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Amy Margolies<sup>a</sup> & John Hoddinott<sup>a</sup>

<sup>a</sup> Poverty, Health and Nutrition Division, International Food Policy Research Institute, 2033 K Street NW, Washington, DC 20006, USA  
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## Costing alternative transfer modalities

Amy Margolies and John Hoddinott\*

*Poverty, Health and Nutrition Division, International Food Policy Research Institute, 2033 K Street NW, Washington, DC 20006, USA*

Discussions regarding the merits of cash and food transfers focus on their relative impacts. Much less is known about their relative costs. Activity-based costing methods are applied to interventions situated in Ecuador, Niger, Uganda, and Yemen, finding that the per-transfer cost of providing cash is always less than food. Given the budget for these interventions, an additional 44,769 people could have received assistance at no additional cost had cash been provided instead of food. This suggests a significant opportunity cost in terms of reduced coverage when higher cost transfer modalities are used. Decisions to use cash or food transfers should consider both impacts and costs.

**Keywords:** costing; social protection; food aid; cash transfers; multicountry

### 1. Introduction

Many developing countries are increasing the size and scope of their social protection programmes. Undertaking this expansion successfully requires addressing a series of technical questions, including the intended target group, targeting mechanisms used to reach these beneficiaries, and the size and frequency of transfers and the transfer type – cash, food or other in-kind resource or some form of near-cash transfer such as a voucher. Cash transfers provide beneficiaries with more choice in the use of the transfer, but governments may wish to use in-kind transfers so as to paternalistically promote the consumption of certain goods (Cunha 2014). While cash transfers are not appropriate when markets function poorly or when prices are rising (Maxwell, Lentz, and Barrett 2008), international experience suggests that cash can be delivered more quickly than food (Lentz, Passarelli, and Barrett 2013). The choice of transfer type has long produced a polarised and acrimonious debate (Devereux 2006). More recently, efforts have been made to assess in a more rigorous fashion the relative benefits of cash, food, and near-cash transfers (see Hidrobo et al. 2014 for a summary.). However, benefits of any given transfer modality must be assessed against the cost of their delivery. As an example, from the perspective of programme designers, if one modality produces only a modest increase in benefits relative to another, but is considerably more expensive to implement, it may be more desirable to use the less effective modality but reach a larger population.

Relative to the number of studies that assess the impact of social protection interventions, much less is known about implementation costs. Less than a quarter of the social protection programmes listed in Coady, Grosh, and Hoddinott (2004) have costing information, and Grosh et al.'s (2008) magisterial review of social protection interventions also contains relatively few studies with costing data. Caldés, Coady, and Maluccio (2006)

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\*Corresponding author. Email: [J.Hoddinott@cgiar.org](mailto:J.Hoddinott@cgiar.org).

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provide examples of how to assess the costs of a conditional cash transfer programme, and Harou et al. (2013) and Lentz, Passarelli, and Barrett (2013) compare costs of alternative means of procuring food. But while it is frequently asserted that cash is cheaper to deliver than food, evidence of the magnitude of these relative cost differences is hard to come by.

Within this context, this article makes two contributions. First, we show how an adaptation of a method used in the health economics literature can provide estimates of the full economic costs of alternative transfer modalities. Second, we apply this method to compare the costs of delivering food or cash (and in one case, vouchers) to beneficiaries in interventions situated in four very different contexts, peri-urban Ecuador, semi-pastoral Niger, rural northern Uganda, and smallholder settlements in Yemen. A feature of these comparisons is that all other aspects of the interventions – the targeting of beneficiaries, the size and duration of transfers, and so on – were designed to be the same for these different transfer modalities in each country. This means that our comparisons of the cost of delivering alternative modalities are not confounded by other differences in programme design.

The article is organised as follows. Section 2 provides contextual information on the four-country study. Section 3 describes the methods for calculating these comparative costs, using the Ecuador case study as an example. Section 4 gives results for all four countries. Section 5 extends the analysis by relaxing assumptions we make about the cost of sourcing food. Section 6 further extends the analysis to assess the opportunity costs associated with choosing higher-cost transfer modalities, and Section 7 concludes.

## 2. The four-country study

In partnership with the World Food Programme (WFP), we participated in a four-country study to assess the comparative performance of cash transfers, food payments, and vouchers on household food security. The studies in Ecuador, Uganda, Niger, and Yemen were carried out over the period 2010–2012. In all countries, an experimental design was used with modalities (cash, food, and vouchers) randomly assigned at a locality (village or neighbourhood level). Timing, frequency, and value of transfers were equalised to the extent possible across modalities, thus ensuring that differences in outcomes were attributable to the modality and not to other confounding factors. All studies took place in localities with well-functioning grain markets. The four countries were chosen to cover the range of contexts in which WFP works. In Ecuador, the pilot was undertaken in an urban area with a refugee population, with easy access to banks and markets selling a wide range of foods. The study in Niger represents a rural, classic Sahelian food security setting with very poor households facing severe seasonal food shortages. The Uganda study was also undertaken in a rural setting in the north, but was additionally a postconflict area. The Yemen intervention took place in a poor and conflict-prone setting in which there were concerns that cash would be used to purchase *qat*, a mild narcotic that is widely consumed.

In Ecuador, unconditional transfers were made in two Northern provinces (Carchi and Sucumbios) with a large concentration of Colombian refugees and poor host Ecuadorians. Beneficiaries were randomised at the barrio (neighbourhood) level to receive US\$40 cash transfers that were accessed from ATMs using a debit card; US\$40 in vouchers redeemable for specified foods in supermarkets; US\$40 in food: rice (24 kg), vegetable oil (4 L), lentils (8 kg), and canned sardines (8 cans of 0.425 kg). Transfers were received monthly for a 6-month period. All beneficiaries also received nutrition sensitisation training.

In Niger, transfers were provided conditional on public works for 3 months (all households) and unconditionally for 3 months (targeted households) in the Zinder region, where there are high levels of chronic and transitory food insecurity. The intervention site that was selected is well served by both local traders and also those moving grains between Niger and the nearby border with Nigeria. Beneficiaries were randomised at the worksite level to receive a cash payment of 25,000 West African CFA franc (US\$55) per month or an in-kind payment of 87.5 kg of cereals, 18 kg of pulses, and 3.5 kg of vegetable oil and salt. Payments were made every 2 weeks during public works and on a monthly basis for unconditional transfers. Cash payments were made via a mobile ATM that was transported to villages; each beneficiary received a debit card that was used to withdraw funds.

In northern Uganda, transfers were linked to children's enrolment in Early Childhood Development centres (preschools) in three districts of Karamoja – a poor, rugged, post-conflict subregion with high seasonal food insecurity. For each child aged 3–5 years enrolled in preschool, beneficiaries were randomised at the preschool level to receive 25,500 UGX (Ugandan Shillings) (US\$10.25) in cash, added electronically to mobile money cards; or 25,500 UGX worth of food: multiple-micronutrient fortified corn soya blend, vitamin-A fortified oil, and sugar. Transfers were distributed every 6–8 weeks for 12 months (six transfer cycles). Transfers were made preferentially to the child's mother.

In Yemen, unconditional transfers were distributed in rural districts of two governorates (Hajjah and Ibb) with high baseline levels of food insecurity. Randomisation was done at the food distribution point (FDP) level. Each FDP is a school serving a cluster of neighbouring villages. Cash and food groups received three transfers each: a cash transfer of 10,000 Yemen riyals (YER) (US\$49) every 2 months beginning in November 2011; or a food basket consisting of 50 kg of fortified wheat flour and 5 L of oil in August 2011, October 2011, and April 2012. Prior to selecting these governorates, a market study was conducted to ensure that there was sufficient market penetration to ensure access to food by households receiving cash.

### 3. Methods

In a typical programme budget, expenditures are grouped by category or line item. For a social protection intervention, these include the cost of transfers to beneficiaries, staff time, transport, materials, bank charges (for cash transfers), storage (for in-kind transfers such as food) and overhead costs such as office space, and management costs. While accounts based on these categories tell us how much it costs to administer an intervention, they are less helpful when we want to compare the relative costs of alternative transfer modalities. For example, staff costs are expressed in terms of salaries and benefits paid for all aspects of an intervention: design, selection of beneficiaries, oversight of implementation, reporting, and audit. Information from accounts expressed in this way cannot tell us if it would be cheaper to shift from one transfer modality to another. Instead, we need a means of allocating all project costs to the different activities involved in implementing a transfer programme.

One such approach is the activity-based costing–ingredients (ABC–I) method. This approach combines activity-based accounting methods with the 'ingredients' method, which calculates programme costs from inputs, input quantities, and input unit costs (Kaplan and Anderson 2004; Fiedler, Villalobos, and de Mattos 2008; Tan-Torres Edejer et al. 2003).<sup>1</sup> Note that our interest is in costing out the activities specifically associated with delivering cash transfers, food transfers, and vouchers. We are not

interested in the costs that are common across all transfer modalities, such as those associated with beneficiary selection; rather, we are concerned with costs specific to a given transfer modality.

Understanding the ‘ingredients’, activities and associated costs of a modality requires detailed understanding of how these modalities are implemented. As outlined in Kaplan and Anderson (2004), we rely on three methods: focus group discussions with programme staff; key informant interviews with implementers and managers; and a limited amount of direct observation.<sup>2</sup> Our initial focus group discussions played an especially important role to develop the initial list of activities for each modality. We refined the lists through further communication with key informants and direct observation. We then developed an understanding of how much time it took to complete these activities. We implemented a staff time allocation questionnaire that was distributed to all WFP employees who were directly involved in any component of programme operations; data from these questionnaires were reviewed in small-group discussions to verify accuracy and resolve ambiguities. The questionnaire provided the crucial information on the cost of staff time spent on different programme-related activities. WFP also shared data from their internal accounting system, WINGS (WFP Information Network and Global System), which provided us with information on the cost of material inputs (for example, the cost of printing vouchers).

### *3.1. Ecuador case study*

Table 1 provides a detailed breakdown of the modality-specific costs for the Ecuador case study, disaggregating by labour (largely WFP staff costs) and materials, services, transport, and other nonlabour costs. The first set of rows describes the costs associated with the cash transfers. Cash payments to beneficiaries were made monthly by transferring US\$40 onto a preprogrammed debit card that could be used in an ATM. Implementing this process required identifying and contracting with a bank who was willing to provide this service, paying the costs associated with the production of the debit cards, wire fees associated with transferring funds from WFP to the bank, and staff costs associated with monitoring this payment process. For example, staff monitoring costs could include troubleshooting when beneficiaries had difficulties using their debit cards and spot checks to make sure that beneficiaries were not being denied access to ATMs.

Similarly, a variety of activities were necessary for the implementation of the voucher modality. The first activity was the assessment, selection, and establishment of contractual agreements with supermarkets. Staff time was then needed to design a voucher that was readily identifiable as a voucher and was resistant to tampering or duplication. Material resources in the form of paper and printing costs were necessary to produce the vouchers for distribution to beneficiaries. WFP staff conducted voucher distribution, ensuring that beneficiary IDs were matched with voucher serial numbers. Supermarkets collected used vouchers on a monthly basis and submitted them to WFP suboffices in addition to a liquidation report that included collated and printed receipts of purchases with signature. The WFP suboffice counted and verified liquidation reports and reconciled them with the supermarket vouchers, checking ID numbers in their beneficiary database. Liquidated vouchers were sent to the WFP country headquarters, where they are reviewed and confirmed. The country office then sent an order of payment through the WINGS finance system and notified the bank to initiate payment. The partner bank then executed payments to the participating supermarkets for the amounts specified in the redeemed

Table 1. Activity-based costing for Ecuador cash-food-voucher study.

Activity	Transfer modality					
	Cash		Voucher		Food	
	Labour (cost of WFP staff time)	Materials, services, transport, and other non-WFP staff costs	Labour (cost of WFP staff time)	Materials, services, transport, and other non-WFP staff costs	Labour (cost of WFP and NGO staff time)	Materials, services, transport, and other non-WFP staff costs
	All costs in US\$					
Developing contracts with banks for cash transfers	1183	-	-	-	-	-
Production of debit cards	-	13,219	-	-	-	-
Wire fees	-	215	-	-	-	-
Monitoring cash payments	3799	773	-	-	-	-
Scoping activities for supermarket selection	-	-	1374	-	-	-
Negotiation of contracts with supermarkets	-	-	2398	884	-	-
Voucher design and printing	-	-	11,275	582	-	-
Voucher liquidation	-	-	6857	-	-	-
Identification of food storage facilities	-	-	-	-	2341	-
Food storage rental costs	-	-	-	-	-	22,519
Food storage, repair costs	-	-	-	-	-	2096
Ration preparation	-	-	-	-	-	18,764
Food distribution (WFP)	-	-	-	-	4365	-
Food distribution (NGO)	-	-	-	-	10,244	1500
Travel preparation	74	-	85	1118	53	-
Payment execution	2794	-	2604	-	282	-
Project monitoring	1014	-	1078	-	884	-
Column total	8863	14,207	25,672	2584	18,169	44,879
Total modality-specific cost		23,070		28,256		63,048
Share of total cost (%)	38	62	91	9	29	71
Cost per transfer		US\$2.99		US\$3.27		US\$11.46

Source: Authors' calculations.

vouchers. As a final step, WFP updated its database to reflect the full liquidation of vouchers issued.

The modality-specific costs for the food transfer centre on those costs unique to moving commodities – namely storage, packing, and distribution. Activity costs for food encompassed work conducted in the warehouse for the monitoring of logistics for shipments, product inventory, and supervision of ration preparation and packaging. WFP contracted two locally based international nongovernmental organisations (NGOs) to conduct distribution activities in the subregions of Carchi and Sucumbíos and so both WFP and NGO labour costs are included. As each WFP programme requires a different selection of commodity type and quantity, preparation and repackaging of rations is necessary to appropriately fit the desired composition of the food basket. There are also human resource costs for WFP to manage the storage of these commodities in their warehouses until they are transferred to the implementing partner NGOs for regional distribution. Other food-handling-related costs included monthly rental costs for NGO warehouses as well as those material costs for repairs and investment in facilities. WFP staff costs were incurred for transport of commodities to warehouses, and the NGO partners had both staffing and material costs for cars, gas, and maintenance for the food distribution activities that included moving commodities and delivery to programme beneficiaries.

Note that these calculations largely exclude activities common to all modalities. These include items such as overhead costs for offices, data monitoring, or the selection of beneficiaries for programme participants. However, some common costs differ slightly depending on the modality. For example, in Uganda, the cost of producing ID cards was higher for cash than food as the cash card had a photo instead of the simple printed food ration card. In Yemen, both food and cash required mobilisation and sensitisation costs to make participants aware of the programme activities; however, as cash was a newer modality type, more staff time was invested. In Ecuador, administrative and logistics procedures for programme operations, such as preparation for staff travel, the execution of payments (through finance department), and monitoring of programme activities (collecting data to verify delivery of transfer, and so on), differed slightly by modality.

The last four rows of [Table 1](#) summarise the Ecuador data by transfer modality. There are several findings of note. Suppose we only observed the non-WFP staff costs, such as materials, services, and transport. [Table 1](#) indicates that vouchers were the least cost transfer modality for this category, requiring an expenditure of only US\$2584. Relative to vouchers, cash transfers would seem to be much more expensive, requiring US\$14,207 to administer. The non-WFP staff costs of food transfers are three times that of cash, US\$44,879. However, once we account for WFP staff costs, the relative positions of cash and vouchers change. Vouchers required substantially more staff time to administer, US\$25,672, compared to US\$8863 for cash. Food transfers required US\$18,169. The total modality-specific costs were US\$23,070 for cash, US\$28,256 for vouchers, and US\$63,048 for food.

Two additional comments are worth making. First, based on these data, we can calculate a cost transfer value (Caldés, Coady, and Maluccio 2006). Modality-specific costs are the sum of all material and staff-based costs unique to that modality. Subsequently, the modality-specific cost transfer value is this total cost divided by the total number of transfers distributed for that modality. To provide an example, in the case of cash in Ecuador, the total modality-specific cost of cash was US\$23,070. The total number of transfers delivered across six rounds of distribution was 7705. The cost per transfer is thus USD\$2.99.

Second, there is a distinction between fixed and variable costs. Would we get the same pattern if this intervention had lasted 1 year or longer rather than 6 months? In the case of Ecuador, both cash and vouchers have fixed costs of setting up contracts and operations with the banks and supermarkets, respectively. The variable costs of these modalities, however, will incur minimal increases along with extended programme duration, as the variable costs of printing extra vouchers or production of extra debit cards and associated fees are low. One might also expect to see a smoothing of staff time invested in these modalities as well as the effort involved in setting up new programme pilots being more labour-intensive than a previously established modality, such as the food transfer. In the case of food, the rental of the storage facility can be assumed to be a fixed cost, assuming that the volume of food transferred does not increase to the extent that additional storage space is required. However, food incurs fixed significant costs, for instance, the cost of transport for distribution, packaging, and preparation of rations. For example, the per-unit cost of packaging a ration remains constant even if the volume of rations transferred increases. Inasmuch, we would not foresee the cost of the food transfer to decrease over time. Conversely, the costs of cash and vouchers could decrease due to low variable costs and to economies of scale. To see the effect of this, suppose we extend each programme by 6 months so that additional transfers are made. A rough calculation, on the strong assumption that no other costs change, suggests that this would decrease modality-specific costs per transfer across all programme modalities. However, the potential decrease in cost per transfer is greater in the cash modality (–62%, from US\$2.99 to US\$1.13) than in the case of vouchers (–17%, from US\$3.27 to US\$2.73) or food (–4%, from US\$11.46 to US\$11.03).

#### 4. Results

We apply the ABC-I method to three country studies of WFP programmes in Ecuador, Uganda, and Yemen. The principal cost drivers for each country are found in [Table 2](#); results are found in [Table 3](#). Cost centres (categories) were standardised to facilitate groupings of related activities across country contexts. For example, in one country, fumigation costs for warehousing food rations may have been a cost ingredient for the food modality, but was not necessary in another country. The activity cost of ‘Food storage and Packaging’ aggregates those cost ingredients that may not be the same across country contexts, but which are nonetheless appropriate inputs into that cost category. The activity cost centre groupings allowed for analysis across country contexts, despite some variation in actual inputs and subactivities. The principal activities for each modality and country are listed in [Tables 2](#) and [3](#).

Calculation of modality-specific costs for the fourth country in [Tables 2](#) and [3](#), Niger, did not require the ABC-I method. Programme implementation was subcontracted to several Nigerien NGOs who were responsible for overseeing public works operations, selecting beneficiaries for the unconditional transfers, and making both food and cash payments. In villages selected for cash transfers, these NGOs charged WFP a 6 per cent fee based on the value of cash transfers that were made. In villages selected for food transfers, payments to these NGOs were based on the cost of per metric ton of transporting and distributing food to beneficiaries. In addition to these costs, WFP was responsible for purchasing the debit cards used by beneficiaries and for transporting food to the NGOs operating in Zinder.<sup>3</sup> Given these contractual arrangements, we are not able to separate out the cost of WFP staff time from materials, services, transport, and other non-WFP staff costs.

Table 2. Cost drivers, by country.

Cost category	Ecuador	Uganda	Yemen	Niger
1. Programme logistics	Travel preparation	Mobilisation and sensitisation	Mobilisation and sensitisation	
	Finance	Design and implementation	Implementation	
	Project monitoring	Finance Project monitoring	Finance Project monitoring	
2. Voucher costs	Scoping activities for supermarkets			
	Negotiation of supermarket contracts			
	Design and Printing of vouchers			
3. Cash costs	Voucher liquidation			
	Developing contracts with banks	Production of photo ID cards	Wire (post office transaction) fees	Production of debit cards
	Production of debit cards	Wire (Bank & SIM) fees		Fees charged as a % of funds transferred
4. Food costs	Wire (bank) fees	Travel		
	Identification of storage facilities	Mobilisation and sensitisation	Food storage rental costs	Transport to local storage facilities
	Food storage rental & maintenance	Food storage rental & maintenance	Food storage maintenance costs	Transport to villages
	Production of ration cards	Production of ration cards	Production of ration cards	Ration preparation
	Ration preparation	Ration preparation	Ration preparation	Food distribution
	Food distribution (WFP & NGOs)	Food distribution (WFP & NGO)	Food distribution	
	Security & Insurance	Q&Q surveys <sup>a</sup> Security & insurance	Q&Q surveys Security & insurance	

Note: <sup>a</sup>Quantity and quality Surveys: quality checks to ensure that food rations are not spoil.

Across all countries, the per-transfer cost of providing cash is always less than that for food. The per-transfer cost of cash ranges within a fairly narrow band, between US\$2.89 per transfer in Niger and US\$3.24 per transfer in Uganda. The cost per food transfer varies more widely across countries, reflecting the different settings where these transfers take place. The cost of making a food transfer ranged from US\$6.41 (Uganda) to US\$11.46 (Ecuador). On a per transfer basis, cash costs US\$3.17 less to deliver to a beneficiary in Uganda; US\$6.80, in Yemen; US\$7.38, in Niger; and US\$8.47, in Ecuador. We note that the key comparisons are those within and not across countries. Cross-country differences reflect differences in programme design as well as differences in wages, transport, and other costs.

A principal cost driver across all countries for food transfer modality is distribution and transport of commodities. The distribution cost category is inclusive of land transport in-country, including movement from central storage facilities to regional

Table 3. Modality-specific transfer costs in Ecuador, Uganda, Yemen, and Niger.

Modality type Cost type	Ecuador				Uganda				Yemen				Niger		
	Voucher		Cash		Food		Cash		Food		Cash		Food		
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
1. Programme logistics	3767	-	3882	-	1219	-	34,801	-	36,209	191	35,520	-	9036	-	-
2. Voucher costs	21,905	2584	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Cash costs	-	-	4982	14,207	-	-	5668	27,164	-	-	11,640	44,034	-	-	-
4. Food costs	-	-	-	-	16,950	44,879	-	21,417	145,506	-	-	-	219,822	-	-
Column total	25,672	2584	8864	14,207	18,169	44,879	40,369	27,164	57,626	145,697	47,160	44,034	75,114	219,822	-
Total cost	28,256	[1441]	23,071	[1284]	63,048	[917]	67,533	[2972]	203,323	[4530]	91,194	[9985]	294,936	[9985]	98,917
Number of beneficiaries:															
Cost per transfer:	US\$3.27		US\$2.99		US\$11.46		US\$3.24		US\$6.41		US\$3.04		US\$9.84		US\$2.89
															US\$10.27

Note: All monetary amounts are expressed in USD.

Source: Authors' calculations. (1) Labour. (2) Materials, services, transport, and other non-WFP staff costs.

facilities, transport cost of delivery to distribution points, as well as any associated insurance or human resource costs necessary to complete those activities. Thus, the cost of distribution varies in accordance with geographic context and dispersion of delivery sites. Transport costs can also be affected by the price of fuel, drivers' wages, and other transport-related inputs. Note that, given the volume of these transfers, and the fact that they must all be transported by road, there is little possibility of exploiting economies of scale in distribution. Examining human resource costs for the food modality across the three countries, the most labour-intensive activities were for distribution and monitoring in Uganda and Ecuador and for the logistics of implementation in Yemen. The difference in distribution costs between Ecuador, Uganda, and Yemen can be explained partially by these geographic differences (peri-urban in Ecuador and rural in Uganda and Yemen). In Ecuador, the costs of storage were more expensive than the distribution, as it covered both the costs of WFP storage and partner NGOs in the subregions. However, as distribution sites were located close to beneficiary households, participants travelled to local storage sites to collect their transfers. By contrast, Yemen households were more dispersed and in less secure areas; food shipments had to be brought directly to villages. In the case of Yemen, cash beneficiaries travelled further (to post offices) to collect their transfers.

The breakdown of cash-related costs reveals that the major cost driver for this modality is the execution of payments, which is the transaction fee charged by the partnering organisation for the release of cash payments. These fees were approximately 3 per cent in Ecuador, Uganda, and Yemen. In Niger, the bank fee was considerably higher, 6 per cent.

Since cash transfers were introduced only for these studies, calculation of average costs per beneficiary for cash entails a more straightforward measure of total costs divided by the number of beneficiaries reached. But note that it is very likely that some set-up costs of the food distribution system are not captured in the measures of total costs for food (since these set-up costs were incurred many years ago), while set-up costs of the cash distribution are captured in the measures of total costs for cash (since these set-up costs were incurred during the study). In particular, because the cash modality was a new endeavour, start-up activities for cash (such as re-verification, security, and other measures) required labour and human resources, while analogous activities for the food modality had been incurred long before the study period and did not appear in project financial records. Interestingly, despite the initial costs required for start-up of cash, in all three countries (Ecuador, Yemen, and Uganda), the amount of human resource cost of cash relative to that of food per beneficiary was significantly greater and was nearly double in the cases of Ecuador and Yemen. In other words, despite the fact that food was a well-established programme modality, the human resource costs were still significant.

A caveat to these results is that differences in the location and operations of distribution points can affect the calculation of modality-specific transfer costs. Hypothetically, if there is only one cash distribution point in a district but multiple FDPs, the cost of delivering food will be *ceteris paribus* higher than the cost of providing cash. Cash would appear less expensive to deliver, but only because the cost of accessing transfers had been shifted from the programme to the beneficiary. The household surveys that took place alongside these interventions included a set of questions on the cost of travelling to payment sites, the cost of transport home, the time spent travelling to payment sites, and the time spent at the distribution point waiting for payment. These are shown in [Table 4](#). There is no meaningful difference in

Table 4. Private costs of obtaining transfers.

Modality type	Ecuador			Uganda		Yemen		Niger	
	Voucher	Cash	Food	Cash	Food	Cash	Food	Cash	Food
<i>Time costs</i>									
One way travel to payment point (min)	28	28	39	38	35	61	37	-	-
Waiting time at payment point (min)	53	16	54	80	86	34	44	-	-
Total time spent obtaining transfer (min)	109	72	132	156	156	158	112	60	60
Total time spent obtaining transfer (hours)	1.8	1.2	2.2	2.6	2.6	2.7	1.9	1.0	1.0
<i>Monetary costs</i>									
Transport costs as a percentage of transfer value (%)	4.1	3.7	5.3	0.0	0.0	8.6	2.0	0.0	0.8

Note: Total time spent obtaining transfer = (2 x one way travel time) + waiting time.

Source: Authors' calculations.

private cost – time or money – between obtaining food and cash transfers in Niger or Uganda, a result consistent with the fact that both were transported into the villages where beneficiaries reside. Private costs of obtaining food transfers were higher than those associated with cash transfers in Ecuador because the distribution of food took longer and because some households had to purchase transport to take their food rations home. In Yemen, beneficiaries had to travel to local post offices to obtain their cash transfers, whereas food was trucked into their villages, where distribution costs partially shifted to beneficiaries.

## 5. Accounting for food procurement costs

Our comparative analysis has assumed that the costs of the transfers themselves do not differ across modality. The cost to WFP of the food in each ration is assumed to be equal to the value of each cash transfer. Since the value of the cash transfer was set to the amount required to purchase the food ration in the market, this assumption implicitly translates to assuming that the full cost to WFP for the food in each food ration is the market value of the food. So, for example, in the Ecuador case study, we assume that it costs WFP US\$40 to procure the food basket worth US\$40. However, suppose that WFP could procure the items in the Ecuador food basket at a cost below their US\$40 transfer value. If this were the case, it would narrow – and possibly reverse – the cost advantage of the cash modality. To assess this possibility, we worked with WFP staff to calculate the actual procurement costs for the food transfer modality, including the cost of commodities in food rations, external shipping costs, and staff time dedicated to pipeline and procurement activities for two countries where these data were available, Ecuador and Yemen. Results are shown in Table 5.

In Ecuador, most of the canned fish, rice, lentils, and oil that made up the food basket were procured locally. However, some vegetable oil and lentils were also obtained through international procurement. In order to assess any difference in cost of procurement by the WFP, we collected supplementary data to assess those costs of

Table 5. Accounting for procurement costs in Ecuador and Yemen.

Modality type	Ecuador				Yemen					
	Cash		Voucher		Cash		Food			
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)		
1. Programme logistics	3882	—	3767	—	1219	—	35,520	—	9036	1067
2. Voucher costs	—	—	21,905	2584	—	—	—	—	—	—
3. Food costs	—	—	—	—	16,950	44,879	—	—	148,878	218,755
4. Cash costs	4982	14,207	—	—	—	—	11,640	44,034	—	—
5. Procurement cost (food, cash, voucher)	—	308,160	—	345,840	—	256,572	—	1,467,795	—	1,085,809
Column total	8864	322,367	25,672	348,424	18,169	301,451	47,160	1,511,829	157,914	1,305,631
Total cost	331,231		374,096		319,620		1,558,989		1,463,545	
Number of beneficiaries	[1284]		[1441]		[917]		[9985]		[9985]	
Total cost per transfer	US\$42.99		US\$43.27		US\$58.25		US\$52.04		US\$48.85	

Note: All monetary amounts are expressed in USD.

Source: Authors' calculations. (1) Cost of WFP staff time. (2) Materials, services, transport, procurement, and other non-WFP staff costs.

commodities destined for food baskets in programme distribution. External shipping and human resource-related pipeline costs were included for those international commodities procured, while in-country transport was included for locally procured commodities. Based on these data, we estimate that it cost US\$46.76 in food procurement costs to provide a basket of commodities worth US\$40. Because the cash transfer was US\$40, this means that accounting for WFP's costs of procuring food increases the difference in providing transfers as food rather than as cash. When we include the food procurement cost and the monetary value of cash and vouchers, we find cash (US\$42.99 per transfer) and vouchers (US\$43.27 per transfer) are even less expensive than food (US\$58.25 per transfer).

In Yemen, wheat was procured locally, while vegetable oil was obtained through international procurement. External shipping costs, stevedoring, and customs fees were included for the international commodities, calculated as a percentage amount of the total oil procured for this intervention. The cost of procuring food was less than its market value; it cost WFP US\$39.01 to provide a food basket valued at US\$49. So even though the modality-specific cost of food in Yemen (US\$9.84) was higher than for cash (US\$3.04), when we include the cost of procurement of the transfer, the cost of food per transfer (US\$48.85) was less expensive than that of cash (US\$52.04). This occurs because at the time of these purchases, WFP was a relatively large buyer in a relatively small market. Another key feature driving this result is that wheat, which made up the largest share of the food ration, was sourced locally. Lentz, Passarelli, and Barrett (2013) note that, on average, cereals sourced locally are, relative to international procurement, 53 per cent less expensive. Finally, had the programme been expanded, this cost differential would have again narrowed, as WFP would have been able to reap scale economies in the delivery of cash that are not available for food.

## 6. The impact of modality-specific cost differences on coverage

In the four countries we consider here, we have shown that the modality-specific costs of transferring cash are less than those for food. But we have not shown that these differences 'matter' in any welfare sense. In this section, we address this concern.

Specifically, suppose that we could re-do these interventions, keeping all design and implementation features – payment levels, frequency of payment, location of payment, and so on – the same. We also keep the same aggregate budget for these interventions, US\$2 million per country for transfers. Given the information we have on modality-specific costs, we estimate separately the number of beneficiaries we could reach if all transfers were made in cash and the number of beneficiaries we could reach if all transfers were made in food. We can then assess the opportunity cost, in terms of foregone programme coverage, of using a higher cost transfer modality.

These calculations are shown in [Table 6](#). For each country we report the value of the transfer, the modality-specific cost of using that modality, and, adding these together, the total cost of making one transfer to a beneficiary. Multiplying this by the number of transfers gives the total cost of providing that transfer to a single household. Next, we take the budget for transfers (US\$2 million) and divide it by the total cost of a transfer to one household. This gives us the total number of households that could be reached if the entire budget was used for food or for cash. The modality-specific cost of providing food transfers was always higher than for cash. Consequently, as [Table 6](#) shows, programme coverage could have been increased by 12.7 per cent in Niger, 13.1 per cent in Yemen, 19.7 per cent in Ecuador, and 23.5 per cent in Uganda. Across all four countries, an

Table 6. Impact of modality-specific cost differences on coverage.

Calculation	Ecuador		Uganda		Yemen		Niger	
	Cash	Food	Cash	Food	Cash	Food	Cash	Food
Transfer value (USD)	US\$40.00	US\$40.00	US\$10.25	US\$10.25	US\$49.00	US\$49.00	US\$55.00	US\$55.00
Modality-specific transfer cost (USD)	US\$2.99	US\$11.46	US\$3.24	US\$6.41	US\$3.04	US\$9.84	US\$2.89	US\$10.27
Cost of one transfer	US\$42.99	US\$51.46	US\$13.49	US\$16.66	US\$52.04	US\$58.84	US\$57.89	US\$65.27
Number of transfers	6	6	7	7	3	3	6	6
Total cost per beneficiary household	US\$257.94	US\$308.76	US\$94.43	US\$116.62	US\$156.12	US\$176.52	US\$347.34	US\$391.62
Budget for transfers	US\$2,000,000							
Number of beneficiary households	7753	6477	21,179	17,149	12,810	11,330	5758	5107
Average household size	3.8	3.8	6.2	6.2	7.1	7.1	6.8	6.8
Number of beneficiaries	29,461	24,613	131,309	106,323	90,951	80,443	39,154	34,728
Difference	4848		24,986		10,508		4427	
Per cent difference	19.7		23.5		13.06		12.7	

Source: Authors' calculations.

additional 44,769 people could have received assistance at no additional cost had cash been provided instead of food. These calculations change slightly if we take into account food procurement costs. Because food procurement costs were higher than the value of the cash transfer, accounting for these increases the number of people who could have been covered had WFP provided cash to all beneficiaries in Ecuador; the reverse is true in Yemen.

## **7. Conclusion**

This article contributes to discussions regarding appropriate transfer modalities. We make two contributions. First, we show that ABCI methods can be used to calculate the modality-specific costs of providing food, cash, and vouchers to beneficiaries. Second, we apply this method to beneficiaries in interventions situated in four very different contexts. As we noted in the 'Introduction' section, a feature of these comparisons is that all other aspects of the interventions – the targeting of beneficiaries, the size and duration of transfers, and so on – were designed to be the same for these different transfer modalities in each country. This means that our comparisons of the cost of delivering alternative modalities are not confounded by other differences in programme design.

We find that the per-transfer cost of providing cash is always less than food. The per-transfer cost of cash ranges within a fairly narrow band, between US\$2.89 per transfer in Niger and US\$3.24 per transfer in Uganda. The cost per food transfer ranges from US\$6.41 (Uganda) to US\$11.46 (Ecuador). On a per transfer basis, cash costs US\$3.17 less to deliver to a beneficiary in Uganda; US\$6.80, in Yemen; US\$7.38, in Niger; and US\$8.47, in Ecuador.

There are caveats to our findings. First, there can be circumstances where the implementer can exploit their buying power to procure food at below market prices and this can narrow the cost differential between cash and food. This occurs in Yemen, but not Ecuador. Second, our results are derived from the specific circumstances of our four case studies. They do not, for example, examine the comparative cost of transfer modalities in emergency humanitarian settings, where logistical challenges and market function may greatly differ and alter cost structures. Third, these interventions were of relatively short duration and at relatively modest scale. The results are based on programmes of a certain duration, 6–12 months, so our findings should not be generalised without consideration of how costs may change with increased programme duration. Mindful of these, given the budget available for these interventions, an additional 44,769 people could have received assistance at no additional cost had cash been provided instead of food. This suggests that there is a significant opportunity cost, in terms of reduced coverage, when higher cost transfer modalities are used.

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## Notes

1. Use of activity-based costing methods in manufacturing and health care has become increasingly common over the last 30 years. A detailed bibliography and history of its application is beyond the scope of this article; Turney (1996) provides an introduction, brief early history, and bibliography. We note that other attractive features of the ABC-I method include the ability to account for opportunity costs, quantified as economic costs, in the total programme costs. It also allows for the incorporation of 'off-budget' expenditures, for example, donated goods or services that otherwise would not be included as programme operating costs.
2. Kaplan and Anderson (2004) note that time logs are another means of obtaining information, but these were not kept by the WFP staff who were responsible for implementing these interventions.
3. These calculations abstract from a number of fixed costs associated with setting up these payments. For example, there were additional costs associated with writing the computer programs needed to dispense payments through the mobile ATMs. Costs such as these are not included in the calculations reported here. We exclude costs that were common to both the food and cash payments such as costs associated with implementing the public works, identifying the beneficiaries, programme sensitisation, identification of implementing partners, and contract negotiations with micro-finance institutions selected to implement this intervention.

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