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Impact Evaluation of Cash and Food Transfers for the Seasonal Emergency Safety Net in Hajjah and Ibb Governorates, Yemen

Endline Report

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Acronyms

ABC-I	Activity-based Costing Ingredients
ATE	Average Treatment Effect
CCT	Conditional Cash Transfer
CFSS	Comprehensive Food Security Survey
CO	Country Office
DDI	Dietary Diversity Index
EA	Enumeration Area
ESN	Emergency Safety Net
FCS	Food Consumption Score
FDC	Food Distribution Committee
FDP	Food distribution point
HDDS	Household Dietary Diversity Score
IFPRI	International Food Policy Research Institute
LTSH	Landside Transport Shipping and Handling
MoE	Ministry of Education
ODOC	Other Direct Operational Costs
PMS	Proxy Means Score
PMT	Proxy Means Test
PPSC	Yemen Post and Postal Savings Corporation
PRRO	Protracted Relief and Recovery Operation
PSM	Propensity Score Matching
RD	Regression Discontinuity
RCT	Randomized Controlled Trial
SWF	Social Welfare Fund
SPSS	Statistical Package for the Social Sciences
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WINGS	WFP Information Network and Global System

YER	Yemeni riyal
YPC	Yemen Polling Center

Executive Summary

Introduction

This report is the final impact evaluation of the World Food Programme's Cash and Food transfer program in Yemen. The program operated in Hajjah and Ibb governorates within the larger Emergency Safety Net (ESN), which provides assistance to qualifying households in rural Yemen. The report details the relative effectiveness of each modality at alleviating food security among the targeted population.

Methodology

The impact evaluation relies primarily on the randomization of Food Distribution Points (FDP) into receipt of cash or food. Supplementary analysis uses the responses of ineligible households to control for FDP-level trends.

Transfer Experiences

Cash transfer points were more widely dispersed than food distribution points. Consequently, cash beneficiaries travelled much longer and spent significantly more money to acquire their benefits. The discrepancy was particularly acute in Hajjah, where cash beneficiaries spent five times more than food beneficiaries and 10 percent of their transfer amount on transportation and related expenses. The majority of food beneficiaries began the program in favor of a transfer compromised fully of food, but by the endline an all-cash transfer proved the most popular option. Cash beneficiaries overwhelmingly favored an all-cash transfer (80 percent) by the end of the pilot.

Impact

Dietary Diversity

Cash beneficiaries experienced significantly greater dietary diversity, as measured by three basic indicators: Household Dietary Diversity Score (HDDS), Dietary Diversity Index (DDI), and Food Consumption Score (FCS). Amongst the three, the cash advantage was largest for FCS, where the impact of cash transfers was 9 percent higher than on food transfers. Children in cash beneficiary households also consumed a wider variety of foods and were 16 percent more likely to obtain a minimally diverse diet.

Food Consumption & Expenditure

Food beneficiaries consumed approximately 100 more calories per person per day than food beneficiaries, though the total value of the consumed food was similar across both groups. The higher caloric consumption for food households stemmed entirely from the consumption of food basket items: wheat and oil. Cash households, however, consumed significantly higher caloric levels of animal products (27 percent) and pulses and tubers (40 percent). Expenditure patterns matched these consumption differences, as cash households not only spent significantly larger sums on food basket items, but also on non-basket items such as rice (42 percent) and meat (73 percent).

Non-food Consumption & Expenditure

No significant differences in patterns of non-food consumption or expenditure emerge by modality. In particular, the preferred estimates did not detect higher qat expenditure or usage among cash households.

Subjective Food Insecurity

Households receiving both cash and food report similar rates of difficulty meeting food needs during the study period. Similarly, no significant differences were found in reports of reductions in meal frequency or volume.

Cost

Cash benefits proved nearly five times less expensive to deliver than food baskets. Exclusive of the transfer value, each cash transfer cost WFP $5.22 and each food transfer $11.50. Including the additional transportation costs incurred by cash beneficiaries, who were required travel significantly farther than food recipients, raises the per transfer cost of cash to $8.37. The total cost to WFP, including the value of the transfers, to raise FCS by 15 percent using cash amount amounted to $374.77.

Conclusion

Cash transfers raised dietary diversity and quality more highly than food, and were cheaper to deliver and administer. Food beneficiaries, however, consumed more calories overall. Consequently, food transfers appeared to be extra-marginal in terms of dietary composition, but infra-marginal in terms of overall food consumption. That is, under the alternative of an equal-valued budget increase, food beneficiaries consume more oil and wheat than they would optimally, and would spend the excess money on higher quality food items (like meat and pulses) instead of non-food items (like qat)

1. Introduction

Developing country governments and donors are increasingly interested in moving away from commodity-based assistance, such as food aid, and replacing it with alternative transfer modalities such as cash and vouchers. In theory, cash is preferable to in-kind transfers because it is economically more efficient (Tabor 2002). In addition, cash does not distort individual consumption or production choices at the margin (Subbarao et al. 1997). Provided that certain assumptions hold, cash transfers provide recipients with freedom of choice to make the most needed expenditures, including human capital investments, and give them a higher level of satisfaction at any given level of income than is the case with food (Hanlon, Barrientos, and Hulme 2010). Cash distribution can also stimulate agricultural production and nonagricultural activities by shifting out the demand curve for these items. Further, distributing cash is likely to be cheaper than distributing food or other commodities. In-kind administrative costs can be 20-25 percent higher than that of cash transfers (Cunha 2010; Ahmed et al. 2009, 2010).

The literature on the use of alternatives to food transfers has been summarized in papers by Gentilini (2007) and Sabates-Wheeler and Devereux (2010). Both note that in contrast to the heated debates regarding the use of alternatives to food, a more careful examination of the issues suggests that both have benefits and drawbacks. In terms of their impact on beneficiaries, the impact of a food transfer compared to one received through an alternative modality depend upon at least six factors:

- In the case of a food transfer, is the size of the transfer "infra-marginal" (less than what the household would have consumed without the transfer) or "extra-marginal" (greater than the amount of that commodity the household would have consumed without the transfer)?
- In the case of a food transfer, is the food product a "normal" (quantity consumed rises when household income rises) or "inferior" good (quantity consumed falls when household income rises)?
- The net value of the transfer to the household after all transactions costs are taken into account. Examples that affect this value include
    - If the household sells some of the food transfer, the price they receive for that transfer relative to the value of the transfer at current market prices;
    - If the household sells a voucher, whether they receive the full value of the voucher or whether it is sold at a discount;
    - The costs of going to markets and using vouchers and/or cash to purchase food and other goods;
- The extent to which a food transfer or alternative modality is associated with the perceived obligation to use this transfer in a particular fashion (for example, food vouchers "should" be used to purchase food; food transfers "should" be shared with extended family members);

- The interaction between the transfer modality and the gender of the recipient. For example, if food and food transfers are a "woman's" resource while cash and cash transfers are a "man's" resource, then differences in preferences between men and women may result in different uses of transfers obtained from different modalities even if their value is comparable;
- The extent to which beneficiaries are liquidity constrained (i.e., unable to borrow or convert goods into cash). For example, when food transfers cannot be readily resold, a "lumpy" cash transfer (unlike a similarly-valued food transfer) would be more likely to be used to make purchases of larger, nondivisible goods.

Despite substantial research into the impact of food assistance (e.g., Barrett and Maxwell 2005) and the impact of conditional cash transfers (CCTs) in many contexts (see Fiszbein et al. [2009] for a review), there is almost no evidence from a rigorous evaluation directly comparing the impact and cost-effectiveness of cash transfers and food transfers in the same setting (Ahmed et al. 2009; Gentilini 2007; Webb and Kumar 1995). This evaluation study in Yemen is one of five impact evaluations being undertaken in different countries by World Food Programme (WFP) and the International Food Policy Research Institute (IFPRI) in which cash, food vouchers, or food assistance will be compared to learn which modalities are most effective in different contexts.[1] In the Yemen case study, cash and food transfers are distributed as part of an unconditional seasonal emergency safety net (ESN) to qualifying households in rural areas of Hajjah and Ibb Governorates with the primary objective of increasing food security. Therefore, the impact evaluation is targeted at estimating the relative impact and cost-effectiveness of cash and food transfers on household and child food security indicators as well as complimentary indicators such as household food consumption, expenditure, and child dietary diversity. Areas of secondary interest include dynamics of qat expenditure as well as gender issues including, but not limited to, women's decision making.[2]

The Yemen study is designed as a prospective, randomized impact evaluation based on a matching or discontinuity design. The study is nested in a larger ongoing seasonal ESN operating in 11 governorates that aims to deliver food assistance during the lean season of May to October. For the 2011-2012 ESN, existing food distribution points (FDPs) in Hajjah and Ibb were randomly assigned into cash transfers or food transfers. Households qualified for assistance based on a proxy means test (PMT) carried out by the Social Welfare Fund (SWF) and the World Bank. Those eligible households residing in the FDP catchment area were provided three transfers on an approximately bi-monthly basis. Households in the same catchment area who just missed qualifying for the transfers based on their proxy means score (PMS) serve as the comparison group to the treatment households. A baseline survey was conducted in September 2011 in collaboration with the Sana'a-based Yemeni survey firm Yemen Polling Center (YPC). An endline survey, again in collaboration with YPC, is scheduled among these

[1] The other countries are Ecuador, Niger, Timor Leste, and Uganda. These are described, along with the motivation and learning objectives for this five-country study, in Ahmed et al. (2010).

[2] Qat (or khat, gat, or miraa) is a flowering plant native to the Horn of Africa and the Middle East and is chewed as a stimulant.

same households for March 2012, after the third and final transfer distribution (post-intervention).

This endline report introduces the context for this study, describes the interventions and evaluation design, and summarizes the data from the baseline survey. Chapter 2 describes the WFP cash and food assistance transfer program. Chapter 3 describes the experimental evaluation design for studying the impact of the cash and food assistance and describes methodologies that will be used to measure the impacts of study objectives. Chapter 4 describes the sample design for the baseline household survey. Chapter 5 summarizes the baseline survey questionnaires, the structure of the field teams, notes from the fieldwork, and the data entry and cleaning process. Chapter 6 summarizes household characteristics from the baseline survey data. Chapter 7 reports tests of the results of the randomization, comparing key outcome and control variables across the two treatment and comparison arms at baseline. The main results of the impact evaluation are found in Chapter 8. Chapter 9 discusses the results of the costing comparison, and Chapter 10 concludes.

2. The Intervention (Cash and Food Transfers)

Yemen consistently ranks near the bottom across a range of development indicators, including those linked to nutrition, food security, gender, and human development. More recently, the emerging conflict and civil unrest has thought to exacerbate the so called triple "F" (food, fuel, and financial) crisis, further impoverishing the Yemeni population (Breisinger et al. 2010). From September 2009 to January 2010, WFP carried out a Comprehensive Food Security Survey (CFSS) covering 19 out of 21 governorates in Yemen (WFP-CO Yemen 2011a). The sample used a two-staged randomized design, resulting in a total of approximately 6,733 households in both urban and rural areas (570 enumeration areas [EA] and 12 households per EA). Results of the CFSS showed that almost one in three Yemenis suffered from food insecurity (31.5 percent), more than 12 percent of which could be characterized as severe food insecurity. Further, 59 percent of children aged 6 to 59 months were stunted (height-for-age below 2 standard deviations from the median of the international reference). In addition, the CFSS observed that there is a perceived seasonality for households to access sufficient quantities of food. Since then, multiple data sources have confirmed the food security and nutrition "crisis" affecting diverse regions in Yemen.[3]

In response, WFP proposed a seasonal ESN consisting of bi-monthly cash and food transfers to assist 1.8 million "severely-food-insecure" persons across 14 governorates[4] in the six-month lean season from May to October. The ESN is one component of a comprehensive two-year Protracted Relief and Recovery Operation (PRRO).[5] In an effort to reach the most vulnerable and food insecure, the SWF beneficiary list is used as the basis for the targeting of transfers. Household-level transfers are distributed in coordination with local partners: the Yemen Post and Postal Savings Corporation (PPSC) in the case of cash transfers and the Ministry of Education (MoE) in the case of food transfers. The PPSC was chosen because it is the financial service provider for the Government of Yemen social safety net program as well as being the only service provider with comprehensive nationwide penetration. Transfers are given out at district branches of the PPSC in each governorate (see Annex 1, PPSC branches in Hajjah and Ibb).[6]

The food transfers are stored in warehouses outside of Sana'a and distributed through local government-run primary schools with the assistance of a food distribution committee (FDC) (see Annex 2, FDPs in Hajjah and Ibb). The FDC is comprised of approximately three individuals per FDP including a school teacher from each primary school, a local council administrator, and a guard. Each individual beneficiary holds a WFP ration card containing a

[3] See, for example, the release of a recent UNICEF survey reporting one in three children in Hodeida suffering from malnutrition (IRIN 2011).

[4] The targeted governorates are Al-Baidha, Al-Dhalee, Al-Hudaida, Al-Mahwait, Amran, Dhamar, Hajja, Ibb, Lahj, Mareb, Raymah, Sana'a (rural), Shabwa, and Taiz.

[5] In addition, the new PRRO's nutrition component aims to prevent and address acute malnutrition through (1) blanket supplementary feeding for children 6 to 23 months; (2) targeted supplementary feeding for children 6 to 59 months; and (3) Targeted supplementary feeding for pregnant and lactating women.

[6] Note that during contracting, PPSC indicated mobile services (which would allow transferring directly to beneficiaries); however, this was stopped due to security concerns. This service has the potential of being re-started in governorates that are relatively more secure in the future.

unique ID number, photograph, and other identifying information, and presents the card at the time of transfer pickup. Because beneficiaries may not always be able to travel due to physical disability or other reasons, other family members can collect transfers on behalf of the beneficiary if they have the ration card, national ID of the beneficiary, and self-identification. Initial meetings with beneficiaries were held in June 2011 before the first transfer of the 2011 cycle was distributed to sensitize beneficiaries to the program objectives and logistics.[7] A follow-up meeting for cash beneficiaries was held in November 2011 during the first disbursement of cash transfers.

The value of the bi-monthly transfer is standardized across treatment arms. The food ration is equivalent to the estimated median residual caloric gap between the recommended individual caloric intake and the typical intake of food-insecure households (initially calculated at approximately 25 percent of the required calorific needs, or 500 kcal per person per day). The bi-monthly food ration to cover this gap for an average household size of seven persons is 50 kg of wheat flour and 5.0 liters of vegetable oil. The total value of the cash transfer is approximately $49 (10,500 Yemeni riyals [YER]) per bi-monthly per household, a figure based on the equivalent price of the food ration on local markets. Cash transfer households can collect cash at any time up to 25 days after disbursement.

WFP CO is responsible for monitoring the distribution of the transfers, including supervision of the PPSC, the MoE, and the FDC. Although the transfers were originally scheduled to be distributed in identical cycles taking place approximately bi-monthly in June, August, and October, a number of logistical and administrative delays resulted in a marked change to disbursement schedules. These delays were related to contracting of the survey firm YPC, procurement of post offices, timing of the holiday season in Yemen (Ramadan and Eid) and general environmental concerns arising from the security situation. At the timing of the drafting of this report, transfers are under way, with two cycles of food and cash completed and ongoing monitoring by WFP CO. The evaluation design, including the sampling strategy, selection of beneficiaries, and the implications of timing delays for the impact evaluation strategy, is described in more detail below.

[7] In the case of cash transfer FDPs, a second resensitization campaign was held between November 22 and 25 after funds were transferred to PPSC to reinforce messages from the first campaign.

3. Experimental Design and Estimation Strategy

3.1 Experimental Design to Study the Impact of Transfers

The strategy for estimating the impacts of the cash and food assistance is built into the design of the study. We use an experimental design to randomly assign each of the 136 FDPs or "clusters" to one of two treatment arms: the cash transfer group and the food assistance group. Because the total number of clusters is relatively large, random assignment of clusters assures that, on average, households should have similar baseline characteristics across treatment arms. The gold standard for randomized control trials (RCTs) is to have a third arm of randomization that includes a pure control group that receives no transfers. Such a design eliminates systematic differences between beneficiaries and non-beneficiaries in targeted programs and minimizes the risk of bias in the impact estimates due to "selection effects" based on differences in household characteristics. As a result, average differences in outcomes across the groups after the intervention can be interpreted as being truly caused by, rather than simply correlated with, the receipt of transfers.

Upon discussions with the Yemen CO, however, it became apparent that a pure randomization strategy was not feasible in the context of the ESN for several reasons. First, since the program is an emergency operation serving highly food-insecure households across a large geographic area, there would be ethical concerns with excluding a qualifying population. Furthermore, since the ESN was provided during the 2010 lean season, there would be potential security concerns with revoking transfers to certain clusters while continuing to provide transfers to nearby clusters.

As an alternative strategy, a comparison group consisting of households categorized by the SWF as having economic means just above the cut-off for qualification to receive ESN transfers was identified. However, as is clear from the baseline survey report (see, in particular, Figure 6.1), the PMT replication using the baseline data did not produce discernible treatment probability discontinuities at the cut-off points used by the SWF. Instead, there exists considerable overlap between the treatment and comparison group along multiple dimensions of asset ownership and demographic characteristics.

As a final note to the evaluation design, due to changes in timing of the transfers and survey work, several challenges affect our ability to directly compare the impacts of food and cash. First are differences in the timing of the food and cash transfer distributions. Most notably, the changes in timing of the survey and distribution schedule have resulted in the loss of a pure pre-intervention survey, as the baseline survey occurred after the first food transfer (but before the first cash transfer). In order to truly compare the two modalities, the disbursement schedules should be identical so that differences in impact can be attributed to difference between the modalities rather than differences in seasonal or other environmental factors influencing budgeting and resource flows within the household, or discrepancies in the period between transfer receipt and survey measurement.

The first distribution cycle for cash began on November 22 (duration of 25 days), while the second started on January 5, and the third began on February 22, all with identical duration periods (WFP-CO 2012). In contrast, the first food disbursement began August 3, prior to the

baseline survey, and the second transfer began in late October. The final food transfer, however, did not occur until April. Differential timing of modality receipt represents a significant challenge in comparability.

Indeed, discrepancies in the timing of food and cash distributions, particularly with respect to the timing of the baseline and endline survey, complicate the impact evaluation analysis. Despite these temporal incongruities, the aggregate value of transfers preceding the endline survey remains comparable across modalities. In addition, randomization assures that mean differences in endline outcomes between cash and food beneficiaries should provide well-identified impact measures without the need to control for baseline covariates potentially affected by early food transfers.

3.2 Costing Component

IFPRI has developed a costing protocol to track comparative costs relative to program modality and to assess cost-effectiveness across the four countries involved in the WFP impact evaluation. The protocol relies on an activity-based costing ingredients method (ABC-I). Traditional accounting methods do not take into account the opportunity cost of program activities, or benefits sacrificed when resources are allocated elsewhere. Therefore, accounting costs often underestimate the true overall cost of program operations. The use of the ABC-I method allows for opportunity costs, quantified as economic costs, to be included in the total program costs. This method also allows for the incorporation of "off-budget" expenditures, for example, donated goods or services that otherwise would not be included as program operating costs. In this case, donated commodities would be incorporated, even if the actual cost of those rations were provided by donor governments.

In the activity-based costing approach, costs are organized into their respective sectors, known as cost centers. The ABC-I method is a combination of activity-based accounting methods with the "ingredients" method, which calculates program costs from inputs, input quantities, and input unit costs (Fiedler, Villalobos, and De Mattos 2008; Tan-Torres Edejer et al. 2003). As the ingredients method alone does not allocate costs according to program activities, it would not allow for comparison between modalities. However, this method, when paired with the ABC-I approach, matches activities with all their corresponding inputs into cost centers.

The general ledger of total funds spent may serve as a reference point from which to detail activities and ingredients (Canby 1995). However, as program staff currently utilizes cost-accounting methods that aggregate data by cost centers that are not separated by program modality, it may be necessary to re-organize and cost these inputs using the ABC-I approach. Furthermore, as the WFP Executive Board noted in a recent meeting,

> The practice of embedding non-commodity activities in the commodity-based cost structure results in non-commodity inputs not being properly defined and categorized. This creates significant difficulties in planning, controlling, managing and implementing such activities . . . [and] in benchmarking across projects, developing performance metrics and evaluating the impact (WFP 2010);

it may also be necessary to categorize these costs as recurrent or start-up costs in order to facilitate future data analysis.

A cost profile analysis provides information regarding the comparative benefits of program modalities by allocating costs to each modality's activities and individual inputs ("ingredients"). Additionally, program costs should be separated into initial program start-up costs versus recurrent costs. A cost-effectiveness analysis is a further step in evaluating the various program modalities. As some outcomes may vary according to the program design in each country, common outcomes should be identified that can be compared across contexts, if possible. The calculation of cost per unit of desired impact would then be compared across program modalities for these selected outcomes.

The bottom-up approach of ABC-I is a thorough, albeit time-intensive, method. Detailed input data are required, such as the percentages of time allocated for personnel costs by activity. This particular "ingredient" requires the direct participation of country program staff that may already have many demands on their time. In-country interviews with program staff are necessary to accurately delineate these types of data. Additionally, utilizing the ABC-I method may make it difficult to include activities and inputs provided by the program central office (Maluccio, Caldés, and Coady 2005).

For the costing component in Yemen, IFPRI staff initiated discussions surrounding costing work via Skype and email communications. Costing work is ongoing in accordance with information flows and the assistance of the CO.

3.3 Estimation Strategy

Estimation of the relative impacts of cash and food transfers relies on the randomized assignment of FDPs to either modality. With a sufficient number of clusters, random assignment eliminates systematic differences between food and cash beneficiaries and permits unbiased causal inference based on post-intervention outcomes. By obviating the worry that households either select into or are selected into either treatment based on their characteristics, impact estimates are unlikely to be biased by innate differences between each group. Consequently, the preferred empirical specification throughout the paper relies on average differences between each treatment group in the endline survey:

$$Y_{i,c,s=\text{elg}} = \alpha + \beta^{post} F_{c,s=\text{elg}} + \delta X_{i,c,s=\text{elg}} + \varepsilon_{i,c,s=\text{elg}}, \qquad (1)$$

where $Y_{i,c,s=\text{elg}}$ is the outcome of interest for treatment-eligible (status s= *elg*) household i in FDP c in the post-intervention survey, $F_{c,s=\text{elg}}$ is a dummy variable equal to 1 if the treatment eligible household is located in an FDP assigned to receive food, and $X_{i,c,s=\text{elg}}$ is a vector of control variables for treatment eligible households. The parameter β^{post} gives the change in outcome Y due to assignment to the food group relative to assignment to the cash group (i.e., the cash group is the omitted group). Note that the main empirical specification given by equation (1) uses only post-intervention outcomes, and is estimated solely among the sample of households eligible to receive the treatment. Ignoring the covariates for simplicity, β^{post} represents a simple difference in post treatment means:

$$\hat{\beta}^{post} = (\bar{Y}^{post}_{Food} - \bar{Y}^{post}_{Cash}) . \quad (2)$$

To illustrate, $\hat{\beta}^{post} < 0$, for cash households experienced a larger increase in outcome Y than food households. If $\hat{\beta}^{post} > 0$, food households experienced a larger increase in outcome Y than cash households. For all the results presented in chapter 8, $\hat{\beta}^{post}$ remains our preferred impact estimate.

Both the baseline and endline surveys collected data on households deemed ineligible for receiving either cash or food transfers. These comparison households had proxy means test scores just above the cut-off line to receive benefits, and dwell in the same FDP catchment areas as beneficiaries. Thus, even if the assumption of no systematic differences between food and cash beneficiaries does not hold, an alternative assumption may still hold that the difference between eligibles and ineligibles in each does not systematically differ by modality assignment. Under such an assumption, the causal impact of each intervention can be estimated by the following:

$$Y_{i,c,s} = \alpha + \beta_{DD} F_{i,c,s} * Elg_s + \phi F_{i,c,s} + \eta Elg_s + \delta X_{i,c,s=\text{elg}} + \varepsilon_{i,c,s} . \quad (3)$$

In this difference-in-difference specification in equation (3), Elg_s is a dummy variable equal to 1 if the household is eligible to receive WFP benefits, and only post-intervention outcomes are used. Thus the parameter β_{DD} gives the difference in impact between eligible and ineligibles in the food FDPs relative to the cash FDPs. Expressed in terms of mean differences:

$$\hat{\beta}^{post}_{DD} = (\bar{Y}^{post}_{Food,Beneficiary} - \bar{Y}^{post}_{Food,Non-beneficiary}) - (\bar{Y}^{post}_{Cash,Beneficiary} - \bar{Y}^{post}_{Cash,Non-beneficiary}) . \quad (4)$$

The estimand in equation (4) suffers from potential problems stemming from asymmetric leakage of transfer effects on ineligibles by modality. Specifically, the introduction of cash and food transfers into an FDP may induce changes in the outcomes of non-beneficiaries due to price or informal insurance effects, and the size and direction of these changes may differ by modality. For example, Angelucci and DeGiorigi (2009) show that cash transfers affect the consumption of non-eligibles, and Cunha, DeGiorgi, and Jayachandran (2011) demonstrate that food and cash transfers have differential impacts on local prices. Consequently, the introduction of outcomes for ineligibles may introduce bias into the causal impact estimate. Nevertheless, the size of the bias may be small, so equation (3) serves as a robustness check.

The most common empirical specification in randomized trials is the "pre-post" difference-in-difference, which looks at the change in outcomes from baseline to endline by treatment arm. While baseline survey data were collected in this study, the baseline survey occurred after the first food transfer was distributed, but before beneficiaries received the first cash transfer. Thus, the change in an outcome variable between the baseline and endline survey cannot be attributed to cash and food transfers in the same manner. For the food treatment arm, two transfers occurred between the baseline and endline survey, and the baseline outcome measure may have been affected by the food distribution that occurred approximately one to two months before the survey. Cash recipients received three cash transfers between the baseline and endline, and baseline outcome measures could not have been affected by the

program. Therefore, the analysis here does not rely primarily on comparisons between treatment groups of baseline-endline outcome differences.

While the introduction of baseline outcome values into the analysis introduces potential bias, the size of the bias may be small. In particular, under the assumption that effects dissipate two months after the transfer, the number and previous receipt of a transfer may minimize the bias introduced by the incongruity in the timing and initiation of each transfer type. Consider the following ANCOVA specification:

$$Y^{Post}_{i,c,s=\text{elg}} = \alpha + \beta^{ANC} F_{c,s=\text{elg}} + \delta X_{i,c,s=\text{elg}} + \phi Y^{\text{Pre}}_{i,c,s=\text{elg}} + \varepsilon_{i,c,s=\text{elg}}. \tag{5}$$

The parameter of interest, β^{ANC}, now expresses the simple mean group difference in post-intervention outcomes, but now differenced by the baseline outcome measurements in the following manner:

$$\hat{\beta}^{ANC} = (\bar{Y}^{post}_{Food} - \bar{Y}^{post}_{Cash}) - \phi(\bar{Y}^{\text{Pre}}_{Food} - \bar{Y}^{\text{Pre}}_{Cash}). \tag{6}$$

Similarly, the β^{post}_{DD} estimand using eligibility can be modified to include controls for baseline outcomes. The following equation yields the desired estimator:

$$Y^{Post}_{i,c,s} = \alpha + \beta^{ANC}_{DD} F_{c,s} * Elg_s + + \rho F_{i,c,s} + \eta Elg_s + \delta X_{i,c,s} + \phi Y^{\text{Pre}}_{i,c,s} + \varepsilon_{i,c,s}. \tag{7}$$

The subsequent result is similar to the basic eligibility estimator, but includes a difference-in-difference term for pre-intervention outcomes:

$$\begin{aligned}\hat{\beta}^{ANC}_{DD} &= (\bar{Y}^{post}_{Food,Beneficiary} - \bar{Y}^{post}_{Food,Non-beneficiary}) - (\bar{Y}^{post}_{Cash,Beneficiary} - \bar{Y}^{post}_{Cash,Non-beneficiary}) \\ &-\hat{\phi}[(\bar{Y}^{pre}_{Food,Beneficiary} - \bar{Y}^{pre}_{Food,Non-beneficiary}) - (\bar{Y}^{\text{Pre}}_{Cash,Beneficiary} - \bar{Y}^{\text{Pre}}_{Cash,Non-beneficiary})].\end{aligned} \tag{8}$$

As a final robustness check, a full difference-in-difference-in-difference (DDD) model can be estimated. The DDD specification estimates the modality difference between the pre-post and eligible-non-eligible outcomes. The regression takes the following form:

$$\begin{aligned}Y_{i,c,s,t} &= \alpha + \beta_{DDD} F_{c,s} * Post_t * Elg_s + \gamma F_{c,s} * Post_t + \lambda Post_t * Elg_s \\ &+\xi F_{c,s} * Elg_s + \phi F_{i,c,s} + \psi Post + \eta Elg_s + \delta X_{i,c,s,t} + \phi Y^{\text{Pre}}_{i,c,s} + \varepsilon_{i,c,s,t},\end{aligned} \tag{9}$$

where $Y_{i,c,s,t}$ represents the outcome of household i in cluster c of eligibility status s at time t. The triple difference estimator can be represented by the following:

$$\begin{aligned}\hat{\beta}_{DDD} &= (\bar{Y}^{post}_{Food,Beneficiary} - \bar{Y}^{pre}_{Food,beneficiary}) - (\bar{Y}^{post}_{Food,Non-Beneficiary} - \bar{Y}^{pre}_{Food,Non-beneficiary}) \\ &-(\bar{Y}^{post}_{Cash,Beneficiary} - \bar{Y}^{pre}_{Cash,Beneficiary}) - (\bar{Y}^{\text{Post}}_{Cash,Non-beneficiary} - \bar{Y}^{\text{Pre}}_{Cash,Non-beneficiary}).\end{aligned} \tag{10}$$

By fully exploiting the presence of a control group and two survey rounds, the DDD estimate potentially eliminates common trends unrelated to transfer effects more completely than the other estimators. However, uncertainty regarding the reliability of the pre-post difference for the food group, as well as issues with the validity of non-eligibles as a control

group, implies that in practice the DDD estimate might exacerbate problems with the study design by stacking confounding errors.

In all specifications, we calculate intent-to-treat (ITT) estimates. That is, we consider all treatment eligible beneficiaries as treated, without regard to reports of actual receipt of the transfer. We do so for several reasons. First, only 7 percent of potential beneficiaries report not receiving a transfer. Second, those reporting not receiving a transfer may be strategically underreporting. We find that administrative records contradict nearly half of those cash beneficiaries not reporting transfer receipt. Third, after correcting for contradictory reports, we find reports of nonreceipt to be symmetric by modality. As a consequence, we prefer ITT estimates to dropping a potentially nonrandom part of the sample.

3.4 Time from Receipt of Transfer

Due to a last minute delay by WFP in their implementation of the food distribution, food beneficiaries received their final transfer much closer to the endline survey date than cash recipients. The median food and cash households obtained their transfers 15 and 49 days, respectively, prior to the survey. This nearly month long gap complicates the impact estimates presented here.

The potential distortionary impact of the difference in transfer timing depends on the outcome under consideration and the extent to which households are able to smooth consumption. For example, assuming no credit and storage constraints, the timing of transfer receipt should have no or very little impact on comparative outcomes related to consumption and expenditure.[8] However, if, for instance, food depreciates at a higher rate than cash due to spoilage,[9] the timing discrepancy will be evident in a higher marginal propensity to consume from the basket among food households. Without solid evidence on the empirical validity of these various assumptions, it is difficult to model and predict the size and direction of bias introduced by timing differences.

The analysis presented in this report takes a minimalist approach with respect to adjusting for differences in timing of transfer receipt. Due to the quite limited degree of overlap between the empirical distributions of survey-transfer duration by modality, controlling for the time gap explicitly introduces multicollinearity problems that complicate the identification of treatment effects. However, for outcomes that rely on a recall period including the week before the survey (e.g., days in the last 7 the household consumed meat), the analysis excludes those households that received their transfer in the eight day period before the survey.[10] As these excluded households are exclusively food recipients, analysis is conducted to demonstrate that the selected sample is still "balanced" with respect to the cash comparison group (i.e., that the minority of households who received the transfer close to their survey date are not observably different than the rest of the food beneficiary sample). Throughout the analysis, the implications

[8] Note that if households smooth consumption by selling assets, measures of wealth may still be affected.

[9] It is not obvious, *a priori*, that the 'burn rate' of food must be higher than cash. For example, the monitoring cost of cash in an intrahousehold bargaining process may differ from food, thus introducing a timing imperative in the spending of cash.

[10] The choice of a period of eight, and not seven, days was given due to time lags from transportation and ingredient preparation.

of the transfer timing differences on the interpretation of the results are discussed when relevant.

4. Sample Design

4.1 Site Selection and Sampling

Overall, 14 governorates were chosen to implement the ESN based on the classifications of at least 10 percent of the population as severely food-insecure, with the end objective of reaching at least 75 percent of this population at the governorate level (WFP-CO Yemen 2011a). The governorates of Hajjah and Ibb were chosen to be the sites of the cash and voucher pilot based on several criteria. These governorates are second- and third-ranked among the 14 governorates implementing the ESN in terms of absolute numbers of food-insecure persons. In addition, Hajjah and Ibb have high percentages of the food-insecure (46.3 percent and 44.0 percent, respectively, according to the 2009 CFSS), as well as relative stability and implementation feasibility (WFP-CO Yemen 2011a). In addition, prior to the start of the 2010-2011 ESN, a pilot market study was conducted by a consultant assessing the validity and market penetration to assess the appropriateness of cash transfers in both governorates. Despite similar levels of food insecurity, Hajjah and Ibb have markedly different landscapes, agroecological zones, economic activities, and cultural backgrounds driving levels of both food insecurity and general poverty.

The FDPs within the sample area were randomized into cash or food transfers. Taking into consideration the context of the project area, we stratified the randomization of clusters at the governorate-level due to the distinct socioeconomic and geographic characteristics of Hajjah and Ibb. Stratification guarantees that, within each stratum, each of the treatment arms is represented equally in each governorate. Stratifying in this manner reduces the chance that random assignment of clusters results in significant geographic discrepancies between treatment arms (in this case, location-specific characteristics would be confounded with receipt of treatment). Before conducting the randomization, consultations were undertaken with WFP and YPC to ensure that (1) there was sufficient number of qualifying households in each cluster and (2) there was sufficient geographical distinction between clusters. This process led to the bundling of several clusters, and resulted in 68 cash and 68 food FDPs across the two governorates.[11] Due to misinterpretation of the location of one of the FDPs, the actual number of FDPs in the food treatment is 67.

4.2 Sample Size

The sampling for the baseline survey was conducted by IFPRI after receiving the SWF beneficiary lists for households residing in each FDP catchment area. Based on the distribution of clusters in the treatment arms and the required sample sizes, 15 treatment households and 11 comparison households were randomly selected to be interviewed in the baseline survey. In total, 3,536 households were included in the baseline sample. Approximate sample size

[11] In addition, several "cash replacement" FDPs were randomly selected to account for the possibility that no financial institution was in proximate distance to the FDP; however, these replacements were not utilized in the sample frame and were subsequently dropped from the evaluation.

calculations were conducted across countries at the inception of the study and are found in Ahmed et al. (2010).

This analysis conducted throughout this report is restricted to 3,353 households for whom consistent data from both the baseline and endline surveys exists. Of the 183 households in the original sampling frame not included in this analysis, only 26 are omitted due to pure attrition. These 26 households had moved away from their location during the baseline survey, and were unable to be interviewed for the endline survey. The majority of these households originally resided in the Al-Wahdah FDP in Hajjah, and were forced to move due to ongoing tribal violence. Given the conditions, an attrition rate of less than one percent is quite remarkable. Another 54 households were not included because multiple beneficiaries lived in the same household. A further 17 households resided in an area not included in the ESN (see above). Four households are dropped because they appeared to reside in a food FDP area, but reported receiving cash transfers. The remaining households not considered here were listed by administrative records as ineligible to receive benefits (i.e., group C), yet reported receiving WFP transfers in either round, or had extensive incomplete or missing data for key sections.[12]

[12] These households are dropped because of the likelihood that they participated in another food transfer program, which was not randomly distributed across the sample FDPs

5. Baseline Survey

5.1 Survey Instruments and Topics

The survey instruments used for the baseline consist of two components: (1) *Household questionnaire*, completed for each household in the sample, and (2) *Food Distribution Point questionnaire*, completed for each FDP in the sample, including a market and price module.

The *household questionnaire* contains household-level information as well as detailed information on individual household members (see Table 5.1 for details). As the key objective of the study is to understand how households use the transfers, whether use differs by transfer modality, and which household and environmental characteristics determine use, many of the modules in the household questionnaire focus on household socioeconomic characteristics and uses and sources of resources. Household-level information includes composition and demographics, dwelling characteristics, consumption habits, food and nonfood consumption and expenditures, assets, transfers into and out of the household, budgeting behavior, and experience with WFP transfers. In addition, individual-level information is collected on the following: schooling of household members ages 5 to 18, activities and labor force participation of household members ages 10 and above, health information for any household member suffering from illness, injury, or disability in the past four weeks, and food frequency for children under 6 years. Further, several sections focus on areas of interest for gender, including maternal health and women's status, decision making, and violence. Due to the sensitive nature of these questions in Yemen, the decision was made that only female enumerators would collect information on these sections (modules G and R). The majority of remaining sections in the household questionnaire are answered by the member of the household who is most knowledgeable on the topic. In many cases the household head is suggested for general information and information on economic activities, while the female head or spouse is recommended for information on health, food, or issues pertaining to children.

Table 5.1 Household questionnaire modules

Module	Description	Target respondent	Round (1,2,[B]oth)
A	Household identification, location and interview details	Household head	B
B	Household roster and demographic information	Household head	B
C	Education (ages 5 – 18)	Household head	B
D	Activities and labor force participation (ages 10 and up)	Household head	B
E	Housing characteristics	Household head	B
F	Health	Female head/spouse	B
G	Maternal health (primary female aged 12 – 49)	Female head/spouse	B
H1	Health and nutrition knowledge	Female head/spouse	1
H2	Marriage preparation and costs	Household head	2
I	Consumption habits and food security indicators	Female head/spouse	B

Module	Description	Target respondent	Round (1,2,[B]oth)
J	Consumption and food expenditure	Female head/spouse	B
K	Food frequency (children aged 0 – 6 years)	Female head/spouse	B
L	Markets and purchasing behaviours	Female head/spouse	B
M	Nonfood expenditure	Household head	B
N	Assets (productive, durable and credit)	Household head	B
O	Other exchanges (transfers and income sources)	Household head	B
P	Budgeting behavior	Household head	B
Q	Experience with WFP transfers	Household head	B
R	Women's status, decision making, and domestic violence	Female head/spouse	B
S	Shocks	Household head	2

Food Distribution Point questionnaires were completed for each FDP included in the sample. The instrument was administered to a local leader or other administrators or "key informants" such as members of the FDC. The questionnaires included information on community characteristics (for example, number of households and demographics); educational and health facilities (whether schools/hospitals/health professionals are present in the community, how far away from the community they are if not); access to services in the community (lending services such as banks, moneylenders, credit unions, microfinance, post offices, restaurants); infrastructure (public transportation, water, electricity); livelihoods and shocks (major economic activities, average daily wages for various types of work, whether there were unusual rainfall patterns recently or other negative shocks including flood, drought, civil unrest, presence of refugees and internally displaced persons); and women's status (customs on how marriage and dowry). The final component of the FDP questionnaire is a price survey: a list of the main food items in our food consumption module, to determine if food is available in village markets or shops, and if so, asking the unit price of the food item. Collecting this price data allows for analysis of the conditions under which households make decisions. This information may reveal to what extent variation in these conditions explains variation in consumption patterns.

Questionnaire development was an iterative process lead by IFPRI with input from WFPCO, YPC, WFP-Rome, and outside experts. Details of specific administration and implementation considerations as well as protocol for all questionnaires are found in the enumerator training manual developed by IFPRI and YPC.

5.2 Enumeration Team and Training

Enumerator training was conducted for the baseline survey on September 3-7, 2011 for enumerators assigned to conduct the household survey. Enumerators and supervisors were recruited for training in Sana'a at the YPC offices. All supervisors had previous experience working with YPC. Due to security concerns in Sana'a at the time of the survey preparation, IFPRI staff was unable to travel to Yemen. As an alternative, a three-day meeting (August 17–

19, 2011) was held at the WFP-Cairo office with key staff from IFPRI, YPC, and WFP, including bilingual Arabic and English speakers from both the evaluating and survey firms. Prior to meetings in Cairo, instruments had been translated into Arabic and supervisors had pretested both questionnaires in a one-day field-test exercise.

The enumerator training subject matter covered general enumerator guidelines for behavior in the field, procedures for questionnaire application such as consent forms, definition of codes, skipping patterns, and reference periods. As part of this training, the household and FDP questionnaires were pilot-tested a second time with the entire team and revisions were implemented based on feedback.

For the endline survey, IFPRI staff travelled to Yemen in February of 2012 in order to review the baseline survey, adjust fieldwork and data entry protocols in preparation for the endline survey, and collaborate on the construction and translation of the endline questionnaire. Staff from IFPRI also travelled to Yemen to assist YPC with the enumerator training that occurred on March 26-29, 2012.

5.3 Fieldwork

The baseline survey began on September 10, 2011, with parallel enumeration in Hajjah and Ibb. The field team included 40 household enumerators (20 in each governorate for which approximately 50 percent were women), divided into teams of 5 enumerators each. Each team was headed by a supervisor responsible for monitoring progress and quality. Fieldwork for the household sample continued over the next four weeks. The endline fieldwork began on April 4, 2012, with the same number and distribution of enumerators and supervisors.

6. Baseline Characteristics

In this section, we provide analysis on household characteristics at the time of the baseline survey for the 3,353 households in the baseline sample (see Table 6.1). While the original sampling frame evenly divided observations between Hajjah and Ibb, the sample used for analysis is slightly weighted in favor of Ibb. The discrepancy stems primarily from the high level of attrition in one cash-assigned FDP, Al-Wahdah, which was affected by armed conflict (see above). The minimal discrepancies in beneficiary types in each governorate do not pose a threat to the identification strategy.

Table 6.1 Baseline survey sample, by governorate

Household sample	All		Ibb		Hajjah	
Comparison	1,983	59.1	717	41.8	653	39.9
Treatment	1,370	40.9	998	58.2	985	60.1
Food	*1,001*	*50.5*	*494*	*49.5*	*507*	*51.5*
Cash	*982*	*49.5*	*504*	*50.5*	*478*	*48.5*
Total	**3,353**		**1,715**		**1,638**	

6.1 Household Poverty and Asset Ownership

Tables 6.2 and 6.3 report summary statistics of several key demographic and socioeconomic indicators across treatment eligibility and treatment arms. Treatment eligible households are more likely to be larger, have more young members, and be headed by a male. While the household heads in comparison households are more likely to have some formal education, property ownership rates were nearly identical between both groups (Table 6.2). For telephones, treatment households even reported higher ownership rates. Consequently, based on observables, comparison households do not appear starkly different from those eligible to receive WFP benefits.

Comparing the food and cash treatment arms (Table 6.3), the randomization again appeared to function reasonably well. In terms of household demographics, food households appear relatively more likely to be headed by a females and single people, although the education levels of the household head do not significantly differ. In terms of assets, cash households do appear to be slightly more likely to have more phones and own their plot of land, and they have a wealth index level .09 standard deviations higher than food households.[13] These differences are relatively small in magnitude, but significant at the 10 percent level, implying that controlling for baseline socioeconomic status in the main analysis will improve the accuracy of estimated treatment effects.

[13] The standardized wealth index is constructed using principal components analysis of 11 asset ownership indicators and 4 household structure characteristics. The methodology used to construct the index is similar to that used to construct wealth indices in the Demographic and Health Survey (DHS). The constructed index is then normalized across the baseline sample.

Table 6.2 Comparison of means of key variables at baseline, by treatment eligibility

	Treatment	Comparison	Difference
Hajjah	0.50	0.48	0.02
Female-headed HH	0.19	0.26	-0.07***
HH head attended primary school or higher	0.26	0.35	-0.09***
HH head is married	0.80	0.71	0.09***
HH head's age	47.33	46.83	0.50
Household size	8.78	7.07	1.70***
HH members age 0-5	1.22	1.08	0.14**
HH members age 6-17	3.94	2.62	1.32***
Number of phones	0.45	0.39	0.06***
Number of TVs	0.28	0.27	0.01
Number of refrigerators	0.07	0.07	0.00
Number of sewing machines	0.02	0.01	0.00
Number of bikes	0.00	0.00	-0.00
Number of motor vehicles	0.03	0.02	0.00
Owns a plot of land	0.21	0.21	-0.01
Owns any cattle	0.06	0.04	0.01
Standardized Wealth Index	0.02	-0.01	0.03
Observations	1,983	1,370	

Much of the analysis in the following chapter makes use of a subset of the sample analyzed in Tables 6.1-6.3. The subset consists of households who received their transfer more than 8 days prior to the endline survey. As nearly all cash households received their transfer prior to the eight day cut-off, the subset is primarily a subsample of the surveyed food beneficiaries. The survey-transfer timing was driven largely by coincidental logistical concerns of both the World Food Program food transfer team, and the YPC survey fieldwork, and there is little a priori reason that the food beneficiary subsample is 'selected for' in a statistically meaningful sense. Nevertheless, there is no guarantee that this is a random subsample of the randomly selected food beneficiaries, and consequently Tables 6.4 and 6.5 illustrate the socioeconomic characteristics of the subsample in relation to both the cash and "unselected" food sample.

Table 6.3 Comparison of means of key variables at baseline, excluding those who receive transfers with 8 days of survey, by treatment status

	Food	Cash	Food - Cash
Hajjah	0.51	0.49	0.02
Female-headed HH	0.21	0.17	0.05**
HH head attended primary school or higher	0.27	0.25	0.02
HH head is married	0.77	0.82	-0.05**
HH head's age	47.59	47.06	0.52
Household size	8.66	8.89	-0.23
HH members age 0-5	1.20	1.23	-0.03
HH members age 6-17	3.89	4.00	-0.11
Number of phones	0.48	0.42	0.05*
Number of TVs	0.29	0.27	0.02
Number of refrigerators	0.07	0.07	0.01
Number of sewing machines	0.02	0.01	0.01
Number of bikes	0.00	0.00	-0.00
Number of motor vehicles	0.02	0.03	-0.00
Owns a plot of land	0.23	0.19	0.04*
Owns any cattle	0.06	0.05	0.01
Standardized Wealth Index	0.07	-0.02	0.09*
Observations	1,001	982	

For this selected sample, the difference between food and cash households in the standardized wealth index shrinks, and becomes statistically insignificant (Table 6.4). Differences in other indicators remain nearly the same, but become less precise. Only in low ownership rates of motor vehicle ownership, does the difference both increase and reach conventional levels of precision.

Table 6.4 Comparison of means of key variables at baseline for beneficiaries receiving transfer more than 8 days before survey, by treatment status

	Food	Cash	Food - Cash
Hajjah	0.48	0.49	-0.01
Female-headed HH	0.21	0.16	0.05*
HH head attended primary school or higher	0.28	0.25	0.03
HH head is married	0.78	0.83	-0.05*
HH head's age	47.01	47.02	-0.01
Household size	8.66	8.90	-0.24
HH members age 0-5	1.22	1.24	-0.03
HH members age 6-17	3.88	4.01	-0.13
Number of phones	0.46	0.43	0.04
Number of TVs	0.30	0.27	0.03
Number of refrigerators	0.07	0.07	0.00
Number of sewing machines	0.02	0.01	0.01
Number of bikes	0.00	0.00	-0.00
Number of motor vehicles	0.01	0.03	-0.02*
Owns a plot of land	0.22	0.18	0.03
Owns any cattle	0.06	0.05	0.00
Standardized Wealth Index	0.05	-0.02	0.07
Observations	632	949	

Comparing those included and those excluded within the food treatment group (Table 6.5), it becomes clear that while the excluded group is slightly more likely to come from Hajjah, differences in other indicators are generally not significant economically and statistically. The lone exception is that the excluded group has higher motor vehicle ownership rates (5% versus 1%), and slightly higher wealth index levels (not statistically significant). As a whole, the summary statistics do not suggest that selecting the subsample of food households who received the transfers more than 8 days from survey time introduces discernible bias into the analysis.

Table 6.5 Comparison of means of key variables at baseline for food recipients, by timing of receipt

	Received within 8 days of survey	Received more than 8 days before survey	Difference
Hajjah	0.55	0.48	0.07*
Female-headed HH	0.22	0.21	0.01
HH head attended primary school or higher	0.25	0.28	-0.02
HH head is married	0.77	0.78	-0.01
HH head's age	48.57	47.01	1.56
Household size	8.66	8.66	-0.00
HH members age 0-5	1.17	1.22	-0.05
HH members age 6-17	3.89	3.88	0.01
Number of phones	0.50	0.46	0.04
Number of TVs	0.28	0.30	-0.01
Number of refrigerators	0.08	0.07	0.01
Number of sewing machines	0.02	0.02	-0.00
Number of bikes	0.00	0.00	0.00
Number of motor vehicles	0.05	0.01	0.03***
Owns a plot of land	0.24	0.22	0.03
Owns any cattle	0.07	0.06	0.01
Standardized Wealth Index	0.11	0.05	0.06
Observations	369	639	

7. Experience with Transfers

The endline survey collected detailed data on the experience of beneficiaries with several aspects of the transfer process. The following section presents these self-reported indicators, which give insight into the perspective of transfer recipients, highlight some key differences in the functionality of the transfer process by modality, and motivate the more extensive analysis of food security and other outcomes in the following sections.

7.1 The Transfer Process

The endline survey asked respondents detailed questions about the last transfer they received of either modality. Analysis of the responses suggests clear differences in the logistical experiences of beneficiaries (Table 7.1). In both governorates, cash recipients travelled far longer in order to obtain their transfers than food recipients. In Hajjah, beneficiaries travelled for

approximately 80 minutes to receive the transfer, nearly 3 times longer than food recipients. Further, cash recipients report much higher expenses associated with obtaining their transfer. In Ibb, the difference in expenses by transfer totaled 417 YER ($2.10), while in Hajjah the difference was an even larger 881 YER ($4.45). In Ibb and Hajjah, cash beneficiaries paid out 4 and 8 percent of their transfers, respectively, while food beneficiaries spent only 2.3 and 1.7 percent of the value of their transfers on transportation and related expenses incurred to obtain the benefit. In Hajjah, cash respondents also reported waiting times twice as high as those experienced by food beneficiaries.

Table 7.1 Beneficiary experiences with the transfers

Location	Outcome	Food	Cash	Food - Cash
Ibb	Travel time to distribution point (minutes)	34.01	61.33	-27.33
		(1.35)	(3.04)	(2.98)***
	Waiting time (minutes)	44.03	37.20	6.83
		(3.36)	(3.15)	(4.85)
	Total cost to receive (YER)	244.38	661.71	-417.33
		(17.27)	(34.66)	(35.38)***
	Received transfer on time? (1 = Yes, 0 = No)	0.69	0.72	-0.03
		(0.02)	(0.02)	(0.03)
	Generally received full transfer? (1 = Yes, 0 = No)	0.94	0.90	0.04
		(0.01)	(0.01)	(0.02)**
	Treated courteously? (1 = Yes, 0 = No)	0.93	0.92	0.00
		(0.01)	(0.02)	(0.02)
	Transfer program is fair and will help family? (1 = Yes, 0 = No)	0.96	0.95	0.01
		(0.01)	(0.01)	(0.01)
	N	432	290	
Hajjah	Travel time to distribution point (minutes)	29.17	79.56	-50.39
		(1.36)	(2.94)	(3.08)***
	Waiting time (minutes)	35.18	74.60	-39.42
		(2.18)	(4.83)	(5.04)***
	Total cost to receive (YER)	181.24	1,061.77	-880.54
		(14.83)	(50.34)	(48.94)***
	Received transfer on time? (1 = Yes, 0 = No)	0.82	0.86	-0.04
		(0.02)	(0.02)	(0.02)
	Generally received full transfer? (1 = Yes, 0 = No)	1.00	0.97	0.02
		(0.00)	(0.01)	(0.01)***
	Treated courteously? (1 = Yes, 0 = No)	0.96	0.95	0.01
		(0.01)	(0.01)	(0.01)
	Transfer program is fair and will help family? (1 = Yes, 0 = No)	0.99	0.99	-0.00
		(0.01)	(0.00)	(0.01)
	N	451	379	

Notes: Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

The differences by modality in monetary and time costs associated with obtaining the transfer stems from the different distribution methods for each type of transfer. Food rations are trucked in to a Food Distribution Point, which is a school serving surrounding villages. The

randomization occurred at the FDP level, with food households selected from the villages surrounding the school where distribution occurred, and cash households selected from the area surrounding schools where the distribution would have occurred if food were being distributed. Thus, food beneficiaries in each of the 68 FDP-level clusters received their food in each of the 68 schools servings as local distribution points. In contrast, cash households from the 34 separate FDP-level clusters in Ibb were served by only 12 post offices in the governorate, and the 34 cash clusters in Hajjah were served by only 7 post offices (see Annex 1 and 2). As a consequence of the disparity in the abundance and convenience of food and cash distribution points, food households report substantially lower costs associated with receiving their transfers. Higher costs and waiting times in Hajjah for cash recipients likely stem from the smaller number of outlets.

While cash and food beneficiaries reported a wide gap in travel costs, other aspects of receiving the transfers appear quite similar. Nearly identical proportions of beneficiaries of each modality agreed that the program was fair—99 percent in Hajjah for both cash and food. Similarly, despite the different distribution methods, over 90 percent of both cash and food recipients felt they were treated courteously when receiving the transfer. However, even although high levels of both cash and food beneficiaries report receiving their full transfer, cash beneficiaries were significantly more likely to report not receiving the full transfer. In Ibb, for example, 94 percent of food beneficiaries felt they "generally received their full transfer," but only 90 percent of cash beneficiaries felt the same way.[14] It is unclear what accounts for this difference. While the gap may reflect actual discrepancies in the percentage of transfers given, it may also reflect different levels of understanding of the full transfer amount.

7.2 Transfer Decisions

Beneficiaries reported that male household members were significantly more likely to make decisions about cash transfers than food transfers, regardless of the gender of the female head (Table 7.2). In male-headed households, the person reported to be in charge of making decisions about food transfers is the male head in 82 percent of households, while the same figure for cash households is 87 percent. The female spouses of male heads control food transfers in 13 percent of cases, but control cash transfers in only 7 percent of such cases.

In female-headed households, the female head controls transfers in 98 percent of food households, but only 92 percent of cash households. In the female-headed cash households, the male spouses make decisions in 3 percent of the cases, and another male household member in 4 percent of the cases. The gender differences represent clear disparities in the way Yemeni households treat the decisionmaking provenance of cash versus food.

Beneficiaries were also asked to break down into categories how their transfers were used. While Chapter 8 offers more detailed analysis of the impact of transfers on consumption

[14] While complaints were geographically disparate, a few areas emerged as particularly prone to such complaints. The highest percentage of incomplete food transfer reports occurred in Bilal bin Ribah FDP in Al Sayanni district in Ibb (27%), although food-related complaints were distributed very thinly and widely across most other FDPs. For cash, Al Sabrah district in Ibb, served by the Al Sabrah post office, proved most prone to complaints of shortchanging (33%), followed by Fara'a Al Odain district (25%), also in Ibb.

and expenditure, Table 7.3 displays the self-reported breakdown of transfer expenditure for each type. Note that food households rarely report selling the transfer. On average, less than one percent of the transfer is sold. The vast majority of the food transfer (69%) is reported to be consumed immediately, with another 28 percent saved for consumption beyond two weeks.

Cash households report spending 88 percent of their 10,500 YER transfer on staple foods. Unlike food households, cash households report spending a nontrivial portion of their transfers towards repaying debts (5 percent) and transportation (2 percent), but almost nothing on qat (14 YER).

Table 7.2 Who decides how transfers are spent?

Gender of household head	Position of household member	Food	Cash	Food - Cash
Male	HH head	0.82	0.87	-0.05
		(0.01)	(0.01)	(0.02)***
	Head's spouse	0.13	0.07	0.06
		(0.01)	(0.01)	(0.02)***
	Other male HH member	0.01	0.02	-0.01
		(0.00)	(0.01)	(0.01)
	Other female HH member	0.03	0.03	-0.00
		(0.01)	(0.01)	(0.01)
	N	756	730	
Female	HH head	0.98	0.92	0.06
		(0.01)	(0.02)	(0.02)**
	Head's spouse	0.00	0.03	-0.02
		(0.00)	(0.01)	(0.01)*
	Other male HH member	0.01	0.04	-0.02
		(0.01)	(0.02)	(0.02)
	Other female HH member	0.00	0.02	-0.01
		(0.00)	(0.01)	(0.01)
	N	201	156	

Notes: Cells are proportion of household members in a certain position (row name) that are the primary deciders of the transfer is used, by gender of household head and treatment type. Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 7.3 Self-reported breakdown of how the last 10,500 (YER) transfer was used

Use	
Food	Food YER equivalent
Consume	7,260.75
	(112.57)
Sell in order to buy non-staple foods	6.32
	(6.32)
Sell in order to buy nonfood goods	15.07
	(11.32)
Share with family or friends outside the household	103.11
	(19.83)
Sell in order to repay debts	56.59
	(18.96)
Saved to use beyond the next two weeks	3,026.34
	(110.13)
Stolen or obliged to give to other relative or neighbor	18.23
	(7.76)
Transportation	13.59
	(3.70)
N	949
Cash	Cash YER
Staple foods	9,284.17
	(82.40)
Non-staple foods	84.53
	(13.56)
Qat or other tobacco products	13.72
	(3.43)
Nonfood goods	210.90
	(37.92)
Voluntarily shared or given to family members outside the household	98.12
	(22.43)
Repaid debts	475.15
	(60.90)
Saved for use beyond the two weeks of receiving the transfer	75.67
	(23.01)
Stolen or obliged to give to other relative or neighbor	50.94
	(9.24)
Transportation	207.04
	(19.89)
N	853

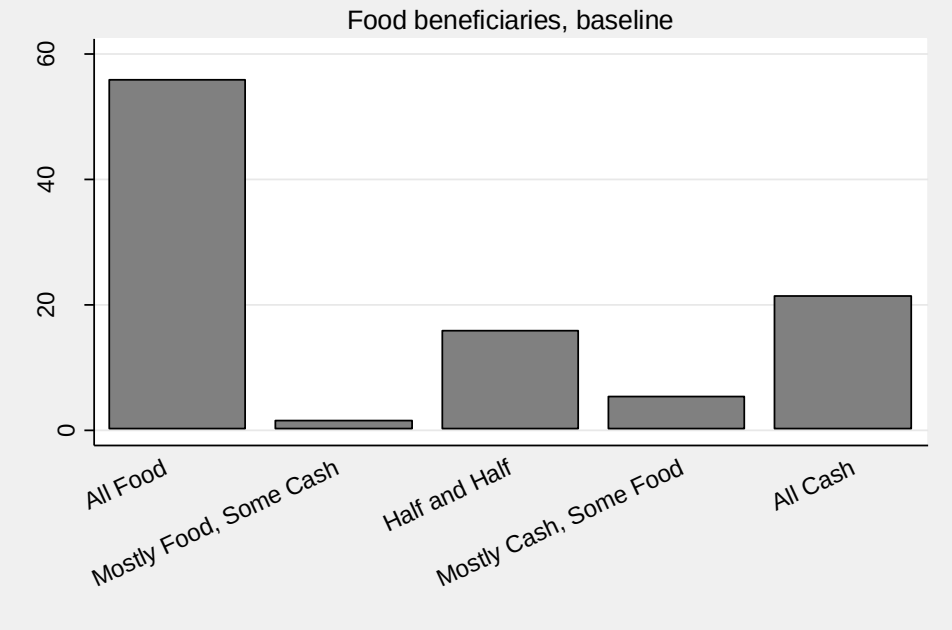
Notes: Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

7.3 Transfer Opinions

Beneficiaries were asked the proportion of cash and food that they would prefer to comprise their transfer. Figures 7.1a, 7.1b, and 7.1c graph the responses according to survey round and modality assignment.[15] In the first survey round, over half of food beneficiaries preferred receiving a transfer of all food, and less than 25 percent wanted a transfer composed entirely of cash (Figure 7.1a).

The results from the endline survey reveal much stronger preferences for cash (Figures 7.1b and 7.1c). Half of food beneficiaries in the last survey round now preferred to have an all cash transfer, while only a third preferred an exclusive food transfer. Among the cash group over three quarters expressed a preference for an all cash transfer, and only 10 percent preferred food only.

Figure 7.1a Ideal transfer modality, food beneficiaries, baseline



[15] Only beneficiaries who actually received a transfer were asked this question. As a result, no data exits for cash beneficiaries during the first found.

Figure 7.1b Ideal transfer modality, food beneficiaries, endline

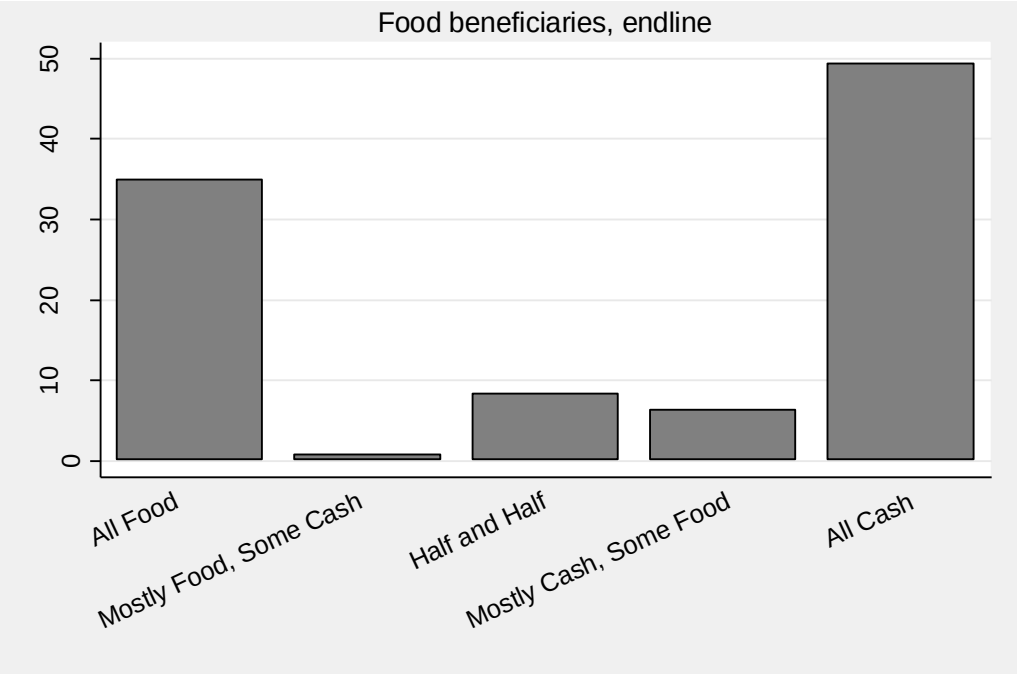
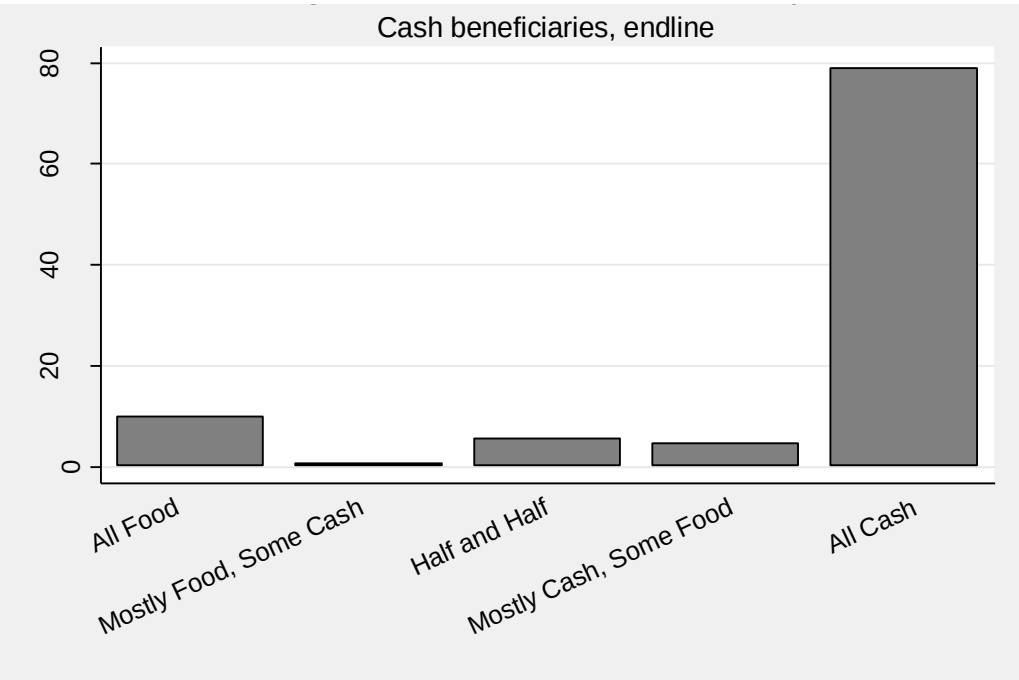


Figure 7.1c Ideal transfer modality, cash beneficiaries, endline



8. Impact of Transfers on Dietary Diversity, Food Consumption and Food Security

8.1 Data and Descriptive Statistics

The following analysis relies on the construction of several different food consumption aggregates. These aggregates are primarily based on detailed questions concerning the food purchased and consumed by the household over the previous seven days.

Three separate indices of household food consumption aggregate data on household food frequency: the Dietary Diversity Index, Household Dietary Diversity Score (HDDS), and the Food Consumption Score (FCS). The most straightforward of these measures, the Dietary Diversity Index (DDI), sums the number of distinct food categories consumed by the household in the previous seven days. The household questionnaire covers 39 such food categories (see Annex 3 for a list), and thus the DDI in this survey can feasibly range from 0 (no consumption at all) to 39. Hoddinott and Yohannes (2002) show that the DDI correlates well with both household dietary quantity and quality, and thus provides a useful summary point of comparison within the measured sample. The HDDS captures a similar element of food access, although it differs from DDI in that frequency is measured across standardized food groups, instead of individual food items. The score is calculated by summing the number of food groups consumed in the previous seven days from the following 12 groups assembled by the Food and Agriculture Organization (Kennedy, Ballard, and Dop 2011): cereals, roots/tubers, vegetables, fruits, meat/poultry/offal, eggs, fish/seafood, pulses/legumes/nuts, milk/milk products, oils/fats, sugar/honey, miscellaneous.

The FCS also aggregates seven-day consumption across standardized food categories. However, the FCS weights food group consumption by both days of intake and a predetermined set of weights designed to reflect the heterogeneous dietary quality of each food group (Weismann et al. 2008). The FCS is calculated by summing the number of days eight different food groups (staples/pulses, vegetables, fruit, meat/fish, milk/dairies, sugar/honey, oils/fats) were consumed by a household during the seven days before the survey, multiplying those frequencies by the appropriate weights, and summing across categories to obtain a single proxy indicator. While Weismann et al. (2008) do not find justification for the truncation to eight categories and weighting scheme of the FCS, the score remains in use by the WFP in its food security assessments of Yemen, and is thus reproduced here for comparability. Following the WFP (2008), we use the food groups and weights listed in Table 8.1 to calculate the FCS.

In addition to measures of dietary diversity, the analysis considers three basic measures of per capita food intake in the household: calories of food consumed, value of food consumed, and value of food available.

Caloric intake is constructed from the amount of food consumed by households (from purchases, own stock, or in kind gifts/payments). In order to convert quantities of various food items into kilocalories, the food amounts are multiplied by their per unit energy values. Several challenges complicate this process. No complete food composition tables exist in Yemen, so we have no standardized source for determining Yemen-specific energy conversion units. Instead, this analysis relies on energy values stemming primarily from the Food Composition Table for

Egypt in the World Food Dietary Assessment System of the Food and Agricultural Organization (FAO) (WFOOD 1996), and secondarily from the USDA Nutrient Database (USDA 2010). The strategy here mirrors that in Ecker et al. (2010).

Table 8.1 Aggregate food groups and weights to calculate the Food Consumption Score

Group	Food items	Food group	Weight
1	Maize, maize porridge, rice, sorghum, millet past, bread, and other cereals Cassava, potatoes and sweet potatoes, other tubers, plantains	Staples	2
2	Beans, peas, groundnuts and cashew nuts	Pulses	3
3	Vegetables, leaves	Vegetables	1
4	Fruits	Fruit	1
5	Beef, goat, poultry, pork, eggs, and fish	Meat and fish	4
6	Milk, yogurt, and other dairies	Milk	4
7	Sugar, sugar products, and honey	Sugar	0.5
8	Oils, fats, and butter	Oil	0.5

Source: WFP 2008.

Several caveats apply to the caloric data presented here. The primary purpose of constructing the caloric indicators is within sample consistency, so that the analysis of the effect of transfers on caloric consumption can be accurately assessed for both treatment groups. Therefore, in order to avoid introducing modality specify bias into the construction of the aggregates, refuse factors and aggressive imputation of missing or outlier values were not integrated. While the estimates of caloric consumption differentials by treatment groups are highly reliable, the overall mean caloric consumption figures may be slightly overstated.

Value of food consumed and available is likewise determined from seven day recall of food quantities purchased, consumed, and received. While consumption statistics refer only to food that household members reporting actually consuming, any food stocks purchased or received by the household in the previous seven days but not consumed factor into the available food category.[16] Consumption and availability of food quantities are converted into values using the imputed unit prices for each food derived from the food expenditure module.

In the transfer effects analysis, all the consumption data are converted into logarithmic form due to right skewing of the data. Further, the top and bottom 2 percent of the distribution of each aggregate are trimmed in order to diminish the influence of outliers.

Finally, several measures of self-reported household food insecurity are reported. These include months in the previous six that households had difficulty satisfying their food needs, and days in the past week that households were required to reduce the amount of food consumed at or frequency of meals consumed. These indicators are reported as a subjective supplement to objective measures of food insecurity.

Tables 8.2 and 8.3 present several dietary diversity, food consumption, and food insecurity aggregates from the baseline and follow-up surveys, respectively. At baseline, households eligible for treatment consumed approximately 7 out of 12 basic food groups (HDDS), 2,562 kilocalories per person per day,[17] 2,215 of which were derived from consumption

[16] Note that stored food received or bought more than seven days prior to the survey will not be counted.

[17] As noted above, the caloric consumption figures are likely an overestimate.

of cereals, ate meat less than one day per week, chewed qat nearly 3 days per week, and considered themselves food-insecure for less than three of the previous six months. Note that at baseline, the comparison group had higher objective measures of food security (FCS, caloric consumption), but very similar measures of self-reported food insecurity (Table 8.2). At the endline, however, treatment eligible households narrowed the gap or overtook comparison households in mean levels of dietary diversity and caloric consumption (Table 8.3).

Table 8.2 Comparison of means of key outcome variables at baseline, by treatment status

	Treatment	Comparison	Difference
Household Dietary Diversity Score (HDDS)	7.12	7.26	-0.14
Dietary Diversity Index (DDI)	10.96	10.79	0.17
Food Consumption Score (FCS)	49.12	52.98	-3.86***
Poor food consumption (FCS < 28.5)	0.20	0.13	0.07***
Daily per capita consumption (kcal)	2,562.62	2,840.79	-278.17***
Daily per capita cereal consumption (kcal)	2,216.20	2,373.98	-157.78**
Days consumed meat or poultry (in last 7)	0.56	0.59	-0.02
Days consumed qat (in last 7)	2.78	2.99	-0.22
Months had difficulty meeting food needs(in last 6)	2.65	3.05	-0.40***
Days household reduced meal frequency (in last 7)	0.64	0.71	-0.07
Days adults ate less food (in last 7)	0.37	0.47	-0.10
Days children ate less food (in last 7)	0.22	0.29	-0.07
Observations	1,581	1,085	2,666

Note: Excludes those who received transfer with 8 days of survey.

Table 8.3 Comparison of means of key outcome variables at endline, by treatment status

	Treatment	Comparison	Difference
Household Dietary Diversity Score (HDDS)	7.29	7.12	0.17*
Dietary Diversity Index (DDI)	11.24	10.91	0.33*
Food Consumption Score (FCS)	51.34	50.10	1.24
Poor food consumption (FCS < 28.5)	0.17	0.20	-0.03*
Daily per capita consumption (kcal)	2,671.5	2,700.0	-28.5
Daily per capita cereal consumption (kcal)	2,137.2	2,153.8	-16.6
Days consumed meat or poultry (in last 7)	0.72	0.63	0.09
Days consumed qat (in last 7)	2.88	2.85	0.03
Months had difficulty meeting food needs (in last 6)	2.26	2.35	-0.10
Days household reduced meal frequency (in last 7)	0.14	0.18	-0.04
Days adults ate less food (in last 7)	0.15	0.19	-0.04
Days children ate less food (in last 7)	0.09	0.14	-0.04
Observations	1,581	1,085	2,666

Note: Excludes those who received transfer with 8 days of survey.

8.2 Relative Impacts of Treatment on Dietary Diversity, by Transfer Modality

Analysis of the relative of effects of food and cash transfers begins with dietary diversity outcomes. Equation (1), the main specification relying on only the difference in endline survey outcomes between the treatment groups, is estimated with and without covariates (Table 8.4). The first row estimate represents the difference in outcomes between the food and cash groups (i.e., equation [2]). Note that all the estimated coefficients are less than zero, which indicates that

the impact of the cash treatment is larger than that of food for each outcome. In addition, for each outcome, the magnitude of the difference is larger and more precisely estimated when controlling for covariates.

For the household dietary diversity score (HDDS), the single difference estimate with covariates implies that households in the food group consumed .41 less food groups out of a possible 12. Relative to the baseline mean, that represents a 5.7 percent larger effect for cash, significant at the 1 percent level.

The results for the dietary diversity index (DDI) estimations are similar to HDDS, although slightly less precisely estimated. Cash households consumed .63 more food items out of a possible 39, which represents a 5.8 percent advantage over food households. That estimate is significant at the 5 percent level.

Table 8.4 Relative impact of food and cash transfers on dietary diversity measures with and without covariates

	HDDS		DDI		FCS	
Difference (Food-Cash)	**-0.26**	**-0.41**	**-0.46**	**-0.63**	**-2.41**	**-4.52**
	(0.16)	**(0.15)*** **	**(0.35)**	**(0.28)** **	**(1.40)***	**(1.19)*** **
Female-headed household		-0.50		-0.91		-4.12
		(0.19)***		(0.34)***		(1.87)**
HH head attended primary school or higher		0.25		0.49		1.00
		(0.12)**		(0.23)**		(1.48)
Household head is married		-0.05		-0.11		-2.66
		(0.19)		(0.35)		(1.99)
Household head's age		-0.01		0.00		0.02
		(0.00)		(0.01)		(0.05)
Household size		0.06		0.16		0.85
		(0.02)***		(0.04)***		(0.25)***
Household members age 0-5		0.01		0.08		0.03
		(0.04)		(0.07)		(0.50)
Household members age 6-17		-0.04		-0.09		-0.72
		(0.03)		(0.05)*		(0.29)**
Wealth index: 2nd quintile		0.24		0.37		3.27
		(0.15)		(0.28)		(1.50)**
Wealth index: 3rd quintile		0.42		0.87		5.18
		(0.16)**		(0.33)***		(1.65)***
Wealth index: 4th quintile		0.80		1.61		7.95
		(0.16)***		(0.30)***		(1.68)***
Wealth index: 5th quintile		1.05		2.40		10.19
		(0.19)***		(0.37)***		(1.95)***
Constant	7.39	6.82	11.42	8.53	52.31	48.88
	(0.12)***	(0.56)***	(0.23)***	(0.93)***	(0.98)***	(3.62)***
N	1,581	1,581	1,581	1,581	1,581	1,581

Notes: Standard errors in parenthesis clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for district fixed effects. Excludes those who received transfers within 8 days of the survey.

The largest difference between the cash and food treatments arises for the food consumption score (FCS) outcome, which weights dietary diversity by food quality. For the FCS, the impact of cash transfers is 4.52 units, or 9.2 percent higher than food transfers (Table 8.4). The estimated difference is significant at the 1 percent level.

To investigate the robustness of this effect, we present several different specifications of the relative impact of each transfer (Table 8.5). The estimates in Table 8.5 are all derived from regressions that control for the same variables listed in Table 8.4. Row 1 corresponds to the simple difference estimate (equation [2]) in Table 8.4;, row 2, the single difference estimate from an ANCOVA estimate (equation [6]); row 3, the double difference using the comparison group as a control and only the endline data (equation [4]); row 4, the ANCOVA double-difference specification (equation [8]); and row 5, the full triple difference specification (equation). For all the specifications, the point estimate of interest remains negative (i.e., cash appears to have a larger impact on dietary diversity than food). As discussed in Section 3.2, these alternative specifications all potentially suffer from different sources of bias, and are presented for completeness.

Table 8.5 Relative impact of food and cash transfers on dietary diversity measures

	HDDS	DDI	FCS
Difference (Food-Cash)	**-0.41**	**-0.63**	**-4.52**
	(0.15)* **	**(0.28)** **	**(1.19)*** **
Endline Ancova of Eligibles			
Difference (Food-Cash)	-0.35	-0.51	-4.08
	(0.13)***	(0.26)*	(1.17)***
Endline DD			
Food*Eligible DD	-0.01	-0.03	-2.03
	(0.16)	(0.28)	(1.53)
Endline DD Ancova			
Food*Eligible DD	-0.07	-0.08	-2.54
	(0.15)	(0.27)	(1.52)*
Full DDD			
Food*Post*Eligible DDD	-0.30	-0.27	-4.86
	(0.20)	(0.40)	(2.14)**

Notes: Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Top row estimates are from endline single difference (equation 2). Next row estimate is equation (6). Third row is equation (4). Fourth row is equation (8). Last row is equation (10). Excludes those who received transfers within 8 days of the survey.

Controlling for the baseline level of the outcome variable (row 2) does little to change the estimate. Differencing out the dietary diversity on non-eligibles (rows 3 and 4), however, reduces the gap between cash and food to nearly zero for HDDS and DDI, and halves the estimate for the FCS. When the baseline survey is used to fully difference out the trends among eligibles and ineligible trends, the FCS coefficient is nearly identical to that obtained from the single difference estimate. So while the integration of the ineligibles into the estimation reduces the magnitude of the disparity between cash and food, particularly for HDDS and DDI, we estimate a consistently larger relative impact of cash for FCS.

The World Food Program considers a Food Consumption Score below 28.5 as poor to borderline food consumption. As implied from the estimates on FCS in tables 8.4 and 8.5, households receiving food transfers were more likely to be considered as having poor food consumption than those receiving cash transfers (Table 8.6). The magnitude of the effect depends on the specification. The linear probability (OLS) estimate from column suggests that food households have a 6 percentage point higher probability of having a poor FCS score. The probit estimates indicate that, for the average household, food households had a 9 percent higher likelihood of an FCS score below 28.5.

Table 8.6 Relative impact of food and cash transfers on probability of having a low FCS score

	OLS Linear Probability	**Probit Marginal Effect**
Difference (Food-Cash)	0.06	0.09
	(0.03)**	(0.03)***
N	1,581	1,521
Adj R-squared	0.04	

Notes: Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Excludes those who received transfers within eight days of the survey.

Taken together the estimates imply a robust advantage for cash transfers over food transfers in the effect on dietary diversity, as suggested by theory. The larger effect for the FCS outcomes suggests that the disparity in diversity is driven at least in part by more frequent consumption of higher quality food groups.

8.3 Relative Impacts of Treatment on Consumption, by Transfer Modality

Dietary diversity comprises one aspect of food security, but the quantity and value of food consumed also plays a key role. In this section, the relative effect of the transfers is calculated for three different consumption aggregates (Table 8.7): the value of food consumed by the household, the value of food available to the household, and the calories consumed by the household. All three indicators have been calculated on a per-capita basis, and log transformed.[18]

Focusing on the preferred single difference estimates (row 1) of Table 8.7, the value of household consumption appears slightly higher in the cash group, but the difference is statistically insignificant. The value of food available, however, is estimated to be 12 percent higher among the cash group, with a p-value less than .01.[19] Conversely, food households appear to be consuming four percent more calories per capita than those in the cash group.

[18] See Section 8.1 for a more detailed explanation of the construction of these consumption aggregates.

[19] The wide disparity may result primarily from food beneficiaries storing food transfers, which were not counted in this analysis.

Table 8.7 Relative impact of food and cash transfers on consumption

	Log value of HH consumption (per-capita)	Log value of available food in HH (per-capita)	Log HH per-capita calorie intake
Difference (Food-Cash)	**-0.04**	**-0.12**	**0.04**
	(0.04)	**(0.04)*** **	**(0.02)***
Endline Ancova of Eligibles			
Difference (Food-Cash)	-0.03	-0.12	0.05
	(0.04)	(0.04)***	(0.02)**
Endline DD			
Food*Eligible DD	0.07	-0.01	0.09
	(0.03)**	(0.04)	(0.03)***
Endline DD Ancova			
Food*Eligible DD	0.05	-0.03	0.09
	(0.04)	(0.04)	(0.03)***
Full DDD			
Food*Post*Eligible DDD	-0.00	-0.08	0.04
	(0.06)	(0.06)	(0.06)

Notes: Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Top row estimates are from endline single difference (equation 2). Next row estimate is equation (6). Third row is equation (4). Fourth row is equation (8). Last row is equation (10). Excludes those who received transfers within 8 days of the survey.

In concert with the dietary diversity analysis, the results from analyzing consumption aggregates paint a more complete picture of household food security. Households receiving transfers in-kind appear to be consuming more food on a caloric basis, but the excess calories are more likely to be "cheap." That is, the higher caloric intake of food households likely stems from the inexpensive (on a per-calorie basis) staples in the food basket. That story is consistent with the large discrepancy between the two transfer groups in FCS, which more heavily weights non-staple foods.

Robustness checks are largely consistent with the main estimates, although the point estimate on the value of household consumption indicator is reversed for the endline double difference estimates (column 1, rows 2 and 3), and the relative gap between caloric consumption increases (column 3, rows 2 and 3). As with the dietary diversity scores, these specifications are clearly more favorable to food transfers.

8.4 Relative Impacts of Treatment on Food Types, by Transfer Modality

To better determine how each transfer type influences dietary composition, caloric consumption is disaggregated by food group. The relative effect of the transfers is estimated on the frequency of consumption of food groups, as well.

Caloric consumption analysis by food groups reveals that food transfer recipients consume significantly more calories from their food basket items than cash recipients, but cash recipients consume more from higher value, nutrient rich food groups (Table 8.8). Using the single difference specification, food recipients consume 8 and 31 percent more calories from cereals and oils than cash recipients. However, cash recipients enjoy 27 percent more calories

from animal products (i.e., meat, fish, dairy, eggs). Even more striking, the caloric intake of non-cereal starches like tubers, pulses and legumes, is 40 percent higher among the cash group. While cash beneficiaries receive slightly more calories from fruit and vegetables, the difference is not significant.

Table 8.8 Relative impact of food and cash transfers on calorie consumption, by food group

	Cereals	Tubers, Pulses, Legumes & Nuts	Animal Products	Fruit & Vegetables	Oil	Sugar, Snacks & Other Foods
Difference (Food-Cash)	0.08	-0.40	-0.27	-0.08	0.31	-0.05
	(0.04)*	(0.16)**	(0.14)*	(0.10)	(0.09)***	(0.06)
N	1,581	1,581	1,581	1,581	1,581	1,581

Notes: Dependent variables are the log of household consumption (kcal/day/person) for each food group. Standard errors in parentheses clustered at the FDP level. * p < 0.1; ** p < 0.05; *** p < 0.01. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Excludes those who received transfers within eight days of the survey.

Food frequency estimates also suggest a far more diverse diet for cash recipients. Table 8.9 displays incident rate ratios (IRRs) derived from negative binomial regression coefficient estimates of the relative impact of the transfers on the number of days per week that a food group was consumed by the household. Food frequency is a count variable, which can take positive integer values between 0 and 7. The negative binomial regression model is a generalized version of the poisson model that permits the variance to be greater than the mean, and more appropriate to food frequency data due to the large number of zeros.[20] The IRRs in Table 8.9 are interpreted as follows: numbers above 1 represent higher rates of feeding frequency among the food beneficiaries (relative to the cash group), numbers lower than 1 represent lower rates of feeding frequency among food beneficiaries (relative to the cash group), and an IRR of 1 represents perfect equality of feeding frequency rates between the two groups.

Unsurprisingly, the estimates detect no difference between the food and cash groups in the rate of the consumption frequency of cereals (column 1). The equality stems from the fact that 99 percent of all households consume cereals every day. However, food beneficiaries do consume oil, a food basket item, at 1.04 times the rate of the cash group (column 10). Conversely, food beneficiaries consume fish, meat (including poultry) and eggs at much less frequent rates than cash beneficiaries (approximately 68, 38, and 40 percent less, respectively). Food beneficiaries also consume nuts and pulses, and roots and tubers significantly less frequently, as well.

8.5 Relative Impacts of Treatment on Feeding of Young Children

Feeding practices greatly affect the health and nutritional status of young children (WHO 2008). The previous results demonstrate that transfer type clearly influences the amount, variety, and frequency of consuming different food groups. Consequently, using data from the child feeding survey module, we examine the extent to which very young children experience

[20] In addition, goodness of fit tests strongly reject a poison process with no overdispersion.

these differences in Table 8.10. As per standard practice, infant and young child feeding variables are disaggregated by age, and food frequency is aggregated into seven food groups (WHO 2008).[21]

The first indicator, known as minimum dietary diversity, measures whether the child has consumed four or more food groups. Children between 6 and 23 months living in food beneficiary households are 16 percent less likely to obtain a minimally diverse diet (column 1). Differences by modality for older children are not significant (column 2). Children in both age groups from food beneficiary households consumed less food groups overall relative to their cash peers (columns 3 and 4).

Mimicking the methodology used to construct the overall household dietary diversity indicators, we also construct child specific measures of HDDS and FCS (columns 5 through 8). The relative gap for both age groups and indicators is negative, underscoring the fact that the relatively higher dietary diversity benefit derived from cash transfers is experienced by young children as well. Indeed, in comparison to the household FCS estimates in Table 8.2, the gap is even larger for children.

8.6 Relative Impacts of Treatment on Self-Reported Measures of Food Insecurity

The evidence thus far suggests that cash beneficiaries consumed a wider and more valuable array of food items at more frequent rates than food beneficiaries. Food beneficiaries, however, consumed slightly more total calories, nearly all derived from their food baskets of wheat and oil. Consequently, the relative impact of subjective assessments of household food insecurity may depend on the manner in which households consider food quality versus quantity when determining the criteria for a period of "difficulty meeting food needs".

[21] The seven food groups are (1) grains, roots and tubers; (2) legumes and nuts; (3) dairy products; (4) Flesh foods; (5) Eggs; (6) Vitamin A-rich fruits and vegetables (i.e., orange foods); and (7) other fruits and vegetables.

Table 8.9 Relative impact of food and cash transfers on household food frequency

	Cereals	Roots/ Tubers	Vegetables	Fruit	Eggs	Meat & Poultry	Dairy	Fish & Seafood	Nuts & Pulses	Oils & Fats	Sugar, Sweets, Snacks & Honey
Difference (Food-Cash)	1.00	0.83	0.97	0.72	0.60	0.62	0.95	0.32	0.81	1.04	0.98
	(1.32)	(1.82)*	(1.15)	(1.59)	(1.98)**	(2.97)***	(0.74)	(3.58)***	(1.75)*	(2.05)**	(1.32)
N	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581

Notes: Negative binomial regression. T Statistics in parentheses. Standard errors clustered at the FDP level.. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Excludes those who received transfers within eight days of the survey. Dependent variables is number of days in last week that household ate food item. Coefficients are incidence-rate ratios, where 1 represents perfect equality of feeding frequency between food and cash, values below 1 represent lower feeding frequency by food treatment, and values above 1 represent higher feeding frequencies by food treatment.

Table 8.10 Relative impact of food and cash transfers on dietary diversity for infants and young children

	Child 6 to 23 months ate 4 or more food groups	Child 24 to 59 months ate 4 or more food groups	Total food groups consumed by child aged 6 to 23 months	Total food groups consumed by children aged 24 to 59 months	HDDS of children aged 6 to 23 months	HDDS of children aged 24 to 59 months	FCS of children aged 6 to 23 months	FCS of children aged 24 to 59 months
Difference (Food-Cash)	-0.16	-0.05	-0.42	-0.30	-0.49	-0.35	-6.48	-7.46
	(0.06)***	(0.05)	(0.21)*	(0.14)**	(0.30)	(0.16)**	(4.25)	(1.88)***
N	267	791	267	791	267	791	266	791

Notes: Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Coefficients in columns (1) and (2) are linear probability estimates. Excludes those who received transfers within eight days of the survey.

Once again, we use negative binomial regressions in Table 8.11 to report IRR estimates of the relative impact of transfers on several count data outcomes: the number of days in the previous seven that households cut back on the number of meals consumed; the number of days in the previous seven that adults in the household ate less food than desired; the number of days in the previous seven that children in the household ate less food than desired; and the number of months in the last six that households reported problems satisfying their food needs.

Table 8.11 Relative impact of food and cash transfers on self-reported food insecurity

	Days household reduced meal frequency (in last 7)	Days adults ate less food (in last 7)	Days children ate less food (in last 7)	Months had difficulty meeting food needs (in last 6)
Difference (Food-Cash)	0.49	0.61	0.89	1.06
	(1.46)	(1.46)	(0.24)	(0.54)
N	1,580	1,580	1,377	1,983

Notes: Negative binomial regression. T Statistics in parentheses. Standard errors clustered at the FDP level.. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Excludes those who received transfers within eight days of the survey in columns 1 through 3. Coefficients are incidence-rate ratios, where 1 represents perfect equality of frequency between food and cash, values below 1 represent lower frequency in the food treatment, and values above 1 represent higher frequencies in the food treatment.

The indicators dealing with self-reported food insecurity coping strategies (columns 1 through 3) all suggest that cash beneficiaries reported higher rates of cutting back on food consumption in the previous week. However, none of the effects are significant at conventional levels. Similarly, no significant difference between the transfers is found in self-reported difficulty satisfying food needs. As a result, despite the strong differences by transfer modality in food consumption patterns, self-reports of food insecurity do not appear dependent on transfer type.

8.7 Relative Impacts of Treatment on Food Expenditure

In-kind transfers clearly obviate some of the need to purchase foods. However, the extent to which these transfers impact expenditure patterns in Yemen for items both excluded and included in the food basket is unknown.

Examining patterns of weekly food expenditure reveals that cash beneficiaries spend more on nearly every food group than food beneficiaries (Table 8.12). Overall, cash beneficiaries spend 47 percent more per week (approximately 570 YER, or $2.88) on all food items. Unsurprisingly, the largest expenditures differences by transfer modality involve food groups that include items in the food basket. Cash beneficiaries spend 160 percent more money on wheat, and 130 percent more on fats (i.e., oils). Echoing results from the food frequency and caloric consumption estimates, the largest nonfood basket discrepancy in expenditure is for "flesh foods" (i.e., meat, chicken and fish), where cash households spend 73 percent more than food beneficiaries. Expenditure differences for fruits and vegetables are not significant. These

results may understate the expenditure differences between the treatment groups if cash beneficiaries spend a large share of the transfers within the first week.[22]

8.8 Relative Impacts of Treatment on Nonfood Expenditure

One motivation for distributing in-kind transfers, as opposed to cash, is to ensure that that the transfer is used as intended by the donor. This "paternalistic" justification for in-kind donor preferences may be especially pertinent in contexts where intrahousehold bargaining power is unevenly distributed, and the propensity to indulge vices is high. Both circumstances could potentially be applied to rural Yemen, where female autonomy is low, and consumption of a mild narcotic leaf, qat, is high. Therefore, we examine the patterns of nonfood expenditure by modality, in order to determine if the different transfer vehicle led to changes in nonfood related spending.

In Table 8.13, we display coefficients from single difference regressions of several nonfood expenditure items on modality type. In terms of total nonfood expenditure, we cannot detect any differences between the cash and food groups. In fact, the point estimate on total nonfood expenditure exclusive of qat and sheesha is zero. Examining qat expenditure only, the point estimate suggests that food beneficiaries spend slightly more on qat, although the coefficient is imprecisely estimated and not significant.[23] Indeed, no significant differences emerge by modality for any of the nonfood expenditure spending categories. Consequently, transfer type did not appear to influence patterns of expenditure for items other than food.

8.9 Relative Impacts of Treatment on Self-Reported Measures on Usage of Qat

Due to its widespread use and identification with Yemeni social behavior, we investigate qat's consumption and use in more detail. Examining those eligible to receive transfers at baseline, 52 percent of households reported consuming any qat in the past week, and 30 percent reported chewing every day. Those numbers are below the 70 percent estimate of any qat consumption obtained by a nationally representative survey in Milanovic (2007). The smaller estimates are likely due to the different sample composition in the survey; respondents here are poorer, more likely to live in female-headed households, and not representative geographically. Underreporting of qat consumption due to reluctance to discuss the issue may also play a role.[24]

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[22] Conversely, the consumption and dietary diversity may overstate the differences by transfer group if food households consume a disproportionate share of food basket items within the first week.

[23] We examine qat in more detail in the following section.

[24] Reluctance to reveal qat usage will bias estimates only if underreporting is asymmetric by modality. That asymmetry might arise in the case of highly heteroskedastic measurement error. If, for example, cash beneficiaries do spend larger sums on qat, but those who spend high sums also underreport more severely, than the expenditure and consumption estimates will underestimate the modality difference. Frequency of use, estimated in Table 8.14, is less likely to be subject to such error.

Table 8.12 Relative impact of food and cash transfers on weekly food expenditures

	Total food expenditure	Wheat	Sorghum	Rice	Meat (incl. fish & poultry)	Eggs	Legumes	Dairy	Fats	Vegetables	Fruit
Difference (Food-Cash)	-0.47	-1.60	-0.30	-0.42	-0.73	-0.05	-0.20	0.04	-1.30	-0.17	-0.10
	(0.10)***	(0.27)***	(0.09)***	(0.21)**	(0.25)***	(0.07)	(0.14)	(0.10)	(0.18)***	(0.18)	(0.15)
N	1,543	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581

Notes: Dependent variable is the log of weekly food expenditure for the food group in the column heading. Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Excludes those who received transfers within eight days of the survey.

Table 8.13 Relative impact of food and cash transfers on nonfood expenditures

	Total nonfood (including qat & tobacco)	Total nonfood (excluding qat & tobacco)	Total nonfood (excluding celebrations, qat, & tobacco)	Qat	Tobacco	Clothing	Transport	Household and kitchen supplies	Fuel and lighting	Celebration
Difference (Food-Cash)	-0.01	0.00	-0.00	0.13	0.11	0.00	-0.04	-0.01	-0.04	0.04
	(0.09)	(0.10)	(0.10)	(0.25)	(0.18)	(0.16)	(0.14)	(0.06)	(0.14)	(0.04)
N	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581

Notes: Dependent variable is the log of weekly expenditure on the item in the column header. Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Excludes those who received transfers within eight days of the survey.

Indeed, the overall averages for qat consumption disguise large differences by region and gender of the headship. In Ibb, 57 percent of households have consumed qat, versus only 46 percent in Hajjah. More strikingly, male-headed households consume much more frequently than female-headed households. In the former, qat is chewed at least once a day by 60 percent of the treatment eligible sample at baseline, while 35 percent consume the leaf daily. For female-headed households in the same sample, any consumption is only 16 percent and daily consumption just under 12 percent.

The analysis in Table 8.13 showed no difference in qat expenditure based on treatment status, but in this section we focus on consumption. Narrowing the focus on consumption permits us to examine how transfer type may affect not only expenditure, but also acquisition of qat stemming from formal or informal trading or sharing. As with expenditure, the preferred single difference estimate shows no effect of modality due to frequency of use (Table 8.14, row 1). The estimated incident rate ratios of days in the past seven in which qat was consumed are nearly equal by modality. The differencing estimate that relies on the non-eligible group in the endline as a control does find an approximately 20 percent higher frequency of use for the cash group. Once again, however, the full triple difference estimate does not reveal significant differences by transfer modality.

Table 8.14 Relative impact of food and cash transfers on frequency of qat use

	Days used qat (of last 7)
Difference (Food-Cash)	**0.97**
	(0.41)
N	1,581
Endline Ancova of Eligibles	
Difference (Food-Cash)	0.96
	(0.44)
N	1,581
Endline DD	
Food*Eligible DD	0.81
	(2.15)**
N	2,666
Endline DD Ancova	
Food*Eligible DD	0.80
	(2.19)**
N	2,666
Full DDD	
Food*Post*Eligible DDD	0.91
	(0.65)
N	5,332

Notes: Negative binomial regression. T Statistics in parentheses. Standard errors clustered at the FDP level.. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Top row estimates are from endline single difference (equation 2). Next row estimate is equation (6). Third row is equation (4). Fourth row is equation (8). Last row is equation (10). Excludes those who received transfers within eight days of the survey. Coefficients are incidence-rate ratios, where 1 represents perfect equality of frequency between food and cash, values below one represent lower frequency in the food treatment, and values above one represent higher frequencies in the food treatment.

Table 8.15 presents another set of qat consumption indicators. In the first column, we examine whether transfer type impacted the probability of consuming any amount of qat. Single difference estimate suggest that no difference by modality exists. The eligibility differenced estimates, however, do indicates an 8 percent higher probability of chewing any amount for cash households, although the triple difference estimates do not support that finding.

Table 8.15 Relative impact of food and cash transfers on qat consumption

	Consumed any qat	Value of weekly household qat consumption (per-capita)	Value of weekly household qat consumption (per capita) among chewers
Difference (Food-Cash)	**-0.00**	**-0.02**	**-0.02**
	(0.03)	**(0.13)**	**(0.07)**
N	1,581	1,581	820
Endline Ancova of Eligibles			
Difference (Food-Cash)	-0.00	-0.01	-0.02
	(0.03)	(0.13)	(0.07)
N	1,581	1,581	820
Endline DD			
Food*Eligible DD	-0.08	-0.27	0.01
	(0.04)**	(0.14)*	(0.08)
N	2,666	2,666	1,367
Endline DD Ancova			
Food*Eligible DD	-0.07	-0.27	0.01
	(0.04)*	(0.14)*	(0.08)
N	2,666	2,666	1,367
Full DDD			
Food*Post*Eligible DDD	-0.04	-0.30	-0.20
	(0.05)	(0.22)	(0.22)
N	5,332	5,332	2,777

Notes: Standard errors in parentheses clustered at the FDP level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All estimates control for gender, education, and age of marriage of the household head, household size, number of young children, wealth quintiles, and district fixed effects. Coefficients in column (1) are linear probability estimates. Top row estimates are from endline single difference (equation 2). Next row estimate is equation (6). Third row is equation (4). Fourth row is equation (8). Last row is equation (10). Excludes those who received transfers within eight days of the survey.

The last two columns of Table 8.14 analyze the (log) value of weekly household qat consumption among the entire sample and among chewers, respectively. Once again, the preferred estimates (row 1) do not indicate a significant difference by transfer type. Differencing by eligibility does suggest that cash transfers lead to higher value qat consumption, but differencing by eligibility and survey round does not suggest a significant difference. Among those who report any consumption, no estimates suggest differences by modality. Consequently, even using the eligibility differenced specification, any increase in qat consumption due to cash transfers would work through the intensive margin. However, given the high degree of quality and price variability in qat, it is unlikely that cash transfers would serve to increase the adoption of chewing, but not the amount spent by chewers.

9. Costing Analysis

9.1 Methods

An important question to address in assessing the relative effectiveness of different food assistance modalities is the cost of implementing each modality. A relative assessment of cost-effectiveness by modality allows an examination of which mechanism (cash or food) provides the greatest benefit for the amount of funds invested. The particular goals of this costing analysis are to answer the following two research questions: (1) *What are the relative costs of each modality (cash and food)?* (2) *Which modality is the most cost-effective?*

While WFP tracks program costs via traditional accounting for its own records and for external accountability purposes, such methods do not allow for an accurate breakdown by modality. Traditional accounting costs often underestimate the true overall cost of program operations due to, among other things, the cost of staff time dedicated to each treatment type. Therefore, the Activity-based Costing – Ingredients (ABC-I) approach is used to calculate costs for the analysis. The ABC-I method is a combination of activity-based accounting methods with the "ingredients" method, which calculates program costs from inputs, input quantities, and input unit costs (Fiedler, Villalobos, and de Mattos 2008; Tan-Torres Edejer et al. 2003). As the ingredients method alone does not allocate costs according to program activities, it does not allow for comparison between modalities. However, this method, when paired with the ABC approach, matches activities with all their corresponding inputs into cost centers. The use of the ABC-I method allows for opportunity costs, quantified as economic costs, to be included in the total program costs. This method also allows for the incorporation of "off-budget" expenditures, for example, donated goods or services that otherwise would not be included as program operating costs.

The costing analysis utilizes data from the WFP-CO accounting ledger, information gathered from staff by the country office, internal procurement and operations documents, as well as interviews with local partners. An advantage of the detailed information on costs from the WFP accounting ledgers is that it permits the separation of costs that are common across program modalities from those that are modality specific. A second strength of the cost data is that calculation of the staff costs associated with the intervention. Distinct cost calculations are necessary to allow for inclusion of actual operational field costs, as well as to avoid double-counting.

There are several assumptions inherent in this analysis which must be noted. In this case, the analysis focuses specifically on the cost to WFP and not to external institutions or to program beneficiaries. One particular issue in this case regards the comparability of transfers, in that in certain contexts food may hold more value, or the price of food may vary significantly in response to factors such as inflation. However, in order to facilitate comparison between the implementation costs between modalities, the cash value is assumed to be equivalent to the value of the food ration if procured in a local market. These measures were also solely calculated as an estimate of average cost, rather than marginal cost, in that average cost is assumed to be a constant.

9.2 Cost Description

In order to facilitate comparison between the cash and food interventions, the number of food-transfer beneficiaries was scaled to the number of cash recipients, at approximately 10,000 households. The cost analysis of the intervention covers a 3-transfer cycle for both interventions. Those costs associated with the IFPRI impact evaluation are excluded, as they go beyond the monitoring and evaluation activities normally included in programming. Additionally, meetings held in Cairo, Egypt, were not included in cost considerations, as such meetings are generally not held out of the country and represented an atypical cost.

As utilized in the costing analysis, the food modality was delivered in three cycles over the course of an 8-month intervention period to one beneficiary per household. While the ESN food program has been ongoing for the past two years, the needs of the study required a limitation to an 8-month intervention period to ensure comparison between treatment arms. Additionally, for those costs that apply across the entire ESN umbrella food distribution program, a proportional amount of such costs are calculated to represent the size of the group for the purpose of our comparative study.

Food incurred higher costs for distribution and those costs associated with in-country transport, as well as warehousing and other associated costs for commodity storage. In addition to staffing costs as determined through staff time allocation matrices, costs for the food modality were generated from the WFP WINGS system, across both ODOC and LTSH/ITSH cost categories, with the aid of local staff member Ali Alhomeidy. Only those cost categories applicable to the food distribution were included, and those unrelated to the ESN program were subsequently excluded. Ocean freight, port operations and other external shipping expenses were excluded from this analysis. However, internal transportation and labor costs were included as to accurately reflect the cost of food distribution in country.

A primary cost driver for cash is the 3% fee of total cash transferred each cycle as incurred by the post office. The costs in relation to the post office concern staff time invested to manage beneficiary lists and to supervise the transfer process (validation, distribution, and registration of transaction), as well as any materials cost. In contrast with other countries, training or additional investments in preparation for the cash transfer modality was not deemed necessary as the post office had prior experience processing the Social Welfare Fund transfer (SWF). However, while this particular implementing partner had previous experience with cash transfers, the cash modality as implemented by WFP required a beneficiary sensitization campaign, as it was new.

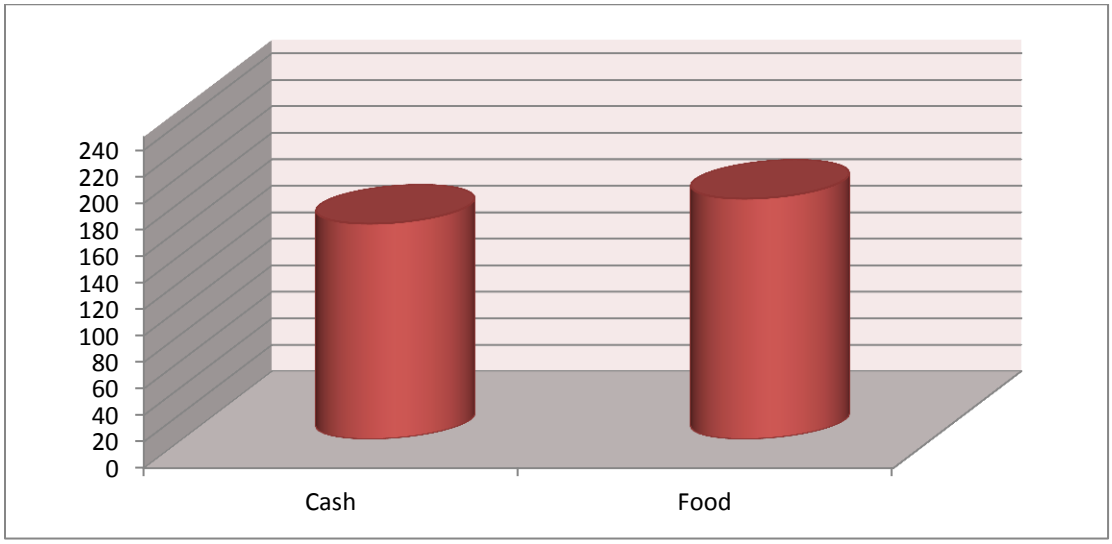
Because WFP had not conducted a cash transfer program previously, the cash modality may have incurred more administrative efforts upon start-up than would be necessary if the program infrastructure was already established. Thus, we may overstate relative cash costs due solely to differing placement of each modality on the experience curve, and unrealized economies of scale in cash distribution.[25]

Figure 1 reveals that the cash modality is less expensive per beneficiary ($162.65) than the food modality ($181.49). These costs include the cost of the transfers itself during the 3-cycle

[25] Food distribution, for example, benefits from a well-established procurement and distribution system and extensive institutional experience both in Yemen and abroad.

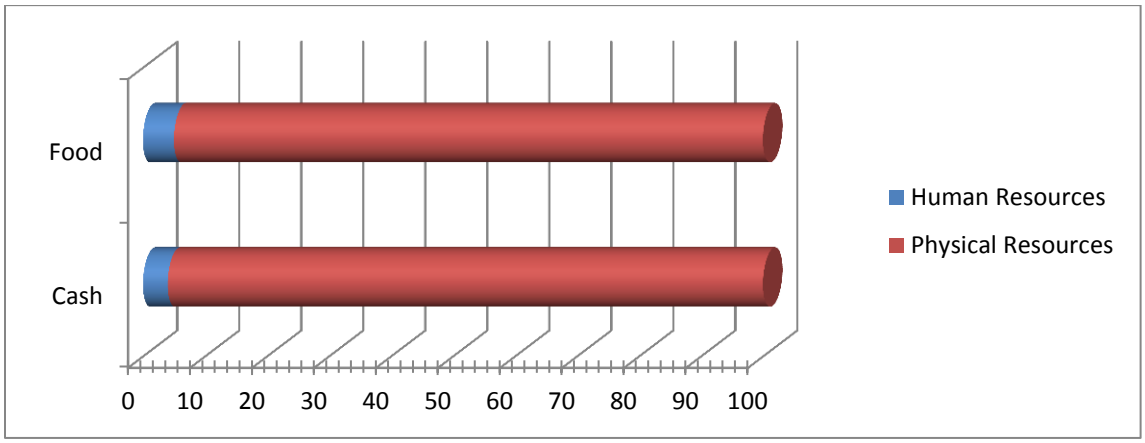
intervention period. On a per transfer basis, excluding the cost of the transfer, cash ($5.22) is approximately half as expensive as compared to food ($11.50). Thus, in terms of the transaction costs, 2.2 cash transfers could be made for the cost of transferring one food basket.

Figure 9.1 Total cost of three transfers per beneficiary, by modality



A slightly higher percentage of labor (human resource) costs were required to deliver a food transfer (5%) than a cash transfer (4%), particularly in terms of distribution. Those costs paid to MoE for the execution of distribution activities were included, as were handling, packaging, administrative and security costs. Another consideration for the cost analysis surrounds the cost incurred to beneficiaries to collect the transfer. In this case, households had to invest income in significant travel to receive the cash transfer, which amounted to approximately an additional $90,000. Incorporation of the beneficiary cost to collect the transfer, cash rises to a total cost of $175.05 per beneficiary, or subsequently $28.05 per transfer ($9.35 per transfer excluding the value of the transfer). For food transfers, addition of beneficiary costs raises the per-transfer cost (excluding the transfer value) to $12.48.

Figure 9.2 Total cost, by type (percent), by modality



9.3 Cost-effectiveness

Examining outcomes and the subsequent cost of implementation would allow for a calculation of cost effectiveness to determine which transfer modality is preferable. To this end, it must be noted that the distribution of food and cash transfer were not well aligned in terms of timing, particularly as the baseline survey occurred after the first cycle of food rations were already delivered. The lack of baseline data for the food modality, as well as the lack of a control group precludes an accurate cost effectiveness analysis for food transfers. However, cost effectiveness was calculated for the cash modality utilizing baseline and end line data on the outcomes of interest. Consistent with the methodology utilized in the other WFP studies, this analysis examines the cost of 15% increase in the principal food security outcomes, based on the total cost per beneficiary excluding cost of transfer.

Raising food consumption score (FCS) by 15 percent using cash required $374.77 per beneficiary over the span of the program (Table 9.1).[26] To raise the dietary diversity index (DDI) an equal amount would require an additional $134.57 per beneficiary ($509.34). Finally, the Household Dietary Diversity Score (HDDS) is the least cost effective to increase by this amount ($603.90).

Table 9.1 Cost-effectiveness, by food security outcomes

	Household Food Security Indices		
	Household Dietary Diversity Score (HDDS)	**Dietary Diversity Index (DDI)**	**Food Consumption Score (FCS)**
Cash	$603.90	$509.34	$374.77
Food	—	—	—

[26] This figure includes both the value of the transfers, as well as all costs associated with the program.

10. Impact Evaluation Conclusions

This report examines the randomized distribution of cash and food transfers by the World Food Program in rural Yemen. Across two governorates, Ibb and Hajjah, 136 different sites were randomly selected to receive either three installments of approximately $49 worth of oil and wheat, or the same value in cash. The report focuses primarily on the differential impacts of these transfer types on food security outcomes.

Relative to the food beneficiaries, households that received cash transfers enjoyed a more diverse diet, consumed higher value foods (such as animal products), spent more money on both staple and non-staple food items, and fed infants and young children a wider variety of foods. Cash beneficiaries also consumed approximately 100 less calories per day than food recipients. Self-reported measures of food insecurity incidents and nonfood expenditures, including qat, did not differ by transfer type. Robustness checks that utilize the responses of non-beneficiaries suggest that gaps in dietary diversity are smaller than those suggested by the main estimates, and that cash recipients are more likely to use qat. However, these checks are not supported by estimates that incorporate baseline survey results, and may suffer from bias stemming from differential impacts on non-beneficiaries according to transfer type.

Costing analysis demonstrates that cash was delivered to beneficiaries more cheaply than food. Delivering each cash transfer cost WFP $5.22 (10.7% of the transfer value), while each food transfer cost $11.50 (23.5% of the transfer value). The physical resources required to store and transport food comprised the bulk of the cost gap.

Cash transfers raised dietary diversity and quality more highly than food, and were cheaper to deliver and administer. Food beneficiaries, however, consumed more calories overall. Consequently, food transfers appeared to be extra-marginal in terms of dietary composition, but infra-marginal in terms of overall food consumption. That is, under the alternative of an equal-valued budget increase, food beneficiaries consume more oil and wheat than they would optimally, but they would spend the excess money on other food items (like meat and pulses) instead of nonfood items (like qat).

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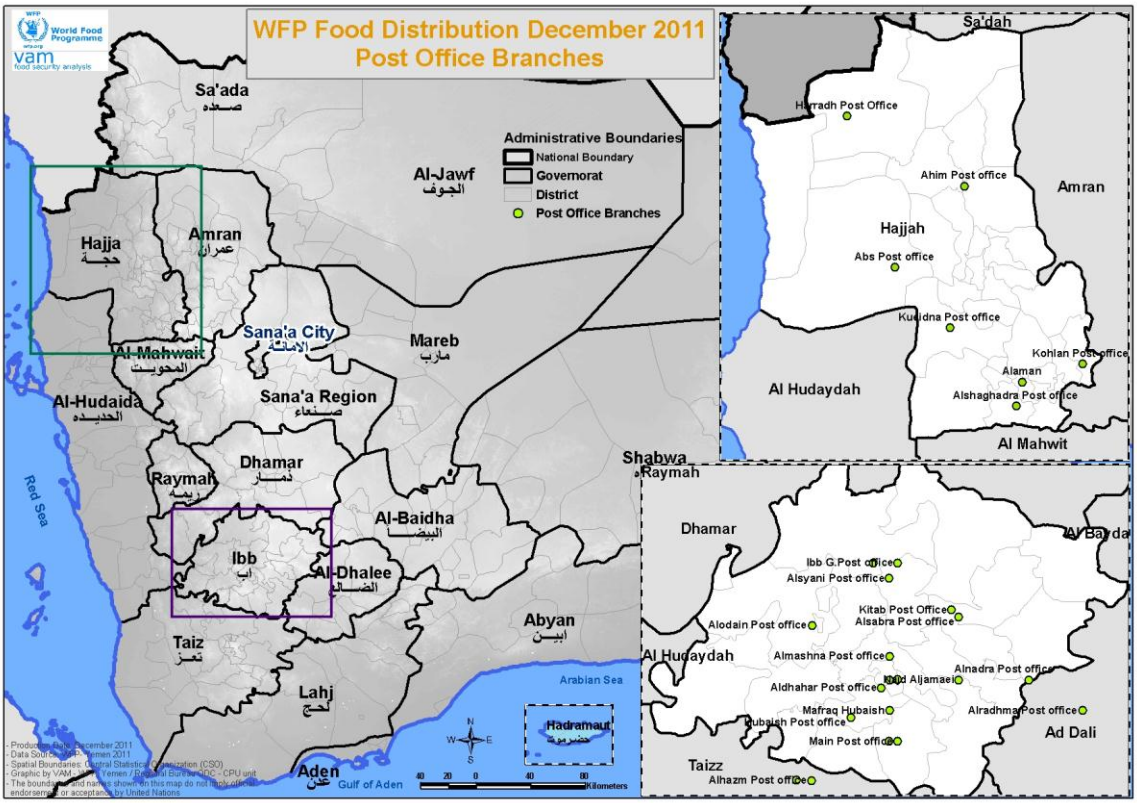
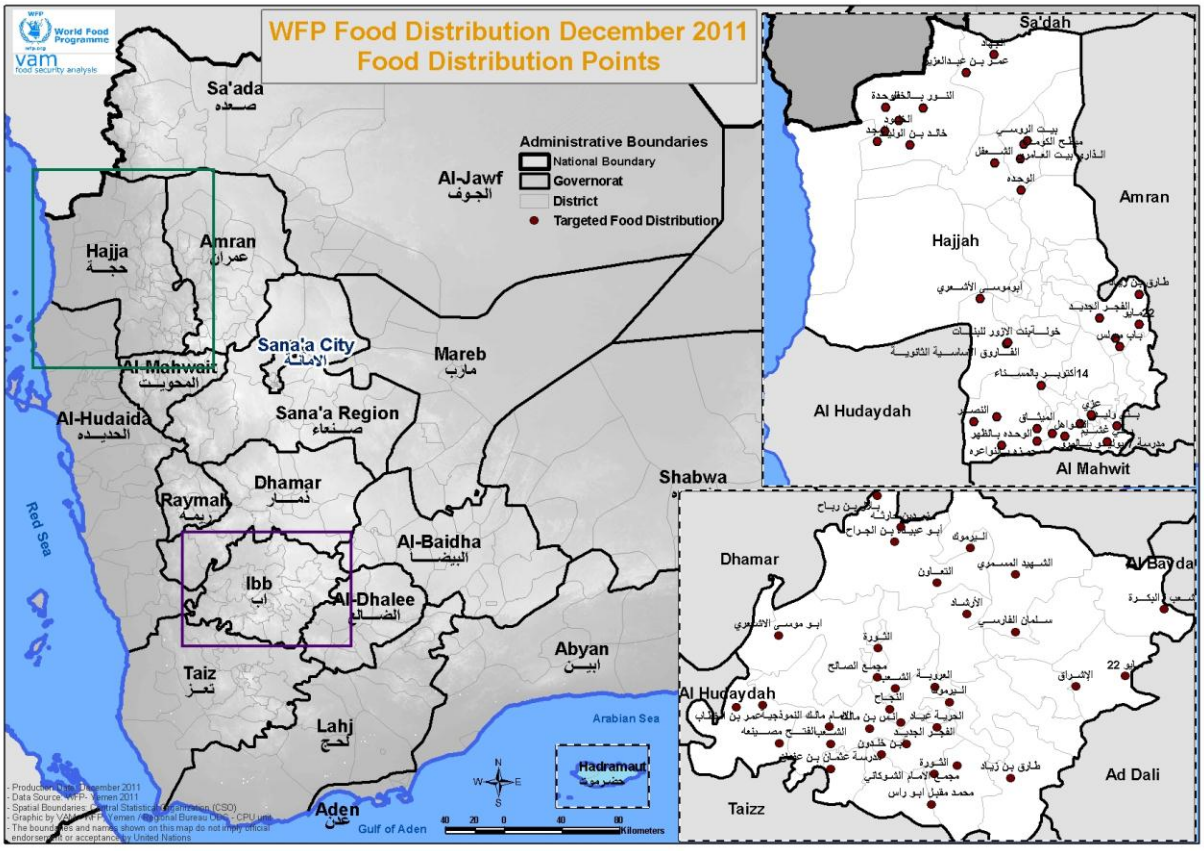
Annex 1: Map of PPSC branches in Hajjah and Ibb



Source: WFP-CO Yemen (2011b).

Annex 2: Map of food distribution points in Hajjah and Ibb



Source: WFP-CO Yemen (2011b).

Annex 3: List of 39 Foods Covered by Household Consumption Module

01	Wheat (flour, bulgur)
02	Sorghum
03	Maize
04	Millet
05	Legumes (beans, peas, lentils)
06	Barley
07	Bread/pita/kedma
08	Potato or white sweet potato
09	Rice
10	Chicken
11	Fish or other seafood
12	Meat (Lamb/goat/beef)
13	Eggs
14	Leafy greens (spinach, kale)
15	Orange-colored fruits and vegetables (orange sweet potato, oranges, mangoes, carrot, papaya, apricots)
16	Bananas
17	Lemons
18	Grapes
19	Other fruits (Apple, melon, pomegranate, peaches, guava, figs, pineapple, prickly pear)
20	Cucumber
21	Onion, garlic
22	Tomato
23	Eggplant
24	Cabbage
25	Squash/zucchini
26	Other vegetables (okra, peppers, peas, green beans)
27	Nuts
28	Vegetable oil/butter/ghee/semn
29	Dried fruits (apricots, dates, raisins)
30	Honey/sugar
31	Spices/condiments (ginger, chilies, salt etc)
32	Dairy products (buttermilk, yogurt, sour milk, cheese)
33	Aseed porridge
34	Coffee (qishr, qahwa)
35	Tea/tea leaves
36	Chips/fried snacks
37	Sweets/biscuits/etc.
38	Yemeni sweets
39	Soft drinks/juices/other sugary drinks