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Economic Life in Refugee Camps

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Summary. — We analyze economic life in three Congolese refugee camps in Rwanda and the interactions between refugees and local host-country economies within a 10-km radius around each camp. Refugees in one of the three camps received food aid in kind, while in the other two camps they were given cash via cell phones provided by the UN World Food Programme. We find that refugee economies arise inside each camp, and the structure of these economies reflects the economic context around the camps. Despite undergoing forced migration and often living in destitute conditions, refugees actively interact with host country economies. Interactions with the host country result in a divergence of refugee households' income from the assistance they receive. A shift from in-kind to cash aid appears to increase refugee welfare while strengthening market linkages between camp and host economies. This finding is potentially important for refugee policies as well as for other types of development assistance, as donors find themselves under pressure to shift from in-kind to cash aid.

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“There is interest in observing the growth of economic institutions and customs in a brand new society ... the essential interest lies in the universality and the spontaneity of this economic life ... as a response to the immediate needs and circumstances.”

[R.A. Radford]

Each year the United Nations High Commissioner for Refugees (UNHCR), see [UNHCR \(2016\)](#), provides refuge to millions of displaced people around the globe, and the UN World Food Program (WFP) provides these refugees with food aid, either in-kind or cash. Most refugees are in camps located in low-income countries bordering conflict zones. A naïve image might be that refugees are stripped of agency by world events beyond their control and passively dependent on distributed food aid to survive ([De Bruijn, 2009](#)). However, an in-depth look at the lives of refugees paints a much more complex reality. Refugee camps may be the closest observable approximation to what happens when individuals with heterogeneous endowments of human capital and other resources are plopped down upon a hilltop or plain and allowed to interact with each other and a host-country economy—if the rules permit—given the often severe constraints they face. In other words, the genesis of an economy.

We analyze the economic life of three Congolese refugee camps in Rwanda and the interactions between refugees and the host-country economy within a 10-kilometer radius surrounding each camp. None of the three camps existed prior to 1996; all were literally featureless hilltops surrounded by local host-country communities with economies ranging from very simple to relatively complex. The three camps were selected to represent different host-country economic contexts. Under Rwanda's rules, refugees are free to interact with the host-country population; however, Rwandan nationals are restricted from entering the camps. The camp gate, therefore, creates an exogenous asymmetric separation between camp and host-country economy. The camps also differ with respect to their exposure to a major recent innovation in refugee assistance delivery. The WFP originally provided in-kind assistance to refugees in all three camps, but recently it has begun to replace food aid with cash transfers accessed through

cell phones. One of the three camps switched to cash eighteen months prior to our study, and another two months prior. The third camp still received aid in food.

There is little information about refugees' economic lives prior to entering the camps, or the structure of the surrounding host-country economy prior to the camps' creation. The refugee camp populations are small compared to those of the districts in which they are located. It is not clear how one would obtain a true baseline, beyond the knowledge that the camp site, itself, was devoid of population and of an economy of any kind. The camps were created by events that were largely exogenous to both the refugees and the local host-country economies.

In collaboration with the WFP, we carried out detailed economic surveys of a random sample of refugee households and a number of formal businesses (not likely to be picked up by the household sample) inside each camp, as well as host-country households and businesses within a 10-kilometer radius outside of each camp. A 10-kilometer radius captures the main markets in which refugees transact. Given poor transportation infrastructure, refugees rarely engage directly with markets outside this radius.

Our study contributes to the literature on the economics of refugee camps and the interactions of refugees with the local economies around camps. Previous research has described the emergence of exchange within refugee camps, the variety of activities in which refugees engage, and the welfare

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consequences of different refugee settlement designs and aid delivery mechanisms. We use the micro-survey data that we collected to explore a set of predictions about refugee's welfare and interactions with host economies, grounded in economic theory.

This paper's goals are to characterize the demographics and income generating activities of three Congolese refugee camps in Rwanda and share our discovery that, despite unusual and grim circumstances, economies form in refugee camps, and these economies involve a vigorous exchange of goods and services within camps as well as between camps and surrounding host economies. The choice of aid delivery mechanism has important implications for refugee welfare, and potentially for the host country, as well.

The paper is organized as follows: Section 1 describes our analytical framework, and it broadly highlights some of the relevant literature on refugees, immigrants, and the implications of alternative refugee aid delivery mechanisms upon which this paper builds. Section 2 introduces the three camps and the host-country economies surrounding them. The data suggest that the structure of the surrounding host economy shapes refugees' economic activities and incomes. In Section 3, we analyze the consumption patterns and market behavior of refugees in the in-kind and cash camps, including refugees' interactions with markets for food and other goods outside the camps. Refugees' exchange relationships with the host country have ramifications for host country businesses and households. In Section 4, we compare welfare outcomes in and around the three camps and econometrically measure welfare differences between the camps that have switched to cash and the camp that continues to distribute in-kind food aid. We find evidence that, in the Rwandan context, aid in cash significantly increases refugee welfare. The final section concludes and discusses future avenues of research.

1. ECONOMICS OF DISPLACED POPULATIONS, HOST COMMUNITIES, AND AID

If refugee settlements are closed and isolated from the host economy, without access to trade, microeconomic theory suggests that the provision of aid in kind results in a suboptimal allocation of resources. The utility of refugees is maximized only if the proportions of goods and services provided in kind coincide with refugees' marginal rates of substitution across goods and services. If refugees are given in-kind aid but are allowed to engage in exchange with the host country, a higher level of utility can be achieved.

As previous evidence has pointed out (Jacobsen, 2005), in most refugee camps "almost everyone has something to trade." The magnitude and diversity of trade is determined by the type of aid refugees receive, refugees' ability to work and trade in the local economy, and the interconnectedness of the local economy with the rest of the country. Jacobsen (2005) describes vibrant markets inside refugee camps, with a variety of goods being exchanged.

There are two different food-aid delivery regimes in Rwanda's refugee camps: in-kind and cash transfers. Refugees at cash camps receive monthly transfers through m-VISA accounts on cell phones supplied by the WFP. They can "cash out" or use their cell phones to purchase goods or services from authorized vendors, which include some refugee-run businesses inside the camps. In-kind camps are provided a monthly basket of four food items—maize, beans, cooking oil, and salt—on a regular basis.

The freedom of movement and action afforded refugees in Rwanda, combined with an asymmetric integration of camps with local economies, expands refugees' opportunities and incentives for employment, production, and exchange. By limiting camp entry, refugee camp rules potentially create a "price band" and the potential for rent seeking by influential camp actors. Refugees' physical and human capital, together with the rules of engagement with the host country, predict the types of economic activities in which refugees participate. So do the economic settings in which refugee camps are situated.

Host economies surrounding the three refugee camps we study range from relatively urban (Gihembe) to potentially agricultural (Nyabiheke). After entering the host country, most refugees' livelihoods depend primarily on aid. A minority have enough capital to start a business. Rwanda permits refugees to leave their camp at will, including for work. Many refugees work outside the camp or for international agencies within the camp. Some refugees own their own businesses, which include petty trade, food preparation, barber shops, and sale of charcoal and firewood. Lack of access to credit is an obstacle to establishing refugee businesses, although remittances and the use of Rotating Savings and Credit Associations (ROSCA) schemes partially relax the credit constraint for some refugee households.

If host populations benefit economically from the establishment of refugee settlements and the operations of humanitarian agencies, they may be more likely to welcome refugees. The staff of non-governmental organizations (NGOs) demand a variety of goods and services, including food, housing, and transportation. NGOs also generate employment for refugees and some locals. The settlement of refugee camps and operations of humanitarian organizations may benefit host communities by improving the available infrastructure. Host businesses may benefit from the availability of low-wage and seasonal refugee labor.

(a) Refugee welfare and cash transfers

In recent years refugee assistance has gravitated toward a model of self-reliance, on the theory that refugees benefit from aid regimes that strengthen their self-esteem and capacities while preparing for eventual return to the home country. These efforts include a switch from in-kind aid to cash transfers. From a microeconomic perspective, enabling refugees to freely buy goods and services based on personal preferences and tastes should be welfare-improving.

Evaluating whether the switch to cash actually improves refugees' welfare is problematic for at least two reasons. First, in cash camps we do not observe the characteristics of refugees before the switch to cash. Second, the switch to cash was not random. Comparisons of refugees with host populations around the three camps, presented later in this paper, suggest that there are welfare improvements under a cash aid regime. A more rigorous causal evaluation of welfare impacts is not possible at this point.

The decision by WFP to shift food aid from in-kind to cash was based on a number of feasibility studies that included market assessments, financial services, security considerations, and local government priorities. Market considerations recommended the three camps we study in this paper as candidates for switching from food to cash. A pilot approach was adopted: one camp was selected to gauge acceptance by beneficiaries, reliability of the technology to transfer cash, and implications for food security, prices, and availability of food in the market. The pilot camp, Gihembe, was chosen based on its proximity to a major town, which facilitated access by all

stakeholders to implement and monitor the intervention. Once the feasibility of aid in cash was demonstrated, the cash regime was gradually rolled out in the other two camps.

Our study adds to the existing literature in two main ways. First, it analyzes the impacts of humanitarian aid on displaced populations and the merits of in-kind versus cash aid to refugees. Second, it offers a detailed picture of economies inside refugee camps and their interactions with host-country economies, which have welfare implications for both refugee and host populations.

Alix-Garcia, Bartlett, and Saah (2012) analyze movements from rural to urban areas using data on a displaced population in Sudan to show how food aid impacts local prices, food, housing and labor markets. A qualitative study by Karadawi (1983) suggests that humanitarian assistance and other relief programs have contributed to 'powerlessness of refugee recipients' due to conflicting goals of aid agencies and host governments. While food insecurity remains a serious concern among refugees and displaced populations, improved targeting of both food and cash assistance is important, and the expansion of cash-based assistance could be more effective (Doocy et al., 2011). Reflecting on contradictory evidence and anecdotes in the ongoing debate about welfare and efficiency gains from alternative aid-delivery mechanisms and the importance of aid in general, Jacobsen (2005) notes that "assistance is necessary for the survival of newly arrived refugees."

Grosh, Del Ninno, Tesliuc, and Ouerghi (2008) discuss a recent debate regarding the design of aid programs in developing countries. Increasingly, refugee assistance in developing countries is distributed as cash instead of in kind. This is justified on the grounds that it generates the largest welfare gains by allowing beneficiaries to choose how best to spend the added income (Blackorby & Donaldson, 1988). After the appropriate administrative structure is in place, which may be costly, cash-transfers are the easiest form of aid to administer, and they are also the most efficient. The second theorem of welfare economics implies that under certain assumptions, cash transfers result in less deadweight loss than other forms of aid (Currie & Gahvari, 2008). However, in closed economies where supply is unable to rise in tandem with demand, cash transfers may trigger price increases, with adverse impacts on consumers (Basu, 1996 and Gentilini, 2007).

Jacoby (1997) argues that in-kind transfers are difficult to administer, which creates inefficiencies and suboptimal outcomes. In-kind aid may be justified when prices are volatile (Coate, 1989); however, under some circumstances the sale of food aid may lower prices of distributed food items and adversely affect local production. Hidrobo, Hoddinott, Peterman, Margolies, and Moreira (2014), using a randomized control trial, find that in-kind transfers lead to higher caloric intake among beneficiaries than cash transfers, although they also conclude that in-kind transfers are less cost-effective.

Radford's (1945) classic narrative piece on life in a World War II prisoner of war (POW) camp describes how a vibrant exchange economy emerges, fueled by distributed ration packages, with cigarettes serving as a numeraire currency. The most obvious economic feature differentiating the refugee camps we study from a POW camp is the severity of the rules imposed on the latter, in particular the isolation of POWs from the local economy. Integration of refugees with host economies through the exchange of goods and services essentially removes macroeconomics from our analysis, because the camp and host economies share a common currency. The freedom of movement and action afforded to refugees and asymmetric integration of camps with local economies create expanded opportunities and incentives for employment,

production, and exchange. Recent studies add descriptions of economic life in refugee camps and interactions with host populations (see Jacobsen, 2005).

A branch of literature indirectly related to this paper addresses immigrant assimilation in host communities (Borjas, 1985; Chiswick, Lee, & Miller, 2005; Waters & Jiménez, 2005). An obvious difference between refugees and other migrants is that refugees' displacement is considered involuntary and temporary, whereas most migrants choose their destination and duration in the host economy, unless contracted specifically for temporary work. A second difference is that, in most migration studies, host countries are high-income nations, whereas the majority of refugees are hosted by less-developed countries bordering conflict zones (Chambers, 1986; Maystadt & Verwimp, 2014). Despite undergoing forced migration and often living in destitute conditions, many refugees have productive capacities and assets, and they interact with host-country economies as consumers and workers to the extent that the law permits (De Montclos & Kagwanja, 2000; Maystadt & Verwimp 2014; Werker, 2007).

2. CAMP SETTINGS AND REFUGEE ECONOMIES

The WFP currently operates in six refugee camps in Rwanda, five of which house refugees from the Democratic Republic of Congo (DRC). The three camps in our study were selected to represent different host-country economic contexts and food-distribution mechanisms. Gihembe, the oldest of the three, was founded shortly after the onset of civil wars in the DRC in 1998, followed by Nyabiheke (2006–07) and Kigeme (2011). Two of the three camps received aid in monthly cash transfers at the time of our study. One (Gihembe) switched to cash eighteen months prior, and the other (Nyabiheke) two months prior. The third camp (Kigeme) still received aid in the form of monthly food packets. The surveys, carried out in the summer of 2015, gathered data to carry out a study of how refugee camp economies interact with surrounding host-country economies and the local economic impacts of alternative food aid delivery mechanisms, specifically in-kind versus cash aid.

The descriptive analysis that follows sketches a picture of three different host-country economies.¹ Nyabiheke is an agricultural economy, with potential farm employment and the seasonality and low wages typically associated with farm work. The result is a high incidence of refugee employment in agriculture but relatively low wage income. With fewer host-country businesses nearby, Nyabiheke refugee households are more likely to have businesses inside the camp.

At the other extreme, Gihembe is largely a non-farm economy, with the potential to provide more stable and higher-paying jobs to workers with the requisite human capital. Gihembe refugees have the highest incidence of non-farm wage work and the highest average wage earnings per household. However, they also have the lowest wage-labor participation rate of all three camps, likely reflecting human capital constraints on securing non-farm jobs.

Kigeme lies somewhat in between these two extremes. It offers fewer agricultural work opportunities than Nyabiheke, but less non-farm wage employment than Gihembe.

We drew random samples of 155–224 refugee households per camp from the list of all households provided by the WFP. We also drew samples of 162–243 host-country households in all the economically relevant sectors (third-level administrative subdivision in Rwanda, after province and

district) in a *donut*-shaped area out to a 10-km radius surrounding each camp, using household lists provided by district authorities. Since only 14–20% of host-country households and 8–17% of refugee households had a non-farm business covered by the household surveys, we augmented the household business samples by randomly sampling 63–100 host businesses at the main commercial sites, including periodic markets, within the donut and 15–23 refugee businesses inside each camp. There are no lists of businesses around the camps, so a systematic (n-th name selection) sampling method was used for the additional host business surveys. We use probabilistic sample weights when making inferences about the local economy.

(a) Socio-demographics

Table 1 reveals significant differences in socio-demographic characteristics between host-country (left three columns) and refugee (right three columns) populations, but not across camps. Host-country households average around 5 members. Most (69–75%) are male-headed. Household heads are slightly older in the area surrounding Nyabiheke, the most agricultural of the three camps. Average schooling of household heads barely exceeds 3 years around all three camps. School enrollment rates for host-country children are high for a developing country, however (87–94%). Refugee households are larger (5.4–5.6 members) than host-country households (4.7–5.1). Refugee household heads are nearly as likely to be female as male. They are younger and have less schooling than host-country heads, on average—well below three years.

Low education potentially limits refugees' access to nonfarm jobs. However, young adults in older camps are likely to have had access to education at an early age and to have accumulated more years of schooling. Refugees 18–35 years of age in Gihembe (the oldest of the camps) average 4.5 years of schooling, compared to 3.8 in Nyabiheke. Current enrollment rates for refugee children approach 100% in all three camps, reflecting the presence of UNHCR-run schools.

Refugees have better health outcomes and access to treatment than host-country households. They report a smaller number of sick members in the month prior to the survey, and they are more likely to seek treatment if sick (Table 1; treatment for refugees is free at UNHCR clinics inside the camps.) A smaller share of refugees sleep under a mosquito net, however. Refugee women are much more likely to consume supplements during pregnancy and give baby food and

supplements to their infants than their host-country counterparts (not shown).

(b) Host-country context and employment

The host-country data are from surveys we carried out in five districts spanning a total of nineteen sectors around the three camps. Section B of the Online Appendix provides information about these sectors, including comparisons using district-level, urban and rural Rwanda data.

Host-country economies differ around the three camps, and predictably, so do refugee employment outcomes (Table 2). Data on wage employment provide insight into the structure of host economies surrounding the camps (left three columns). Host economies around the youngest and oldest camps (Kigeme and Gihembe) have the highest percentage of households with at least one person doing wage work in the 12 months prior to the survey (67% and 63%, respectively, compared to 50% around Nyabiheke). The share of males doing wage work significantly exceeds the share of females. Monthly wage income is twice as high in Gihembe (83,211 RWF) as in Kigeme (43,113), and it is significantly lower in Nyabiheke (23,782). A similar spread is evident in households' per-capita wage income.

Participation in wage labor markets is lower for refugee than host-country households, but it is significant nonetheless (right panel of Table 2). The highest share of refugee households with wage income is in Nyabiheke (0.47), where wage-labor participation by host-country households is lowest. It is followed by Kigeme (0.42) and Gihembe (0.34), where host-country wage-labor participation is highest. As in the host-country population, female refugees have uniformly lower wage labor force participation rates (0.07–0.17) than males (0.23–0.41).

The host-country economy around Nyabiheke Camp is largely agricultural, dominated by family farms, with little wage employment in government, retail, or services compared with the other two camps. The economies with the highest wage employment have the lowest shares in agriculture (0.39 and 0.46) and the highest shares in government, retail, and other services. Gihembe, the least agricultural of the three economies, is also the most commercial in terms of wage employment share (0.05 in retail). It has the highest shares in government (0.13) and NGO work (0.05). Its service share (0.23) is similar to Kigeme's (0.26) and considerably higher than Nyabiheke's (0.07).

Table 1. Selected Socio-demographic Characteristics of Host-country and Refugee Households

	Host-Country Households			Refugee Households		
	Kigeme	Gihembe	NyabihMke	Kigeme	Gihembe	Nyabiheke
Sample Size	243	180	162	224	166	155
Household Size	5.02	4.74	4.68	5.57	5.58	5.37
Household Head (Share Male)	0.74	0.71	0.77	0.53	0.52	0.49
Household Head Age	46.79	46.72	50.8	43.62	45.23	43.61
Average Years of Schooling						
Household Head	3.56	3.47	3.19	2.21	2.68	2.37
All—Ages 18–35	4.19	4.21	4.25	3.64	4.36	3.82
All—Ages 36–65	3.84	3.06	3.61	1.99	2.56	2.58
Enrollment Rates of Children 6–16 Years	0.95	0.88	0.87	0.96	0.97	0.98
# of Members Reported Sick in Last Month	1.23	1.31	1.69	1.13	1.11	1.51
Share Seeking Treatment	0.75	0.76	0.85	0.97	0.94	0.97
Share of Members Sleeping Under Mosquito Net	0.69	0.80	0.89	0.59	0.59	0.49

Table 2. *Wage employment and income of host-country and refugee households*

	Host-Country Households			Refugee Households		
	Kigeme	Gihembe	Nyabiheke	Kigeme	Gihembe	Nyabiheke
Share of Households with Wage Worker in the Last 12 Months	0.67	0.63	0.50	0.42	0.34	0.47
Share of Females earning a wage	0.32	0.31	0.22	0.11	0.07	0.17
Share of Males earning a Wage	0.48	0.45	0.37	0.32	0.23	0.41
Total Household Wages*	43,113	83,211	23,782	20,466	24,830	24,386
Household Wages Per Capita*	8,435	16,310	5,493	4,889	5,483	4,493
Sector of Wage Work (Share)						
Agriculture	0.46	0.39	0.64	0.19	0.15	0.32
Government	0.10	0.13	0.03	0.01	0.03	0.02
NGO	0.02	0.05	0.03	0.44	0.21	0.27
Construction	0.14	0.15	0.20	0.25	0.14	0.22
Retail	0.03	0.05	0.01	0.01	0.17	0.06
Other Service	0.26	0.23	0.07	0.09	0.25	0.12
Location of Wage Work						
Inside Refugee Camp	0.01	0.00	0.00	0.68	0.35	0.43
In Local Economy	0.94	0.89	0.90	0.21	0.24	0.37
Outside	0.05	0.11	0.10	0.11	0.41	0.21

*US\$1 = approximately 700 Rwandan Francs at the time of the survey.

Table 3. *Agriculture and livestock around the three camps*

	Host-Country Households		
	Kigeme	Gihembe	Nyabiheke
<i>Agriculture</i>			
Household Participated in Ag	0.78	0.69	0.92
Sold Crops (If in Ag)	0.23	0.25	0.50
Hired Labor (If in Ag)	0.21	0.19	0.24
Cultivated Hectares (If in Ag)	0.24	0.35	0.63
<i>Livestock</i>			
Raised Livestock	0.52	0.40	0.62
Sold Livestock (If in Livestock)	0.25	0.33	0.26
Gross Sales (RWF)	71,750	99,517	72,516
Number of Animals	1.88	2.75	2.35
Livestock Composition			
Cows	0.32	0.51	0.39
Poultry	0.14	0.23	0.29
Pigs	0.44	0.09	0.05
Goats	0.10	0.17	0.27

Table 3 presents the basic structure of agricultural and livestock production in the host economies. 92% of host-country households around Nyabiheke participate in agriculture. Their average cultivated area is two to three times that around the other camps. 50% of households sold crops—more than twice the percentage of households around the other two camps. Nearly one in four hired farm workers. A significantly larger share of households around Nyabiheke camp raised livestock (0.62, compared to 0.40 and 0.52 in Gihembe and Kigeme, respectively; middle panel of Table 3). Participation in livestock markets is similar around the three camps; at least 25% of households that raised livestock sold animals in the 12 months prior to the survey. However, total revenue from livestock sales was significantly higher around Gihembe than the other two camps. Livestock composition also differed across the three host-country economies (bottom panel of Table 3). Gihembe livestock producers specialize in cows and poultry, Kigeme in pigs, and Nyabiheke in cows, poultry and goats.

Given the importance of agriculture in Nyabiheke, refugees are significantly more likely to perform agricultural work there

than around the other two camps (see refugee households columns in Table 2). Nearly one-third of all Nyabiheke wage workers had farm jobs, while 81–85% of workers from the other two camps had nonfarm jobs. The sectoral composition of refugee wage workers reflects that of host-country workers; there appears to be a complementarity between host-country family farming and refugee agricultural wage labor.

NGOs employ a large share of refugees: 0.21–0.44, compared with 0.02–0.05 of host-country workers. Among non-agricultural sectors, refugees are uniformly under-represented in government, and they are over-represented in construction and other services at two of the three study sites. A disproportionately large share of Gihembe workers are employed in retail.

The camp economy employs more than two-thirds of all refugee wage workers in Kigeme and 35–43% in the other two camps. The local economies outside the camps absorb an additional 21–37%. Refugees are more likely than host-country workers to travel outside the local economy for wage work, particularly in the more commercial Gihembe. The large majority of wage earners from host-country households work inside the local economy, and almost none work inside the refugee camps due to entry barriers.

There is a strong host-country business presence around Kigeme and Gihembe camps (left four columns of Table 4). Around one in five Kigeme and Gihembe host-country households had a non-farm business during the 12 months prior to the survey. Business ownership is somewhat lower (13%) in the agricultural area around Nyabiheke. Businesses are largest in Gihembe and smallest in Nyabiheke in terms of asset value, although Kigeme and Nyabiheke businesses are more likely to hire workers than businesses in Gihembe. Average reported monthly profit is highest in Gihembe and lowest in Nyabiheke.

Land constraints inside the camps preclude refugee households from self-employment in agriculture and livestock.² Nevertheless, refugee non-farm businesses inside the camps are common, particularly where there is less presence of host-country businesses in the camps' vicinity. The right four columns of Table 4 show that between 8% and 17% of all refugee households operated a non-farm business of some kind. The highest incidence is in Nyabiheke, the camp with the smallest incidence of host-country businesses around it. Most

refugee businesses operate out of homes, though a few more formal businesses can be found on the main street inside each camp. These are family operations, with little or no hired labor, and they are much smaller in reported value than host-country businesses.

Refugee businesses inside the camps source food and other merchandise from host-country farms and traders. Some purchase merchandise on periodic trips to the capital, Kigali. All benefit from the asymmetric movement of people between the camp and surrounding economy. Fewer host-country businesses near the camp implies higher transaction costs of buying food and other items for refugee households. This creates a price band: the price charged by camp businesses exceeds the host-country price by an amount up to the refugee consumers' per-unit cost of transacting with host-country businesses outside the camp (including time). Thus, it is not surprising to find the highest incidence of refugee businesses in Nyabiheke, where a relatively small share of host-country households have businesses near the camp. Businesses in Nyabiheke also report the highest average profit. At Kigeme, the camp where refugees still receive aid in kind, the average reported profit of businesses owned by refugee households is approximately half that of the other two camps.

The four rows at the bottom of Table 4 summarize the types of non-farm businesses in which host-country households and refugees are involved. Differences in business composition are not striking, but overall refugees are more likely to be petty traders, while host-country households are more likely to be involved in retail. (Gihembe is the exception.)

Besides food aid, wage employment in the host country, and profits from businesses inside the camps, refugee households obtain income from remittances sent by family and friends outside the camp (Table 5). Refugees are slightly more likely to receive remittances than host-country households in their locality. The share of refugee households receiving cash remittances ranged from 0.08 (Nyabiheke) to 0.20 (Gihembe), compared with 0.05 (Kigeme) to 0.09 (Gihembe and Nyabiheke) for host-country households. Some refugee households sent cash to households outside the camp. The share of out-remitters is small in the two most recent camps, Kigeme and Nyabiheke (0.02), but it is non-negligible in the more established camp, Gihembe (0.06). Refugee households are much more likely to receive other types of transfers, for example, from NGOs and government.

Combining income from wage work, businesses and remittances, refugee households' total income substantially exceeds the aid they receive for all but the poorest income deciles at Kigeme and for the upper half of the income distribution at the two cash camps (Appendix Figure A1). The WFP aid

packages refugees receive are uniform on a per-capita basis. They amount to an average of 37,000 (Kigeme) to 41,000 (Gihembe) RWF.³ WFP aid represents 76–78% of refugee households' total income at the three camps. Wages add another 14–16%; non-farm business profits, 2–4%; and remittances, 5–6% (Figure 1). Outside the camps, agriculture and wages comprise the bulk of host-country households' income. The relative importance of agriculture to the local economy of Nyabiheke is evident in Figure 1.

Two findings stand out from the distribution of refugee household income and aid in Figure A1. First, even relatively poor households supplement their food aid with income from other sources. This is particularly true for the in-kind camp, Kigeme, where the total income and aid curves begin diverging from each other at the second income decile. Second, the income distribution is nevertheless unequal, with total income curves diverging sharply from food-aid curves at the top income deciles.

Refugee households' total incomes are higher than the assistance refugees receive, but on average they are significantly lower than host-country household incomes around the three camps. Total per-capita incomes averaged 9,159–10,393 RWF inside the three camps (Table 6, second row, right three columns), compared to 13,763–19,910 outside the camps (left three columns). They do not vary as much across camps as across host-country communities around camps. Average total and per-capita household incomes are highest around Gihembe and lowest around Kigeme. Refugee incomes are highest where host-country incomes are highest (Gihembe).

Poverty rates, like total household income, vary around the three camps in patterns that reflect the nexus of economic opportunities described above. The headcount poverty rate is highest around Kigeme (.605) and lowest around Nyabiheke (.531). The poverty gap index is also highest around Kigeme, though similar in the areas surrounding the other two camps. Headcount poverty rates are significantly higher inside (0.725–0.755) than outside (0.531–0.605) the camps. However, the poverty gap index is considerably lower inside than outside the camps, reflecting the income floor created by WFP food aid.

Refugees receive free housing, healthcare, and education, and these are not reflected in conventional poverty measures. Thus, poverty differences might not accurately reflect welfare differences between refugee and host-country households. We used the Alkire and Foster (2011) method to estimate a multi-dimensional poverty index based on the weighted deprivations that households face, then constructed a headcount ratio that takes into account the severity of deprivation.⁴ Based on this deprivation-adjusted poverty rate, the difference

Table 4. *Non-farm businesses around and in the three camps*

	Host-Country Households				Refugee Households			
	Overall	Kigeme	Gihembe	Nyabiheke	Overall	Kigeme	Gihembe	Nyabiheke
Non-farm Business		0.22	0.17	0.13	0.13	0.08	0.17	
Hires Workers		0.17	0.04	0.14	0.03	0.07	0.00	
Value of Business (RWF)		743,491	1,770,193	579,904	34,397	32,271	63,327	
Average Monthly Profit		55,326	77,737	30,470	10,813	18,014	22,242	
Type of Business								
Petty Trader	0.29	0.30	0.29	0.26	0.41	0.40	0.40	0.44
Retail	0.18	0.14	0.24	0.19	0.09	0.02	0.21	0.06
Food Service	0.23	0.26	0.15	0.29	0.24	0.23	0.29	0.22
Other (including non-food services)	0.30	0.30	0.32	0.27	0.26	0.36	0.11	0.28

Table 5. *Shares of Households Receiving and Sending Cash Remittances*

Share of Households	Host-Country Households			Refugee Households		
	Kigeme	Gihembe	Nyabiheke	Kigeme	Gihembe	Nyabiheke
Receiving Remittances	0.04	0.09	0.10	0.15	0.20	0.08
Sending Remittances	0.02	0.06	0.03	0.02	0.06	0.02
Receiving Other Transfers	0.20	0.17	0.09	0.50	0.30	0.37

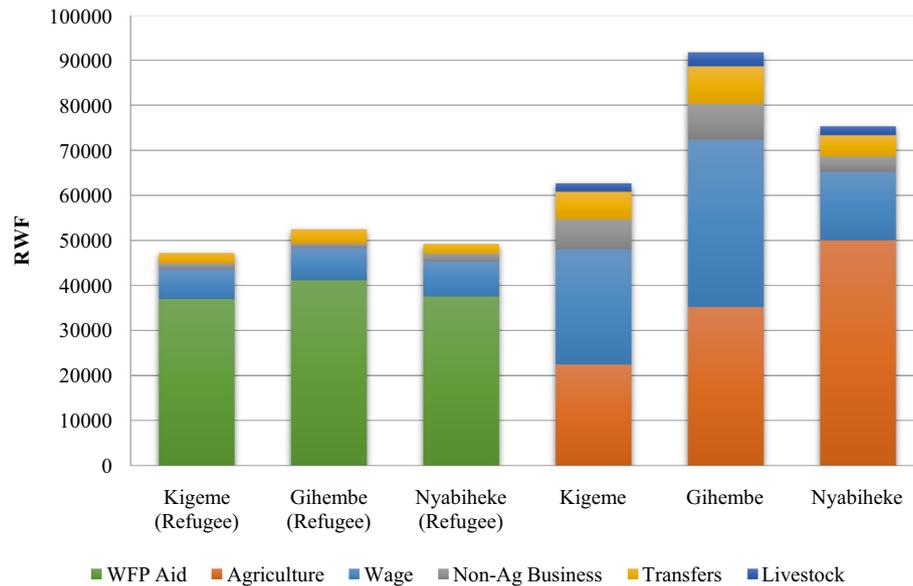


Figure 1. *The composition of total household income for refugee and local households in each location. This figure shows the composition of household monthly incomes by sources within refugee and local households in Rwandan Francs. The left three bars are for the refugee households and the right three bars are for the households in the local economy outside the respective refugee camps. (To interpret references to colour in this and other figures, the reader is referred to the web version of this article.)*

Table 6. *Household income and poverty around and in the three camps*

	Host-Country Households			Refugee Households		
	Kigeme	Gihembe	Nyabiheke	Kigeme	Gihembe	Nyabiheke
Household Income Total (RWF)	69,100	97,074	80,380	47,222	52,427	49,215
Household Income Per-capita (RWF)	13,763	19,910	15,670	9,384	10,393	9,159
Poverty Head Count	0.605	0.556	0.531	0.755	0.729	0.725
Poverty Gap	0.329	0.297	0.296	0.207	0.215	0.214
Multi-Dimensional Poverty Adjusted Head Count	0.270	0.249	0.270	0.465	0.220	0.342

in poverty between refugee and host-country households is smaller at both cash camps, and it is lower for refugees than host households at Gihembe. For the in-kind camp, however, the difference remains large, with refugee households much more likely to be poor and deprived.

3. CONSUMPTION AND MARKET BEHAVIOR

Refugee households' income generation through active engagement with the host-country economy distinguishes life in a refugee camp from the "Edgeworth Box" camp economy described by Radford (1945). So do their connections with the host-country economy via exchange. In the following subsections we sketch how exchange takes place within the three camps and refugees' engagement with host-country markets.

(a) Kigeme Camp: life before cash

Kigeme represents a refugee camp prior to the switch in aid from in-kind to cash. Despite being an in-kind camp, it is not an entirely in-kind economy, because some refugees have wage employment outside the camp, the vast majority sell a part of their food aid in markets outside the camp, and most purchase at least some additional food items from the surrounding host-country economy.

The food basket that refugee households receive at Kigeme Camp is comprised of 12.5 kg of maize, 3.7 kg of beans, 0.9 kg of oil, and 0.2 kg of salt per household member per month. Figure 2 shows the percentage of refugee households at Kigeme that sell all or part of their allotments of maize, beans, oil, and salt in markets outside the camp. Around 80% of Kigeme refugee households sell some maize or cooking oil,

and 89% sold at least one of the four components of their packet (not shown). The amount sold differs by food item: On average, one quarter of all maize allotments, smaller percentages of beans (2.5%) and cooking oil (3.9%), and no salt were sold in markets outside the camp.

Cash from food-aid sales (together with other income) enables refugees to purchase a variety of food and non-food items in the surrounding economy. The left panel of Figure 3 shows the percentage of Kigeme refugees consuming and purchasing different food items during the seven days prior to the survey. The sum of the lengths of two bars (purchased and not purchased), in each camp, gives the percentage of refugee households consuming the corresponding item. It is close to 100% for the key items included in the WFP food aid package (maize, beans, salt, and cooking oil), but for items not in the package it varies widely, from 72% for fresh vegetables to 0.4% for fresh meats. In the absence of cash aid in this camp, this diversity of consumption is striking.

For most food items, the majority consumed is from purchases. Most of the rest—including the majority of beans, maize, and cooking oil—is in-kind aid. For all foods, more than 70% of purchases are made in host-country markets within the 10 km radius around the camp, with most of the remaining 30% purchased within the camp.⁵

The food packet given to refugee households in this camp is valued at 6,300 RWF, which is the amount that refugees receive in cash in the other two camps. Using average prices reported by refugee and host-country consumers in and around Kigeme Camp, we find that the refugee food packet per capita is worth 6,263 RWF when measured in consumer prices, with a standard deviation of 45.5 RWF.⁶

Sales of in-kind aid are highest in refugee households without other sources of income. More than 91% of refugee households with no other sources of income sold some of their food packet. This percentage decreases slowly with income. Around 70% of households in the top income decile sold some of their food packet.

In a highly competitive market setting, refugees should be able to sell their food packet items at or near the market price. However, there is evidence of a price band due to transaction costs related to finding the best buyers: refugees consistently sell food aid at prices below market retail prices. Table 7 reports the ratio of sale to retail prices. For maize and cooking oil, the most commonly sold items, the average ratio of the price at which refugees sell to the price of the item in the market is 0.571 and 0.811, respectively, both statistically different

from 1. For beans the ratio is 0.832 and not significantly different from 1. (The estimate for beans is imprecise due to the small number of sales recorded). We could not find any variables that significantly explain the differences in ratios across refugee households. Ordinary least-squares regressions reveal constant ratios across age, sex, and education of the household head. In addition, we flipped the perspective and could not find a difference in the ratios based on who the household sold to (merchant or store versus other household). The only variable that was statistically significant was the refugees' time of arrival at the camp; the ratio is 0.05 lower for refugees who are newcomers to the camp.

As a result of these price bands, refugees cannot transform aid to cash without incurring a significant transaction cost, and this in turn limits their ability to use host-country markets to diversify food consumption. Based on the average selling prices in Table 7, the full-income value of the food packet for refugees at Kigeme camp is 3,969 RWF, or approximately 64% of the packet's value in consumption prices. In other words, the cash that refugees could obtain by selling all of their WFP packet is only 64% of the packet's value.

There are three possible reasons why refugees receive a lower price. First, the quality of food items received by refugees might be lower than food sold in local markets. Second, refugees could lack bargaining power as sellers in local markets, and bargaining power could depend on how long the refugee has been in a camp. Third, our numbers might reflect underreporting of prices if refugees fear accurate reporting might compromise the aid they receive.^{7,8} On average, 25% of maize, 5% of oil, and 2% of beans are sold. Due to the lower prices that refugees receive, refugee households lose on average approximately 10% of the value of the food packet. We do not have information on the two cash camps before they switched to cash, but we believe it is likely that refugees at Nyabiheke and Gihembe previously sold food and purchased goods in local markets, just as those at Kigeme did at the time of our survey.

(b) Gihembe and Nyabiheke: life with cash

Households in the two cash camps, Gihembe and Nyabiheke, take their cell phones to a participating local business, where they have the option of "cashing out" (taking the entire transfer in cash), making direct purchases with their phones, or any combination of the two.⁹ A transaction fee applies

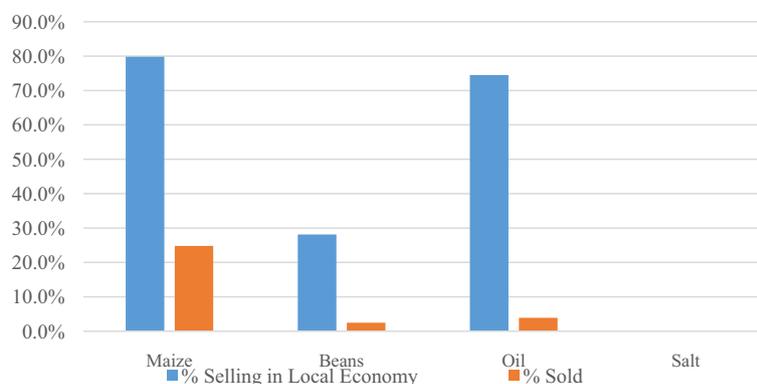


Figure 2. Sales of food aid in the local economy, Kigeme Camp. This figure shows the sales of food aid by the in-kind receiving refugees. The blue bar shows the proportion of households that sold each item in the local economy. The orange bar represents the percentage sold. Nearly all Kigeme refugee households sell some food in the local economy surrounding the camp. Nearly one quarter of all maize received from WFP is sold outside the camps.

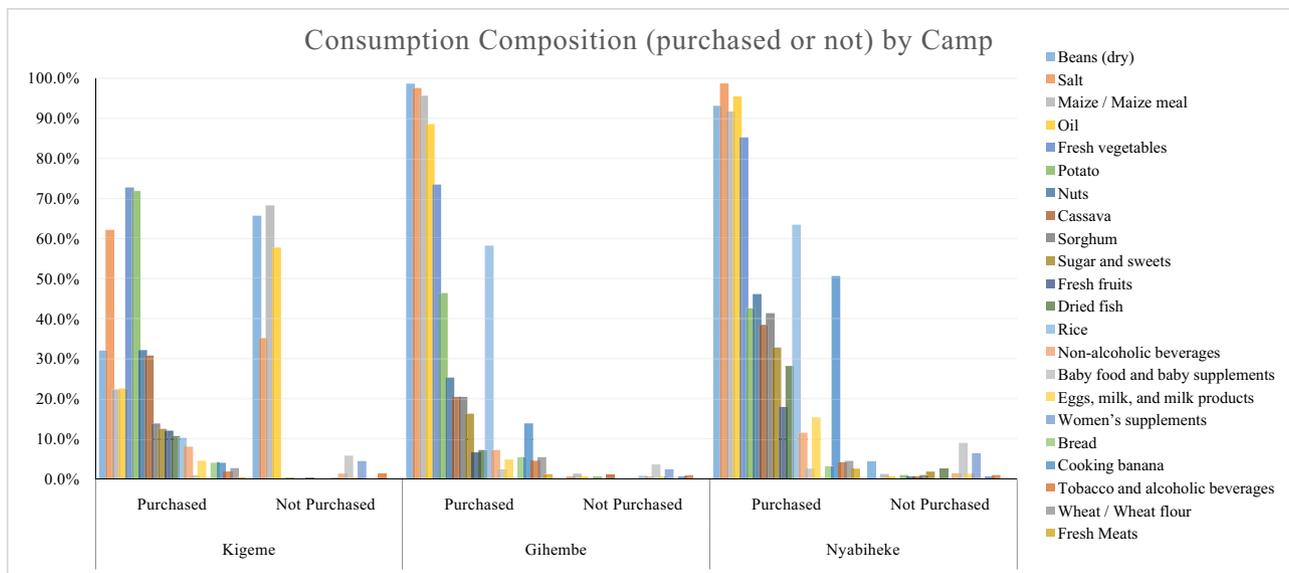


Figure 3. Consumption composition inside Refugee Camps. This figure gives the composition of consumption inside in-kind (Kigeme) and cash (Gihembe and Nyabiheke) camps. Most Kigeme refugees' consumption of foods not in the WFP package is from income generated through the sale of food aid in the local economy outside the camp. Nearly all Gihembe and Nyabiheke refugee households consume maize, beans, salt, and oil, the components of the WFP food package they received previously. More than half consume fresh vegetables, potato, and rice. The majority of these goods are purchased in the local economy inside and outside the camp.

Table 7. Prices of food packet items

	Number of households in sample who sold item	Average Price per unit Sold in Kigeme	Average market price per unit in Kigeme	Ratio of Prices	Statistically less than 1?	Average Market Price in	
						Gihembe	Nyabiheke
Maize	177	175.64	310.55	0.571	Yes	378.48	279.51
Beans	63	306.65	368.13	0.832	No	417.59	393.74
Cooking Oil	167	1010.68	1252.94	0.811	Yes	1453.4	1409.7

to cash withdrawals after the initial one; this may encourage refugees to limit their withdrawals and possibly elect to cash out. Because they do not receive food aid in-kind, very few households in these camps sell food.

Our data reveal that most refugee households cash out then purchase food and other items, primarily in local host-country markets (within 10 km of the camp). However, there appear to be some differences between the two cash camps, possibly reflecting the structure of the surrounding economy as well as exposure to the new distribution mechanism.

(c) Gihembe Camp: settled into cash

Gihembe Camp switched from in-kind to cash aid in early 2014; thus, refugees in this camp have had almost two years to adjust to the new distribution regime. Most households in this camp (79%) cash out after receiving their transfers. The middle panel of Figure 3 shows food consumption and purchases by Gihembe households. Nearly all households consume the four components of the in-kind food-aid package they received prior to the switch to cash. Nearly all of these four food staples are purchased, and nearly two-thirds of the purchases are from host-country vendors within 10 km of the camp. A majority also consume fresh vegetables, potatoes,

and rice. Smaller percentages consume cooking bananas, potatoes, and fresh fruits and vegetables.

(d) Nyabiheke: an agricultural economy adjusting to cash

The Nyabiheke survey was carried out only two months after the switch from food to cash. Data from this camp portray an economy in transition from in-kind to cash assistance. Nearly all (94%) of Nyabiheke refugees immediately cashed out upon receiving their first transfer. A higher cash-out rate in Nyabiheke compared with Gihembe might reflect the stage of adjustment at which the two camps find themselves. However, it might also reflect a difference in the demand for cash between the two camps. Households' demand for cash might be different in localities where there is a relative abundance of food available to purchase in nearby markets. It might also reflect differences in incomes between the two camps.

Nyabiheke households, like their counterparts in Gihembe, use cash to purchase all of the items in the WFP food package received prior to the shift to cash, but they consume a wider variety of other food items (right panel of Figure 3). More than three quarters consume fresh vegetables, and more than half consume rice and cooking banana. It is clear from a

comparison of the three panels of Figure 3 that dietary diversity is greater at Nyabiheke than at the other two camps.

4. REFUGEE WELFARE

The findings presented above have implications for the design of aid delivery mechanisms. Identifying the impacts of a change from in-kind to cash food aid is complex, because we do not have before-and-after data from individual camps. In Gihembe and Nyabiheke, we might imagine what food consumption and interactions with local food markets looked like before the shift to cash. Comparing the two cash camps to Kigeme reveals insights into how the switch to cash might affect food consumption and welfare.

Figure 4 compares consumption patterns between the two cash camps and Kigeme Camp. The length of each bar indicates the difference in percentage of households consuming the corresponding food item between the cash and in-kind camp. Short bars indicate that the share of households consuming the food item in the cash camp is similar to the share in Kigeme Camp.

The cash-camp households are virtually identical to Kigeme Camp households when it comes to consuming maize, beans, salt, and oil—the four components of the WFP food package. However, the cash-camp households are considerably more likely to consume rice and cooking bananas.

Differences in food availability might explain observed differences in consumption across camps, making it difficult to isolate impacts of the switch to cash on dietary diversity. We can address this by using the consumption patterns of the

local population as a baseline for each camp. Host-country households have higher income, on average, than refugee households; thus, we restrict our sample of host-country households to those with a per capita monthly income less than 12,600 RWF, double the value of aid given to refugees. We expect local households to have more diverse diets than refugees. To compare consumption across camps, therefore, we calculate the ratio of the percentage of households within each camp that consumed each food item and divide it by the percentage of nearby similar host-country households consuming the item.

Figure 5 reveals that this ratio is higher for the cash camps; that is, cash-camp diets look more like nearby host-household diets than do in-kind camp diets. Excluding the food packet items, the overall average of the ratio of percentage of refugee households to percentage of local households consuming a certain food item is 0.8 in the cash camps versus 0.65 in the in-kind camp, and the difference is statistically significant.

Welfare indicators suggest that refugees in the cash camps are better off than those in the in-kind camp. Refugees at each camp were asked: *In the last 7 days, have there been times when your household did not have enough food or money to buy food?* Based on this question (Table 8), food security (“no” to this question) is lowest at Kigeme Camp (14% of households) and highest at Gihembe Camp (60%). In Nyabiheke Camp, 39% of refugees consider themselves to be food secure. Refugees were asked additional questions related to food security, including: *How many days in the last week did you have to consume less preferred meals?* The shares of households answering one day or none are shown in Table 8. It is clear from these shares that refugee households in the in-kind camp

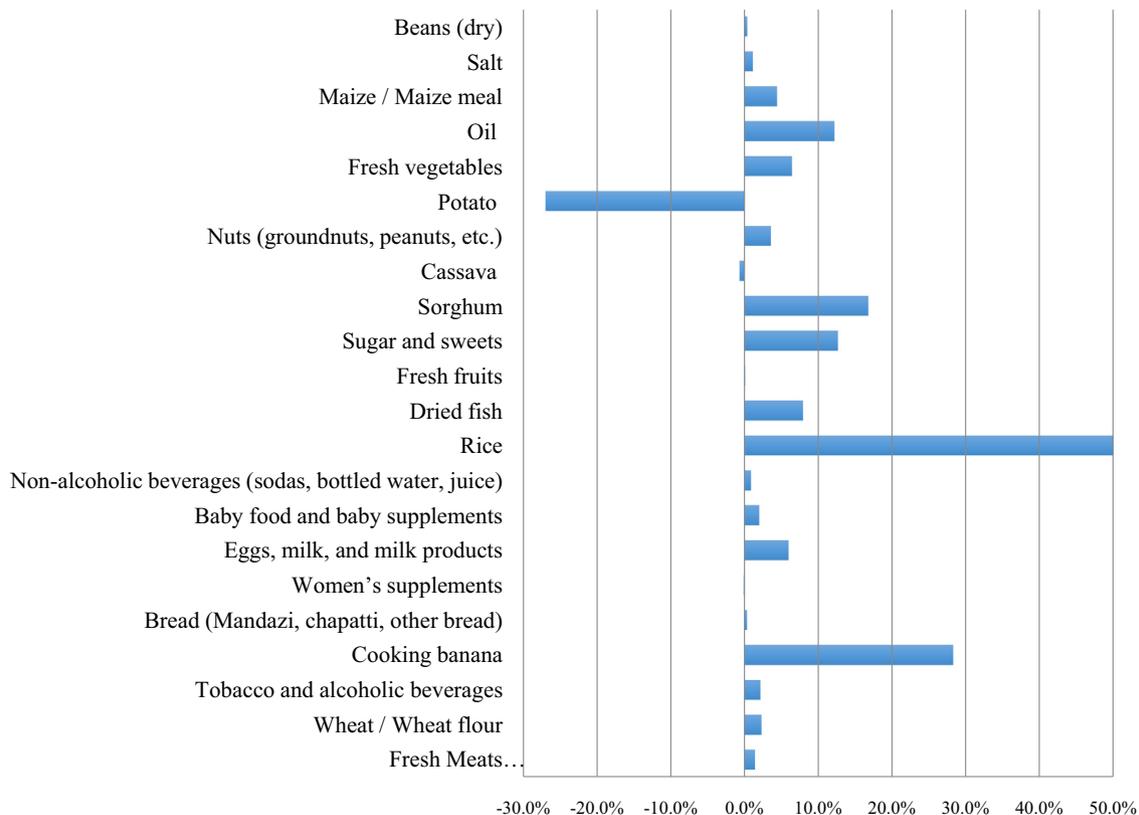


Figure 4. Difference in percentage of households consuming specific food items between cash and in-kind camps. This figure shows that the two cash camps are similar to the in-kind camp in terms of consumption of the five staples in the WFP food package, but both demand more rice, sorghum, and cassava, and Nyabiheke Camp households consume considerably more of other foods.

ECONOMIC LIFE IN REFUGEE CAMPS

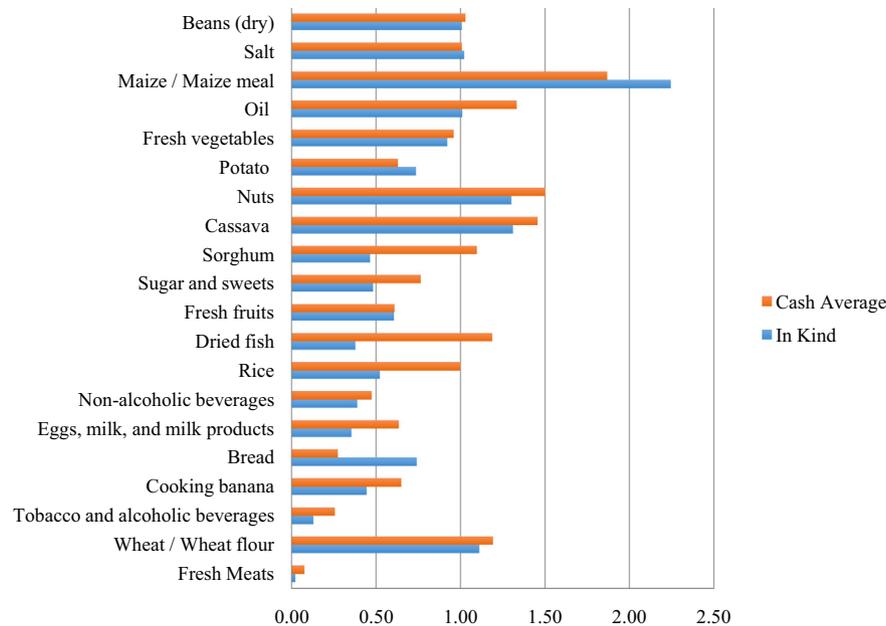


Figure 5. Ratio of percentage of refugee households consuming specific food items to percentage of local households consuming these food items. This figure compares consumption by each refugee population to that in the nearby host population to account for region specific differences. If the ratio is 1, then refugees and their respective host populations have similar consumption patterns. In the refugee camps receiving cash, consumption patterns look more like those of the host populations around the camps.

Table 8. Welfare indicators from the household surveys

	Host-Country Households			Refugee Households		
	Kigeme	Gihembe	Nyabiheke	Kigeme	Gihembe	Nyabiheke
Share Food Secure	0.28	0.42	0.39	0.14	0.60	0.39
In the past 7 days, share of households that did not have to consume						
Less Preferred Meals	0.39	0.49	0.49	0.22	0.44	0.53
Borrowed Food	0.86	0.94	0.91	0.52	0.95	0.86
Fewer Meals	0.64	0.78	0.79	0.57	0.84	0.72
Smaller Portions	0.51	0.59	0.62	0.33	0.72	0.56
Share of Households that claim that						
Things are going well	0.33	0.37	0.32	0.17	0.34	0.23
Things are Not too difficult	0.38	0.41	0.38	0.17	0.36	0.30
They Are Happy	0.48	0.54	0.45	0.35	0.53	0.49

are less food secure than those in the cash camps of Gihembe and Nyabiheke. However, host-country households surrounding Kigeme also show lower levels of food security than those around the other two camps (left panel of Table 8).

We also asked: *During the last week, how often have you felt that things are not going well? During the last week, how often have you felt that difficulties accumulate so much that you cannot handle them? And: During the last week how often have you felt happy?* These questions are intended to reflect people's self-assessment of welfare and sense of control in life. For both of the first two questions, the shares responding "not often" or "never" are considerably lower at Kigeme (0.17 for both) than Gihembe (0.34 and 0.36, respectively), with Nyabiheke again in between (0.23 and 0.30). The share of households in Kigeme that consider themselves happy in the past week is 0.35; at Gihembe and Nyabiheke the shares are 0.53 and 0.49, respectively.

There are limitations to what we can conclude from these comparisons because the three camps almost certainly differ

in ways other than exposure to cash. We do not have welfare self-assessments prior to the switch to cash in Gihembe and Nyabiheke camps, and we do not observe a switch to cash at Kigeme camp. However, we can garner some insights by comparing welfare in refugee and nearby host-country households.

Figure 6 shows the difference in positive response shares between the local host-country households and respective refugee households. Large positive bars indicate that a larger share of host than refugee households responded positively to the welfare question. The black lines represent the confidence interval of that difference. Differences between host-country and refugee household welfare indicators are not statistically different from zero in the camps that receive aid in cash. However, at the in-kind camp the difference is greater than zero at the one-percent significance level for all welfare indicators except consumption of fewer meals. This is suggestive evidence that cash improves welfare among

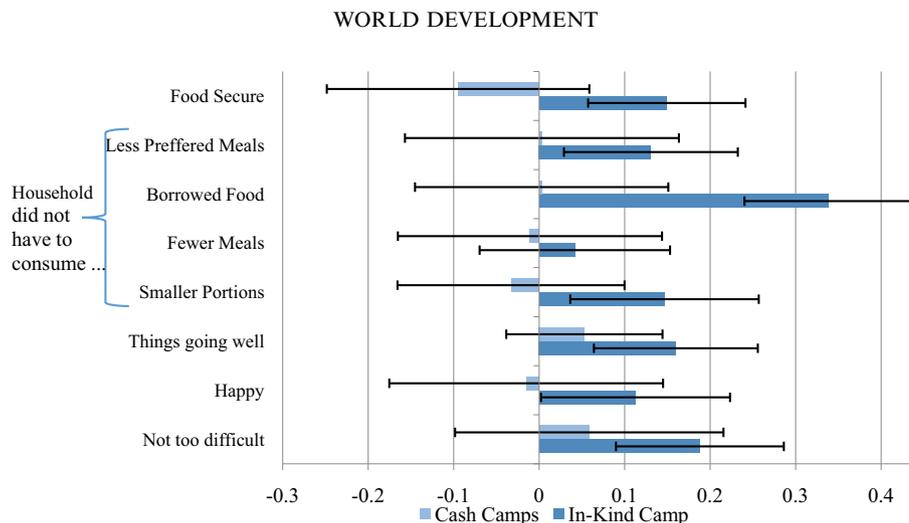


Figure 6. Differences between local host-country and refugee household shares of positive responses to welfare questions. This figure compares the responses to welfare questions among refugees and their respective Rwandan counterparts living near the refugee camp to account for region specific differences. Positive responses are coded as 1 and negative ones as 0. The average of the refugee population is subtracted from the average of the local population. Large positive values signify that the local population has more positive responses to welfare questions than the refugees in that locality. The figure shows that refugees in camps receiving cash aid cannot be differentiated in terms of welfare responses from their respective local populations. However, refugees in the in-kind camp are much more likely to be food insecure and to report negative responses to welfare measures than the nearby host population.

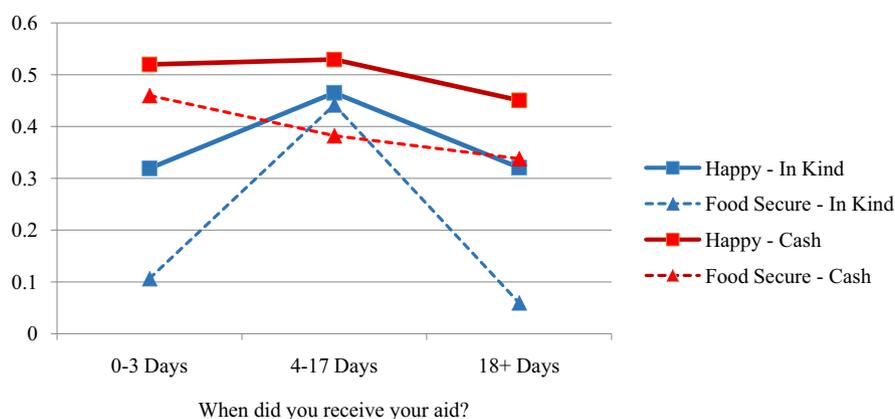


Figure 7. Responses to Food Security and Happiness questions vary by time since last aid receipt in in-kind camps. This figure shows how food security and happiness responses vary depending upon the time elapsed since the last receipt of aid. In the in-kind camps, answers to these questions are less stable than in the cash-camps.

refugees, making refugee welfare more closely resemble welfare in the nearby host-country population.

In Appendix Table A1 we add to the evidence on the relationship between aid regimes and refugee welfare by estimating a series of regressions of welfare outcomes. Since we are unable to observe households before and after the switches from in-kind to cash aid, the regression can only be interpreted in a correlation sense. Furthermore, the correlation of outcomes within each camp would require clustering standard errors at the camp level, but we only have data for three camps. Thus, we provide an upper bound on the significance of these correlations. The regressions control for a large number of individual and household characteristics. In addition, we include a location (camp) fixed effect for Gihembe to capture any camp-specific unobserved variation owing to different host country contexts. Our results are robust to controlling for the location dummy.

Welfare in refugee households differs significantly between the cash and in-kind camps. Kigeme refugees are significantly

less likely to be food secure, spend significantly less on food, and are significantly less likely to agree with the statement: *Things are not too difficult these days*. Food aid refugees are also less likely to consider themselves happy, and they are significantly more likely to have a very high discount rate. It is plausible that these differences could be location-specific and not due to in-kind aid. To compare, Table A2 in the appendix shows the results from the same regressions for non-refugee households. The results show that non-refugees in the locality around the Kigeme refugee camp also have lower levels of food security, although the difference is not as large as that of refugees.

In Table A3, we construct indices for food security and welfare using principal component analysis¹⁰ and find that Kigeme refugees exhibit especially lower levels of food security and welfare. Host-country households near Kigeme are also less food secure than those at the other locations, albeit to a lesser extent than refugees. When it comes to welfare, refugees at Kigeme have lower levels of reported welfare compared

to refugees at other locations, whereas host-country households near Kigeme report levels of welfare similar to host households near the two cash camps. This evidence is suggestive again of a gain in welfare and food security from receiving cash aid.

Given that the survey asks about welfare and food security in the past week, it is possible that the timing of the survey with respect to receipt of the aid package could explain some of the variation in welfare answers. This hunch is validated in our regressions; time since receipt of aid is a strong predictor of welfare outcomes. To investigate this further, we observe in [Figure 7](#) that in-kind camp responses to the food security and happiness questions vary widely by time elapsed since last aid receipt. In the two weeks after receipt of a food packet, a little under 50% of households answer that they are food secure; however, later in the month this number drops to less than 10%. In the cash camps, the level is higher overall and relatively stable throughout the month. When it comes to food security, it is plausible that refugees are better able to smooth consumption with cash.

5. CONCLUSION

This glimpse into the economies of Congolese refugee camps in Rwanda leads us to three overarching conclusions:

First, when people are uprooted from their homelands and resettled into camps like the ones studied here, refugee economies arise. These refugee economies are more complex than [Radford's \(1945\)](#) "Edgeworth Box" POW camp economy.

Second, refugees' economic outcomes—and the structure of refugee economies—are shaped by refugees' capital—particularly human capital—as well as by the host-country economic

context. Interactions with host-country economies result in a divergence of household income from refugee assistance.

Third, the shift from in-kind aid to cash appears to increase refugee welfare in fundamental ways. This finding is potentially relevant for other types of development assistance, as donors find themselves under pressure to shift to cash.

This paper does not consider the potential spillovers from refugee aid to nearby host economies. Refugees' heavy participation in host-country markets for consumption suggests that these spillovers may be large ([Taylor et al., 2016](#)). The finding that refugee households at the in-kind aid camp (Kigeme) actively buy and sell food in local markets prior to the shift to cash is evidence that refugee food aid impacts local economies even when aid is in-kind. This suggests that Kigeme could follow the other two camps' lead in becoming more involved in local markets once it switches to cash and refugees no longer have to sell rations in order to purchase food. It also leads us to suspect that households in Gihembe and Nyabiheke camps already were actively involved in outside markets prior to the shift to cash.

The evolution of refugee-camp economies clearly depends on the rules governing interactions with the host country as well as the structures of nearby host-country economies. The resettlement of refugees around the world takes different forms, ranging from isolated camps to nearly complete integration with host-country communities. Isolated refugee camp economies are likely to resemble [Radford's](#) POW camp economy, with an emphasis on exchange rather than production and few potential linkages with the surrounding host population. Our research suggests that enabling refugees to interact efficiently with the economy around them can increase refugee welfare while creating benefits for host-country businesses and households.

NOTES

1. While we do not have full details on all the geopolitical economic factors outside the refugee camps, for instance the composition of leadership or ethnic structures, we list in [Figures B1–B3 in online appendix](#) the religious composition, consumption expenditure and income shares of local economies outside the camps and put into perspective their comparison to rest of Rwanda.

2. A negligible number of refugees rented land from host-country households outside the camp.

3. We valued the Kigeme aid package at the value of cash transfers at the other two camps. We investigate the true implicit value of Kigeme aid packages below.

4. For more information on the variables used to construct our index see [Appendix, Section B](#). The Alkire and Foster method and multi-dimensional poverty measures are explained in more detail in [Alkire and Foster \(2011\)](#), [Stoeffler, Alwang, Mills, and Taruvinga \(2015\)](#), and [Bossert, Chakravarty, and D'Ambrosio \(2013\)](#).

5. Besides purchases, food consumed during the seven-day recall period could come from gifts, loans, home production, or exchanges with other households.

6. Cost-efficiency and cost-effectiveness are key considerations in WFP's decision of whether to shift from in-kind to cash aid. The variables shaping food costs are diverse and context specific. While investing in logistic infrastructure, the WFP has made an effort to increase the amount

of food sourced regionally or in-country. In the case of Rwanda, a considerable portion of the cereals that comprise the in-kind package are sourced in-country, at prices that compete with the price of food available in local markets. Despite this, cash transfers tend to be cheaper than in-kind aid. An initial market assessment conducted in 2013, prior to the introduction of cash in refugee camps, estimated that cash transfers were 15% cheaper than in-kind assistance. As global cereal prices declined and the amount of food sourced locally increased, the relative efficiency of cash fell. WFP estimates that, since the introduction of cash to Rwanda's refugee camps, cash transfers on average have been 4% cheaper than in-kind food aid.

7. [Jacobsen \(2005\)](#) notes that in Sembakounya camp in Guinea, the refugees sold their aid in 'Japanese' bulgur to obtain locally produced rice. In many cases it is not surprising to find that refugees or locals might underestimate the quality of food thereby reducing its value in local markets.

8. While perception on the quality of food is a possibility, our understanding is that it is unlikely. The WFP sources most food inside the country, and refugees report that the quality of food they receive is high.

9. The participating businesses include host-country businesses outside the camps and refugee businesses inside the camps.

10. The first principal component represents an index of all the different and correlated variables.

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APPENDIX A. SUPPLEMENTARY DATA

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.worlddev.2017.02.030>.

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