30.96	4.61	20.34
North East	2.57	20.16	2.50	18.72
North West	5.77	28.77	2.54	34.55
North Central	14.86	38.96	10.36	32.06
South Central	5.68	29.52	3.68	26.60
Central Highlands	11.24	32.83	7.04	33.40
South East	4.14	14.23	4.52	11.99
Mekong River Delta	4.39	13.34	3.66	11.90

Table 6: Budget Shares and Calorie Shares in FHH and MHH in Vietnam in 2002

	FHH		MHH	
	Budget Share	**Calorie Share**	**Budget Share**	**Calorie Share**
Rice	29.54	69.48	34.42	73.48
Wheat	1.00	0.68	0.88	0.49
Other Cereals	2.11	1.01	2.42	1.74
Vegetables	6.17	0.64	6.03	0.99
Fruit	3.49	0.11	3.00	0.09
Meat	19.92	5.29	19.54	4.56
Fish	10.37	0.98	9.55	0.83
Dairy	2.45	1.10	1.89	0.94
Alcohol	0.97	1.22	1.90	2.29
Other	12.56	8.70	12.26	6.91
Eating Out	11.42	10.79	8.11	7.66

Table 7: Determinants of Calorie in Female-Headed and Male-Headed Households

	Female Headed Households			Male Headed Households		
	coef	**t-ratio**	**sig**	**Coef**	**t-ratio**	**sig**
redriver	0.02360	1.87	**	0.08167	14.16	*
northeast	0.12019	7.73	*	0.10907	15.72	*
northwest	0.09390	2.91	*	0.02830	2.46	**
northcentral	0.03412	2.15	**	0.04286	6.35	*
southcentral	-0.05073	-3.46	*	-0.03669	-5.10	*
centralhigh	0.00815	0.4		0.01190	1.34	
southeast	-0.14617	-11.32	*	-0.12119	-18.22	*
Kinh	-0.09914	-3.49	*	-0.07806	-9.50	*
Tay	-0.07857	-1.94	***	-0.02059	-1.70	
chinese	-0.17782	-3.41	*	-0.15524	-6.82	*
Khmer	-0.00270	-0.06		-0.05019	-2.82	*
Muong	-0.00313	-0.06		0.04291	2.76	*
Nung	-0.05729	-1.03		-0.04089	-2.61	*
Rural	0.19857	20.65	*	0.20015	39.49	*
Na	0.24871	65.09	*	0.18935	83.46	*
Nc	0.27291	90.37	*	0.20446	165.43	*
HH_educ	-0.00004	-0.02		-0.01606	-12.68	*
log_pcfe	0.43780	46.64	*	0.41824	88.35	*
_cons	10.23229	128.36	*	10.72254	273.54	*
Observations		6968			22549	
F-ratio		1004.75			2616.86	
Prob > F		0.00			0.00	
R-squared		0.72			0.68	
Adj R-squared		0.72			0.68	
Root MSE		0.32			0.26	

Notes:

* significant at the 1 percent level
** significant at the 5 percent level
*** significant at the 10 percent level

Table 8a: IV Regressions of Calorie Share and Intake in FHH and MHH in 2002

	rice			wheat			other cereals		
	Coef.	**z**	**sig**	**Coef.**	**z**	**sig**	**Coef.**	**z**	**sig**
log_pcfe	-0.1625	-10.20	*	0.0067	3.20	*	0.0240	3.39	*
redriver	-0.0044	-1.08		-0.0014	-2.67	*	0.0077	4.21	*
northeast	0.0165	4.24	*	-0.0028	-5.45	*	0.0255	14.68	*
northwest	0.0469	8.47	*	-0.0029	-3.98	*	-0.0292	-11.85	*
northcentral	0.0188	3.20	*	0.0003	0.43		0.0096	3.68	*
southcentral	-0.0216	-5.34	*	0.0012	2.30	**	0.0050	2.80	*
centralhigh	0.0370	7.31	*	-0.0004	-0.57		-0.0017	-0.77	
southeast	-0.0292	-10.11	*	0.0017	4.38	*	0.0011	0.82	
Kinh	0.0941	21.79	*	0.0011	1.94		-0.0913	-47.50	*
Tay	0.1059	19.30	*	0.0000	0.02		-0.0887	-36.32	*
chinese	0.0817	7.64	*	0.0014	0.97		-0.0954	-20.07	*
Khmer	0.1199	16.16	*	0.0004	0.45		-0.0896	-27.12	*
Muong	0.0882	12.52	*	0.0011	1.21		-0.0557	-17.79	*
Nung	0.0877	12.14	*	0.0004	0.40		-0.0647	-20.15	*
Rural	0.0604	10.27	*	-0.0025	-3.19	*	0.0109	4.17	*
Na	-0.0033	-3.31	*	0.0006	4.44	*	0.0020	4.46	*
Nc	0.0127	22.91	*	-0.0001	-1.29		0.0001	0.38	
HH_educ	-0.0054	-4.35	*	0.0000	0.16		-0.0031	-5.65	*
M_Head	0.0121	6.59	*	-0.0007	-2.78	*	0.0020	2.46	**
_cons	1.8070	14.43	*	-0.0450	-2.74	*	-0.0991	-1.78	***
Observations		29517			29517			29517	
F – ratio		585.97			69.00			254.78	
Prob > F		0.00	*		0.00	*		0.00	*
Centered R^2		0.43			0.06			0.12	
Uncentered R^2		0.97			0.14			0.18	
Root MSE		0.13			0.02			0.06	
Anderson LR		428.47			428.47			428.47	
X^2 p-value		0.00	*		0.00	*		0.00	*
Sargan statistic		79.57			17.65			265.32	
X^2 p-value		0.00	*		0.00	*		0.00	*

Notes:

* significant at the 1 percent level
** significant at the 5 percent level
*** significant at the 10 percent level

Table 8b: IV Regressions of Calorie Share and Intake in FHH and MHH in 2002

	Vegetables			fruit			Meat		
	Coef.	**z**	**sig**	**Coef.**	**z**	**sig**	**Coef.**	**z**	**sig**
log_pcfe	0.0020	0.56		0.0009	2.89	*	0.0366	9.54	*
Redriver	0.0019	2.10	**	0.0002	2.50	**	0.0085	8.70	*
northeast	-0.0020	-2.31	**	0.0002	2.04	**	0.0110	11.75	*
northwest	0.0222	17.98	*	0.0000	-0.35		0.0089	6.68	*
northcentral	0.0114	8.76	*	0.0001	1.00		0.0010	0.71	
southcentral	0.0046	5.16	*	0.0001	1.34		-0.0064	-6.59	*
centralhigh	-0.0025	-2.19	**	0.0002	2.13	**	0.0006	0.49	
southeast	-0.0015	-2.40	**	0.0000	-0.15		-0.0044	-6.34	*
Kinh	-0.0372	-38.76	*	0.0002	1.91	***	0.0041	3.91	*
Tay	-0.0287	-23.51	*	0.0001	0.95		0.0050	3.81	*
Chinese	-0.0371	-15.61	*	0.0002	0.90		0.0046	1.78	***
Khmer	-0.0350	-21.21	*	0.0000	0.14		0.0009	0.52	
Muong	-0.0435	-27.79	*	0.0004	2.94	*	-0.0014	-0.81	
Nung	-0.0323	-20.10	*	0.0000	0.00		0.0082	4.74	*
Rural	0.0037	2.79	*	0.0001	1.20		-0.0051	-3.58	*
Na	0.0010	4.43	*	-0.0001	-4.24	*	0.0002	0.89	
Nc	0.0002	1.68		-0.0002	-15.49	*	-0.0040	-29.87	*
HH_educ	-0.0009	-3.36	*	-0.0001	-2.30	**	0.0016	5.33	*
M_Head	0.0002	0.41		-0.0001	-2.99	*	-0.0024	-5.31	*
_cons	0.0221	0.79		-0.0059	-2.29	**	-0.2268	-7.53	*
Observations		29517			29517			29517	
F – ratio		271.74			29.67			411.96	
Prob > F		0.00	*		0.00	*		0.00	*
Centered R^2		0.15			0.001			0.31	
Uncentered R^2		0.22			0.12			0.74	
Root MSE		0.03			0.003			0.03	
Anderson LR		428.47			428.47			428.47	
X^2 p-value		0.00	*		0.00	*		0.00	*
Sargan statistic		4.36			9.526			39.90	
X^2 p-value		0.36			0.05	**		0.00	*

Notes:

* significant at the 1 percent level
** significant at the 5 percent level
*** significant at the 10 percent level

Table 8c: IV Regressions of Calorie Share and Intake in FHH and MHH in 2002

	Fish			dairy products			alcohol		
	Coef.	z	sig	Coef.	Z	sig	Coef.	z	sig
log_pcfe	-0.0025	-1.94	***	0.0106	6.97	*	0.0092	2.60	*
redriver	-0.0126	-38.43	*	-0.0003	-0.79		-0.0030	-3.31	*
northeast	-0.0127	-40.48	*	0.0014	3.71	*	0.0018	2.09	**
northwest	-0.0120	-27.11	*	0.0006	1.13		0.0146	11.90	*
northcentral	-0.0096	-20.47	*	0.0015	2.65	*	0.0005	0.38	
southcentral	-0.0050	-15.36	*	0.0024	6.30	*	-0.0060	-6.75	*
centralhigh	-0.0107	-26.37	*	0.0024	5.02	*	0.0038	3.34	*
southeast	-0.0052	-22.57	*	0.0000	-0.13		-0.0054	-8.43	*
Kinh	0.0036	10.41	*	0.0014	3.38	*	-0.0118	-12.33	*
Tay	0.0016	3.57	*	0.0017	3.15	*	-0.0072	-5.93	*
chinese	0.0022	2.55	**	0.0010	1.02		-0.0162	-6.85	*
Khmer	0.0016	2.61	*	0.0013	1.87	***	-0.0052	-3.14	*
Muong	0.0010	1.83	***	0.0007	1.09		-0.0079	-5.03	*
Nung	0.0009	1.52		0.0010	1.52		-0.0036	-2.24	**
Rural	-0.0017	-3.64	*	0.0026	4.61	*	0.0055	4.18	*
Na	-0.0005	-6.02	*	-0.0001	-1.39		-0.0002	-1.07	
Nc	-0.0002	-4.46	*	-0.0010	-18.03	*	-0.0012	-10.16	*
HH_educ	0.0001	0.93		0.0000	-0.28		-0.0009	-3.45	*
M_Head	0.0000	-0.25		-0.0004	-2.36	**	0.0102	25.01	*
_cons	0.0349	3.48	*	-0.0725	-6.06	*	-0.0455	-1.64	
Observations		29517			29517			29517	
F – ratio		397.49			71.63			112.82	
Prob > F		0.00	*		0.00	*		0.00	*
Centered R^2		0.19			0.02			0.07	
Uncentered R^2		0.49			0.41			0.38	
Root MSE		0.01			0.01			0.03	
Anderson LR		428.47			428.47			428.47	
X^2 p-value		0.00	*		0.00	*		0.00	*
Sargan statistic		7.25			4.33			45.51	
X^2 p-value		0.12			0.36			0.00	*

Notes:

* significant at the 1 percent level
** significant at the 5 percent level
*** significant at the 10 percent level

Table 8d: IV Regressions of Calorie Share and Intake in FHH and MHH in 2002

	eating out			other food items			per capita calorie intake		
	Coef.	z	sig	Coef.	Z	sig	Coef.	z	sig
log_pcfe	0.0317	2.24	**	0.0432	6.31	*	0.3787	10.51	*
redriver	0.0018	0.50		0.0016	0.90		0.0552	5.98	*
northeast	-0.0409	-11.82	*	0.0019	1.15		0.1022	11.57	*
northwest	-0.0464	-9.45	*	-0.0026	-1.09		0.0225	1.79	***
northcentral	-0.0312	-6.00	*	-0.0024	-0.96		0.0207	1.56	
southcentral	0.0357	9.98	*	-0.0101	-5.85	*	-0.0512	-5.61	*
centralhigh	-0.0293	-6.52	*	0.0005	0.24		0.0048	0.41	
southeast	0.0314	12.25	*	0.0117	9.47	*	-0.1248	-19.08	*
Kinh	0.0209	5.46	*	0.0150	8.07	*	-0.0594	-6.08	*
Tay	0.0063	1.30		0.0040	1.71		-0.0172	-1.39	
chinese	0.0432	4.56	*	0.0146	3.18	*	-0.1327	-5.49	*
Khmer	-0.0152	-2.31	**	0.0207	6.51	*	-0.0179	-1.06	
Muong	0.0143	2.29	**	0.0027	0.90		0.0454	2.85	*
Nung	0.0059	0.92		-0.0035	-1.12		-0.0292	-1.79	***
Rural	-0.0615	-11.80	*	-0.0124	-4.91	*	0.1762	13.23	*
Na	0.0035	3.94	*	-0.0030	-7.01	*	0.2114	94.32	*
Nc	0.0018	3.74	*	-0.0082	-34.39	*	0.2198	175.71	*
HH_educ	0.0071	6.52	*	0.0016	3.02	*	-0.0075	-2.67	*
M_Head	-0.0163	-9.97	*	-0.0047	-5.91	*	0.1009	24.22	*
_cons	-0.1345	-1.21		-0.2348	-4.37	*	10.8359	38.25	*
Observations		29517			29517			29517	
F – ratio		353.36			363.54			3167.24	
Prob > F		0.00	*		0.00	*		0.00	*
Centered R^2		0.23			0.22			0.70	
Uncentered R^2		0.47			0.68			1.00	
Root MSE		0.11			0.05			0.28	
Anderson LR		428.47			428.47			428.47	
X^2 p-value		0.00	*		0.00	*		0.00	*
Sargan statistic		83.32			51.95			136.46	
X^2 p-value		0.00	*		0.00	*		0.00	*

Notes:

* significant at the 1 percent level
** significant at the 5 percent level
*** significant at the 10 percent level