Gender differences in the adequacy of poverty-targeted food assistance programs

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Abstract

In this study, we assess the degree to which a food voucher program for refugees in Lebanon adequately meets the nutritional needs of female- and male-headed households. In a natural experiment in which some households received an unconditional cash transfer in addition to a food voucher, we analyze spending on food, food consumption, and food coping behaviors that results from the additional cash. The food voucher program increases food purchases, consumption, and dietary diversity, and reduces food coping strategies. Households who receive the additional cash transfer continue spending more on food and continue to increase food consumption. These latter effects are concentrated in female-headed households, indicating that the food voucher benefit level fell short either in providing for these families' nutritional needs or in meeting their food consumption preferences despite the fact that they were assessed as equally impoverished by a proxy means test used to target the program. These results imply that social assistance programs concerned with addressing a specific type of deprivation could take into account differences in the incidence of that deprivation when setting benefit levels.

1 Introduction

Social welfare programs are often designed to identify the needy and provide resources to address household shortfalls in meeting basic needs. In addition to targeting recipients, one of the major design elements of such programs is the amount needed to meaningfully alleviate deprivations. In recent decades, unconditional cash transfers (UCTs) and value voucher programs have become increasingly popular in the humanitarian field to alleviate poverty in vulnerable populations (MacPherson and Sterck 2021). Many scaled programs rely on both uniformly applied definitions of poverty and static per household or per person benefit amounts. While this approach has substantial logistical benefits in program administration, it can overlook baseline structural differences across needy populations in either their assessment of need or the benefit they receive.

Across many contexts, women feel the sting of poverty far more than men, and the gap is widening. In 2021, 31.9 percent of women in the world were moderately or severely food insecure compared to 27.6 percent of men – a difference of over 4 percentage points, an increase from 3 percentage points in 2020 and 1.7 percentage points in 2019 (FAO and WHO 2022). In an ideal world, social assistance programs intended to address food insecurity would reflect such structural differences. However, the relationship between the gender of the household head and vulnerability are less clear, especially in refugee contexts. This paper investigates whether a proxy means-tested food value voucher program for Syrian refugees in Lebanon adequately covers households' food needs for both male- and female-headed households. This question intends to understand whether single poverty thresholds and uniform benefit levels are enough to overcome structural differences in the experience of poverty. To do this, we exploit a feature of a large-scale social assistance program in which households that were already eligible for a per capita food voucher were subject to quasi-random assignment of an additional UCT program. We use a regression discontinuity design to determine whether the additional unrestricted cash was allocated disproportionately or differentially to additional food purchases across female- and male-headed households. This provides a test of the degree to which the assessment of need and the uniform per capita food value voucher transfer is adequate across household headship types. That is, if a significant increase in food purchases is seen after receipt of the additional cash program, it would suggest that the food vouchers benefit level is not meeting the nutritional needs of beneficiary households.

We find that female-headed households spend more on food after the additional cash transfer while male-led households see no significant change in their monthly food expenditure. Furthermore, the expenditure that does increase for male-led households after the additional cash transfer are generally for calorie-rich food groups such as meats or for inessential items such as spices and sugar. Female-headed households, on the other hand, use their additional cash to purchase bulk items such as pulses, despite both groups having received the voucher transfer. This suggests that women-led households are not having their nutritional needs met by the food voucher program, and are having to spend a significant

amount of their cash transfer on additional food.

1.1 Gender, Poverty, and Food Insecurity

Our study contributes to a literature highlighting women's and children's vulnerability to food insecurity (de Groot et al. 2017). In the context of Syrian refugees, Hanmer et al. (2020) examines the gender disparities among refugees in Jordan to find that assistance from the United Nations High Commission on Refugees (UNHCR) and the World Food Programme (WFP) reduces poverty although the extent to which assistance reduces poverty rates varies across household types resulting in a gender-poverty gap that disadvantages female-headed households. Grimaccia and Naccarato (2022) found that in a European sample, certain factors such as the number of children in a vulnerable household impact female-headed households more than they would a comparable male-led household.

Kassie et al. (2014) and Broussard (2019) both found that not all of the gender disparities in food security can be explained by observable factors. This suggests that a completely quantitative proxy-means test (such as the one used to determine aid eligibility in the Lebanese case, described below) may not necessarily account for the disparity in such a way that female-headed households receive enough additional aid to eliminate it. Other papers, such as Calvi et al. (2023), show intra-household inequality in the incidence of poverty, finding that refugee children are up to three times more likely to be impoverished than adults. Intra-household inequalities such as these are evidence that a refugee's demographic qualities such as age and gender can have a meaningful effect on the incidence of poverty regardless of their household composition.

Armand et al. (2021) examine the effects of a gender-targeted conditional cash transfer program in North Macedonia. The authors compared expenditure shares between households living in municipalities randomized to different payment modalities and found that targeting mothers had a significant effect on the share of total expenditure allocated to food (increasing by 4-5%). Notably, observed differences in budget shares are not driven by impacts on overall household expenditure statistics, which could suggest that looking at expenditure shares might produce different results in this study. However, other papers, such as Bauchet et al. (2021) examining the pediatric nutritional impacts of a gender-targeted program in the Bolivian Amazon, finds no evidence of heterogeneity in program impacts. The authors suggest that considering cultural context is imperative for determining whether a gender-targeted method is most effective.

1.2 Humanitarian Programs

This paper also relates to the evaluation of cash and food programs in humanitarian contexts. Existing literature on voucher-based transfers suggests a positive impact on food security and consumption, decreasing out-of-pocket spending for food while increasing overall food expenditure. Hidrobo et al. (2014)

found in the context of northern Ecuador that while both cash-based assistance and vouchers increased food consumption significantly, voucher programs in particular lead to higher levels of dietary diversity and caloric intake.

Salti et al. (2022) use a similar regression discontinuity design to this paper to examine the effects of WFP's cash-based assistance program among Syrian refugees in Lebanon to find that multipurpose cash improves total household expenditures for all treatment groups. Altındağ and O'Connell (2023) also found that the Lebanese cash transfer improved household consumption, food security, and reduced the frequency of harmful coping strategies in the short-term.

In relation to food, Burchi et al. (2018) showed that while cash transfers increase availability of food for vulnerable populations in Sub-Saharan Africa, the lack of supplemental nutritional information meant that dietary diversity did not see substantial increases. These findings are corroborated by other papers such as Hoddinott et al. (2018), which found that households in Niger receiving in-kind transfers saw marked increases in dietary diversity compared to households that received cash assistance. Brugh et al. (2018) and Miller et al. (2011) also found that the cash transfer program in Malawi increased food consumption and dietary diversity variables for beneficiary households. Systematic reviews such as Doocy and Tappis (2017) found that unconditional cash transfers led to greater improvements in dietary diversity and quality than food transfers. These findings combined with the previous studies on voucher programs could suggest that the food voucher and cash transfer programs working in tandem in Lebanon could provide very positive results in increasing both consumption and dietary quality.

With inspiration from Hanmer et al. (2020), who suggests that "unless gender disadvantage is considered in the design of development policies to replace humanitarian assistance, the poverty reduction gains it achieves will not be sustained," our paper seeks to examine this gender-poverty gap in the context of a multi-modal environment and through the lens of nutritional outcomes. Our results suggest that when designing future welfare programs interested in alleviating a specific dimension of poverty (in this case, food insecurity and nutritional intake), it would be best to take into account structural differences in the incidence of that dimension when allocating benefits.

2   Context and Data

The civil war in Syria has led to one of the most severe refugee crises in modern history, with more than 5.5 million Syrians forced to flee the country and another 6.9 million internally displaced (UNHCR 2023b). One of the most popular destinations for displaced Syrians has been neighboring Lebanon, in which 1.5 million Syrian refugees are estimated to have fled. An estimated 90% of Syrian refugee households live in extreme poverty (UNHCR 2023a). Furthermore, data compiled by the UNHCR and the Lebanese government shows that about 50% of Syrian refugee households are food-insecure (UNHCR 2019).

Since early in the Syrian refugee crisis, WFP and the UNHCR have implemented a multiple modality

social assistance system for refugees in Lebanon. The major components of this system consist of a food value voucher program and unconditional cash transfers. For the period we study, the multipurpose cash assistance program provides a flat rate of $175 USD per month to recipient households, while the food value voucher program is administered using an electronic card that contains a value voucher for basic needs items with a value of $27 USD per household member per month. These values are substantial: average total monthly expenditure per capita in our analysis sample is approximately $70. For the median household size of five, the food voucher program therefore provides almost 40 percent of monthly counterfactual expenditure, and the cash program value being is worth approximately 50% of monthly expenditure levels of a similar household of five. The two programs are targeted across households according to the same proxy means test (PMT), which predicts an expenditure-based poverty score for every refugee household known to UNHCR. Eligibility for each program is assigned starting with the least poor and continuing until program resources are exhausted, creating the sharp discontinuities in assistance eligiblity with which we study program impacts. Eligibility for one program does not affect eligibility for the other per se. The food voucher program reaches approximately 40% of the population in the years we study, while the UCT program reached approximately 20% of the population. The assignment rules and coverage rates therefore imply that all recipients of the UCT are also receiving the food voucher, while this is not the case vice versa. The transfers are directed to the principal applicant/head of household on the case record.

In other contexts, both of these modalities have been shown to improve the overall levels of food security and caloric intake in vulnerable populations (Haushofer et al. 2018; Hoynes and Schanzenbach 2009). In Lebanon, these programs have been shown to improve total household expenditures, including on food, as well as increase food consumption, mitigate food insecurity, and child nutritional well-being (Altındağ and O'Connell 2023; Salti et al. 2022).

The UNHCR and WFP undertake an annual representative survey for assistance agencies and partners to maintain a picture of the situation of refugees in Lebanon. The Vulnerability Assessment of Syrian Refugees in Lebanon (VASyR) has been conducted annually since 2013. This survey is collected through in-person questionnaires conducted by survey teams across Lebanon's 26 districts, and usually surveys approximately 5,000 households per year. The data is a repeated cross-section, and our study uses these data from the 2018 and 2019 waves for our well-being outcomes. Areas of interest for the survey teams include coping strategies, economic vulnerability, food security, education, healthcare, and expenditures, among many others.

2.1 Variable Construction

Household-level observations from the 2018 and 2019 rounds of the VASyR survey provide primary outcome measures of monthly food expenditure, food consumption, dietary diversity, and food insecurity.

We measured food consumption, dietary diversity, and food security using three standardized indices: Food Consumption Score (FCS), a Dietary Diversity Score (DDS), and the Coping Strategies Index (CSI). Variable construction was as follows. We converted the food expenditure measures into United States Dollars (USD) using the stable pegged conversation rate of 1,500 LPB per USD from that period and adjusted to a per-capita basis before taking the natural log for analysis. We also dropped outliers that reported spending more than $300 per household member. First defined by the World Food Program in 2008, the FCS aggregates food consumption data based on 7-day recall questions (WFP 2015). The VASyR questionnaire asked respondents questions such as: "How many days over the last 7 days did members of your household eat: milk and other dairy products: fresh milk/sour, yogurt, lebneh, cheese, or other dairy products?" Eight food groups (starches, pulses, vegetables, fruit, meat, dairy, fats, and sugars) are then aggregated using the standard weighting scheme that results in the FCS index that ranges from 0 to 112.[1] The DDS is a measure of dietary diversity calculated by summing up binary variables for each food group that contributes to the FCS (with the exception of sugars), where a value of 1 indicates that the household ate that food group in the last seven days. The DDS therefore ranges from 0 to 7. To measure food insecurity, we use the CSI, which is calculated based on the answers to the eight food security questions that were asked to respondents (Maxwell and Caldwell 2008). The questions asked for a 7-day recall, so each response ranged from 0 to 7, resulting in an index that sums these unweighted daily incidences ranging from 0 to 56.[2]

The other data used in this analysis comes from program administration records. As described above, the UNHCR and WFP target their major assistance programs using a proxy means test of expenditure that results in a continuous targeting score in units of predicted expenditure per capita for each household known to UNHCR in Lebanon. We detect and use the implicit assignment thresholds in this poverty targeting score, and in our analyses convert the poverty score to be a measure of relative distance to the assignment threshold for the focal program. Section 3 below contains further details of these data and their use in our context.

2.2 Summary Statistics

We provide summary statistics of households within 10 USD of the eligibility threshold for either program in Table 1.[3] The average household has 5.9 people, and the average household head is nearly 40 years old. About 19.5% of households have a female head. 65.9% of households in the sample analyzed experience

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[1]The calculation of the FCS is given by differentially weighting the days eating each food group as follows: $FCS = (starches * 2) + (pulses * 3) + vegetables + fruit + (meat * 4) + (dairy * 4) + (fats * 0.5) + (sugar * 0.5)$.

[2]The components of the CSI are derived from the following questions about whether the household: Relied on less expensive/less preferred food, Borrowed food and/or relied on help from friends/relatives, reduced the number of meals eaten per day, reduced portion size of meals, went an entire day without eating, restricted consumption of adults in order for young children to eat, sent household members to eat elsewhere, and restricted consumption of female household members.

[3]This sample size is a subset of the total sample available in the survey data, and corresponds to the union of the subsets of households that are within 10 USD of either program's eligibility threshold. The two samples are analyzed separately in Table 3 and onward.

Table 1: Summary Statistics

Statistic	Mean	St. Dev.
Panel A: Demographics and targeting scores		
Household Size	5.908	2.130
Age of Household Head	39.543	10.546
Household Head is Married	0.878	0.327
Household Head went to Primary School	0.846	0.361
Household Head went to Secondary School	0.656	0.475
Proportion of Female Household Heads	0.195	0.396
Panel B: Food consumption		
Food Consumption Score	38.567	11.816
Poor Food Consumption (FCS $\leq$ 28)	0.177	0.382
Borderline or Poor Food Consupmtion (FCS $\leq$ 42)	0.659	0.474
Dietary Diversity Score	5.717	1.111
Starches	4.977	1.284
Pulses	2.250	1.437
Vegetables	1.859	1.191
Fruit	0.465	0.740
Meat	0.256	0.357
Dairy	2.988	1.847
Fats	6.544	1.356
Sugar	6.584	1.425
Panel C: Coping strategies		
Coping Strategies Index	13.874	9.680
Food insecure (CSI $\geq$ 18)	0.378	0.485
Relied on Less Expensive Goods	4.848	2.649
Borrowed Food	1.112	1.928
Reduced Number of Meals	2.838	2.923
Reduced Portion Size	2.661	2.925
Days without Food	0.071	0.469
Restricted Food Consumption	2.199	2.931
Ate Outside Home	0.146	0.667
Panel D: Expenditure per Capita		
Total	75.107	45.262
Food	32.349	16.693
Healthcare	11.933	25.107
Education	2.496	6.947
Rent	13.474	23.313
Water	2.322	5.697
Gas	2.151	2.261
Fuel	1.042	4.302
Electricity	3.282	4.802
Debt Repayment	1.412	6.758
Other	0.125	1.793

Notes: N = 3,302. Food variables represent the number of days in the past week that the household has consumed the given food group (max 7). Food consumption score is calculated using standardized weights for each food group determined by the World Food Programme (max 112). The Dietary Diversity Score was calculated using the sum of binary variables describing whether a food group was consumed at all in the last week (max 7). Coping strategies variables represent the number of days in the last week that the household participated in said strategy (maximum 7). The Coping Strategies Index is the sum of coping strategy frequency (max 56). Expenditure is displayed as a per-capita variable in USD.

borderline or poor food consumption levels, and 37.8% of the sample is considered food insecure.

The average household has a Food Consumption Score (FCS) of 38.56 out of a possible 112.0, and a Dietary Diversity Score (DDS) of 5.71 out of a possible 7.0. As far as coping strategies, the average Syrian refugee household has a Coping Strategies Index (CSI) score of 13.87 out of a possible 56.0. This data suggests that high levels of food insecurity is common amongst Syrian refugee households in Lebanon, with high-protein food groups such as meat having the lowest consumption statistics (despite making up significant portions of food expenditure). The average household reports having to reduce their number of meals 2.8 days out of the week, and rely on less expensive goods nearly every day. Total monthly food expenditure per capita is around $32 USD.

In Table 2, we assess differences in demographics, food consumption, food insecurity, and expenditures across female- and male-headed households in the overall sample and in our focal counterfactual group: households who nearly missed eligibility for the additional UCT program. Overall, female-headed households in the full sample have differences in all measures of demographics, human capital, food consumption, dietary diversity, and food and total expenditures. Female-headed households are also assessed as more vulnerable, on average, by the poverty targeting PMT (note that the measure of the poverty score relative to the assistance threshold is increasing in poverty). While this is no surprise in aggregate, Panel B restricts the sample to the set of households who missed eligiblity for the additional UCT program by a small margin (within 10 USD). Male- and female-headed households here have no statistically significant differences in assessed vulnerability, although demographics, background characteristics, and measures of food consumption and food security all remain statistically different, despite being from from a sample of non-recipient households that have been deemed equally vulnerable by the PMT for household expenditure. Male-headed households do not have vastly differing spending patterns across other categories, however, with statistically higher expenditures only on communications and tobacco, but no differences on other major expenditure categories of rent, healthcare, education, or utilities (see Appendix Table 1).

3   Empirical Design

We use a regression discontinuity design (RDD) to analyze these variables and the constituent parts of each index. This is a quasi-experimental design in which there is a discontinuous change in the probability of assignment to program or intervention eligibility at a sharp cutoff point in a continuous running variable. Our analysis therefore compares units of analysis on either side of threshold to provide insight into the treatment effect. In our case, the agencies supplying the multipurpose cash and food voucher programs provide strict cutoff points in the targeting score that a household must meet in order to receive benefits. The thresholds to receive aid are not explicitly set or stated, though they can be inferred ex post by examining the poverty score at which households begin to receive a given modality. These cutoffs are seen

Table 2: Test of equality between male- and female-headed households, demographics and vulnerability measures

Variable	Mean of MHHs	Mean of FHHs	p-value	t-statistic	Significance
Panel A: Full sample					
Poverty score relative to assistance threshold	-39.813	-24.058	<0.001	-10.364	***
Age of Household Head	37.545	40.533	<0.001	-9.089	***
Household Size	5.332	4.283	<0.001	15.078	***
Proportion of Married HOHs	0.93	0.444	<0.001	53.382	***
Primary School Completion	0.902	0.669	<0.001	23.44	***
Secondary School Completion	0.73	0.491	<0.001	17.702	***
Total Expenditure per Capita	99.872	86.054	<0.001	4.716	***
Infant (under 1) in HH	0.234	0.113	<0.001	10.083	***
Child under 5 in HH	0.604	0.393	<0.001	14.674	***
Dietary Diversity Score	5.615	5.47	<0.001	4.044	***
Food Consumption Score	37.051	35.268	<0.001	4.86	***
Severely low FCS	0.23	0.268	0.003	-3.013	***
Coping Strategies Index	13.805	14.873	<0.001	-3.663	***
Food Expenditure per Capita	39.055	34.886	<0.001	5.294	***
Panel B: RD control group					
Poverty score relative to assistance threshold	-5.082	-5.002	0.75	-0.319	
Age of Household Head	39.751	38.727	0.263	1.12	
Household Size	6.458	4.82	<0.001	8.081	***
Proportion of Married HOHs	0.976	0.529	<0.001	19.79	***
Primary School Completion	0.883	0.613	<0.001	8.604	***
Secondary School Completion	0.664	0.429	<0.001	5.697	***
Total Expenditure per Capita	71.853	63.817	0.025	2.248	**
Infant (under 1) in HH	0.238	0.122	0.001	3.322	***
Child under 5 in HH	0.707	0.453	<0.001	6.367	***
Dietary Diversity Score	5.831	5.663	0.056	1.913	*
Food Consumption Score	39.973	36.266	<0.001	3.827	***
Severely low FCS	0.135	0.227	0.003	-2.997	***
Coping Strategies Index	13.478	13.244	0.77	0.293	
Food Expenditure per Capita	32.001	30.12	0.081	1.749	*

Note: Table contains t-tests of equality in the measures listed in rows across male- and female-headed households in the samples indicated in panels. Panel A tests performed on the full available sample of 8,406 observations. Panel B restricts to the 840 observations whose poverty score is within 10 USD below the cash program's eligibility threshold. $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$

in Figure 1, which breaks down the probability of receiving aid based on the distance from the eligibility cutoff. Figures depicting separate programs and years in the original poverty score measure are available in Appendix Figure 1. Each wave of the data is made up of a new cross-sectional sample of households. Since the annual assignment mechanism applies to the entire population, we are able to use crosssectional samples available in each wave as they have been been subject to the same assignment mechanism in their respective assistance cycle.
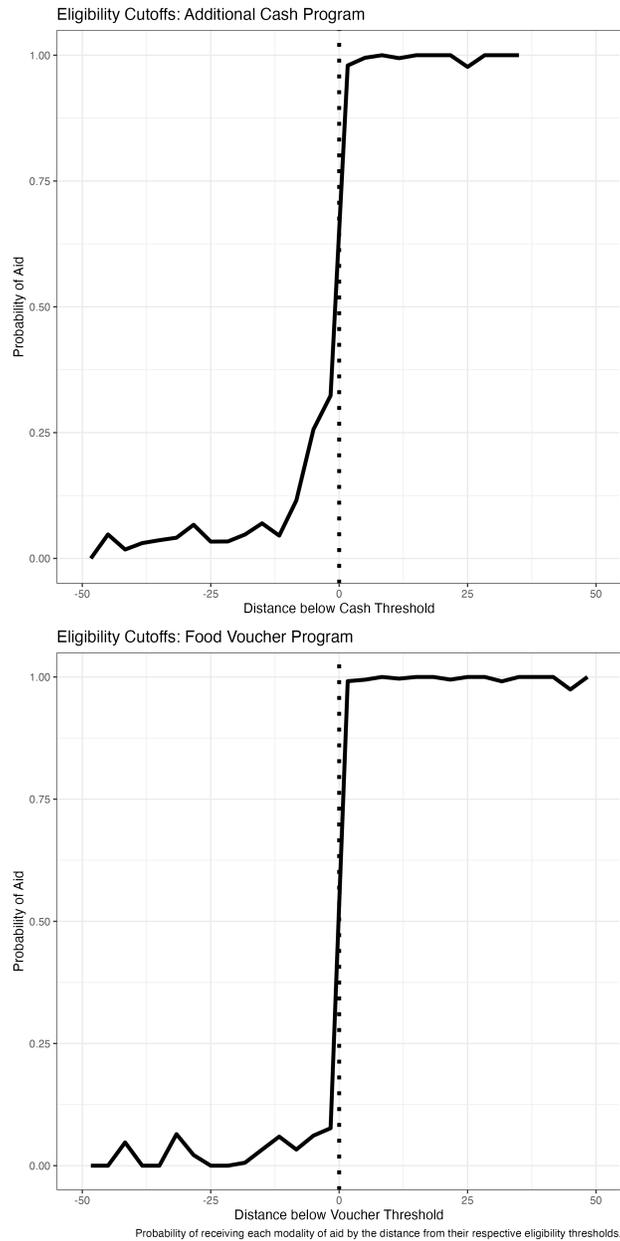
Figure 1: Eligibility schedule: additional cash and food voucher programs (2018-2019)

A household's poverty score is effectively impossible to manipulate across these thresholds for multiple

reasons (Altındağ and O'Connell 2023); we provide density plots to assess the possibility of manipulation in Appendix Figure 2, which confirms a lack of evidence of score manipulation around the thresholds. We also show in Appendix Table 2 that tests for discontinuities in measures that are unexpected to change as a result of the program (falsification outcomes) – namely the household head's age, whether the household has small children, whether there is any disability in the household, and whether the head completed primary education.

Under the assumption that the assignment rule effectively randomly allocates eligibility to households around the cutoff, the following regression then recovers the reduced-form causal estimates of the program effects of the interventions we study:

$$y_i = \alpha + \beta_1 d_i + \beta_2 s_i + \beta_3 d_i * s_i + \epsilon_i$$

In this equation, y_i represents the outcome for household i, d_i is a binary indicator for being eligible for the focal program, and s_i represents the continuous running variable, which is the vulnerability score of a given household i relative to the assignment threshold. We selected a common bandwidth in all analysis samples of $h = 10$ for the purposes of sample consistency; optimal bandwidths across samples and outcomes range from 5 to almost 15 as shown in Appendix Table 3. All specifications use heteroskedasticity-robust standard errors, and we report estimates from specifications in which food expenditure has been transforms by the natural log and all other variables have been unit standardized.

4 Results

Before examining the results of the food voucher and additional cash programs by gender of the head of household, it is important to show whether these programs are improving outcomes for the refugee population as a whole. Table 3 shows that both programs have led to positive results in all four indices. However, the nutritional effects of the food voucher program are much more statistically significant than those of the additional cash.

Most notably, food consumption increases by 0.41 standard deviations, dietary diversity increased by approximately the same magnitude, and the use of coping strategies fell 0.34 deviations. The effects of the additional cash program are much less significant overall, though a sharp increase in food consumption is still evident. Figure 2 breaks down each index into its constituent parts. The major increases in food consumption seen in both programs are driven largely by an increase in the amount of dairy recipient households are consuming, suggesting that dairy shifted from a rarity to a staple of the everyday diet. Households seem to consume more pulses after the food voucher transfer, while the additional cash transfer leads recipients to consume more starches and fruit. Household expenditure on food increases

Table 3: RD Treatment Effects

	Food expenditure per capita	Food Consumption Score	Dietary Diversity Score	Coping Strategies Index
	(1)	(2)	(3)	(4)
Panel A: Food voucher				
Program effect	0.20***	0.41***	0.38***	−0.34***
	(0.05)	(0.08)	(0.08)	(0.09)
N	2,000	2,120	2,120	2,120
Panel B: Additional UCT				
Program effect	0.10**	0.28***	0.09	−0.06
	(0.05)	(0.09)	(0.09)	(0.09)
N	1,437	1,456	1,456	1,456

Note: This table reports estimates of the effect of food voucher and unconditional cash assistance on outcomes listed in column headers across panels. Program effects for expenditure per capita measures are reported in natural log points; for all index outcomes, the program effect is in units of standard deviations. The sample contains all the households within a bandwidth of 10 dollars in the targeting score on either side of the applicable threshold. All regressions include a linear term in the poverty score as well as its interaction with the indicator for being above the detected threshold.
*p < .1; **p < .05; ***p < .01

after the voucher transfer overall.[4]

Table 4: Food Voucher and UCT Effects by Gender of Household Head

	Food expenditure per capita	Food Consumption Score	Dietary Diversity Score	Coping Strategies Index
	(1)	(2)	(3)	(4)
Panel A: Food voucher effects in female-headed households				
Program effect	0.21	0.23	0.29	−0.07
	(0.15)	(0.20)	(0.22)	(0.20)
N	315	353	353	353
Panel B: Food voucher effects in male-headed households				
Program effect	0.20***	0.46***	0.40***	−0.38***
	(0.05)	(0.09)	(0.09)	(0.10)
N	1,685	1,767	1,767	1,767
Panel C: Non-parametric difference, Panel B - A				
Difference, Panel B - Panel A	0.01	−0.22	−0.11	0.31
	(0.16)	(0.22)	(0.24)	(0.22)
N	2,000	2,120	2,120	2,120
Panel D: Additional UCT effects in female-headed households				
Program effect	0.25**	0.44**	0.30*	0.08
	(0.10)	(0.17)	(0.18)	(0.19)
N	349	354	354	354
Panel E: Additional UCT effects in male-headed households				
Program effect	0.06	0.26**	0.04	−0.12
	(0.05)	(0.11)	(0.10)	(0.11)
N	1,088	1,102	1,102	1,102
Panel F: Non-parametric difference, Panel E - D				
Difference	0.19*	0.18	0.25	0.20
	(0.11)	(0.20)	(0.20)	(0.22)
N	1,437	1,456	1,456	1,456

Note: This table reports estimates of the effect of cash-based assistance on outcomes listed in column headers, separated by gender of household head estimated separately across panels. Program effects for expenditure per capita measures are reported in natural log points; for all index outcomes, the program effect is in units of standard deviations. The sample contains all the households within a bandwidth of 10 dollars in the targeting score on either side of the applicable threshold. All regressions include a linear term in the poverty score as well as its interaction with the indicator for being above the detected threshold.
*p < .1; **p < .05; ***p < .01

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[4]Food expenditure results have slightly lower sample sizes due to outliers in the dataset. We chose to filter observations that reported over $200 USD monthly food expenditure per capita and/or over $25 USD monthly food expenditure per capita on an individual food group (as the mean expenditure for meat is around $3, for example).
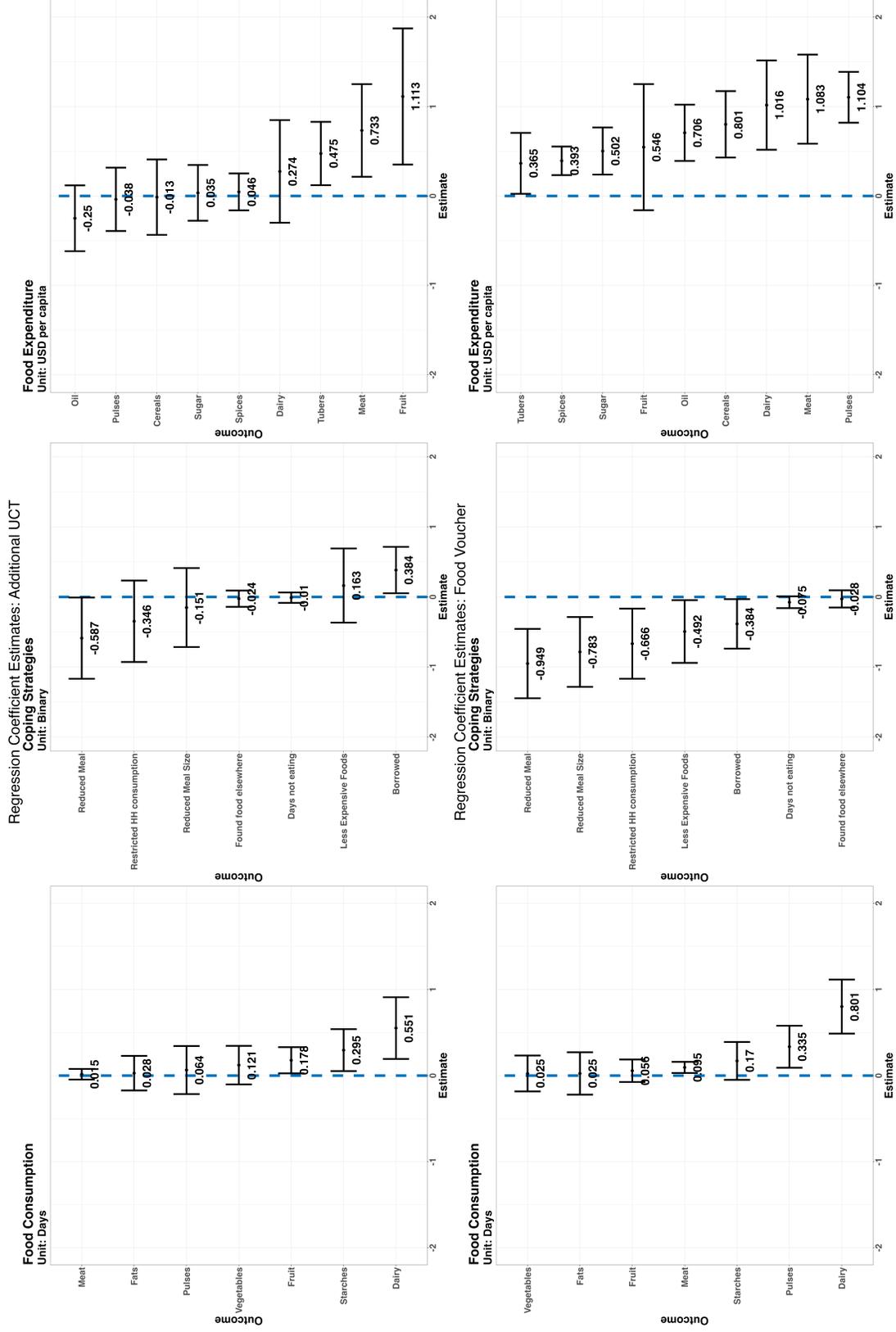
Figure 2: Aid programs impact coefficients: constituents of indices

Table 4 shows the program effects of the food voucher and additional cash program by gender of the head of household. For the food voucher program, male-led households experience a both statistically and practically significant effect in all four outcomes (Panel B). The female-headed household sample is substantially smaller, leading to less precise estimates that are not statistically different from zero (Panel A) nor from the effects in male-headed households (Panel C). We depict the essence of these effects via density plots in Appendix Figure 5. Breaking down the food voucher results to their components in Figure 3 shows that while female-headed households see a very small bump in monthly expenditure on items like sugar and spices, the primary drivers of the statistically significant jump in purchases of these luxury items are male-led households. Male-led households are also eating more dairy, starches, and meat while female-headed households are primarily increasing their consumption of pulses. More detailed breakdowns of each index by gender and transfer modality can be found in Section A.

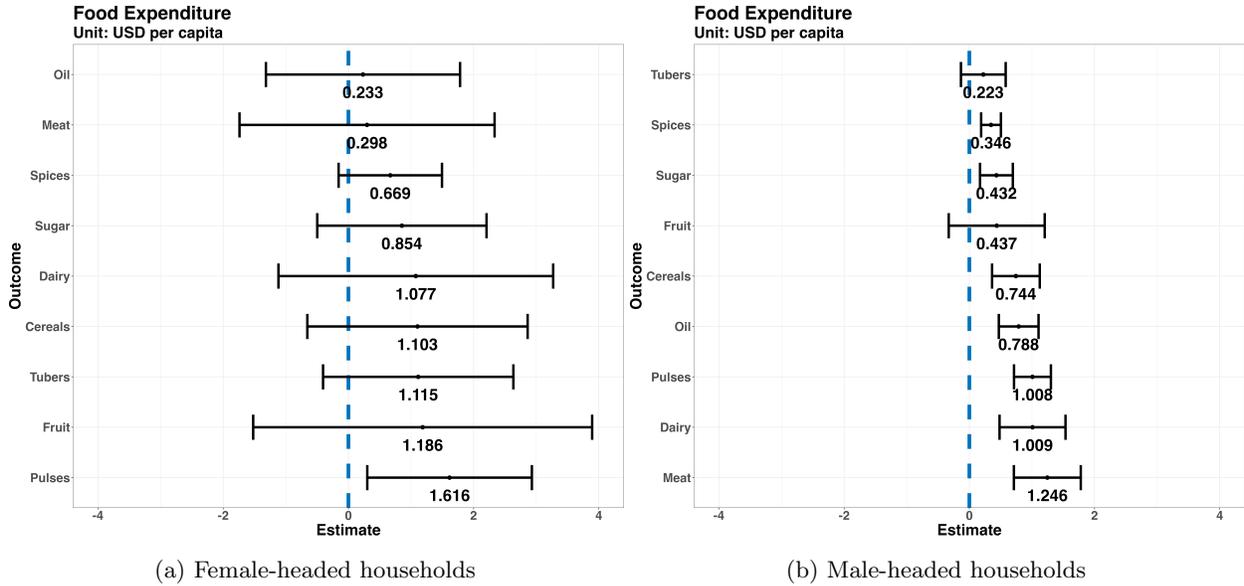(a) Female-headed households   (b) Male-headed households

Figure 3: Monthly food expenditure after voucher program

Looking at the effects of the cash transfer program in Panels D-F in Table 4, we see that the overall effect of the cash program on food expenditures (Panel B, Table 3) are largely attributable to female-headed households, who increase their expenditure by 0.25 log points (Panel D). Male-led households do not see a significant change in monthly food expenditure (Panel E), and this difference is marginally statistically significant at the 10% level (Panel F). Female-headed households also saw a larger increase in their food consumption score and dietary diversity after the transfer by approximately .2 SD relative to male-headed households, although these differences are imprecise and not statistically distinguishable from zero. Overall, we conclude that the programs function approximately equivalently among male- and female-headed households across the outcomes we analyze, although with some evidence that female-headed households continue to spend additional cash on food even when already receiving the

food voucher when male-headed households do not do so.

(a) Female-headed households
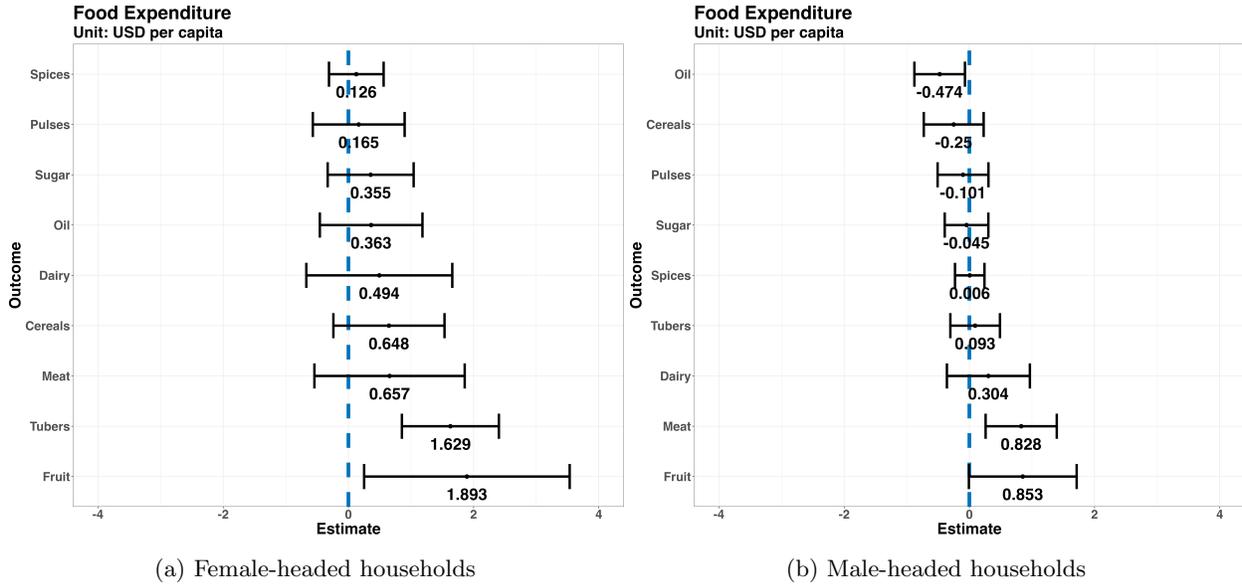
(b) Male-headed households

Figure 4: Monthly food expenditure after additional cash program

When breaking these additional cash program effects down by individual food groups in Figure 4, one observation is that while both male-led households and female-headed households spend more on meat and fruit, female-headed households are single-handedly driving the positive impact on tuber expenditure seen in the overall program effects. While male-led households saw no significant increase in monthly food expenditure overall, they did divert more of their money towards higher quality proteins such as meat instead of tubers and pulses. This likely explains the increase in the food consumption score seen in Table 4, since the FCS weighs high-protein food groups more heavily than carbohydrate-rich groups such as tubers. Furthermore, the FCS is calculated using frequency of consumption in the last week, meaning that female-headed households are likely consuming items such as tubers daily.

When recipient households receive vouchers, only male-led households are diverting those vouchers into a diverse and calorically-rich diet that includes luxury items like spices, while female-headed households are spending most of their vouchers on pulses. This is why only male-led households see a significant difference in their dietary diversity score after the voucher program. When the additional cash is transferred to the most vulnerable households, male-led households spend a modest amount more on meat while female-headed households purchase less nutritionally rich foods like tubers. Despite this phenomenon, female-headed households see higher increases in their FCS. This suggests that female household-heads are purchasing tubers in such a large quantity (likely using nearly their entire cash transfer) that it overcomes the difference in caloric weight for the FCS construction.

Overall, the additional spending may be due to differential preferences across household headship types or to the vouchers not meeting nutritional needs. Table 2 provides some evidence on this point:

female-headed households assessed to have the same level of expenditure-based poverty are significantly worse off nutritionally and spend less on food than comparable male-headed households. This suggests that preferences alone are unlikely to be the cause of additional spending of the cash transfer on food by female-headed households. If preferences alone were the cause, we might expect to see equal or higher food spending per capita or nutritional intake among equally poor female-headed households - but this is not the case. The following section delves further into assessing whether different household structures and demographics across female- and male-headed households can explain this difference.

Table 5: Robustness of cash effect differences for female-headed households: Controlling for heterogeneous effects by covariates correlated with headship

| | Outcome: ln(Food Expenditure per Capita) | | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Bandwidth: 10USD						
Main effect (MHH)	0.06	0.07	0.07	0.06	0.10	0.13*
	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)
FHH * Eligible	0.19*	0.19*	0.18*	0.18*	0.17	0.13
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Eligible * Poverty score distance	−0.003	−0.003	−0.002	−0.001	−0.003	−0.0005
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Child under 5 * Eligible		−0.02	0.02	0.04	0.04	0.03
		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Child under 1 * Eligible			−0.13**	−0.12**	−0.12*	−0.11*
			(0.06)	(0.06)	(0.06)	(0.06)
Elderly HH Member * Eligible				0.14	0.12	0.14
				(0.09)	(0.09)	(0.09)
Secondary School * Eligible					−0.08*	−0.08
					(0.05)	(0.05)
Household Size over 5 * Eligible						−0.05
						(0.05)
N	1,437	1,437	1,437	1,437	1,400	1,400
Panel B: Bandwidth: 15USD						
Main effect (MHH)	0.06	0.07	0.06	0.05	0.09	0.14**
	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)
FHH * Eligible	0.20**	0.20**	0.20**	0.20**	0.20**	0.14
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)
Eligible * Poverty score distance	0.01	0.01	0.01	0.01	0.01	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Child under 5 * Eligible		−0.01	−0.002	0.01	0.01	0.01
		(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Child under 1 * Eligible			−0.03	−0.03	−0.03	−0.02
			(0.05)	(0.05)	(0.05)	(0.05)
Elderly HH Member * Eligible				0.14*	0.12*	0.13*
				(0.07)	(0.07)	(0.07)
Secondary School * Eligible					−0.07*	−0.06*
					(0.04)	(0.04)
Household Size over 5 * Eligible						−0.09**
						(0.04)
N	2,207	2,207	2,207	2,207	2,153	2,153

Note: This table reports interaction effects of the effect of cash assistance on food expenditure per capita. Program effects for expenditure per capita measures are reported in natural log points. The sample contains all the households within a bandwidth of 10 dollars in the targeting score on either side of the applicable threshold. All regressions include a linear term in the poverty score as well as its interaction with the indicator for being above the detected threshold, and additional interaction terms indicated in rows, and their lower-order effects.
*p < .1; **p < .05; ***p < .01

Headship is not exogenous and we may therefore be concerned that it is correlated with other features of the household such as household size, dependency ratios, or human capital, among others. To test whether the differences in UCT effects on food expenditure across female- and male-headed households (Panel F, Column 1 of Table 4) persist after modeling heterogeneous program effects in such features.

Table 5 presents these tests, starting with the base difference in program effects for female- versus male-headed households and progressively adding in additional potential confounds and their interaction with program eligiblity. The focal coefficient is 0.19 in Column 1 of Panel A, which maintains magnitude and significance with the addition of demographic controls, loses significance marginally when adding in a control for schooling, and loses magnitude when controlling for an indicator of above-median household size. When using a slightly larger bandwidth of 15 USD for this outcome as suggested by the optimal bandwidths in Appendix Table 3, the difference remains of a relatively stable magnitude and significant at the 5% level in five out of the six specifications.[5] We therefore conclude that our main result is not substantially confounded with these features, and the differences in program effects across household headship types are not artifacts of other observables that often vary across male- and female-headed households.

5   Discussion

The World Food Programme and the UNHCR determine program eligibility for both a food value voucher program and an additional cash transfer using a proxy means test. However, even in populations that should exhibit approximately the same level of need, we observe consumption and expenditure patterns that imply distinct differences in nutritional preferences or needs needs across male-led households and female-headed households. Female household-heads purchase higher quantities of lower-quality food after an additional cash transfer, suggesting that the food voucher program that satisfied the nutritional needs of male-led households are insufficient for female-headed households. Female household-heads appear to prioritize quantity of food over quality after they receive voucher assistance, and continue to do so after receiving additional cash. This suggests that male-led households and female-headed households experience baseline systemic inequalities in food-related need, and that the programs do not meaningfully alleviate these disparities. While there are more children both in aggregate and per household in male-headed households, children in female-headed households may face a double disadvantage in such situations.

Many different factors play a role in determining a given household's targeting score. These factors are all expressed in units of predicted expenditure per capita. However, while the overall *level* of need may be more or less the same for households in the bandwidth of analysis, the *dimensions* of need differ greatly. Women-led households are more food insecure and require more food assistance even if they exhibit the same predicted expenditure as a similarly vulnerable male-led household. This is consistent with the findings of other studies such as Diab-El-Harake et al. (2022) and Felker-Kantor and Wood (2012), and suggests that proxy means-tested programs overlook critical dimensions of need by focusing

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[5]Controlling for marriage, which is not shown, eliminates the program effect difference – nearly all male household heads are married, while only around 50% of female household heads are. This only nuances our understanding of headedness as an indicator of structural deprivation, however, as female household heads in the context are often involuntarily single due to death, divorce, or migration of husbands.

on distilling the immensely complex situations of refugee households into a single metric of deprivation.

The programs themselves have strong positive impacts on multiple indices of well-being, and these are, for the most part, similar across male- and female-led households. Even among the female-headed households in this sample, the programs increased their food consumption by nearly half a standard deviation. The gender disparities we highlight are not necessarily the result of a fault in program administration or design, but rather from pre-existing structural differences that remain after uniform aid transfers.

This study has a few key limitations that could be pursued in further research. As Beegle and van de Walle (2019) notes, headship as a measure of gender has the potential to overlook key demographic differences and assumes the unitary theory of intra-household allocation holds true. Unfortunately, there is limited individual-level data on consumption and expenditure for refugee households, and therefore we chose to use household headship as a coarse indicator of gender. The limitations of this indicator are important to stress, as much research has moved on from headship as a measure of gender dyanmics in the household to using instead detailed individual-level data about family structure and composition and consumption and other decisions by individual family members. Future research should also examine the potential benefits of a gender-based targeting model for both food voucher and UCT programs, potentially considering differences in both nutritional needs and food consumption preferences by household structure, as well as further investigating the unobserved factors that lead to a systematic gender gap in food security.

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A   Appendix

Appendix Table 1: Test of equality between male- and female-headed households, expenditure categories

Variable	Mean of MHHs	Mean of FHHs	p-value	t-statistic	Significance
Panel A: Full sample					
Healthcare Expenditure per Capita	13.652	15.218	0.137	-1.485	
Education Expenditure per Capita	2.109	1.865	0.286	1.066	
Rent per Capita	23.291	16.671	<0.001	5.507	***
Shelter Expenditure per Capita	0.089	0.231	0.054	-1.928	*
Water Expenditure per Capita	3.087	2.731	0.053	1.936	*
Gas Expenditure per Capita	2.56	2.522	0.676	0.418	
Transportation Expenditure per Capita	2.177	1.911	0.16	1.406	
Electricity Expenditure per Capita	4.501	4.182	0.307	1.022	
Clothing Expenditure per Capita	0.465	0.535	0.495	-0.682	
Communication Expenditure per Capita	3.782	2.641	<0.001	8.228	***
Hygiene Expenditure per Capita	3.896	3.344	0.001	3.351	***
Tobacco Expenditure per Capita	2.896	1.307	<0.001	10.562	***
Debt Repayment per Capita	1.806	1.809	0.993	-0.008	
Other Expenditure per Capita	0.65	0.165	0.518	0.647	
Panel B: RD control group					
Healthcare Expenditure per Capita	11.678	12.191	0.79	-0.267	
Education Expenditure per Capita	1.966	2.565	0.215	-1.24	
Rent per Capita	11.531	9.781	0.301	1.034	
Shelter Expenditure per Capita	0.039	0.34	0.08	-1.754	*
Water Expenditure per Capita	1.901	2.202	0.33	-0.976	
Gas Expenditure per Capita	1.995	2.022	0.843	-0.198	
Transportation Expenditure per Capita	1.617	1.212	0.147	1.453	
Electricity Expenditure per Capita	2.796	2.506	0.383	0.872	
Clothing Expenditure per Capita	0.271	0.291	0.888	-0.141	
Communication Expenditure per Capita	2.275	1.699	0.001	3.427	***
Hygiene Expenditure per Capita	2.679	2.507	0.599	0.526	
Tobacco Expenditure per Capita	1.816	0.507	<0.001	4.92	***
Debt Repayment per Capita	1.051	0.98	0.867	0.168	
Other Expenditure per Capita	0.051	0.283	0.102	-1.639	

Note: Table contains t-tests of equality in the measures listed in rows across male- and female-headed households in the samples indicated in panels. *p < .10; **p < .05; ***p < .01

## Appendix Table 2: Tests of continuity in covariates

	Head's age	Any child Under 5	Any disability	Head completed primary education
	(1)	(2)	(3)	(4)
Panel A: Food voucher				
Program effect	−0.09	−0.02	−0.05*	0.02
	(0.92)	(0.04)	(0.03)	(0.03)
N	2,120	2,120	848	2,058
Panel B: Additional UCT				
Program effect	1.32	−0.02	0.02	−0.07*
	(1.18)	(0.05)	(0.04)	(0.04)
N	1,456	1,456	555	1,419
Panel C: Food voucher, female-headed households				
Program effect	−5.08	0.06	−0.17*	0.06
	(3.10)	(0.10)	(0.09)	(0.10)
N	353	353	116	345
Panel D: Food voucher, male-headed households				
Program effect	0.76	−0.02	−0.03	0.01
	(0.91)	(0.04)	(0.03)	(0.03)
N	1,767	1,767	732	1,713
Panel E: Non-parametric difference, Panel D - C				
Difference, Panel B - Panel A	−5.84*	0.09	−0.14	0.05
	(3.23)	(0.11)	(0.10)	(0.11)
N	2,120	2,120	848	2,058
Panel F: Additional UCT, female-headed households				
Program effect	4.20	0.06	−0.12	0.04
	(2.82)	(0.10)	(0.10)	(0.08)
N	354	354	347	115
Panel G: Additional UCT, male-headed households				
Program effect	0.54	−0.02	−0.03	0.02
	(1.28)	(0.05)	(0.04)	(0.04)
N	1,102	1,102	1,072	440
Panel H: Non-parametric difference, Panel G - F				
Difference	3.66	0.08	−0.09	0.02
	(3.09)	(0.12)	(0.11)	(0.09)
N	1,456	1,456	1,419	555

Note: This table reports estimates of the effect of cash-based assistance on outcomes listed in column headers, separated by gender of household head estimated separately across panels. Program effects for expenditure per capita measures are reported in natural log points; for all index outcomes, the program effect is in units of standard deviations. The sample contains all the households within a bandwidth of 10 dollars in the targeting score on either side of the applicable threshold. All regressions include a linear term in the poverty score as well as its interaction with the indicator for being above the detected threshold.
*p < .1; **p < .05; ***p < .01

Appendix Table 3: Automated Bandwidths: Additional Cash Program

|	Outcome	Female Household Heads	Male Household Heads
1	Food Consumption Score	9.56	4.96
2	Coping Strategies Index	8.89	9.14
3	Dietary Diversity Score	9.08	7.56
4	Food Expenditure per Capita	13.48	7.81

Notes: Automated bandwidth allocation for additional cash program effect sizes. Prioritizes statistical significance and sample size to produce the optimal bandwidth allocation for each outcome measure. Actual bandwidth chosen for analysis was 10 for all outcomes.
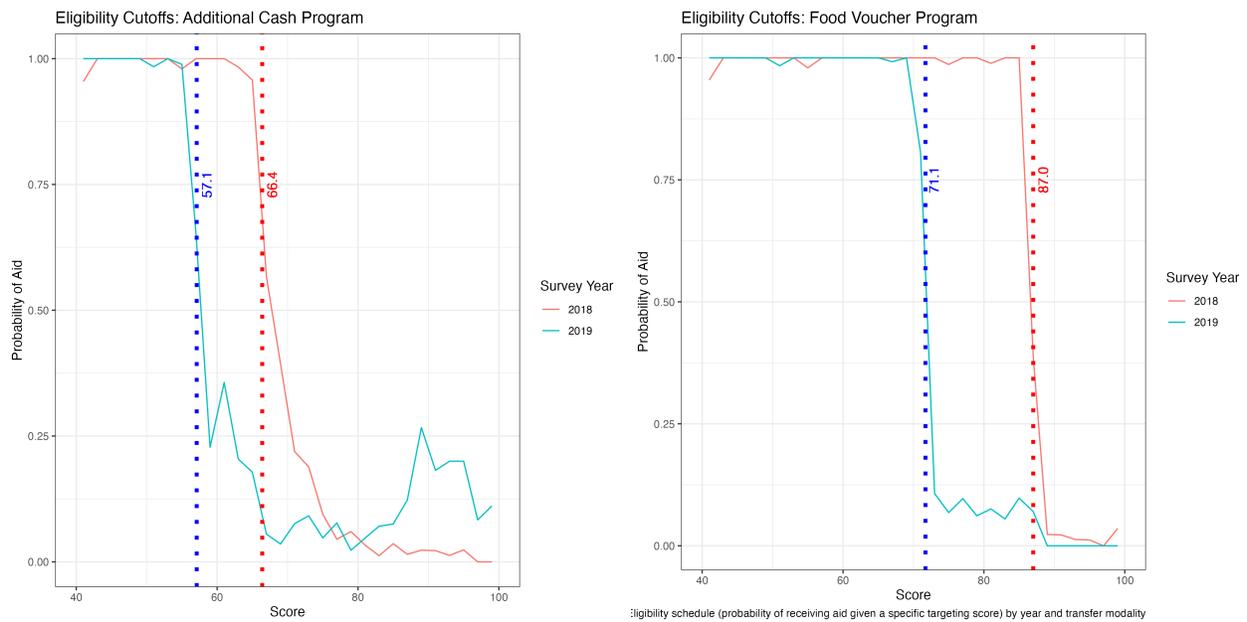
Appendix Figure 1: Eligibility Schedule: Additional Cash and Food Voucher Programs
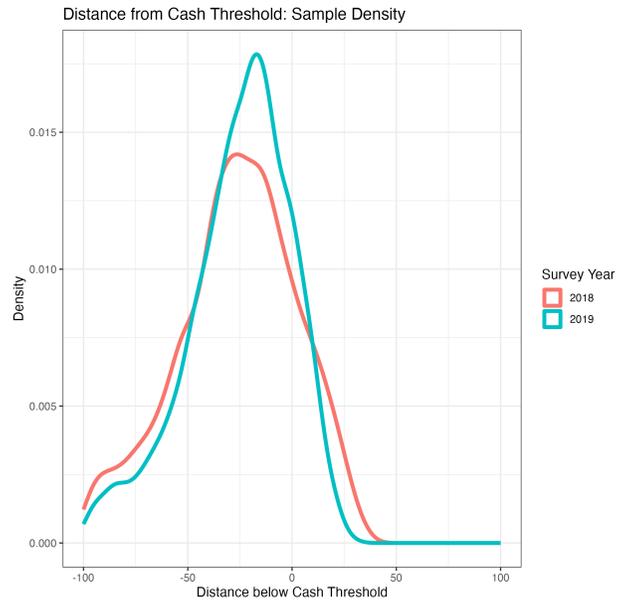
Density test showing the distribution of VASyR respondents' distance from the cash assistance threshold.
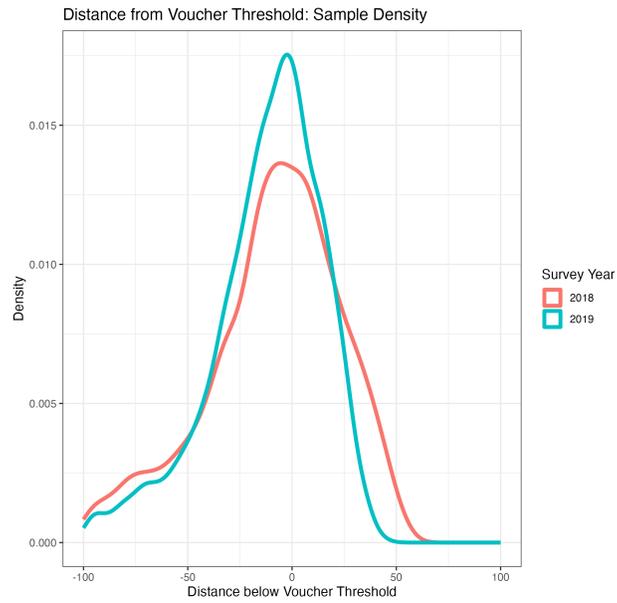
Density test showing the distribution of VASyR respondents' distance from the cash assistance threshold.
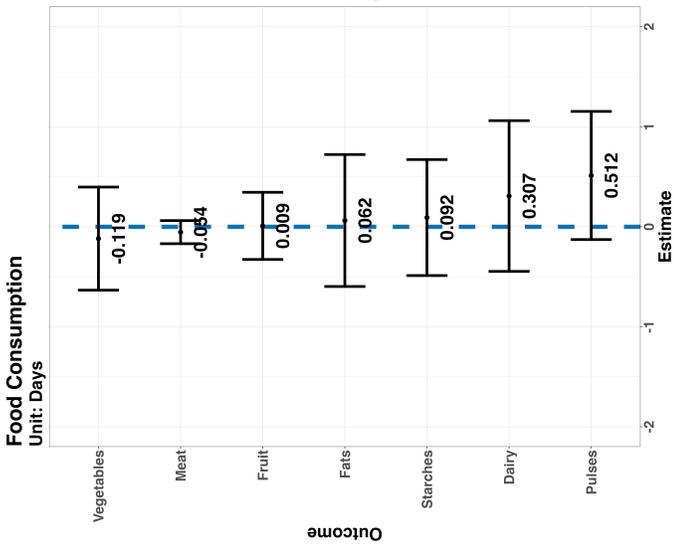
Appendix Figure 2: Density Testing

Food Consumption
Unit: Days

Women-led Households: Additional UCT
Coping Strategies
Unit: Binary

Food Expenditure
Unit: USD per capita

Food Consumption
Unit: Days

Male-led Households: Additional UCT
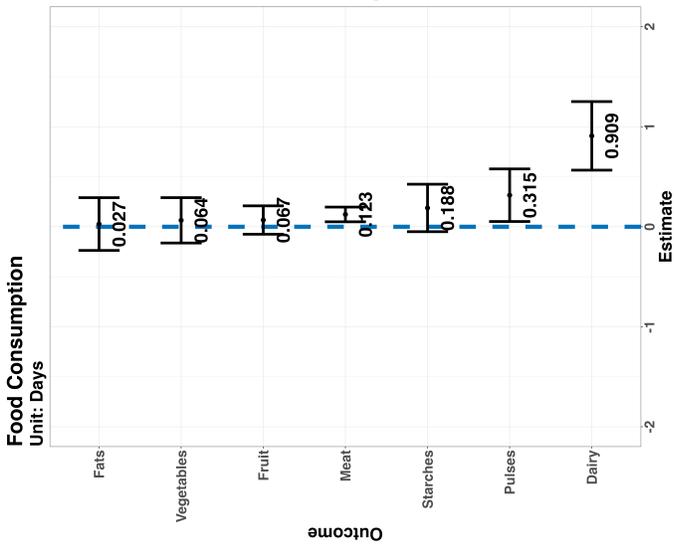**Coping Strategies**
Unit: Binary

Food Expenditure
Unit: USD per capita
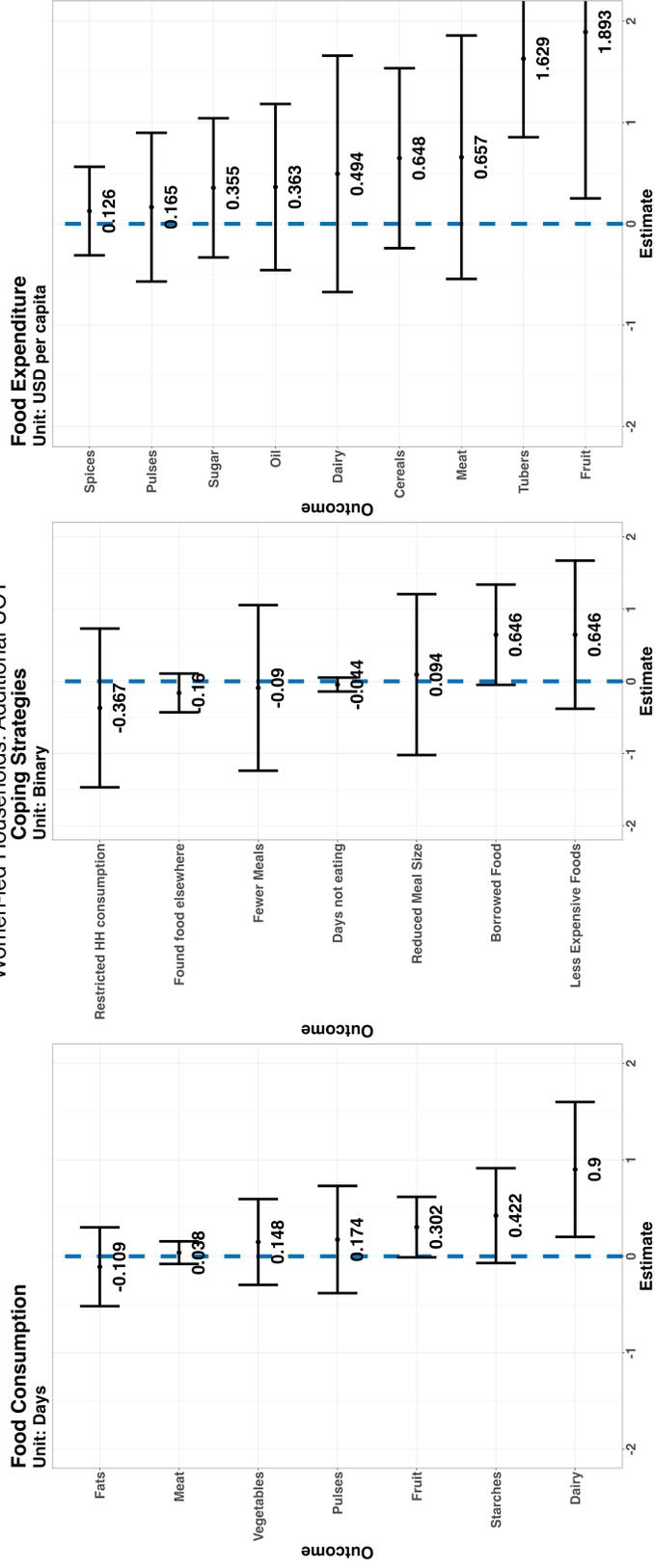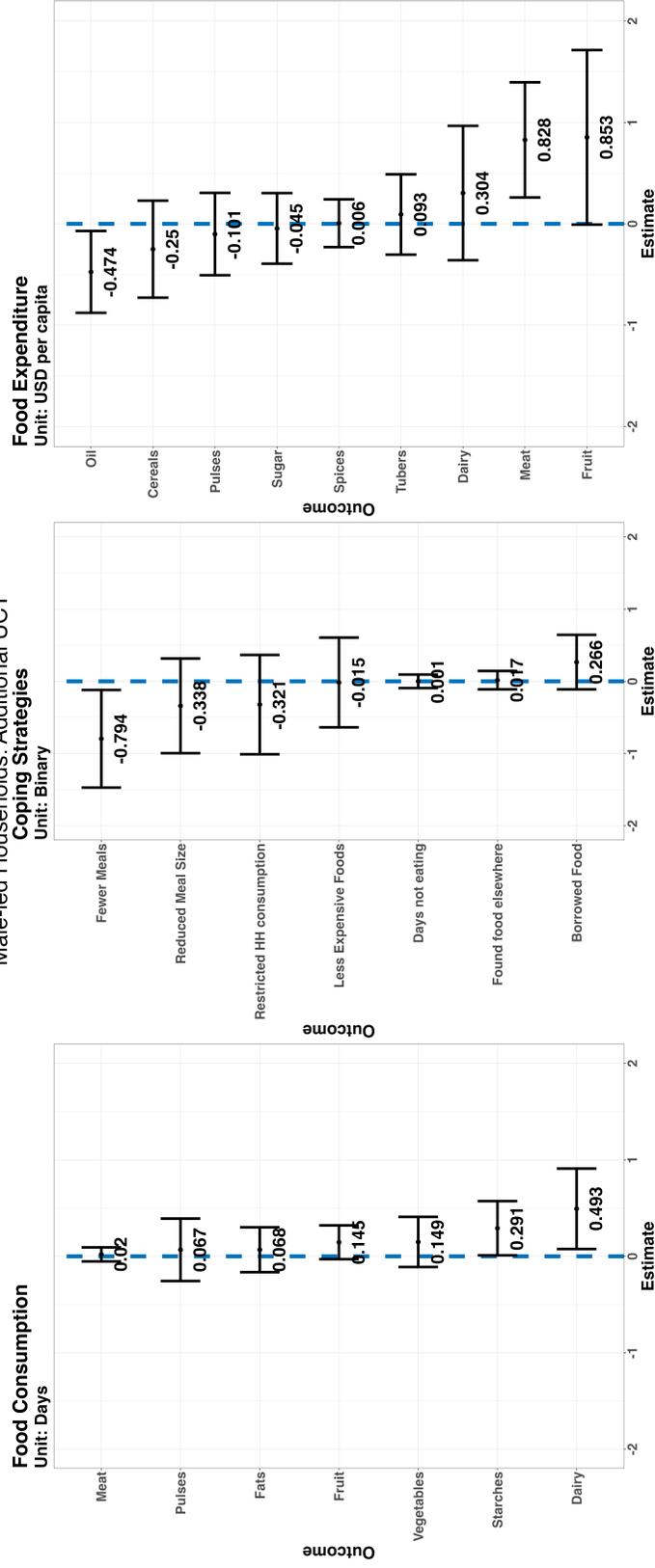
Appendix Figure 3: Cash programs impact coefficients: constituents of indices
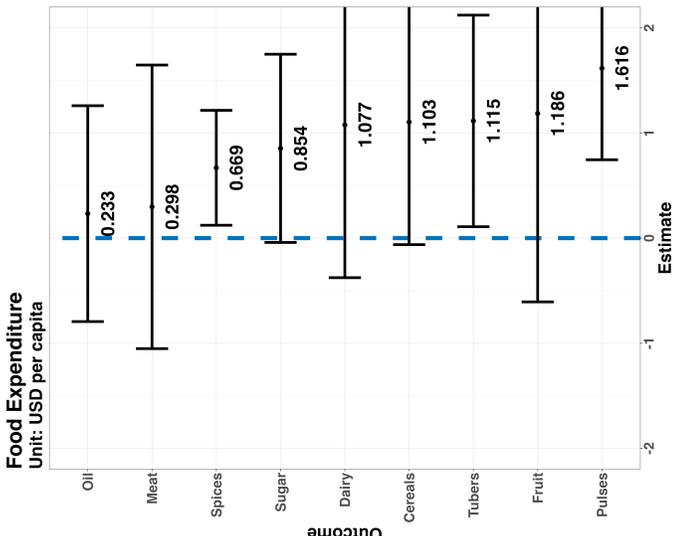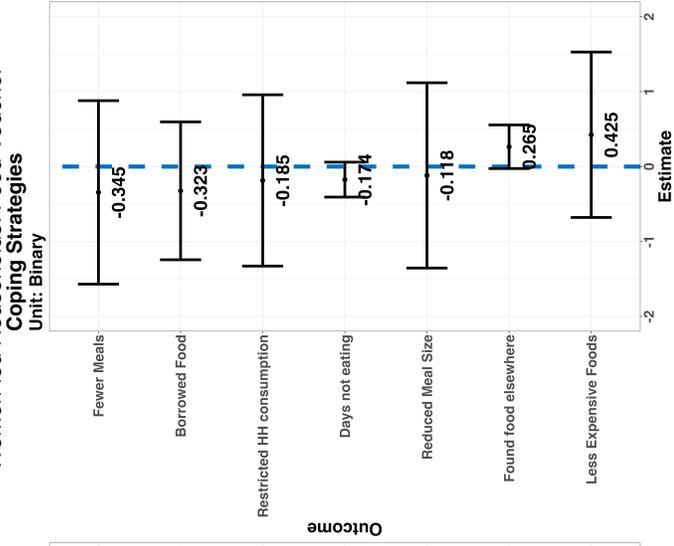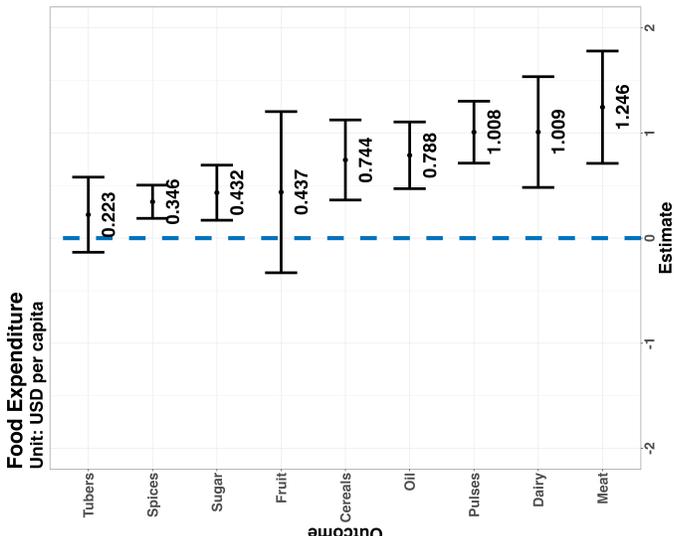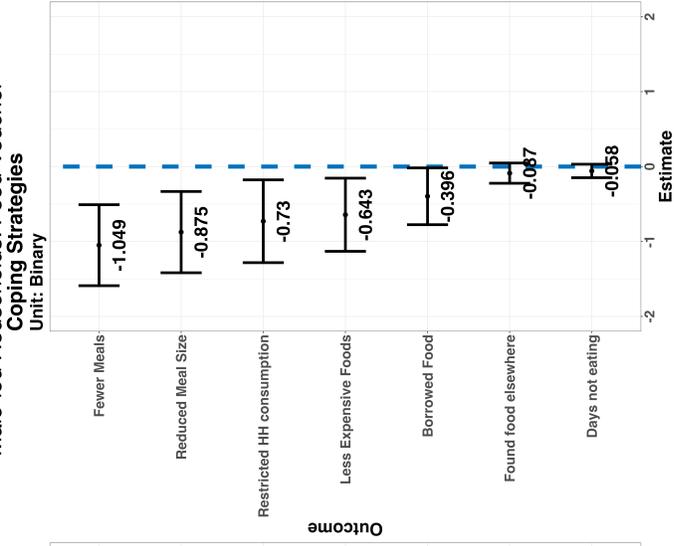
Appendix Figure 4: Voucher programs impact coefficients: constituents of indices
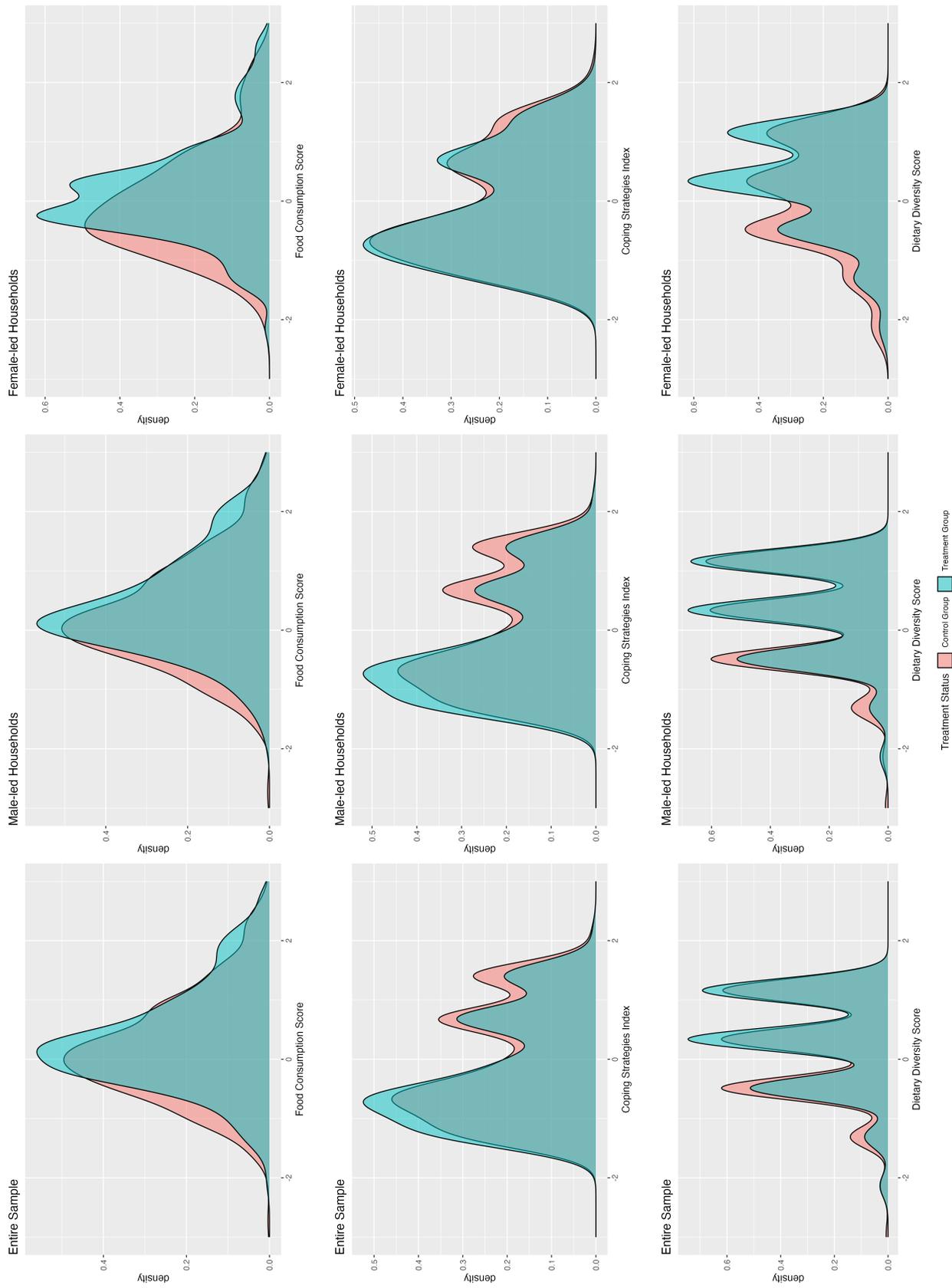
Appendix Figure 5: Density plots of outcomes by treatment status and gender of household head