

# Comparing Cash and Voucher Transfers in a Humanitarian Context: Evidence from the Democratic Republic of Congo

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## Abstract

Despite recent calls in support of cash transfers, there is little rigorous evidence of the relative impacts of cash versus in-kind transfers, especially in humanitarian contexts, where a majority of such programs take place. This paper uses data from a randomized experiment in the Democratic Republic of Congo to assess the relative impacts and costs of equivalently valued cash and voucher transfers. The voucher program distorted households' purchases along both the extensive and intensive margin as compared with unconstrained cash households. Yet there were no differences in food consumption or other measures of well-being, in part due to the fact that voucher households were able to resell part of what they purchased. As there were no significant benefits to vouchers, cash transfers were the more cost effective modality for both the implementing agency and program recipients in this context.

**JEL classification:** J22, O12, C21

**Key words:** Cash transfers, In-kind transfers, Democratic Republic of Congo, Randomized control trial

How should wealth be redistributed to the poor? While cash transfer programs have become an increasingly important part of social protection programs worldwide, a majority of welfare transfers in both developed and developing countries are still in-kind (Tabor 2002; Currie and Gahvari 2008). For example, the U.S. 2013 budget allocated over US\$293 billion to food stamps, Medicaid, and housing vouchers, suggesting that the current ratio of U.S. in-kind assistance to cash transfers is 5.6 to 1 (Glaeser 2012). Globally, 92 percent of low-income countries have in-kind transfer programs, whereas 51 percent have a cash transfer program (Gentilini et al. 2014). Given that economic theory predicts that a program

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I thank Concern Worldwide in DRC for their support in all stages of this project and would especially like to thank Feargal O'Connell, Gabrielle Smith, Julia Lewis, Kai Matturi, Saul Butters, Joel Tschite, and the data collection team in DRC. I greatly appreciate comments from Jessica Goldberg, B. Kelsey Jack, Julie Schaffner, and two anonymous referees, as well as participants at the seminar at IFPRI, University of Gottingen, Northeast Universities Development Conference (NEUDC), Clark University, George Washington University, and Tufts University. I am grateful for financial support from UNICEF and Tufts University. All errors are my own. [A supplemental appendix to this article is available at http://wber.oxfordjournals.org/.](http://wber.oxfordjournals.org/)

recipient will at least (weakly) prefer a cash transfer as compared with an equal-valued in-kind transfer or voucher, why would the public sector prefer in-kind transfers?<sup>1</sup>

There are several reasons why in-kind transfers, including vouchers, might be preferred to cash. First, governmental or non-governmental organizations might want to encourage program recipients to purchase and consume particular food or non-food items, which is more difficult with cash transfers (Cunha 2014; Currie and Gahvari 2008).<sup>2</sup> Second, in-kind transfers may facilitate targeting by encouraging the non-poor to select out of social protection programs (Nichols and Zeckhauser 1982; Moffitt 1983). Third, if certain items are not readily available on local markets, in-kind distributions can increase the local supply of those items. Fourth, in-kind transfers may be more politically viable, especially among populations who are not eligible for the program (De Janvry, Fargeix, and Sadoulet 1991; Epple and Romano 1996). And finally, providing in-kind transfers could be less risky for program recipients, especially if cash is easier to steal.

The relative merits of cash as compared with in-kind transfers have been vigorously debated, particularly in the context of developing countries (Devereux 2006). A 2011 DFID report noted that governments in the developing world are increasingly investing in cash transfer programs (Arnold et al. 2011). More recently, there have been a number of articles about the promise of cash transfers in reducing poverty (Blattman 2014; Blattman and Niehaus 2014).

What is surprising about these calls for cash is the limited rigorous evidence to support these claims (Gentilini 2014; Ozler 2013). While there is extensive literature on the impacts of conditional and unconditional cash transfers, as well as the impacts of in-kind transfers (Whitmore 2002; Hoynes and Schazzenbach 2009; Fraker et al. 1995; Yen 2010), the empirical evidence of their *relative* impacts is more limited.<sup>3</sup> In some cases, that comparison has been all the more challenging due to differences in program design between the two modalities (Sharma 2006; Cunha 2014; Skoufias et al. 2008; Gentilini 2014).<sup>4</sup>

We report the results of a randomized transfer program in the Democratic Republic of Congo (DRC), where internally displaced households living in an informal camp were randomly assigned to cash and voucher transfer modalities. The first intervention, an unconditional cash transfer, was provided in three distributions over a six-month period. The second intervention, an equal-valued voucher, was a coupon that could be redeemed at an organized “voucher fair” selling a variety of food and non-food items for the first transfer, but restricted to food items for the second and third transfers. To minimize the likelihood that any observed differences might be due to differences in program design—rather than the transfer modality—the transfer amounts, frequency, conditions and costs of obtaining the transfer were as similar as possible between the two modalities, and prices at the voucher fair were “set” according to local market prices. Given the extreme vulnerability of the target populations, there was no pure

- 1 In the economics literature, vouchers are categorized as in-kind transfers, as they are often restricted to the purchase of particular items and can lead to a kinked budget constraint (Whitmore 2002; Currie and Gahvari 2008). Development practitioners and donors often make a distinction between cash transfers, in-kind transfers (free distributions) and vouchers (“near-cash”), as vouchers are more fungible than pure in-kind distributions.
- 2 In addition, if policymakers understand the nutritional implications of food consumption choices better than participants, then such policies could lead to higher “true” well-being (where well-being is defined as participants’ preferences under full information or spillovers from improved nutritional status).
- 3 There has also been growing evidence on the relative impacts of conditional and unconditional cash transfers (Baird et al. 2011; Benhassine et al. 2015).
- 4 Sharma (2006) reports the result of a randomized intervention of an equivalently-valued food or cash transfer program in Sri Lanka, where the frequency of the two transfer modalities differed considerably. Cunha (2014) reports the results from a randomized cash and food transfer program in southern Mexico, where the food transfer was worth 33 percent more than the cash transfer and the two transfer modalities were provided at different frequencies. WFP and IFPRI have conducted a series of randomized evaluations of cash versus food transfers in Uganda and Niger (Hoddindott et al. 2014; Gilligan et al. 2013) and cash, voucher and food transfers in Ecuador (Hidrobo et al. 2014), where the transfer modality designs were very similar.

comparison group. Thus, our analysis focuses on the relative impacts of the different transfer modalities, rather than the overall impact of the program.

We find that households' purchasing decisions differed significantly by transfer modality. Unsurprisingly, cash households used their transfer to purchase a diverse set of food and non-food items, including paying for health expenses and school fees, and did not appear to buy "temptation" goods (Evans and Popova 2014). Yet voucher households were significantly more likely to purchase particular food items, such as salt, as it was storable and easier to resell. These results suggest that distortions imposed by the voucher were apparent at both the extensive and intensive margins. Yet differences in purchasing decisions did not translate into differences in food consumption or asset ownership between the two modalities. As there were no significant differences in household well-being, the cash transfer program was the more cost-effective modality for the implementing agency in this context.

Our study most directly relates to the recent work of Hidrobo et al. (2014), who assess the relative impacts of food, cash and voucher transfers among Colombian refugees in northern Ecuador. While all three modalities improved the quality and quantity of food consumed, they find that vouchers led to significantly larger increases in dietary diversity. Although both of our studies focus on similar populations—displaced households—the design is markedly different, as their intervention offered nutrition sensitization and a more flexible voucher program (e.g., the vouchers could be used twice per month at supermarkets). These "flexible" voucher designs are more common in programs in developed countries or in urban voucher programs, but are less common among programs in rural areas or humanitarian contexts.

The rest of the paper proceeds as follows. Section 2 describes the context in the DRC and the experimental design. Section 3 outlines the theoretical framework. Section 4 describes the different datasets and estimation strategy. We discuss the results in terms of uses of the transfer (section 5) before discussing the mechanisms behind these results (section 6) and alternative explanations (section 7). We describe the costs in section 8 before concluding.

## II. Setting and Research Design

### Conflict and Internally Displaced Populations in Eastern DRC

One of the largest countries in sub-Saharan Africa, the Democratic Republic of Congo has been at the center of what has been termed "Africa's world war" since the late 1990s. The original conflict lasted five years and pitted government forces, supported by Angola, Namibia, and Zimbabwe, against rebels backed by Uganda and Rwanda (Williams 2013). The war has claimed an estimated three million lives, either as a direct result of fighting or because of disease and malnutrition (UNICEF 2012).

Despite a peace deal in 2003, renewed fighting erupted in the eastern parts of the country in 2008, displacing millions of people. As of 2011, it was estimated that there were 1.7 million internally displaced persons (IDPs) in the eastern part of the country. The most vulnerable regions are those of North and South Kivu, which are subject to attacks by government and militia forces, looting, and sexual violence. IDPs have been forced to move to formal or informal camps (Williams 2013).

Without access to land, livestock, or other means of generating income, IDPs are often heavily dependent upon external aid to meet their basic needs. Throughout the conflict, international and non-governmental organizations have distributed food aid, medicines, agricultural inputs, and non-food items (blankets, mattresses, hygiene kits and kitchen sets). More recently, such organizations have also provided cash transfers and vouchers, the latter of which is a type of coupon that enables program recipients to purchase goods at pre-organized fairs.

The focus on vouchers as a component of humanitarian assistance in eastern DRC is not uncommon among international humanitarian programs. Of more than fifteen international organizations working in eastern DRC in 2011, ten of them provided voucher assistance. Focusing on humanitarian assistance

more broadly, 58 percent of USAID's emergency response program was allocated to in-kind transfers in 2012, with 25 percent of that allocation devoted to vouchers (Hanrahan 2013).

### Transfer Interventions

In response to the ongoing conflict in eastern DRC, an international non-governmental organization, Concern Worldwide, designed a short-term social protection program. The program sought to increase households' access to basic food and non-food items and services by providing income transfers to 474 IDPs and their households living in an informal camp. The bulk of the transfers were provided between September and November 2011, the "hunger months" in eastern DRC.<sup>5</sup>

The first intervention was the *cash* transfer (*cash*), whereby households received an unconditional cash transfer of US\$130 over a seven-month period. The total value of the transfer was approximately two-thirds of the total annual GDP per capita for DRC, similar to the value of other income transfer programs in DRC and other emergency contexts in sub-Saharan Africa (Garcia and Moore 2012).<sup>6</sup> The payments were made in three disbursements: September 2011 (US\$90), November 2011 (US\$20) and February 2012 (US\$20). The transfer was directly deposited into an interest-free account at the office of a local cooperative located in a nearby town and market center (Masisi Center) so that program recipients had to travel to the town to pick up their transfer. The accounts were opened free of charge, and there were no fees to withdraw the cash transfer.

The second intervention, a *voucher*, provided program recipients with coupons to spend on any items for sale at pre-organized voucher fairs. The total value of the voucher program was also US\$130, and the timing and amount of the distributions were similar to those of the cash transfer modality. Like the cash transfer, the coupons were distributed at Masisi Center, although on a different day.<sup>7</sup> For the first distribution, program recipients could spend the voucher on a variety of food and non-food items at the fair, including school fees, clothing, agricultural inputs and small animals.<sup>8</sup> The second and third vouchers could be spent *only* on food items at the fairs, whereby program recipients circulated freely among pre-approved vendors.<sup>9</sup> Voucher recipients were informed of this policy prior to the start of the program, and were also informed of which items would be allowable at the fair. The voucher fair was closed to all non-voucher recipients. All of the voucher fairs took place at Masisi Center on a pre-arranged non-market day (which coincided with the distribution of the vouchers), and vouchers were not valid after this day. While all items at the voucher fair were available at the local markets, some items were excluded from the voucher fairs, such as meat, doughnuts and beer. The maximum prices for each item at the fair were the same as the prices for the most recent market in Masisi Center. On average, price ranges for food and non-food items were similar at the market and voucher fairs (Appendix S1 in

5 Masisi Territory has a first rainy season between September and December (followed by a harvest) and a second rainy season between March and May (followed by a second harvest). The first transfers coincided with a "hungry period," the period between harvests, when supply was relatively lower and prices relatively higher, especially for IDPs, who are net consumers (Save the Children 2003).

6 The size of unconditional cash transfer programs in sub-Saharan Africa varies considerably, ranging from US\$8 per month in Mali to US\$37 and US\$42 per month in Kenya and Rwanda, respectively (Garcia and Moore 2012). These represent 20–40 percent of per capita income in those countries.

7 While the cash and voucher transfers were not distributed on the same day, they were distributed within the same week.

8 The first fair included 122 vendors and four primary schools in the area. A full list of items available at the multisectoral fair is available upon request. Program recipients could purchase school fees for either the entire year or on a semester basis. School fees were due in September, after the first disbursement.

9 Eleven food vendors were eligible to participate at the second food voucher fair, selling sugar, cassava flour, beans, rice, vegetable oil, palm oil, dried fish and salt. The third food voucher fair included eighteen food vendors and the same food items. Discussions with program recipients revealed that almost all items that they would have purchased were available at the fair, with the exception of meat and doughnuts.

Figure 1. Timeline of Study and Data Collection Activities

2011					2012		
August	September	October	November	December	January	February	March
Identify program participants (454 households)	Baseline survey (Round 1), N=251 households First cash transfer and voucher distribution (food and non-food items)	Second cash transfer and voucher distribution (food items only)	Midterm survey (Round 2) N=136 households		Harvest	Third cash transfer and voucher distribution (food items)	Final evaluation (Round 3) N=182 households

the supplemental appendix, available at <http://wber.oxfordjournals.org/>), and any price differences were not systematically higher or lower for either modality.

Both the *cash* and *voucher* transfers were equivalently-valued, distributed at the same frequency, with the same denomination and at the same location.<sup>10</sup> Yet as is common in most voucher programs in both developed and developing countries, the *voucher* intervention constrained households' choices in terms of where, when, and how the transfers could be used, potentially increasing their transaction costs.<sup>11</sup> While the voucher intervention in our setting is similar to that of voucher programs in many humanitarian contexts (ECHO 2013, CaLP 2011), it is more restrictive than voucher programs in developed countries (such as US food stamps) or in non-humanitarian contexts. Thus, our findings will not be generalizable to all voucher programs but rather to a subset of programs that use a similar type of design. In addition, in the absence of a pure comparison group, we can only estimate the relative impacts of alternative transfer modalities, rather than the overall impact of the social protection program.<sup>12</sup>

### Experimental Design

Prior to the intervention, Concern Worldwide identified 474 internally displaced households living in one informal camp in the Masisi territory of DRC, with a total population of approximately 2,500 individuals. All 474 households residing in the camp were eligible for the intervention, and there were no other international organizations providing aid within the camp. Households were first stratified by neighborhood and then randomly assigned to either the *cash* or *voucher* intervention. In all, 237 households were randomly assigned to the cash transfer intervention and 237 were randomly assigned to the voucher intervention. The transfer was primarily provided to the female household member (either the

10 While average household size in the camp was 5.5 members, households ranged from 1 to 11 members. Since the size of the transfer was the same regardless of household size, some households received US\$130 per capita, whereas others received US\$11 per capita.

11 In many voucher programs in humanitarian programs, vouchers can be exchanged on pre-arranged voucher fairs and are valid for a specific period (usually 1-3 days) for specific goods available at the fair (CaLP 2011).

12 The purpose of the study was to determine which transfer modality would be the most effective for Concern to assist IDPs. In previous evaluations of Concern's voucher and cash-for-work (CFW) programs, which were implemented separately, Concern received somewhat contradictory evidence: One study of Concern's voucher program reported that women preferred vouchers because cash would be "controlled by their husbands, potentially wasted and put them at risk of theft." (ODI 2009) Yet another study of Concern's CFW program reported that very few program recipients engaged in "irresponsible spending" (MDF 2009). Thus, Concern felt that the idea of "responsible and irresponsible spending," as well as issues around security of cash transfers, deserved further consideration.

head of household or the spouse of the household head).<sup>13</sup> While it would have been optimal to ensure a minimum distance between households assigned to different transfer modalities in order to minimize spillovers, this was not possible. The study timeline is presented in figure 1.

### III. Theoretical Predictions

#### Demand and Welfare under Cash and Vouchers

While the cash and voucher transfers were designed to be as similar as possible, the impact of the transfer on household demand depends upon the household type and transfer value. If the value of the food voucher is less than what the household would have spent otherwise on food, then the marginal effect of the voucher on demand would be no different from the effect of the cash transfer.<sup>14</sup> If, however, the value of the food voucher is greater than what the household would have spent otherwise on food, and assuming no resale is possible, then the marginal effect of the voucher program would be different from that of the cash transfer, since the voucher constrains the program recipient's choice.

More formally, assume that households have preferences over two goods, a composite consumption good and food, the latter of which is targeted by in-kind transfers (Currie and Gahvari 2008). Pre-transfer, the household has income  $Y$ , each good has fixed prices (figure 2), and the consumer will maximize utility at points  $A$  or  $B$ . A lump sum cash transfer will cause a shift out of the budget line, whereas an equal-valued food voucher will lead to a kinked budget constraint. If the value of the transfer is infra-marginal for the household, then the household will reach the same indifference curve regardless of the transfer type, and the voucher is equivalent to cash ( $B$  to  $B'$ ). If the value of the transfer is extra-marginal for the household and frictionless resale is not possible, then the household would prefer to consume at  $A'$  but is constrained to  $A''$ , and the household prefers cash.<sup>15</sup> This simple, two-good model predicts that the quantities demanded of food will be the same under both transfer modalities if the voucher is *infra-marginal* but that the quantity demanded of food will be higher with vouchers if the voucher is *extra-marginal*.

Extending this model to our context is relatively straightforward. While the voucher transfer could be spent on food and non-food items during the first transfer, it was constrained to food items during the last two transfers. Thus, we would expect that the purchasing decisions of *cash* and *voucher* households will differ for the last two purchases if the voucher is extra-marginal, at least for a subset of households. Since the vouchers could only be spent at a pre-arranged location for one day, this timing constraint might further distort voucher households' purchases, perhaps towards food items that can be more easily stored, transported or resold.<sup>16</sup>

#### Why Use Vouchers in eastern DRC?

Despite the potential welfare loss for *voucher* program recipients, providing vouchers may be the preferred public policy in a context such as the DRC or other humanitarian contexts. Among the potential reasons cited in favor of in-kind transfers, three appear to be of primary importance in the DRC context. First, while many agencies switched from pure in-kind transfers (e.g., distributions) to vouchers, studies of those programs cited concerns about the consumption of "temptation" goods associated with cash

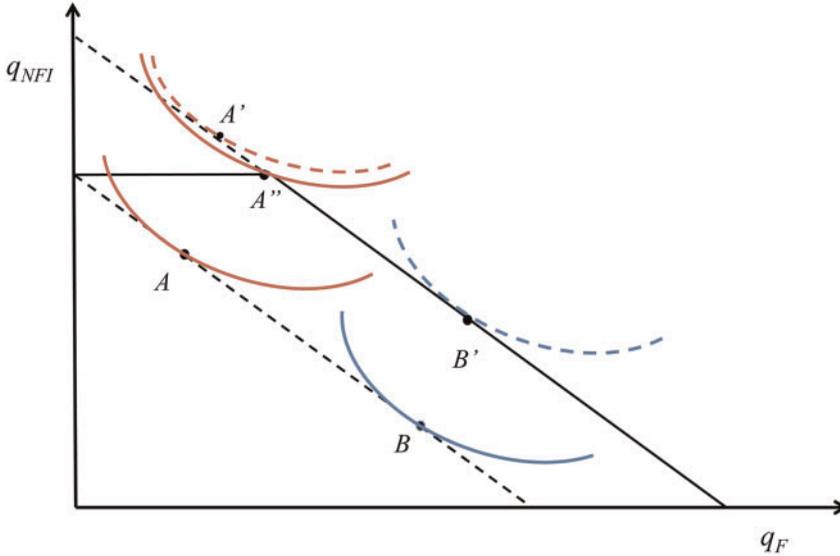
13 In the voucher group, 99.2 percent of program recipients were women. For the cash group, all of the program recipients were women.

14 This is true only if the assumptions underlying basic unitary consumer choice theory hold.

15 If resale is allowed, this will rotate the kink in the budget constraint and allow households to reach a higher indifference curve.

16 Bazzi et al. (2013) show that the timing and expectations of transfers matter. In our context, the timing of the transfers was the same for both modalities. Since both *cash* and *voucher* transfer recipients were informed prior to the program that they would receive three transfers, program recipients should have been able to maximize expenditures subject to these respective constraints, although we do not have the data to address this potential issue.

**Figure 2.** Choices Before and After Receiving an Unconditional Cash Transfer or Food Voucher



Notes: Adapted from Cunha (2014) and Currie and Gahvari (2008).

transfers (UNICEF 2012, ODI 2009). Since *voucher* recipients in our study were prohibited from purchasing certain food items at the voucher fairs (such as meat, doughnuts or beer), this suggests that there might have been an implicit preference for encouraging households to purchase and consume particular food items. Second, international organizations were concerned that local markets did not “offer a wide selection of the goods beneficiaries needed,” suggesting that vouchers were provided, at least in part, to address these concerns (UNICEF 2012). Finally, vouchers were considered to be safer than cash transfers, as they limited the risks associated with transporting and distributing cash.

#### IV. Data and Empirical Strategy

The data we use in this paper come from three primary sources. First, we conducted several rounds of household surveys and use these surveys to measure the impact of the program on households’ behavior and outcomes. Second, we collected price data from voucher fairs and markets to estimate the value of household assets, as well as the prices that program recipients faced. Finally, we conducted focus group surveys with different actors involved in the program. Before presenting our estimation strategy, we discuss each of these data sources in detail.

#### Data

##### Household Data

The first dataset includes information of individual and household characteristics. Among the 474 eligible program recipients, we stratified by neighborhood and randomly selected 251 program recipients to participate in the household survey. A baseline survey was conducted in August/September 2011, prior to the distribution of the first transfer, with follow-up surveys in November 2011 (after the second transfer) and March 2012 (after the third transfer). Each survey included modules on household demographics, asset ownership, shocks, income-generating activities and food expenditures. For the follow-up surveys, we also included modules on the uses of the cash transfer or voucher. As female program

recipients primarily worked as laborers or transporters for non-IDP households, with relatively long distances of travel, we were mindful of the time burden on respondents. As a result, the household surveys did not include a full income and expenditure module. While this somewhat constrains our analysis, we feel that data on transfer use approximates households' expenditures as we argue below.

Typically, attrition is a concern in any humanitarian context, as violence is frequent and populations are highly mobile. Immediately prior to the second round of the survey, violence intensified in the area, and approximately half of the IDP households fled into the surrounding hills. While most households were present in the camp during the third survey round, attrition raises concerns about the external and internal validity of our findings. If the types of households who stayed were different from those who fled, this further affects the external validity of the findings. Furthermore, if the characteristics of the remaining households differed between the *voucher* and *cash* groups, this could affect the internal validity of our findings despite the randomized design.<sup>17</sup>

Appendix S2 formally tests whether there is differential attrition at different rounds of data collection. While 46 percent of households were missing in November 2011 (the second round), there was not a statistically significant difference in attrition rates between the *cash* and *voucher* households. Attrition in March 2012 (the third round) was significantly lower, with 27 percent of households missing. Similar to the November 2011 round, there was no statistically significant difference between the two groups. We also test for whether the baseline characteristics among *non-attriters*—namely, those respondents present during the third survey round—differ by treatment modality (table 1, columns 5–8). There are no statistically significant differences between *cash* and *voucher* households who remained in the sample during the third round, with the exception of the number of months of adequate household food provisioning.<sup>18</sup>

While these results suggest that there is not differential attrition, we might simply be underpowered to detect an effect. Appendix S3 thus shows the determinants of drop-out. Overall, baseline characteristics do not individually or jointly predict attrition in the third survey round. The sole exception is marital status: Married respondents were more likely to drop out, suggesting that perhaps single parents were unable to leave.<sup>19</sup> Overall, however, these results suggest that attrition was primarily driven by the random violence and attacks prevalent in the region, rather than individual household characteristics or the transfer modality. Nevertheless, we construct Lee bounds for the primary outcomes as a robustness check.

### Price Data

The second dataset comprises price data and product information from both the voucher fairs and the primary local market in the area (where the voucher fair was also held). This dataset includes prices for over twenty-five food and non-food products between September 2011 and March 2012. These data are used to calculate the value of household asset ownership, as well as to determine whether households faced different prices for the same goods at local markets versus the voucher fairs.<sup>20</sup>

### Qualitative Data

The household surveys and administrative data are complemented by qualitative data from focus groups with men, women, market resource persons, school principals and the camp administration in March

17 For example, *cash* households might have been able to take the cash with them, as compared with *voucher* households, who would have needed to transport (or sell) other goods.

18 While the difference in means is not statistically significant for household asset ownership, there is a difference in the equality of distributions.

19 These results are also robust to interacting each characteristic in appendix S3 with the cash transfer variable, although there is some differential attrition between the *cash* and *voucher* groups according to livestock ownership. However, this affects less than 11 percent of households in the sample.

20 The voucher fair data also include information on what voucher households purchased, the quantity purchased and the price paid, although we do not have corresponding data for the cash households.

Table 1. Comparison of Pre-Program Characteristics (Entire Sample)

Variables	Full sample				Nonattriters in third round			
	(1) Voucher mean (s.d.)	(2) Cash mean (s.d.)	(3) Difference in means p-value	(4) Kolmogorov- Smirnov test p-value	(5) Voucher mean (s.d.)	(6) Cash mean (s.d.)	(7) Difference in means p-value	(8) Kolmogorov- Smirnov test p-value
<i>Panel A: Socio-demographic characteristics</i>								
Household size	5.43 (2.02)	5.52 (1.86)	0.17	0.83	5.67 (2.14)	5.66 (1.81)	0.64	0.83
Number of children (less than 15 years of age)	4.22 (1.93)	4.27 (2.00)	0.31	0.94	4.34 (2.02)	4.40 (2.00)	0.52	0.98
Program recipient is married	0.77 (0.42)	0.73 (0.44)	0.98	1.00	0.78 (0.41)	0.71 (0.45)	0.57	0.96
Age of program recipient	34.69 (14.47)	34.37 (13.01)	0.47	0.71	34.31 (14.29)	34.94 (13.07)	0.29	0.69
Number of years living in the camp	1.55 (0.76)	1.42 (0.82)	0.67	0.96	1.60 (0.74)	1.35 (0.84)	0.30	0.28
<i>Panel B: Income and income sources</i>								
Number of income sources	1.77 (0.73)	1.80 (0.92)	0.35	0.70	1.76 (0.76)	1.68 (0.82)	0.90	0.80
Total income earned during the past week (Congolese Franc)	2331 (4711)	2567 (4756)	0.84	0.26	2486 (5358)	2116 (2002)	0.51	0.92
Value of food purchases in the past week (Congolese Franc)	1815 (4433)	1823 (1695)	0.9	0.04**	2024 (5164)	1770 (1738)	0.62	0.46
Per capita value of food purchases in the past week (Congolese Franc)	350 (885)	371 (382)	0.82	0.13	387 (1031)	339 (333)	0.56	0.75
<i>Panel C: Agricultural production and livestock</i>								
Have access to land	0.02 (0.15)	0.02 (0.12)	0.82	1.00	0.02 (0.15)	0.02 (0.15)	0.64	1.00
Owned poultry	0.02 (0.13)	0.04 (0.20)	0.61	1.00	0.02 (0.15)	0.04 (0.20)	0.80	1.00

Table 1. (continued)

Variables	Full sample				Nonattriters in third round			
	(1) Voucher mean (s.d.)	(2) Cash mean (s.d.)	(3) Difference in means p-value	(4) Kolmogorov- Smirnov test p-value	(5) Voucher mean (s.d.)	(6) Cash mean (s.d.)	(7) Difference in means p-value	(8) Kolmogorov- Smirnov test p-value
<i>Panel D: Asset ownership</i>								
Total value (USD) of assets	63.37 (24.70)	60.19 (24.69)	0.55	0.10	66.71 (24.74)	60.36 (25.38)	0.12	0.04**
Number of durable goods categories owned	0.01 (0.09)	0.01 (0.09)	0.73	1.00	0.01 (0.11)	0.01 (0.10)	0.67	1.00
Number of nondurable goods categories owned	11.00 (3.46)	10.96 (3.62)	0.62	0.98	11.28 (3.40)	10.64 (3.53)	0.44	0.32
<i>Panel E: Food Security</i>								
Household diet diversity score (out of 12)	2.83 (1.82)	2.98 (1.67)	0.70	0.45	2.89 (1.85)	2.76 (1.62)	0.58	1.00
Number of meals in last day (household)	1.28 (0.56)	1.29 (0.49)	0.57	1.00	1.30 (0.61)	1.30 (0.50)	0.67	1.00
Months of adequate household food provisioning	1.55 (1.23)	1.86 (1.17)	0.02**	0.35	1.59 (1.21)	1.80 (1.15)	0.10*	0.89
Number of observations	124	127	251	251	88	94	182	182

Notes: Columns 1, 2, 5, and 6 report the unconditional means, with standard deviations in parentheses. Columns 3 and 7 report the standard p-values when testing the hypothesis that the difference between the cash and voucher means is equal to zero, including stratification fixed effects as controls. Columns 4 and 8 report the corrected p-values from the Kolmogorov-Smirnov test for the equality of distributions. Durable asset categories include a bike, generator and storage facility. Non-durable asset categories include chairs, radios, mattresses and utensils. “Months of adequate household food provisioning” are the number of months since the previous harvest that the household felt that it had “enough” food. Household diet diversity is a list of twelve categories consumed by the household over the past twenty-four hours. Results are robust to excluding neighborhood fixed effects, the level of stratification. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, \* significant at the 10 percent level.

2012, after the final transfer. The focus groups asked open-ended questions about how households used the transfer and their experience with the program. These data are used to provide additional insights into the quantitative findings.

### Pre-Program Balance of Program Recipients

Table 1 suggests that the randomization was successful in creating comparable groups along observable dimensions. Differences in pre-program socio-demographic characteristics are small and insignificant (panel A, column 3). Average household size was five. Almost all of the program recipients in our sample were women, a majority of whom were married. Households had, on average, been living in the camp for 1.5 years.

Panels B–E provide further evidence of the comparability of the *cash* and *voucher* households for a variety of outcomes. It is crucial to note how vulnerable these households were: Households had very few income-generating opportunities, relying upon only 1.7 sources of income, primarily as daily wage laborers or transporters. Income in the previous week was 2400 Congolese Francs (US\$2.50), and households spent approximately 70 percent of their income on food. There were also few differences in food security status between the two groups prior to the program (Panel E). The average household diet diversity score (HDDS) was 2.90 (out of a total of twelve food categories), well below the average HDDS in sub-Saharan Africa (four) and the recommended HDDS (six).<sup>21</sup> Households ate an average of 1.29 meals in the past twenty-four hours. The only statistically significant difference among the food security indicators was for the months of adequate household food provisioning: on average, *cash* households reported having had “enough food” for .31 more months than *voucher* households. Overall, the results in table 1 are robust to conducting Kalmogorov-Smirnov tests for the equality of distributions (column 4). We also find similar results when restricting the sample to non-attriters from the third survey round (columns 5–8).

### Estimation Strategy

To estimate the effects of different transfer modalities on a variety of outcomes, we use a regression specification that takes the following form:

$$Y_i = \gamma + \alpha \text{cash}_i + \mathbf{X}'_i \theta + \theta_N + \varepsilon_i \quad (1)$$

The variable  $Y_i$  represents the outcome of interest (uses of the transfer, purchases, food expenditures, food security and assets) of household  $i$  after the transfer. The indicator variable  $\text{cash}_i$  is equal to one if the household was assigned to an unconditional cash transfer, zero if the household was assigned to the voucher.  $\theta_N$  are neighborhood fixed effects, the level at which we stratified prior to randomization. To improve precision, we include a vector of household baseline covariates,  $\mathbf{X}'_i$ , such as household size.<sup>22</sup> The error term consists of  $\varepsilon_i$ , which captures unobserved individual or household characteristics or idiosyncratic shocks. The coefficient of interest is  $\alpha$ , the intent-to-treat (ITT) effect of the cash transfer (as compared with the voucher) on the outcome of interest, under the assumption that  $\text{cash}_i$  is orthogonal to  $\varepsilon_i$ . Since take-up was nearly perfect, the ITT is equivalent to the average treatment effect on the treated (ATT). Given the high rate of attrition in the second survey round, we use the data from the third survey round for all specifications. However, we also present the results using the pooled data across all post-transfer survey rounds in appendix S4.

21 The HDDS is a twenty-four-hour recall measure of diet diversity. The instrument involves interviewing the person responsible for preparing meals within the household and asking if anyone in the household consumed each of the twelve different food categories, including staple and other grains, tubers, beans, fruits, vegetables, meat, fish, eggs, oils, sugar, and condiments (including salt). The indicator ranges from zero to twelve, with twelve the highest degree of diet diversity (FANTA 2006).

22 Including household size in the regression also ensures that we are not capturing the effect for a subset of the population, e.g., small households whose per capita value of the transfer was much higher than larger households. Results are robust to excluding household size.

Equation (1) is our preferred specification for most outcomes, as much of the data were not collected during the baseline. For those outcomes where baseline data are available, we also estimate the treatment effect using the Analysis of Covariance (ANCOVA), which controls for baseline values of the outcome variables. In cases where the outcome variables have high variability and low autocorrelation, as is the case in our context, the ANCOVA model is preferred over difference-in-differences (McKenzie 2012).

As is the case with unconditional cash transfer programs, there are a number of potential causal pathways. Throughout this paper, we examine the differentiated impact of the transfer modality on over sixty different outcomes. This raises concerns that the observed effects cannot be attributed to the transfer modality, but are rather simply observed by chance. We address this issue by using a Bonferroni correction that adjusts for the mean correlation among outcomes (Sankoh et al. 1997).<sup>23</sup> In each table, we report the standard p-value, as well as the p-value adjusted for multiple hypothesis-testing for each group of outcomes.<sup>24</sup>

## V. Results

### Extra-Marginality of the Transfer

#### Extensive Margin of Overprovision and Uses of the Transfer

According to our theoretical predictions, we would only expect to see differences in household purchases between the two transfer modalities if the value of the transfer was extra-marginal for a subset of households. Figure 3 shows the cumulative density function of pre-transfer weekly household food expenditures for the cash transfer group. With a voucher transfer equal in value to 2400 FC per household per week (US\$2.62) for the last two transfers, only about 20 percent of households would have consumed more than this amount on a weekly basis. This suggests that that value of the food voucher was extra-marginal for a significant portion of households in the sample and hence that there might be differences in the quantities demanded between the two modalities.<sup>25</sup>

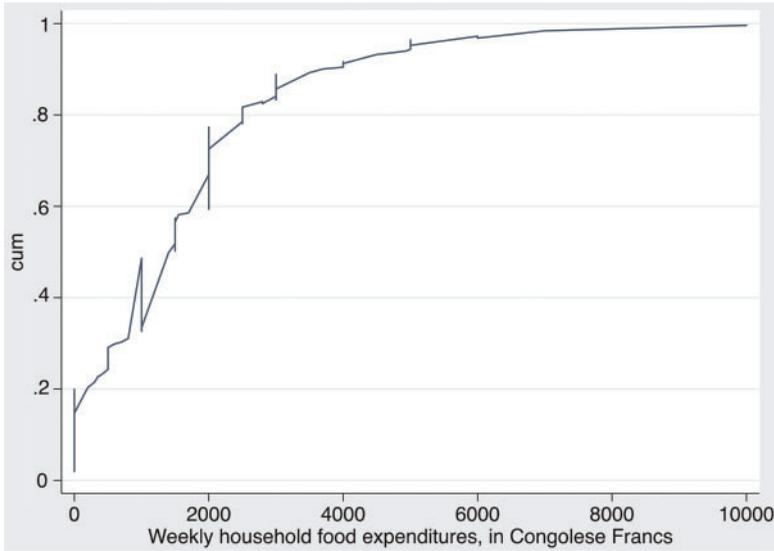
As we do not have a full expenditure module or data on the quantities purchased of all food and non-food items, we are unable to show the impact of the transfer on total expenditures or the total quantities demanded. Nevertheless, we do have data on the uses of the transfer and the amount spent on a subset of items. While this constrains our analysis, we feel that these outcomes are useful for two reasons. First, the transfer represented a significant income shock to recipient households, equivalent to one week of pre-transfer household income. Given this fact, as well as the fact that households only had 1.7 income sources (prior to the program) and did not receive external aid from other international organizations, it is reasonable to assume that households' marginal propensity to consume was high and that the uses of the transfer would approximate overall expenditures during this period.<sup>26</sup> Second, as program recipients faced similar prices at the market and voucher fairs (appendix S1) and there were no reported stock-outs

23 In the case of correlated outcome variables, the mean correlation between outcome variables can be included as a parameter in the Bonferroni adjustment (Sankoh et al. 1997). A mean correlation of zero would yield the full Bonferroni adjustment, whereas a mean correlation of one would mean no adjustment.

24 As households within the same neighborhood might be correlated, we would normally cluster observations by neighborhood. However, there are only eight neighborhoods within the camp. As the Huber-White standard errors may be misleading in this case, as a robustness check, we also conduct inference using a variant of the non-parametric permutation test (Efron and Tibshirani 1993; Anderson 2008). Results are available upon request.

25 This calculation assumes that weekly food expenditures remained relatively constant over the course of the program. While this is a simplifying assumption, it provides a benchmark of comparison for understanding the potential extra- or infra-marginality of the voucher transfer. In addition, although the value of the transfer could have been extra-marginal for most program recipients, it would have been infra-marginal for the wealthiest households (as the maximum amount spent on food prior to the program was 48,000 FC, or US\$48).

26 Over 70 percent of pre-program income was spent on food, suggesting that households were likely near subsistence constraints and had a high marginal utility of income.

**Figure 3.** Extra-Marginality of the Voucher

*Notes:* This figure shows the cumulative density function of weekly household food expenditures (pretransfer) for the cash transfer group. The red line shows the average value of the transfer for the last two transfers (which could only be spent on food items).

for the last transfer (other than intended “forbidden items”), the uses of the transfer capture voucher households’ decision-making under constrained choice.<sup>27</sup>

As the cash transfer was unconditional, program recipients were free to spend the transfer how they wished. Focusing on the last transfer, *cash* households used their transfer to purchase 6.98 different categories of goods including food items (staple and other grains, beans, oil, meat, salt and fish), clothing and school fees (table 2, panel A). (Respondents could list more than one use of the cash transfer, so the total can exceed 100%.) Less than 1 percent of households used the cash transfer to buy “temptation goods,” defined in this context as doughnuts and beer.<sup>28</sup> Thus, cash transfer recipients primarily used the transfer to ensure immediate consumption needs, but also to invest in non-food items and their children’s education.<sup>29</sup>

27 Understanding how *voucher* households optimize under such constraints, which is partially captured by the uses of the transfer, is often difficult to measure in other cash versus in-kind transfer research. For example, Cunha (2014) and Hoddinott et al. (2014) assess the impacts of a food versus cash-transfer program, so cannot observe the purchasing decisions of food transfer households (as they were provided directly with food). Rather, they focus on the impact of the program on the quantities consumed and diet diversity. Hidrobo et al. (2014) primarily compare the value of food *consumption* among cash, voucher, and food households, rather than their purchasing patterns, which does not directly provide insights into the ways in which the voucher program constrained households’ choices.

28 It is possible that we observe no consumption of temptation goods because households were afraid to report the consumption of these goods. While we cannot rule out this possibility, we are primarily concerned with differential spending on temptation goods between the two modalities, rather than the spending on temptation goods *per se*. This is in line with evidence from other cash transfer programs (Evans and Popova 2014).

29 A potential concern with this measure is that program recipients could simply list the first or largest expenditures made after receiving the transfer, which could differ by treatment groups. Thus, we might see a treatment effect on *measured* expenditures rather than *actual* expenditures. This concern is alleviated by the way in which the question was administered: after program recipients listed their initial categories, enumerators were instructed to go through a comprehensive list of potential categories and ask the recipient if they used the transfer on that particular category.

**Table 2.** Uses of the Transfer

	Last transfer only		Standard p-value (3)	Bonferroni adjusted p-value for group of outcomes (4)
	(1) Voucher mean (s.d.)	(2) Cash coeff (s.e.)		
<i>Panel A: Food items</i>				
Number of different purchases made	3.32 (1.78)	3.66*** (0.48)	0.00	0.02
Staple grains (maize, maize flour)	0.49 (0.50)	0.24*** (0.07)	0.00	0.02
Other grains (cassava flour, rice)	0.61 (0.49)	-0.10 (0.08)	0.22	0.02
Beans	0.15 (0.36)	0.38*** (0.07)	0.00	0.02
Condiments	0.00 (0.00)	0.27*** (0.05)	0.00	0.02
Oil	0.45 (0.50)	0.27*** (0.08)	0.00	0.02
Meat	0.00 (0.00)	0.55*** (0.06)	0.00	0.02
Vegetables	0.04 (0.19)	0.35*** (0.06)	0.00	0.02
Salt	0.93 (0.26)	-0.13** (0.05)	0.02	0.02
Fish	0.45 (0.50)	-0.02 (0.08)	0.82	0.02
<i>Panel B: Agricultural items</i>				
Livestock	0.00 (0.00)	0.08** (0.03)	0.02	0.02
Seeds	0.11 (0.31)	0.03 (0.05)	0.53	0.02
<i>Panel C: Other Nonfood Items</i>				
Clothing	0.00 (0.00)	0.42*** (0.06)	0.00	0.02
Housing Materials	0.00 (0.00)	0.11*** (0.03)	0.00	0.02
<i>Panel D: Education and health expenditures</i>				
School fees	0.01 (0.11)	0.65*** (0.06)	0.00	0.02
Medicines	0.00 (0.00)	0.05* (0.03)	0.05	0.02
Reimburse debts	0.07 (0.26)	0.43*** (0.06)	0.00	0.02
Number of observations	178			

*Notes:* This table presents a simple comparison of means for households in the two transfer modalities. Column 1 shows the unconditional mean and s.d. of the *voucher* households for the third transfer, whereas column 2 shows the coefficient and standard error on the *cash* transfer variable for the third transfer (using the third round of data). Column 3 shows the standard p-value, and column 4 shows the Bonferroni-adjusted p-value, adjusted for the mean correlation among groups of outcomes. All regressions control for neighborhood fixed effects, the level of stratification prior to randomization. Heteroskedasticity-consistent s.e. are presented in parentheses. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, \* significant at the 10 percent level.

As compared with *voucher* households, *cash* households used their transfer to purchase a more diverse set of food and non-food items (panel A, column 2). Focusing on food items, *cash* program recipients were significantly more likely to purchase staple grains (a 24 percentage point increase), beans (a 38 percentage point increase), condiments (a 27 percentage point increase), as well as oil, meat and vegetables as compared to the *voucher* group (panel A). Of these items, only meat and condiments were not available at the voucher fair. For non-food items, *cash* households were significantly more likely to use the transfer to pay for school fees, buy medicines, reimburse debts and purchase clothing and housing materials as compared with *voucher* households (panels C and D).<sup>30</sup> These differences in non-food purchasing patterns are not surprising, as these items were not available to *voucher* households for the last two transfers. Yet this general pattern is similar across all transfers (appendix S4).

While *cash* households were more likely to purchase a more diverse set of food and non-food items, the voucher modality distorted the purchasing decisions of *voucher* households for specific food items. *Voucher* households were 10 percentage points more likely to purchase other grains (namely rice) and 13 percentage points more likely to purchase salt than *cash* recipients, although only salt is statistically significant at the 5 percent level (table 2, column 2). These patterns are largely similar across all transfers, although the statistical significance varies (appendix S4).

#### Intensive Margin of Overprovision and Food Expenditures

While table 2 shows the extensive margin of overprovision for each food item, we might be interested in the intensive margin of the uses of the transfer. Given the high degree of measurement error related to the amounts purchased, as well as the limited time for surveys, we only collected expenditure data (related to the transfer) for a subset of food categories. While the data do not represent the entire allocation of the transfer, they do provide some insights into the extent of the intensive margin of overprovision for *voucher* households.<sup>31</sup> Table 3 reports these results. Consistent with the results in table 2, *voucher* households spent more on salt and fish than *cash* households, although only the difference for salt is statistically significant at conventional levels (table 3, panel A). Yet the magnitude of the salt purchases is significant: Whereas *cash* households spent approximately US\$ .80 on salt (or 2.5 kg at local market prices), *voucher* households spent US\$ 8.36, the equivalent of a 25-kg box of salt. This is supported by qualitative data, as *voucher* households stated that they purchased salt specifically for the purposes of resale in a nearby market, as well as the fact that it could be easily stored. In fact, the results in table 3 suggest that *voucher* households might have allocated some of their transfer away from some food items in order to purchase the 25-kg bag of salt, as salt was sold either in small sachets or 25-kg boxes.

Table 3 (panel B) assesses whether total weekly food expenditures differed by transfer modality. Overall, *cash* households spent approximately US\$ .34 less than *voucher* households on food, or about US\$ .11 less per capita, although these differences are not statistically significant (column 2). As the expenditure data are highly skewed, we use an inverse hyperbolic sine transformation (Burbidge et al. 1988). Using the non-linear specification, *cash* households spent less than *voucher* households on overall and per capita food expenditures, although these findings are only marginally statistically significant and not robust to dropping zero values or using a logarithmic specification.<sup>32</sup> While these effects are small in

30 Two *cash* households used money from all three transfers to purchase a parcel of land.

31 On average, *voucher* households spent approximately US\$17 on food items listed compared with the US\$20 voucher value (panel A, column 1). *Cash* households spent approximately \$13.50 on the listed food items, suggesting that they had \$6.50 to spend on other food and non-food items. At local market prices, the additional quantities purchased by cash transfer households would not have been significant (ranging from 1/3 kg of flour, beans or meat, or .6 liters of oil).

32 Except for very small values of  $y$ , the inverse hyperbolic sine approximates the  $\log(2y)$  (Burbidge et al. 1998). Our expenditure data have very small values, especially for per capita data on food expenditures. Thus the transformed variable yields a bimodal distribution.

**Table 3.** Amount Spent and Food Expenditures

	Last transfer only		Standard p-value (3)	Bonferroni adjusted p-value for group of outcomes (4)
	(1) Voucher mean (s.d.)	(2) Cash coeff (s.e.)		
<i>Panel A: Amount spent on particular food items (US\$)</i>				
Staple grain (maize flour)	0.49 (0.50)	0.24*** (0.07)	0.00	0.02
Other grain (rice)	1.22 (0.98)	-0.20 (0.16)	0.22	0.02
Beans	0.15 (0.36)	0.38*** (0.07)	0.00	0.02
Oil	2.68 (3.00)	1.60*** (0.46)	0.00	0.02
Salt	8.36 (2.32)	-7.56*** (0.27)	0.00	0.02
Fish	2.68 (3.00)	-0.11 (0.49)	0.82	0.02
<i>Panel B: Total Food expenditures</i>				
Food expenditures in previous week (\$US)	2.60 (2.37)	-0.34 (0.37)	0.37	0.04
IHS (Food expenditures)	—	-0.82* (0.44)	0.06	0.04
Per capita food expenditures (\$US)	0.56 (0.70)	-0.11 (0.08)	0.17	0.04
IHS (Per capita food expenditures)	—	-0.66* (0.36)	0.07	0.04
Number of observations	178			

*Notes:* This table presents a simple comparison of means for households in the two transfer modalities. Column 1 shows the unconditional mean and s.d. of the voucher households for the third transfer, whereas column 2 shows the coefficient and standard error on the cash transfer variable for the third transfer (using the third round of data). Column 3 shows the standard p-value, and column 4 shows the Bonferroni-adjusted p-value, adjusted for the mean correlation among groups of outcomes. All regressions control for neighborhood fixed effects, the level of stratification prior to randomization. Heteroskedasticity-consistent s.e. are presented in parentheses. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, \* significant at the 10 percent level.

absolute terms, this is consistent with the pattern of *cash* households spending slightly more on a variety of different food items, as compared with the *voucher* households spending significantly more on one primary food item: salt.<sup>33</sup> These results are also robust to using an ANCOVA specification (appendix S5, panel A).

Overall, these results suggest that distortions imposed by the voucher are apparent at two margins. First, *voucher* households purchased some categories of goods at significantly higher rates than *cash* households. Second, *voucher* households adjusted at the intensive margin, purchasing more of some goods (primarily salt) than the unconstrained cash households.

33 An alternative explanation is that cash households bought most of their food with the cash transfer and thereby lowered their food expenditures in the weeks following the transfer. As voucher households had to sell the salt to generate income and purchase food, their expenses might be slightly higher.

### Food Consumption and Assets

Since the voucher program distorted *voucher* households' purchasing decisions as compared with the cash transfer, a natural question is whether the transfer modality had differential effects on other aspects of well-being. For example, if *voucher* households incurred significant costs while reselling salt, the value of the transfer could have been significantly lower among *voucher* households, thereby lowering their purchasing power. In addition, since *cash* households were able to use the transfer when, where, and how they wished, they could have saved a portion of the transfer, thereby allowing them to better cope with shocks, or they could have arbitrated for better prices across different markets, thereby increasing their purchasing power as compared with *voucher* households.<sup>34</sup> Since *cash* households purchased a more diverse set of food items, albeit in relatively small quantities, it is possible that this could have translated into better outcomes.

Table 4 looks at the impact of the transfer modality on households' food consumption, as measured by diet diversity, the number of meals per day, and the number of months of adequate provisioning. Using the HDDS, *voucher* households consumed 3.07 food categories, without a statistically significant difference between the two modalities (panel A). There also were no statistically significant differences in the likelihood of consuming particular food groups or in other food security indicators, including the number of meals per day and the number of months of adequate food provisioning (panel B).<sup>35</sup> These results are also robust to using data from all transfer periods (appendix S4, panel B), as well as controlling for baseline values in an ANCOVA specification (appendix S5, panel B).

Panel C presents the results of equation (1) for a variety of proxy measures for well-being, including income and assets. Consistent with the results in Panels A and B, there is little evidence that the transfer modality led to differential improvements in well-being. There are no statistically significant differences for income or the value of assets owned. The one difference is money left over from the transfer, as broadly defined: whereas *voucher* households did not report any money left over from the transfer, *cash* households were 7 percentage points more likely to have cash left over, with approximately US\$1.11 remaining. These results are statistically significant at the 5 percent level. Yet *voucher* households were 8 percentage points more likely to have poultry (available at the first voucher fair), although the effect is not statistically significant. This suggests that *cash* and *voucher* households engaged in different, but equivalent, types of savings from the transfer. These results are also robust to an ANCOVA specification (appendix S5, panel C).<sup>36</sup>

## VI. How did the Voucher Design affect Households' Behavior?

The core result of this paper is that receiving a voucher transfer, as compared with an unconditional cash transfer, led to significantly different uses of the transfer and the overprovision of one food commodity for *voucher* households. Yet these differences did not lead to differential diet diversity or asset ownership. This section presents evidence as to how the voucher design affected both purchasing decisions and outcomes.

34 If one of the objectives of the *voucher* program was to encourage greater consumption of food items, these benefits would be mitigated to the extent that households purchased items that were not oriented towards consumption or did not consume what was provided. Resale of the goods would detract from the objective of increasing the consumption of those specific foods, whereas lumpy expenditures would support this objective.

35 While milk is included as a category in HDDS, no *voucher* or *cash* households consumed milk, so it is excluded.

36 We might expect differential effects of the transfer modality on purchasing patterns, food security, and other measures of well-being by certain characteristics. We test for differences in these outcomes by household size, marital status, and baseline income (Appendix S6). Overall, the results show that the effect of the transfer modality did not differ by these characteristics.

**Table 4.** Food Consumption, Assets, and Coping Strategies

	Last transfer only		Standard p-value (3)	Bonferroni adjusted p-value for group of outcomes (4)
	(1) Voucher mean (s.d.)	(2) Cash coeff (s.e.)		
<i>Panel A: Household diet diversity</i>				
Household diet diversity (out of 12)	3.07 (1.35)	−0.02 (0.22)	0.94	0.01
Grains	0.66 (0.48)	0.01 (0.08)	0.88	0.01
Tubers	0.73 (0.45)	−0.02 (0.08)	0.79	0.01
Beans	0.19 (0.39)	−0.01 (0.07)	0.94	0.01
Vegetables	0.65 (0.48)	−0.01 (0.08)	0.93	0.01
Fruits	0.06 (0.24)	−0.03 (0.04)	0.42	0.01
Fats	0.36 (0.48)	0.05 (0.08)	0.50	0.01
Eggs	0.00 (0.00)	0.01 (0.01)	0.20	0.01
Meat	0.05 (0.21)	−0.03 (0.03)	0.40	0.01
Fish	0.12 (0.32)	0.05 (0.06)	0.38	0.01
Condiments	0.02 (0.15)	−0.04 (0.03)	0.20	0.01
Sugar	0.24 (0.43)	−0.02 (0.07)	0.76	0.01
<i>Panel B: Other food security measures</i>				
Number of meals per day (household)	1.38 (0.58)	−0.03 (0.10)	0.78	0.03
Months of adequate food provisioning	1.26 (0.76)	−0.01 (0.12)	0.91	0.03
<i>Panel C: Income, assets, and Coping strategies</i>				
Income in the previous week (US\$)	3.36 (2.94)	0.83 (1.04)	0.42	0.04
Total value of household assets (US\$)	89.07 (35.20)	0.36 (5.09)	0.94	0.04
Poultry ownership	0.13 (0.34)	−0.08 (0.05)	0.11	0.04
Money left from transfer (US\$)	0.00 (0.00)	0.07** (0.03)	0.02	0.07
Amount of money remaining from the transfer (US\$)	0.00 (0.00)	1.11** (0.50)	0.03	0.07
Number of observations	178			

*Notes:* This table presents a simple comparison of means for households in the two transfer modalities. Column 1 shows the unconditional mean and s.d. of the *voucher* households for the third transfer, whereas Column 2 shows the coefficient and standard error on the *cash* transfer variable for the third transfer (using the third round of data). Column 3 shows the standard p-value, and column 4 shows the Bonferroni-adjusted p-value, adjusted for the mean correlation among groups of outcomes. All regressions control for neighborhood fixed effects, the level of stratification prior to randomization. Heteroskedasticity-consistent s.e. are presented in parentheses. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, \* significant at the 10 percent level.

### Why Did Voucher and Cash Households Make Different Purchases?

There are multiple mechanisms through which the design of the program might have affected *voucher* households' purchasing decisions. First, while Concern Worldwide tried to identify an exhaustive list of program recipients' preferences beforehand and worked hard to ensure that those food and non-food items were available at the voucher fairs, some items were forbidden or thereby affecting *voucher* recipients' choices. Second, while *cash* households could spend the transfer where, how, and when they wished, *voucher* households had to use the entire value of the voucher on the day of the fair and for specific food items, thereby affecting their choices.<sup>37</sup> And finally, as the transfer program primarily targeted women within the household, the transfer modality could have affected women's control over purchasing decisions.<sup>38</sup>

Table 5 shows how the in-kind transfer design affected households' purchasing decisions. Unsurprisingly, all of the *voucher* households used their transfer at the voucher fairs, whereas none of the *cash* households did so (not shown). *Cash* households were 98 percentage points more likely to spend the transfer at one of the markets outside of the camp, either at the primary market where they received the transfer or at a market that was closer to the camp but in a less secure zone.<sup>39</sup> In terms of the timing of the transfer, none of the *voucher* households used their transfer over multiple periods (by design), whereas *cash* households were 80 percentage points more likely to use the transfer over multiple periods. All of these effects are statistically significant at the 1 percent level.

While the transfer modality affected where, when, and how program recipients spent the transfer, it did not appear to strongly affect intra-household decision-making with respect to the transfer (panel B). A majority of *voucher* program recipients reported that they were responsible for spending all or part of the transfer, along with their husbands. Yet female program recipients in *cash* households were 12 percentage points less likely to discuss the use of the transfer in advance with other family members, with a statistically significant effect at the 5 percent level. Whether this reflects the need for greater intra-household communication before attending the fairs or greater decision-making power in *voucher* households is unclear. However, all other indicators related to intra-household decision-making are not statistically significant at conventional levels.

The results in table 5 thus suggest that the voucher program functioned as designed: *voucher* households had to spend their transfer all at once at the voucher fair and did not have unrestricted choice. This design naturally affected what households purchased, including considerations about arranging transport, storage and resale.<sup>40</sup>

37 Concern Worldwide collected price data on the key regional market prior to the voucher fair and used these prices as the maximum prices for goods at voucher fairs. Appendix S1 shows that voucher households did not face substantially different prices at the voucher fairs (as compared with market prices). Nevertheless, the program design might have affected program recipients' ability to bargain for a lower price. In fact, *voucher* program recipients noted that traders often first cited the maximum price on the market.

38 An additional reason for the differences in purchasing patterns might have been "decision fatigue." While most economic models are based on the assumption that agents are unconstrained in their ability to process information, people often use simple cognitive shortcuts when processing information, leading to systematic biases in decision-making (Simon 1955; Lacetera et al. 2012). While *voucher* households were informed in advance of the availability of items at voucher fairs and in theory should have been able to plan their choices well in advance, this information might not have been easily processed.

39 There were only three markets within a 20 km radius of the camp (Masisi, Lumumbashi, and Nyabiondo), although only Masisi and Nyabiondo were frequented by camp residents.

40 As transport from the voucher fair to the camp cost US\$5 per trip, program recipients stated that weight was a consideration in deciding what to purchase. For example, 65 percent of voucher recipients traveled with family members to the fair in order to help with transport. Those who were unable to travel with family members either purchased fewer items or smaller items that could be easily carried. As one voucher program participant mentioned, "If something was too heavy, I didn't buy it. . . I wanted to buy two boxes of salt but could only carry one, so I bought one plus other things."

**Table 5.** Mechanisms for Purchases and Outcomes

	Last transfer only		Standard p-value (3)	Bonferroni adjusted p-value (4)
	(1) Voucher mean (s.d.)	(2) Cash coeff (s.e.)		
<i>Panel A: Location and timing of purchases</i>				
Market outside camp	0.00 (0.00)	0.98*** (0.02)	0.00	0.07
Spent money in more than one purchase	0.00 (0.00)	0.80*** (0.05)	0.00	0.07
<i>Panel B: Intra-household decision-making with respect to transfers</i>				
Program recipient responsible for spending all or part of transfer	0.95 (0.21)	-0.06 (0.04)	0.15	0.02
Husband responsible for spending part of transfer	0.44 (0.50)	-0.04 (0.08)	0.63	0.02
Discussed how to use transfer in advance with other family members	0.80 (0.40)	-0.12* (0.07)	0.10	0.02
<i>Panel C: Sharing of transfers</i>				
Household shared part of money received	0.18 (0.38)	0.15* (0.08)	0.07	0.05
Household shared part of goods purchased	0.42 (0.50)	-0.15* (0.08)	0.07	0.05
Number of observations	178			
<i>Panel D: Intra-household decision-making</i>				
Husband makes education decisions alone	0.36 (0.48)	0.07 (0.10)	0.51	0.04
Husband decides whether to share transfer with other households alone	0.33 (0.48)	-0.01 (0.10)	0.89	0.04
Husband decides whether/how to save alone	0.36 (0.48)	-0.06 (0.09)	0.55	0.04
Number of observations	130			

*Notes:* This table presents a simple comparison of means for households in the two transfer modalities. Column 1 shows the unconditional mean and s.d. of the voucher households for the third transfer, whereas column 2 shows the coefficient and standard error on the cash transfer variable for the third transfer (using the third round of data). Column 3 shows the standard p-value, and Column 4 shows the Bonferroni-adjusted p-value, adjusted for the mean correlation among groups of outcomes. All regressions control for neighborhood fixed effects, the level of stratification prior to randomization. Heteroskedasticity-consistent s.e. are presented in parentheses. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, \* significant at the 10 percent level.

### Why Was Well-Being the Same in Voucher and Cash Households?

Despite the fact that the voucher modality led to different purchasing decisions between *voucher* and *cash* households, there were no differences in food security or asset ownership. Why was this the case? The most likely explanation is that the transfers were non-binding; in other words, *voucher* households could sell the goods that they purchased or share some of these goods with other households, whereas *cash* households could share some of their cash. Alternatively, if an underground market for vouchers existed, voucher recipients could have sold their voucher.<sup>41</sup> In addition, since the food security data were

41 While the sale of vouchers was technically prohibited, some program recipients reported exchanging their voucher for cash, potentially resulting in a lower income transfer to the household. Although it is impossible to gauge the frequency

collected three weeks after each transfer, the absence of differences could be due to resale, storage, or lumpy expenditures.<sup>42</sup> Finally, the transfer modality could have affected intra-household decision-making, thereby affecting welfare outcomes.

Table 5 (panels C and D) looks at the impact of the transfer modality on these different aspects. Unsurprisingly, program recipients shared part of the transfer: while *cash* households were 15 percentage points more likely to share the money received with other households, *voucher* households were 15 percentage points more likely to share goods purchased with the transfer (panel C). These differences are statistically significant at the 10 percent level. This suggests that sharing is an important household coping mechanism within the camp.

While the transfer modality could have affected intra-household decision-making and hence welfare outcomes, this does not appear to be the case: Overall, men and women made joint decisions with respect to children's education, inter-household sharing and savings (panel D)<sup>43</sup>, and the patterns of intra-household decision-making did not differ by transfer modality. Thus, the results in table 5 suggest that the primary factor explaining similar outcomes was the fact that the transfers were non-binding.

## VII. Ruling out Alternative Explanations

There are several threats to our identification strategy. The primary threat is differential attrition, either related to illness, death or moving.<sup>44</sup> While appendices S2 and S3 suggest that attrition was not strongly correlated with observable characteristics, baseline marital status was a determinant of attrition in the third survey round. Thus, as a robustness check, we construct Lee bounds (2009) for the primary results for which there are statistically significant findings (appendix S7). Overall, most results are robust to bounding the treatment effect.

A second threat to the identification of our results is differential take-up. For example, if the cash transfer made it easier for corrupt agents to steal the transfer, then we would observe differential compliance between the cash and voucher households. Or, if households felt more stigmatized by participating in a voucher program, they might have refused assistance.<sup>45</sup> Table 6 shows the likelihood that a household received the transfer, as well as the amount of the transfer received. All households received their last transfer, regardless of the modality (panel A). Voucher households received an average of 18,329 FC for the third transfer, slightly less than the value of the transfer. While *cash* households reported that they received a higher amount—thirty-seven Congolese Francs more, or \$.02—the magnitude is small, and this is only marginally statistically significant. Thus, it is unclear whether the difference in reported versus actual amounts was due to measurement error, leakage in the program or accounting for the potential sale of vouchers.

with which this practice occurred, voucher recipients reported that they could exchange their US\$20 voucher for approximately US\$11.25–US\$14.15 at the fair. This suggests that vouchers traded for about 55–70 percent of their face value.

42 However, as our survey asked about assets currently in the household, we believe that the storage story is unlikely.

43 Decision-making within the camp might differ from the decision-making structure within program recipients' home villages. In addition, since these questions were asked about spousal decision-making, the questions were only asked of those program recipients who were married or had a partner, thereby further reducing the number of observations in panel D to 130 households.

44 Since *cash* households were more likely to spend their transfer on medicines, this could have reduced the likelihood of illness or death among that group. Table 6 (panel B) suggests that this is not the case, as the prevalence of illness and deaths was similar between the two groups.

45 Imperfect compliance in this context was minimal, potentially for two reasons. First, adverse stigma effects associated with participation (as in Moffitt 1983) are unlikely in this context where all households in the camp were provided with some type of assistance. Second, households were required to present beneficiary identification cards to receive aid packages, and program recipients had to travel to Masisi Center to receive the cash or voucher, making it unlikely that ineligible households in fact received aid.

**Table 6.** Alternative Explanations

	Last transfer only		Standard p-value (3)	Bonferroni adjusted p-value (4)
	(1) Voucher mean (s.d.)	(2) Cash coeff (s.e.)		
<i>Panel A: Take up and leakage</i>				
Received transfer	1.00 (0.00)	*	*	*
Number of transfers received	2.25 (0.97)	0.16 (0.16)	0.32	0.02
Amount received (Congoles Franc)	18,329 (153)	37.17* (19.91)	0.06	0.02
<i>Panel B: Illness and death</i>				
Household member affected by illness	0.59 (0.50)	-0.01 (0.08)	0.87	0.03
Household member died	0.11 (0.31)	0.03 (0.05)	0.57	0.03
Number of observations	178			

*Notes:* This table presents a simple comparison of means for households in the two transfer modalities. Column 1 shows the unconditional mean and s.d. of the voucher households for the third transfer, whereas column 2 shows the coefficient and standard error on the cash transfer variable for the third transfer (using the third round of data). Column 3 shows the standard p-value, and column 4 shows the Bonferroni-adjusted p-value, adjusted for the mean correlation among groups of outcomes. All regressions control for neighborhood fixed effects, the level of stratification prior to randomization. Heteroskedasticity-consistent s.e. are presented in parentheses. \*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, \* significant at the 10 percent level.

A third threat to the validity of our findings is spillovers. An optimal research design would have conducted the randomization at the camp level or randomized at the camp neighborhood level, ensuring a minimum distance between neighborhoods (or households within the neighborhood). While all of these designs were considered at length, there were insufficient neighborhoods, as well as concerns that a neighborhood-level randomization might be construed as “targeting” certain households within the camp. Thus, our identifying assumption fails if, because of spillovers, the *voucher* group is not a proper counterfactual for how households in the *cash* group would have behaved if they were provided with the *voucher* transfer.<sup>46</sup>

Since we cannot rule out the likelihood of spillovers between the two groups—and in fact, evidence in [table 5](#) points to inter-household sharing—we argue that spillovers do not invalidate our findings. First, the issue of inter-group sharing is unlikely to have affected household *purchasing* decisions, especially for *voucher* households, as they had to purchase their items at the fair on the same day (and could not share their vouchers with other households at the fair). While *cash* households could have shared some of their cash with *voucher* households, thereby affecting *voucher* households’ purchasing decisions, this would have made it *more* difficult for us to detect differences in purchasing patterns between the two groups. This is supported by the data: If we estimate the regressions only for the subset of our sample that reported that they did not share cash or goods, we find similar results.

46 In addition to this direct spillover effect, we might also be worried about a direct behavioral effect if *voucher* households changed their behavior as a result of knowing that other households had been offered cash, similar to a John Henry effect. Alternatively, *voucher* households could have strategically purchased more non-food items during the first round and more food items during the second and third rounds. Looking at the first transfer only, *voucher* households were not more likely to use the transfer for non-food items than *cash* households. Finally, *voucher* households could have strategically purchased items (such as salt) to resell to *cash* households; this is not supported by qualitative data, whereby *voucher* households reported that they primarily resold salt to traders in the nearby market.

A fourth alternative explanation is the effect of different transfer modalities on prices (Cunha et al. 2013). If the cash transfer put greater inflationary pressure on local markets, this could have reduced the value of the transfer for those households. Or, if *voucher* households were faced with higher prices at the voucher fairs, particularly if traders exerted some degree of market power, then this could have reduced the purchasing power of voucher households. While the data in appendix S1 suggest that the two groups did not face differential prices at the voucher fair or market, we do not have price data for all three markets within the area. Yet the overall magnitude of the transfer program in the area was fairly small, distributing US\$30,000 to 474 households over a seven-month period, as compared with an IDP population of 60,000. In addition, *cash* households purchased in markets that were 15–20 km apart over several weeks, with fairly limited integration between these markets. This suggests that differential impacts on prices are not driving our results.<sup>47</sup>

### VIII. Costs and Security

One of the key reasons for using vouchers in eastern DRC was to ensure that households could get access to the goods they preferred. Yet the previous results suggest that *cash* households were able to purchase a wide variety of food and non-food items and that there were not differential impacts on household food security and asset ownership. Given these results, what were the costs?

Figure 4 shows the per-recipient cost of each transfer modality. These costs include the staff time, materials, security, travel, and account and transfer fees (primarily for the cash transfer). When looking at the costs per program recipient, the voucher modality cost US\$14.35 (per recipient), whereas the cash modality cost US\$11.34 (per recipient), about US\$3 cheaper per program recipient. Overall, the cost breakdown shows that staff time represents the largest percentage of costs for both interventions, followed by transport and voucher printing (for the voucher intervention) and account-opening fees (for the cash intervention). Yet since the account-opening fees are a one-time, fixed cost, if Concern were to continue cash transfers with existing beneficiaries, the cost per cash program recipient would have only been US\$6 - or US\$8 less expensive than vouchers per program recipient.

While the cash transfer program was less expensive for the implementing agency, an important question is whether the two transfer modalities were similar in terms of their costs to program recipients. For both transfer modalities, program recipients had to travel twenty km to obtain their transfer, a significant time cost for program recipients (four hours). The average wait time for *cash* recipients was 1 hour and 45 minutes, while the wait time for *voucher* recipients was 1 hour and 30 minutes. Thus, the waiting and travel time was similar for both groups, and none of the recipients mentioned this as an issue during the voucher exit fairs, surveys or the focus group discussions.<sup>48</sup> Yet a key difference was the opportunity costs of time: since cash transfer recipients could pick up their cash and shop at any time, they could choose to do so at a time when opportunity costs were relatively lower.

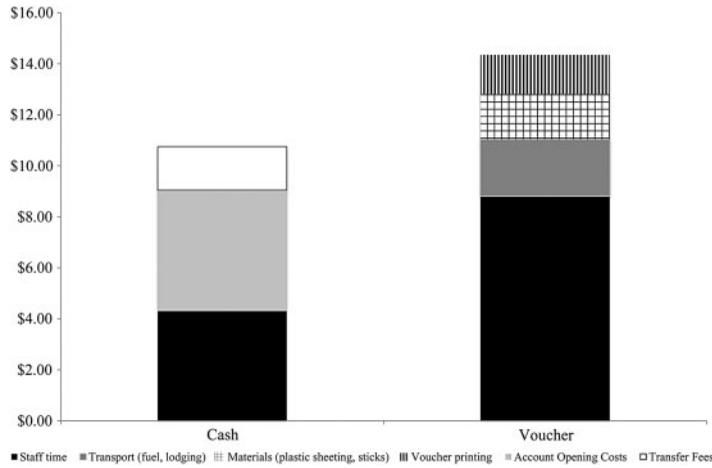
A final cost when comparing the cash and voucher programs is security, especially in a highly unstable environment such as eastern DRC.<sup>49</sup> For example, if non-program recipients could easily observe a

47 A final threat to the validity of our findings is response bias, i.e., if cash and voucher households reported differentially, thereby leading to non-classical measurement error. While we cannot directly test for this, we do look at whether the transfer modality affected a variable that should not have been affected by the program during this time period: household size. While an imperfect proxy, we do not find statistically significant differences in household size between the transfer modalities during the second or third survey rounds.

48 In theory, cash transfer recipients were able to obtain their cash from the cooperative during certain days or times, thereby spreading out the number of program recipients on a particular day. Yet voucher recipients had to arrive on the same day and wait in line for their vouchers. The only way to reduce the wait time for the voucher program would be to issue vouchers that were redeemable for several days, at pre-arranged vendors, and spread out the registration process over a longer time period.

49 For cash transfer programs, implementing agencies often have one of two choices: 1) distribute the cash transfer themselves, whereby they assume most of the risk, or 2) distribute the cash transfer via the private sector or a quasi-public

**Figure 4.** Costs per Recipient by Transfer Modality (USD)



*Notes:* This figure shows the per recipient costs associated with implementing each transfer modality in USD, based upon administrative and financial data from Concern Worldwide.

certain transfer modality, then this could make program recipients easier targets for thieves or looters. Or, if a certain transfer modality requires longer travel or wait times to distribute the transfer or grouping a large number of program recipients, this could put program recipients at greater risk in insecure locations. Overall, the cash transfer program offered greater potential security to program recipients, as they could more easily hide the cash (as opposed to goods, such as salt). This suggests that the cash modality was more secure than the voucher modality for program recipients, at least in this context.<sup>50</sup>

**IX. Conclusion**

Redistribution to the poor through welfare transfers plays an important role in the economies of both developed and developing countries, especially those affected by conflict. This paper explores issues surrounding in-kind and cash transfers, using a randomized control trial of cash and vouchers in an internally displaced camp in eastern DRC.

Estimating the relative effects of the transfer on household purchasing patterns, we find that voucher recipients were more likely to purchase specific items, particularly salt, and in greater quantities. Yet these differential purchases did not translate into differences in consumption or other proxies for well-being.

Some caution is required in terms of interpreting the external validity of these findings. First, while a variety of international organizations use in-kind and voucher transfers, the design and implementation of voucher programs can differ substantially in terms of the values, conditions, and eligibility, especially when comparing humanitarian and development voucher programs (Gentilini 2014). Second, as we cannot completely address the issue of spillovers, it is possible that the results might differ in contexts where the resale or trade of items purchased with food vouchers is not possible and, in fact, that such spillovers

agency. In the latter case, risk is transferred from the implementing agency to the distributing partner. In both cases, the amount of risk incurred by the program recipients depends upon where and how the cash is distributed and what happens in the event of theft.

<sup>50</sup> Cash program recipients reported that it was easy to conceal the cash while traveling or within the camp. Since voucher recipients had to use their voucher at the fair and transport these goods back to the camp, voucher program recipients could have been easier to identify. In terms of the location and transport of items purchased with the transfer, cash recipients were clearly at less risk, as they could choose when, where, and how to purchase and transport their goods.

mitigated the distortionary effects of vouchers. And finally, despite the conflict and high transaction costs in eastern DRC, both of which affect the extent of inter-market trade, traders appeared willing and able to engage in spatial arbitrage, thereby ensuring that supply was available in local markets (UNICEF 2012). This might not be the case in other complex emergencies. Despite these caveats, this research suggests that unconditional cash transfers may be successful in improving households' purchasing power in complex emergencies, while giving households the freedom of choice and lowering implementing agencies' costs.

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