Assessing the direct and spillover effects of shocks to refugee remittances

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Abstract

We examine the impact of exogenously shutting down remittances to Kakuma refugee camp in northern Kenya during 2015. We find that the remittance shutdown did not reduce refugee consumption on average. However, it did decrease consumption of households that previously received remittances through the networks that were closed, while simultaneously increasing consumption for those who continued to receive remittances through other mechanisms. The shutdown also resulted in decreases in the probability of consuming a variety of goods by the host population, particularly those with livelihoods linked to the refugee camp. These findings underscore the tight links between refugee camps and surrounding communities, and are a testament to the multiplier effects of remittances.

JEL codes: O15; F24; O16

Keywords: refugees, remittances, impacts on hosts

Highlights: Assessing the direct and spillover effects of shocks to refugee remittances

- We examine the impact of shutting down remittances into Kakuma refugee camp.
- We find that while refugee consumption was not reduced on average, it was lower among households likely to be affected by the shutdown.
- The host population was also negatively affected by the shutdown, especially those with livelihoods linked to the camp.
- These findings underscore the important relationships between refugee camps and host communities.

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1 Introduction

The count of globally displaced people has recently risen to 68.5 million, 25.4 million of whom are refugees, a number set to substantially increase as conflict around the world continues to drive people from their homes. Although public discourse often focuses on refugees arriving in Europe and the United States, 85% of whom are hosted in developing countries, whose local populations are often as poor or poorer than those displaced (UNHCR 2019). One of the dominant policies in refugee hosting is "enclosure" – the housing of refugees in large "temporary" camps, where their ability to work outside of the camp is limited (Betts 2013). These refugees are thus highly dependent upon remittances sent by friends and relatives outside of the camp, food aid, and the internal camp economy. Until now, the scarcity of information on refugee camp economies and refugee-host interactions has made it difficult to understand the role of these cash inflows. This paper exploits a temporary shutdown of transfer networks to refugee camps in Kenya to shed light on the role of remittances in both the lives of the refugees and, indirectly, on the host populations living near the camp.

On April 8th 2015, the Kenyan government abruptly ordered the national shutdown of Somali-operated money transfer agencies, known as *hawala*, in response to attacks carried out at the end of March by Al Shabaab, a Somali militant group, on Garissa University College[1]. In this sense, the shutdown was truly random and unexpected by households across Kenya. The *hawala* agencies involved in the Kenyan shutdown included the largest money-

[1] A report by the United States' Bureau for International Narcotics and Law Enforcement Affairs published in March 2015, indicated that Somalia's remittance banks, or *hawala*, were responsible for the Garissa attacks and for terrorism financing (Mwahanga 2015, United States Department of State 2015).

sending agency in Africa, Dahabshiil Money Transfer Ltd, and twelve others, including Amal Express, Tawakal Money Transfer, Kaah Express and Juba Express. The closure and asset freeze lasted from April 8 until June 22, 2015, when the Kenyan government instructed the Central Bank of Kenya to issue new regulations on financial oversight and accountability.

During the shutdown, a significant proportion of Kenya's population was affected, most notably the 2.5 million Kenyan citizens of Somali descent and 464,000 Somali refugees hosted in urban centers and refugee camps throughout the country. *Hawala* is most commonly used by Muslims, since it is congruent with Islamic financial norms, and therefore disproportionately affected this population. The shutdown also reverberated across Ethiopians, Eritreans, South Sudanese and other East African nationals in Kenya, since this type of financing is one of the few options for sending money cheaply and securely outside of expensive formal banking systems and dangerous mechanisms such as carrying money by hand[2].

This paper asks two questions regarding the remittance shutdown in Kenya: (1) Do changes in refugee consumption indicate that they are accommodating the *hawala* shutdown? (2) Did effects of the shock reverberate within the host communities living around refugee camps? To answer these questions, we exploit qualitative interviews and household data collected in Kakuma refugee camp and communities surrounding the camp during the summer of 2015. Kakuma refugee camp, established in 1992, is one of the largest and longest-lived refugee camps in the world, with a current total population around 182,000.

Interviews with refugees and money traders establish that the shutdown did indeed decrease remittance inflows into the camp, at least temporarily. Although the consumption of food items did not change among refugee households on average, households most likely to be affected by the remittance shutdown experienced large consumption decreases. In particular, those who actively used hawala in the past or were members of ethnicities likely to be Muslim decreased their consumption of meat and milk by magnitudes ranging from 26 to 33 percent. Meanwhile, households more likely to use other transfer systems increased

[2]The remittance shutdown not only affected refugees, it also affected aid agencies. Dahabshiil's website names the United Nations, World Bank, Oxfam and Save the Children as clients who use its services.

their consumption of these same items, suggesting that prices may have decreased due to weakened demand from remittance-receiving households.

Using a survey of households in villages at increasing distances from the camp, we also test whether households in the host community (i.e., non-refugees) were affected by the remittance shutdown. We first demonstrate that these households tend not to receive cash transfers on the same level as the refugees; less than 10% of local households receive transfers, relative to over 60 percent of refugees. Using a comparison of households living near and far from the camp, the data show slightly higher purchases of some key items before the shutdown for households living close to the camp. Therefore, non-refugee households around Kakuma are indeed somewhat better off than those farther away in the baseline month, a fact also established in Alix-Garcia et al. (2018). However, these same households experienced statistically significant decreases of 12 and 25 percent in the probability of purchasing sugar and tea, which are considered luxury items among this population. Furthermore, these effects were stronger for households selling animals near the camp. This is consistent with a theory that host households that are more engaged with markets are more likely to be affected by the decrease in cash flows to the camp.

On a broader level, these findings are of interest to scholars working in the fields of development and refugee economies, which have mostly been concerned with livelihoods and more latterly the impacts of refugees on host communities. Where refugee economies are concerned, work to date has mostly been descriptive, focused on livelihoods and the kinds of activities and employment opportunities refugees seek (Jacobsen 2005, Horst 2006, Werker 2007, Hovil 2007, Jacobsen et al. 2014, Ruiz & Vargas-Silva 2013, Betts et al. 2017). Outside of the livelihoods literature, and in reaction to what has been called the humanitarian-development divide, interest has also developed in refugee impacts. This literature has addressed the potential for refugee economies to leverage the productive capacity of host economies, but again there is a paucity of empirical data to explain the channels by which this occurs (Zetter et al. 2012, Zetter 2014, Betts et al. 2017).

Our findings use quantitative methods to augment this literature in two ways: first, they highlight that refugees have significant ties to local markets, even when they are limited in their ability to engage in the labor market; second, they illustrate that the policy of shutting down remittances was damaging to both refugees and the host population. In this vein, our findings contribute to an emerging literature that attempts to quantify refugee-host interactions. Recent work documents the positive net effect of refugee camps on host communities (Alix-Garcia & Saah 2010, Maystadt & Verwimp 2014, Taylor et al. 2016), including our own in Kakuma (Alix-Garcia et al. 2018). Further, several descriptive studies document significant interaction between refugees and local households in proximity to Kakuma camp (de Montclos & Kagwanja 2000, Jacobsen 2002, 2005, Aukot 2003, Crisp 2003, Oka 2011), but cannot quantify the economic effects of integration between the two communities. We contribute to this discussion by measuring the degree to which economic shocks in the refugee community resonate in the host population, and highlight the economic integration of the two.

Our work also speaks to the literature examining the effects of remittances on recipients. These studies establish that remittances are directly important sources of insurance (Yang & Choi 2007) and investment in human capital (Yang 2008). Other word shows that negative shocks to remittances can have harmful impacts on recipients in the short-run (Alcaraz et al. 2012), and that migrants respond to shocks in destination countries by adjusting their migration decisions (Yang 2006, McKenzie et al. 2014) or labor force participation in the sending country (Theoharides 2019). Most closely related to our own work are studies on the spillover effects of remittances. These scholars find that households left behind after a migration lottery are worse-off than households with migrants in terms of income, asset accumulation and diet (Gibson et al. 2011) and that countries with higher remittances tend to have greater financial development (Aggarwal et al. 2011). Theoharides (2019) studies the Japanese ban on migrants from the Philippines and documents negative spillover effects to migration opportunities. The setting we explore is unique in the sense that refugees

are not voluntary migrants and are largely dependent on remittances as a primary source of income. In these settings, forced-migrants are limited in their ability to insure against remittances shocks. Moreover, our findings suggest that negative shocks to remittances also have important spillover effects to non-recipients, a topic that has received limited attention in the literature.

2 Context

2.1 Refugee encampment in Turkana, Kenya

In 1991, following an influx of over 400,000 people fleeing state failure and civil war in Somalia, Ethiopia and Sudan, Kenya enacted new policies for refugees. As a result of security concerns, these policies included a humanitarian containment regime for those arriving, where refugees would be required to live in refugee camps close to the borders where they crossed (Betts 2013). It also included *prima facie* processing of refugees en-masse by the UNHCR rather than individual applications to the Kenyan authorities. In practice, this resulted in new camps emerging in remote areas of the country, including Kakuma, close to the border of what is now South Sudan, and Dadaab, near the Somalian border.

Kakuma refugee camp is located in Turkana county (Figure A1). This region is home to the Turkana people, whose traditional livelihoods are pastoral. Turkana county is sparsely populated and very poor: its population density is below one person per square kilometer, with a poverty rate of 94.3% in 2005, the worst of Kenya's 69 districts (KIHBS 2005). School attendance is also very low: 44% for primary school and less than 2% for secondary school, while the national rural averages stand at 78 and 16%, respectively. Households tend to depend upon livestock as their main source of livelihood (62%), with little participation in the wage labor or agricultural production markets (12%) (KIHBS 2005).

The refugee camp was established in 1991, when approximately 7,000 "lost boys" arrived in Lokichoggio – a town close to the Sudanese border, fleeing civil war in neighboring Sudan

and Ethiopia. In June of 1992, the camp was relocated to Kakuma Town, in the central division of Turkana county, where it has remained since. Prior to 1992, Kakuma Town had a population of less than 6,000. By October of 1993, the camp held 35,000 people (Ohta 2005), and is currently home to over 182,000 individuals. Sudanese and South Sudanese constitute the majority of the refugees, although there are also large groups of Somalis and Ethiopians. Figure 1 illustrates fluctuations in the camp population over time.

FIGURE 1 HERE.

Camps of this size and duration are representative of many refugee settings. In 2014 there were 7 camps worldwide with populations over 80,000 people, and a further 19 with populations between 40 and 80,000 (UNHCR 2015). Protracted displacement situations, in which 25,000 or more refugees of the same nationality have been in exile for five years or longer in a given asylum country, are increasingly common; there were 27 such situations in 1993, 38 in 2003, and 32 in 2015. The average length of such situations has increased from 9 to 27 years, and the current number of refugees in this category is 6.7 million, or 41 percent of all refugees (Sarzin 2017).

The policy of encampment legally restricts refugees from working outside of the camp. As a result, refugee households are entirely dependent upon food aid, external transfers, and jobs within the camp. In spite of this, the camp has a significant internal economy of goods and services produced inside of it, as well as a variety of public services provided by international organizations. Moreover, the demand generated by the refugee population is substantial. Oka (2014) estimates that refugees purchase between US$350,000 and US$400,000 worth of goods on a monthly basis in Kakuma camp.

Recent research on Kakuma shows that, far from being unwelcome guests, refugees are important contributors to local economic life. Sanghi et al. (2016) estimate that refugees add approximately 3% to the Gross Regional Product of Turkana. In a related study, we find that over the course of 20 years, refugee inflows to Kakuma have generated significant increases in economic activity and consumption for the Turkana households living near the camp (Alix-

Garcia et al. 2018). Given the reliance of the refugee community on remittances and the intimate connection between the refugee and host economies, the government shutdown of *hawala* transfers in April 2015 had the potential to send shocks throughout the region.

2.2 Hawala and the big shock to remittances

Remittances are a significant part of the Kakuma economy. The majority of the refugees in our survey reported having received a transfer in the last 12 months (61%)[3]. For transfer recipients, 54% of these transactions took place through informal services, such as *hawala*. Anecdotally, refugees noted that the shutdown of the *hawala* systems was detrimental to their ability to obtain cash. Indeed, 45% of refugees in our sample reported that the frequency of their transfers decreased either slightly or significantly after April 2015 (Table 1).

Hawala emerged in the 8th and 9th centuries in order to manage the demands of carrying money for long distance trade. Today, it is used in low-income countries where cultural norms against conventional banking are prevalent and transaction costs associated with money transfers can be prohibitively expensive[4]. In practice, the *hawala* system is comprised of a network of agents, called *hawaldeer*, who facilitate the transfer of money from a client to a recipient in another location. Person A begins by giving money to the *hawaldeer* 1. Person A creates a password and notifies *hawaldeer* 1 of the password he has chosen. He also shares the password with the recipient (person B), who will need it in order to retrieve the transfered funds. *Hawaldeer* 1 then calls one of his network members in the location where Person B lives, and instructs him to give Person B the money. *Hawaldeer* 1 tells *hawaldeer* 2 the password, who then calls Person B and asks for the password. On receipt of the correct password the money is handed over. This creates a promissory obligation between the *hawaldeers*, which is settled later. The transaction is premised on an Islamic honor system, and failure to meet promissory obligations will result in the agent being shunned

[3]We did not ask respondents from where they receive remittances. However, recent literature suggests that refugees receive remittances both from relatives and friends who stayed behind in the home country (Carlos Vargas-Silva 2016), as well as family members settled in developed countries (Savic et al. 2013).

[4]Conventional banks charge interest and for Muslims, usury is *haram* or sin.

from the network or in the case of Somalis, ex-communication from the clan. The system allows the *hawaldeer* and senders to operate outside of official exchange rates and, for the most part, financial regulations.

The *hawala* system in Kenya was shut down in response to attacks that were carried out by Al Shabaab on Garissa University College, leaving 148 people dead and 79 injured in March 2015[5]. The shutdown was therefore unanticipated by households in our sample, as well as by the researchers ourselves. As we prepared our survey instruments for a larger project on measuring the economic impact of refugee camps on the local community (Alix-Garcia et al. 2018), we included questions that would potentially capture the effect of the shutdown on both refugee and host communities. Survey questions on remittances and consumption did not explicitly mention the shutdown, but were rather anchored around the first two weeks of April (before the shutdown) and June (after the shutdown) 2015.

2.3 Hawala in Kakuma

Until April 8, 2015 a variety of transfer systems operated in Kakuma camp. These included formal systems, such as Moneygram, Western Union, and transfers from relatives through MPesa, as well as cash transported from Nairobi in suitcases. In addition, there were a small number of very active *hawala* brokerages. All of these were owned by Somalis, and most began in the mid-2000s. These dealers also operate other businesses, including but not limited to shops and wholesalers. They bring food items, non-food items, technology, communications,and other services in the Kakuma area. They also occasionally offer credit services, but only to Muslims.

At the time of our survey, there were five main *hawala* operators in the camp. Average

[5]The attacks, which provoked outrage in Kenya, followed earlier violence against civilians by the terrorist group in the Westgate Shopping Mall in Nairobi in September 2013 that resulted in 67 deaths. Concerns about lack of oversight of *hawala* money-sending agencies and fears that such money may be used for terrorist financing led to the publication of a list of 85 entities whom were alleged to have links to the Al-Qaeda affiliate, as well as asset freezes and the suspension of trading licenses for thirteen remittance companies. These actions were also taken due to fears that poor security may damage Kenya's tourist industry – a major source of foreign exchange revenue and the second largest sector of the economy after agriculture (Mshenga et al. 2010).

monthly transfers prior to April, as reported by the dealers themselves, are shown in Figure 2. Their reports are consistent with Oka's (2014) estimate of transfers into the camp of around US$200,000 per month. Note that if these reports are accurate, informal transfers through these brokers total over US$3 million per year. All of the *hawala* brokers reported that their transfers went to zero in response to the post-Garissa decree.

FIGURE 2 HERE.

While it is possible that *hawala* dealers were lying to interviewers, and in fact continued to operate discretely during the shutdown, it is unlikely. With only five operators in the refugee camp, the activities of these dealers would have been highly visible – Kakuma refugee camp remains under tight security due to growing concerns of burgeoning terrorist activities (Bi & Bwayoi 2013). Another concern is that perhaps *hawala* users substituted their remittance activities with other methods, such as formal money transfers or mobile money, during the shutdown. We believe that this is also unlikely due to the strict requirement that users of these platforms present government-issued identification, which would be difficult for most refugees to obtain on short notice.

2.4 Mechanisms

Our empirical analysis aims to understand both the impact of the shutdown on refugee consumption, as well as the impacts on the local population. In general terms, such a shock operates as a large, negative income effect, decreasing aggregate demand. In the short term, prices and wages are likely to decrease in response to decreases in demand. For refugees reliant solely on transfers, negative impacts may be large. This will also be the case for non-refugee households that are dependent upon purchases of goods and services by affected households.

Some households – for example, those whose incomes are unaffected by the shock – may actually benefit from the decrease in demand through price decreases. Households that are less engaged with labor or product markets – for example, Turkana herders that are largely

subsistence – may also benefit from the decrease in the prices of goods. Of course, these households may be unlikely to consume many of these goods in the first place. Under the assumption that a decrease in any individual household would be too small to affect prices, these effects should mostly work to reduce consumption among households that lose their transfers and among those who were dependent upon selling either their labor or goods in markets where refugees purchase.

3 Data

The data come from two sets of surveys that were implemented by the authors with support of the World Bank and in collaboration with the UNHCR in the summer of 2015. Using separate instruments, we surveyed both in Kakuma refugee camp and among the host population of Turkana county. The majority of the surveys were implemented in the refugee camp between June 9 and June 20, 2015 and in Turkana households both near to and far from the camp between June 12 and July 1. A portion of surveys for refugee households belonging to the Dinka ethnic group were conducted between June 22 and July 1, 2015, after the *hawala* networks reopened. Below we examine robustness of our estimates to the exclusion of this group. The Turkana household survey, therefore, includes observations on households that were interviewed after the *hawala* networks reopened. All of the Kakuma Town households were interviewed prior to the reopening, which means that if we use the more distant households farther from Kakuma as part of the counterfactual we are likely to understate impacts if it is the case that they benefited from the re-opening of remittance channels.

Slightly different instruments were used within the camp ("the refugee survey") and for households outside the camp ("the Turkana survey"). Both surveys included household demographic, income, and perception modules. Respondents were asked to report all income sources that they or anyone in the household earned or operated in the past year, in a

similar style to the income reporting used in the Living Standards and Measurements Survey (LSMS). Information on consumption was also collected from both refugees and Turkana, albeit in a limited fashion only intended to detect changes in purchases of indicator goods over the short term. The survey included whether or not a good was purchased and the amount purchased for the following goods: milk, meat, fish, rice, fruit, coffee, alcohol at home and outside of the home, tobacco, mirat, henna, incense, phone cards, clothing, soap, diapers, and makeup. Specifically, we asked respondents to recall consumption of these items in the first two weeks of April (which would have been before the shutdown) and in the two weeks prior to the survey (which, depending on the date of the survey, would have been anywhere from late May to early June 2015, after the shutdown). Recall accuracy may be a concern in our setting – we are asking households to remember what they purchased, sometimes more than a month ago. This may potentially reduce the precision in the estimation. However, this situation produces bias only if memory failure varies systematically between the groups affected by the remittance shutdown and those not[6].

Sampling for the refugee survey was proportional to the ethnic populations contained in the camp, with some oversampling of small populations. In total, we surveyed 170 households, across the following ethnic groups: 40 Somali, 50 Dinka, 11 Nuba, 20 Darfuri, 20 Congolese, and 20 Ethiopian[7]. Because there was no sample frame for the refugee population, we sampled in the following manner: first, we recruited and trained enumerators from each of the major ethnic groups in the camp[8]. This was necessary because ethnic tensions are high inside the camp, and therefore it was essential not to have enumerators

[6]If it is the case that those more affected by the remittance decrease are more likely to report that they had higher consumption previously, then this could drive our differential results. However, if this differential result is driven by reporting bias in the refugee sample, then it seems unlikely that we would also find the outcomes that we do among the Turkana tribe.

[7]Table B1 in the Appendix shows the number of households sampled and the number of individuals present in official camp statistics. All other refugee groups present in the camp that we did not sample (Burundians, Rwandans, etc.) represented less than 4 percent of total camp population.

[8]Each of the major ethnic groups in the camp has designated community leaders who work with UNHCR on various issues throughout the camp. To recruit enumerators, we asked community leaders to recommend 2 people from each of the major ethnic groups who had experience doing verbal translation in the camp and who could work with us for the duration of the project.

and interviewees with different ethnicities. Moreover, we assumed that households would feel more comfortable discussing sensitive information, such as consumption patterns and financial access, with someone from the same community. Enumerators were instructed to begin at the center of the community (for the most part, each group has a distinct spatial location). From the center, enumerators surveyed every fifth household until we reached our target sample size[9].

The sample frame used to randomly select households for the Turkana household survey was constructed from the Hunger Safety Net Programme (HSNP) registration dataset (HSNP 2015)[10]. The HSNP is a cash transfer program operated by the Kenyan government with the intention of supporting the poorest households in Turkana, Mandera, Wajir, and Marsabit counties. The registration dataset censused all households in these four counties between October 2012 and June 2013. Over 140,000 households were registered in Turkana county. We sought to sample enough households around Kakuma and in the vicinity of two counterfactual cities in order to be able to detect a 0.2 standard deviation change in income. Counterfactual cities were selected according to two criteria: towns that had a similar size to Kakuma in 1989, and were on the Kitale-Juba highway. Within Turkana province, there are 5 market towns that had a similar size to Kakuma in 1989 (population 5,887), according to the 1989 census data[11]. We selected 2 counterfactual towns, Lorugum and Lokichar, for the final sample, and a stratified sample of villages were selected from distance rings of 2, 2-8, and 8-10 kilometers from the town center. These towns are shown in Figure A4. The final sample included 330 households across 14 villages around Kakuma, Lokichar, and Lorugum.

[9]When enumerators approached households in the refugee camp, they introduced themselves as representatives of the World Bank who were interested in understanding the impacts of the refugee camp on local household livelihoods.

[10]The HSNP is still in operation, but we do not examine it directly in our study. At the time of our survey in 2015 the program was just being rolled out and many Turkana households had not yet received their registration cards.

[11]These are: Lokichar (pop 4,887), Lokori (pop 5,590), Kangatet (pop 5,590), and Lokwal Kalokol (pop 6,842). However, because Lokwa is found off of the main highway, and Kangatet is very close to Lokori and somewhat to the east of the main highway, we eliminated these from consideration. Unfortunately, security challenges made it impossible to arrive at Lokori during the time of our fieldwork. Our Turkana and UNHCR colleagues suggested the town of Lorugum, located on the main highway west of Lodwar en route to Uganda, which is halfway between Lokichar and Kakuma, was a reasonable comparison for Kakuma in the late 1980s.

The distribution of households in each subsample is shown in Table B2 of the Appendix. In our empirical exercises, data is weighted so that results are representative of the population.

4 Impacts of the shutdown on refugee households

We first examine impacts on refugee households and then on the neighboring Turkana people. For the refugees, some of our analysis is comprised of simple summary statistics, where the key source of variation in the data is the comparison between before and after the shutdown. Among the refugees, we will also study whether there was heterogeneity in response across households that might be classified as remittance-dependent relative to those that have never received transfers. To explore the mechanisms discussed in section 2.4, we also examine heterogeneity by sources of income.

Refugee households have an average size of six members, with the majority of them of productive age (16 to 60). 64% of households have at least one member with secondary education, which is significantly higher than the local Turkana population. 32 percent of households mention at least one member who is earning a wage, where the most common professions are teacher, medical, or NGO worker (Table 1), and wage-earning households get the majority of their cash income from these jobs. It bears mentioning that wages in these sectors are unlikely to be affected by changes in refugee transfers, since they are dependent upon international mechanisms. Income from animals comes exclusively from the sale of poultry, rather than livestock, and in general comprises a small part of household cash earnings. Many households (around 54 percent) declare having a small business, and dependence upon these businesses is high but varies significantly[12].

The dependence on remittances is clear – 61 percent of households received transfers in the past year, and of these, 54 percent use informal transfer networks, such as *hawala*. Moreover, the role of upon transfers is large; on average, cash transfers comprise half of

[12] "Small businesses" are immensely heterogeneous, ranging from selling firewood to running a restaurant, and many services in between.

the income of families that receive them. Within the past year, transfers were received on average slightly over six times, and 43 percent of remittance recipients report a decrease in remittance quantity or frequency since the remittance shutdown.

TABLE 1 HERE.

We examine changes in the probability of purchasing goods and the quantity consumed for goods purchased by more than 50 percent of refugees[13]. The summary statistics for types of goods purchased during the first week of April are contained in appendix Table B3. When we measure changes in the probability of consuming goods and the amount purchased in the early weeks of April and at the time of the survey in June 2015, the data show larger adjustments in the amount of particular goods consumed than in the probability of consuming key goods (Table 2). Reductions in the quantity of sugar (7.9%), meat (5.7%), and phone cards (6.3%) purchased are not statistically different from zero.

As discussed above, we could observe a zero result if some households decrease purchasing while others, perhaps benefiting from price decreases, increase theirs. We test to see if results are substantially different if we exclude households surveyed after hawala officially reopened in the refugee camp (see Table B4). Here there is a similar pattern: no statistically significant differences, but qualitative decreases in the amount sugar, meat, and phone cards purchased.

There is no counterfactual to which to compare this change, so it is important to understand the context in which it occurred. Historically over the period from April to June, rainfall tends to decrease in Turkana, and this was also true in 2015. However, the refugee population should be less affected by this type of weather variation, since they do not produce agricultural or pastoral goods directly. The population of the camp was growing over this period – for every month of 2015, around 33,000 new refugees were added. Holding food aid constant, the increase in refugee population could increase prices of local goods. However, we do know that rations were cut during this period: starting on June 15, the amount of

[13]Some goods are particular to specific refugee groups. For instance, henna is consumed almost exclusively by Somali refugees. In addition, some goods, such as incense, diapers, and makeup are rarely consumed. We therefore restrict the analysis to goods that are commonly consumed across all refugee groups in order to detect meaningful changes in consumption.

cereals contained in the rations were decreased, resulting in a reduction of the total calories in the ratios of 30% (World Food Programme 2015). This ration decrease occurred during our last week of refugee surveying and right before the remittance shutdown was lifted. The fact that we detect no overall negative effect on consumption of our indicator goods suggests that the reduction in rations did not reduce the purchasing power of refugees significantly, did not affect a large enough portion of our sample to be detectable, or that there is a delay in the impact of reducing rations on purchasing power.

Regardless of changes in rainfall, population, and rations, these trends should not influence our estimates of heterogenous effects across groups unless certain groups were impacted differentially by these trends. With this in mind, it bears mentioning that Ramadan started on June 18, 2015, which primarily affects those who belong to ethnic groups that are traditionally Muslim – i.e., Somali, Nuba, or Darfuri ethnic groups. These are also the groups who are most likely to have been impacted by the *hawala* shutdown. However, to the extent that households tend to consume more food and luxury goods during the Ramadan period (Gharbi et al. 2003, Hellman 2008), we are likely to understate impacts. Furthermore, if remittance patterns change during Ramadan, they are more likely to increase close to Eid al Fitr (the end of Ramandan), when people are buying new clothes and food for the holiday. In 2015, Eid al Fitr fell in mid-July after the remittance shutdown ended.

A second potential confounder is heterogeneous shocks to remittance senders that more strongly affect the Somali, Nuba, or Darfuri ethnic groups. Approximately 40% of our remittance recipients report receiving transfers monthly over the past year, suggesting that seasonality does not affect frequency (though it may affect amounts). Research on remittances sent to Sudanese refugees in Cairo (Jacobsen et al. 2014) suggests that 59% of these come from inside of Sudan and the rest from other countries (USA, Australia, Canada, Israel, and Saudi Arabia). While distant international source are unlikely to have shocks correlated with the remittance shutdown, we leave open the possibility that senders from Sudan might be affected by regional changes. We are unable to hypothesize about the direction of the

potential bias.

TABLE 2 HERE.

In order to better understand possible impacts, we explore how transfer recipients differ from those who don't receive transfers, and then if *hawala* users are unique within this population (Table 3). The main differences between those who have transfers and those who do not is that those receiving transfers tend to be wealthier and have lived, on average, three years longer in the camp. The former effect seems to be due to the transfers themselves – there are no significant differences in income without transfers between those receiving transfers and those not receiving them. Non-recipients are much more likely to own an enterprise or to sell animals. They are also more likely to belong to the group of households who might use *hawala* transfers (those who belong to ethnic groups that are traditionally Islamic – i.e., Somali, Nuba, or Darfuri households).

The second panel in Table 3 shows that these same kind of households, when they do receive transfers, are more likely to have acquired them through *hawala* sources. Among transfer recipients, hawala users have been in the camp on average the same amount of time as non-hawala users – about 9 years. They are less likely to earn money by selling animals, but are otherwise similar to non-hawala users in terms of household size, education, and employment.

TABLE 3 HERE.

4.1 Estimations

We measure variation in the magnitude of the changes in the amount purchased of goods consumed (c_{ht}) by more than 50 percent of the refugees. The estimator uses fixed effects at the household level (γ_h) and a dummy variable equal to one for the month of June ($June_t$). We examine heterogeneity in outcomes by income source and if the household had received a hawala transfer within the past 12 months. As a more exogenous proxy for hawala, we also estimate differential outcomes according to whether the household speaks one of the languages associated with the finance shutdown (i.e., Somali, Nuba, or Darfuri). These heterogeneity interaction variables are denoted with H_h. We also control for households that generally receive transfers by including an interaction term between receiving transfers and June ($June_t x T_h$). The estimation equation is:

$$c_{ht} = \beta_0 + \beta_1 June_t + \beta_2 June_t x H_h + \beta_3 June_t x T_h + \gamma_h + \mu_{ht} \quad (1)$$

Equations are weighted to make estimations representative of the population, and standard errors are clustered at the household level. The estimation therefore compares consumption trends between April and June across all households, controlling for baseline characteristics and allowing for differential trends among transfer recipients. These correlations are contained in Table 4. For the change in amount purchased, we only include households who ever purchased any of the good in question. This allows us to differentiate between zero change in the actual amount and simply having zero probability of purchasing. Because the changes in purchase probability shown in Table 2 were so small, we do not examine these separately in a regression context.

Panel A shows statistically significant and negative impacts on the amount of meat, milk, and phone cards purchased by Somali, Nuba, or Darfuri-speaking households in June, relative to households speaking other languages. The point estimates are also negative for sugar and rice, though not statistically significant. The marginal effects vary from 19 percent for phone

cards to 25 percent for meat[14]. The fact that households not speaking these languages show increases in their consumption of these goods during the month of June suggests that there may be decreases in prices that induce greater purchasing of these goods for those less affected by the remittance shutdown. It is also interesting that this term is smaller and not statistically significant for phone cards, whose prices are less likely to be sensitive to local demand.

Panel B shows the difference in consumption quantities for those who had received hawala transfers in the past and controls for differential trends for those who ever received transfers at all. Although having received hawala before is more likely to be correlated with unobservable trends, it is telling that these results are consistent with the impacts measured using the more exogenous language-based results in Panel A. We observe negative and statistically significant decreases in the consumption of meat and milk of 33 and 26 percent, respectively. There is also a positive and statistically significant impact on consumption of meat and milk for those having received any kind of transfer in the past – again consistent with price effects.

We also conduct estimations including interactions between time and income source. These are intended to measure whether or not there were decreases in demand for wage labor or purchasing from businesses that might have harmed non-hawala households. There are no detectable differences between households owning a business or having wage income (Panels A and B, appendix table B6) and other households in the sample, controlling for trends of hawala and transfer-receiving households. According to our framework, the coefficient on the interaction between income source and time includes both the effect of decreases in prices (as consumers of these goods), and potentially a decrease in income (due to decreased purchasing of goods they might sell). These two forces would have countervailing effects.

As a robustness check, we include households that did not consume these products in either period (see appendix table B5). To properly account for these zeros, one might want to estimate a tobit bounded at zero. However, a tobit does not allow for household fixed

[14]The marginal effect for a binary variable with a log dependent variable is $exp(.175) - 1 \approx .19$.

effects. Therefore, as a robustness check, we include all the zero purchases and re-estimate the equation using household fixed effects. The results are consistent, although the effect on phone card purchases in panel A is no longer statistically significant. There may be some bias introduced into the estimation by not accounting for the censoring of the data.

We also run these same estimations excluding refugees surveyed in the post-shutdown period (Table B4). The results are qualitatively similar, though statistical significance is only consistent for meat consumption. This decrease in precision may result from the fact that leaving out this subgroup decreases the number of observations substantially, thus increasing the noise in the estimates. This can also be seen by comparing the minimum detectable effects across the tables with and without the latest observations – they increase substantially. As a further robustness check, we examine the coefficients estimated using randomized assignment of the key treatment variables (Sánchez de la Sierra 2019), and find that the meat and milk results remain statistically significant (see Figures A2 and A3).

This combination of results supports an interpretation that the price effects of the transfer decrease may have allowed some refugees to increase purchasing of particular goods while those more strongly affected by the remittance shutdown purchased less. Although the magnitudes of the decreases seem qualitatively larger than those of the increase, the average impacts suggest that there was not a very large decrease in purchasing by the overall camp population. However, it is still possible that the shock may have spilled over into the host population, either because prices decreased for the goods they were selling, or because of the level of market connection between those changing their purchasing habits and households outside of the camp boundaries. The next section examines consumption changes within the non-refugee population.

TABLE 4 HERE.

5 Impacts of the shutdown on non-refugees

5.1 Estimation strategy

This section calculates the effects of the remittance shut down on consumption of the Turkana population. Our basic strategy compares changes in consumption purchases of household h in village v before (the first week of April) and after (in June) the shutdown, near to and far from the camp. The main outcomes are denoted (c_{hvt}), and include both the probability of purchase as well as the amount purchased of particular goods. This differs slightly from our approach with the refugee data, simply because there is much more variation in probability of purchase among the Turkana. We only consider those goods that have more than 30 percent of the sample purchasing in April. We use this lower threshold than for the refugees, because it allows us to examine at least three products rather than two: milk, tea, and sugar. We estimate the impact of being affected by the change in remittances using a fixed effects model, as we did for the refugees in the previous section:

$$c_{hvt} = \theta + \alpha_0 June_t + \alpha_1 Kakuma_v x June_t + \alpha_h Kakuma_v x I_h x June_t + X_{ht}\beta + \gamma_h + \epsilon_{hvt} \quad (2)$$

The treatment variable of interest is an indicator if the household falls into a village in the Kakuma sublocation in June ($Kakuma_v x June_t$). We examine heterogeneity in impact by different income sources ($Kakuma_v x I_h x June_t$) controlling for assets in 2005 interacted with the time dummy. Standard errors are clustered at the level of the 14 villages within which we sampled (X_{ht}). In addition, households are weighted to account for the stratification of the sample by distance from town center. The estimation is a spatial difference in difference analysis. The identifying assumption is that in the absence of the shutdown, the trends in the two types of households over the period April-June 2015 would have been parallel. In a companion paper to this one (Alix-Garcia et al. 2018), we show that living near that camp

has, over the long term, been beneficial for Turkana households over the period from 1992 to 2013. This belies the assertion that the distant villages provide a good comparison in levels of consumption. However, they may still provide useful counterfactual information on trends. We will examine this possibility below.

5.2 Summary statistics

There are a large number of Turkana households (127) that declared no sources of cash income at all in the last year (Table 5). This is quite distinct from the refugee households. The most common source of income is having an "enterprise." By far the most prevalent business is selling firewood or charcoal (79% of business-owning households do this), followed by other types of sales (snacks, water, etc.). Unfortunately, our sample size is insufficient to test for heterogeneity across enterprise type. Households with these enterprises are highly dependent upon them for cash (76 percent of income). Average income per capita is much lower than the refugee households (17,392 Ksh versus 36,292 Ksh for refugees), although the average for those with positive cash income is slightly higher at 23,544 Ksh. Very few households farm, and all those that do live near Kakuma. The few households receiving wages depend heavily upon them (over 80 percent of income). Very few Turkana stated that they received transfers at all, and the main mechanism through which they received them was MPesa (mobile money). Although the sample is extremely small, it appears that transfers to Turkana may also have been affected by the Hawala shutdown – 14 percent of those receiving transfers report them to have decreased between April and June of 2015 (Table 5).

TABLE 5 HERE.

We also requested households tell us about consumption behavior in April and June, using a list of products quite similar to those in the refugee survey[15]. In the April consumption

[15]The full list of products included sugar, water, tea, milk, meat, fish, coffee, home produced alcohol purchased alcohol, tobacco, khat, henna, incense, phone cards, and clothing. Less than one percent of Turkana households purchased khat, henna, coffee, or alcohol outside of the home in April, so these items

variables, two comparisons are notable (Table B8). First, the Turkana purchase many fewer consumption items than the refugees – the refugees on average bought almost five different items of those listed in April, while the Turkana purchased less than two. This is further evidence, supported by ample anecdotes, that they are poorer than the refugees. Second, purchases are marginally higher for some items in the Kakuma subsample. These include water, fish, tobacco, and clothing. This does not translate into significantly larger differences in number of food or luxury items, but is suggestive of slightly higher consumption in Kakuma.

We also note that Kakuma households have significantly higher cash income per capita, although the significance of the difference does not persist once we remove transfers (Table 6). The higher consumption level of households closer to Kakuma does not necessarily invalidate the identification strategy if it does not translate into differential trends. In the interest of trying to assess whether or not the parallel trend assumption holds, we also present the change in assets for households near and far from Kakuma between 2005 and the survey date in June of 2015. For this to be a useful comparison, we must assume that people did not sell off assets in June in response to the remittance shock in April. While the 2005-2015 trend in assets is not significantly different across the two subsamples, it is slightly higher in Kakuma. If this trend were to persist, then we would likely underestimate any decrease in consumption or assets caused by the remittance shock.

TABLE 6 HERE.

5.3 Estimations

The June indicator variable represents the temporal change in the mean value of the dependent variable in non-Kakuma households. It is positive and significant for the probability of purchasing all goods. However, these probabilities are lower in the villages in and around Kakuma Town relative to the other villages much farther away. The differences are statis-

are not included in the table.

tically significant for the probability of purchasing sugar and tea (Table 7, Panel A). The magnitudes of the impacts are a 12 percent decrease in the probability of purchasing sugar relative to the baseline mean, and a 15 percent decrease for tea. They are negative for purchasing milk, but not statistically different from zero. The results are robust to a wild bootstrap cluster routine to account for the small number of clusters (Cameron et al. 2008), which are shown in brackets for the interaction terms.

Our discussion of the possible mechanisms (section 2.4) suggests that households that were less dependent on wage labor or selling products to the camp may have been somewhat protected from the transfer shock. To explore this possibility, we include an interaction term that is equal to one if a household has a wage laborer, owns a small business, or has had income from animal husbandry (Table 7, Panels B, C, D).

For wage-earning households, the interaction term between Kakuma and having a wage job in Kakuma is negative and statistically significant for the probability of purchasing sugar, and for the amount of tea purchased. Business-owning Turkana households seem to have decreased the amount of sugar that they purchase, but not the probability of purchasing it. Finally, Kakuma households selling animals suffer a larger decrease in the probability of purchasing sugar and tea. The fact that Kakuma households adjust by ceasing to purchase these goods altogether rather than reducing the amount that they consume is yet another testament to their extreme poverty. They have much less margin for reduction; for example, while refugees reported purchasing on average 7 kg of sugar in April, the average Turkana purchase of sugar during this same month was 1.8.

TABLE 7 HERE.

We conducted a test of whether or not distance to the camp in kilometers gave similar results to the binary treatment effect (see online Appendix Table B9.) The point estimates are similar in significance and direction of effect, but somewhat difficult to interpret. Furthermore, based on our previous work, we believe that the impact of the camp on local consumption is likely to be non-linear. There are a substantial number of Turkana house-

holds that do not ever purchase the goods that we examine here – this is evident in the large decrease in number of observations between the first three and the second three columns of Table 7. We interpret these columns as extensive versus intensive adjustments in consumption. In order to assuage concerns that these zeros might contain information beyond what is in columns (1)-(3), we estimated the fixed effects model again including zeros for the amounts consumed for columns (4)-(6). These results are contained in appendix Table B10. We observe a similar pattern of negative effects for the interaction between wage work and living Kakuma, though these are not statistically significant. We also observe that households with income from animals have a marginally statistically significant decrease in sugar consumption, and a significant increase in milk consumption in response to the camp. The latter might be explained by a significant surplus of milk on the market due to decreased refugee demand. However, we are not confident in this result because 70% of the data are zeros for the amount of milk purchased.

These results together suggest that although the Turkana do not depend heavily on cash transfers, they are linked with the cash economy generated by the refugee transfers. The data show larger decreases in the probability of purchasing luxury food items by Turkana households near the camp between April and June of 2015. This illustrates the dependence of the local economy on refugee cash transfers, as well as the negative impact of the refugee transfer network shutdown on both refugees and the Turkana. Households that earn income from selling animals are more affected by the remittance shock. Because we do not observe a decrease in the probability or amount of meat purchased on average by the refugees, it is likely that this effect is generated by decreases in prices for animals that the Turkana are selling. The magnitude of these effects on the probability of purchase is quite large: a decrease of 18.5 percentage points (27 percent) for sugar and 22.6 percentage points (37 percent) for tea.

6 Conclusion

We have examined the impact of a remittance shutdown on the consumption of refugees and the host community surrounding one of the largest and most persistent refugee camps in the world – Kakuma camp in northern Kenya. Our data show that while overall purchasing of the food items that we were able to measure was not affected by the shutdown, there were large decreases in the consumption of milk, meat, and phone cards by households most likely to use Islamic transfer schemes. The reason why the average effect of the shutdown was not measurable seems to be that price decreases in these same goods allowed less affected households to increase the amounts that they purchased. We also found that the Turkana households living near the refugee camps were less likely to purchase tea and sugar after the shutdown, an impact that was larger for those households engaged in the sale of animals.

Readers may be concerned that refugees could have quickly found alternative means of transferring money, or perhaps might not have adjusted consumption because they anticipated that the shutdown would be temporary. In the first case, we note that it is unlikely that refugees could switch to more formal transfer institutions during the time frame that we analyze – these institutions require significant documentation that is time-consuming to obtain. Furthermore, even if refugees did find alternative transfer routes, and/or anticipated the shutdown would be temporary, our estimates would be a lower bound on the potential impacts of the remittance disruption.

These results are important for two reasons. First, they confirm a growing consensus in the literature that refugees can have positive effects on host communities through their market interactions. However, these same interactions can also increase some of the risk for host households that are integrated into them. These results are also important for the design of refugee policy in a variety of settings. Policies that directly reduce the ability of refugees to purchase goods are likely to also hurt the host populations that have grown accustomed to living near the camps. This is a phenomenon that would extend to other sorts of policies that reduce refugee purchasing power, including reducing food aid rations. Conversely, policies

supporting refugee's ability to purchase goods – like allocating cash transfers rather than food in kind – are likely to have positive repercussions on local populations.

Finally, this paper also gives insight into the perceived delicate balance between security concerns and economic opportunities. The remittance shutdown was at least in part a response to fears that poor security may damage Kenya's tourist industry – a major source of foreign exchange revenue and the second largest earner for its economy after the agriculture sector. These concerns suggest that *hawala* networks have a detrimental effect on Kenya's well-being, yet at the same time downplay the positive aspects of these networks and the potential they have to stimulate local economies. This is especially the case for areas that host refugees, where remittances provide an important source of revenue for the local economy.

Our results underscore the tight link between refugee and host economies, and the spillover effects that remittances create in general. As the climate around refugee policy becomes increasingly sensitive, it is important to consider the multiplier effects that policy changes create for refugee and host communities alike.

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7 Tables

Table 1: Transfers, demographics, and income sources – refugees

	Mean	SD	Obs
Transfers			
Received transfer in past 12 months	0.612	0.489	170
Uses hawala transfers	0.538	0.501	104
Number of transfers/year	6.260	4.976	104
Quantity of last transfer, KSH	19663.894	97752.938	104
Transfers have decreased since April	0.452	0.500	104
Household demographics			
Number of current household members	6.176	3.191	170
Number current members age 5 or less	0.788	1.022	170
Number of current members ages 6 to 15	1.741	1.950	170
Number of current members ages 16 to 60	3.453	2.018	170
Number of current members older than 60	0.071	0.279	170
Household head with no education	0.465	0.500	170
Member with secondary education	0.641	0.481	170
Household economic activities			
Cash income per capita	36292.011	79996.563	170
Hh with wage	0.318	0.467	170
Hh employed NGO	0.071	0.257	170
Household has enterprise	0.582	0.495	170
Household sells animals	0.259	0.439	170
% income animal sales (if >0)	5.512	17.179	35
% income business (if >0)	58.499	34.884	92
% income wages (if >0)	63.882	28.742	51
% income transfers (if >0)	51.823	37.758	104

Reported means are for the sample; they are not meant to represent population means.

Table 2: Changes in consumption between April and June, 2015 – refugees

	April	June	p-value
Purchase sugar (0/1)	0.97	0.96	0.74
Purchase tea (0/1)	0.92	0.92	0.93
Purchase milk (0/1)	0.60	0.58	0.83
Purchase meat (0/1)	0.80	0.83	0.53
Purchase rice (0/1)	0.65	0.66	0.92
Purchase phone cards (0/1)	0.93	0.92	0.68
Kg sugar	7.03	6.47	0.65
Kg tea	0.73	0.76	0.87
Kg milk	1.28	1.43	0.35
Kg meat	3.36	3.16	0.77
Kg rice	8.44	8.89	0.80
KSH phone cards	289.10	274.69	0.84

Means and p-values are calculated using sampling weights, and so are representative of the population. Tests are two-sided. There are 170 observations for all of the probabilities of purchasing, but the observations vary for the amounts.

Table 3: How different are transfer recipients?

	(1)	(2)	(3)	(4)	(5)
	Has transfers	No transfers	P-value diff	Obs (1)	Obs (2)
Interviewed in Somali, Nuba, or Darfuri	0.327	0.561	0.002***	104	66
Number of current household members	6.327	5.939	0.442	104	66
Household head with no education	0.510	0.394	0.142	104	66
Member with secondary education	0.644	0.636	0.918	104	66
Cash income per capita	45,757.519	21,376.665	0.053*	104	66
Cash income per capita (w/o transfers)	28,270.467	21,376.665	0.503	104	66
Years since first arrival in camp	9.471	6.246	0.000***	102	65
Hh with wage	0.327	0.303	0.746	104	66
Hh employed NGO	0.058	0.091	0.413	104	66
Household has enterprise	0.481	0.742	0.001***	104	66
Household sells animals	0.269	0.242	0.699	104	66
% income animal sales (if >0)	6.659	0.926	0.438	28	7
% income business (if >0)	44.956	76.104	0.000***	52	40
% income wages (if >0)	60.941	68.439	0.368	31	20
	Of those who had transfers before April				
	Hawala transfers	No hawala transfers	P-value diff	Obs (1)	Obs (2)
Interviewed in Somali, Nuba, or Darfuri	0.482	0.146	0.000***	56	48
Number of current household members	6.071	6.625	0.400	56	48
Household head with no education	0.446	0.583	0.167	56	48
Member with secondary education	0.679	0.604	0.434	56	48
Cash income per capita	54,208.957	35,897.509	0.350	56	48
Cash income per capita (w/o transfers)	32,153.964	23,739.722	0.598	56	48
Years since first arrival in camp	9.873	9.000	0.476	55	47
Number of transfers/year	6.125	6.417	0.767	56	48
Transfers have decreased since April	0.571	0.313	0.008***	56	48
Hh with wage	0.286	0.375	0.338	56	48
Hh employed NGO	0.054	0.063	0.847	56	48
Household has enterprise	0.500	0.458	0.675	56	48
Household sells animals	0.161	0.396	0.007***	56	48
% income animal sales (if >0)	13.158	3.580	0.222	9	19
% income business (if >0)	48.173	41.204	0.410	28	24
% income wages (if >0)	63.112	59.373	0.703	13	18

Table 4: Correlations between income sources and consumption amounts – refugees

	IHS(amount of...)					
	Sugar	Tea	Milk	Meat	Rice	Phone
Panel A: Impact on Muslim-language households						
Ever receives transfers x June	0.146*	0.072	0.050	-0.011	-0.078	-0.007
	(0.078)	(0.044)	(0.070)	(0.056)	(0.056)	(0.071)
Islamic language x June	-0.059	0.040	-0.176**	-0.229***	-0.093	-0.177**
	(0.083)	(0.044)	(0.071)	(0.058)	(0.063)	(0.076)
June	-0.092	-0.053	0.130*	0.140**	0.129**	0.064
	(0.075)	(0.046)	(0.078)	(0.059)	(0.062)	(0.066)
MDE	0.231	0.124	0.199	0.162	0.177	0.214
Panel B: Impact of hawala *in past*						
Ever receives transfers x June	0.240**	0.042	0.277**	0.193***	0.048	0.059
	(0.096)	(0.032)	(0.108)	(0.066)	(0.105)	(0.108)
Hawala x June	-0.146	0.030	-0.294**	-0.229***	-0.145	-0.019
	(0.115)	(0.041)	(0.113)	(0.076)	(0.103)	(0.119)
June	-0.129***	-0.026	0.016	-0.011	0.053	-0.053
	(0.044)	(0.024)	(0.049)	(0.041)	(0.042)	(0.052)
Observations	334	316	192	288	226	316
MDE	0.321	0.116	0.316	0.212	0.287	0.333
Mean dep. var. April	1.601	0.550	0.779	1.108	1.834	5.122

Fixed effects estimation with cluster robust standard errors in parentheses. All estimations include a dummy variable for the month of June. Panel B. also includes interaction terms for if the household ever received transfers and June. We define Muslim languages as Somali, Nuba, or Darfuri. Estimates use sampling weights. MDE standards for minimum detectable effect. In Panel A., this is calculated for the interaction between Muslim and June, and in Panel B., between hawala and June.

Table 5: Transfers, demographics, and income sources – Turkana households

	Mean	SD	Obs
Transfers			
Received transfer in past 12 months	0.103	0.304	330
Uses informal transfers	0.029	0.171	34
Amount of last transfer, KSH	4,279.500	6,788.917	34
Transfers have decreased since April	0.147	0.359	34
Household Demographics			
Number of current household members	4.727	1.984	330
Number current members age 5 or less	0.570	0.891	330
Number of current members ages 6 to 15	1.352	1.363	330
Number of current members ages 16 to 60	2.561	1.372	330
Number of current members older than 60	0.233	0.502	330
Household head with no education	0.730	0.444	330
Member with secondary education	0.276	0.448	330
Income per capita	17,392.174	55,343.126	330
Household Economic Activities			
Household has wage earner	0.107	0.310	326
Household has enterprise	0.397	0.490	330
Household sells animals	0.194	0.396	330
% income animal sales (if >0)	59.161	42.873	63
% income farming (if >0)	47.720	43.375	20
% income business (if >0)	76.017	46.569	131
% income wages (if >0)	80.304	20.725	34
% income transfers (if >0)	45.192	31.903	33

Table 6: Summary Statistics – Turkana households

	Kakuma	Non-Kakuma	P-value diff	Obs (1)	Obs (2)
Income per capita	21,504.899	15,307.643	0.831	111	219
Income per capita less transfers	15,400.017	14,608.986	0.557	111	219
Number of assets, 2005	1.009	0.858	0.907	111	219
Change assets 2005-2015	0.117	0.082	0.663	111	219

The table shows mean values for non-refugee households in the Kakuma and non-Kakuma columns.

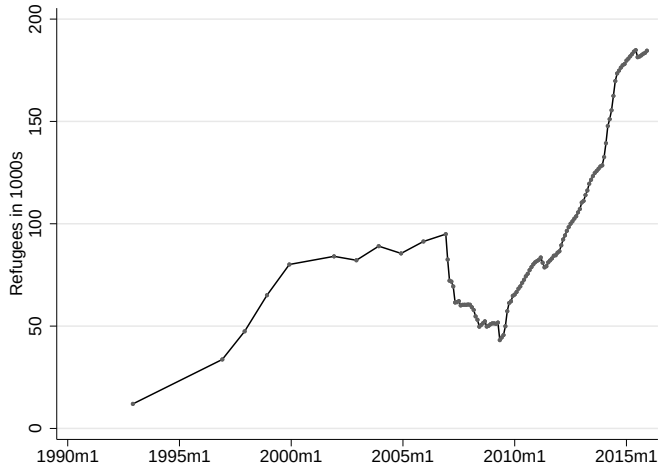
Table 7: Consumption change regressions, Turkana survey

	If purchased			IHS(Amt. purchased)		
	Sugar	Tea	Milk	Sugar	Tea	Milk
Panel A: Simple effect						
Kakuma x June	-0.106**	-0.144*	-0.043	0.069	0.025	-0.120
	(0.047)	(0.075)	(0.060)	(0.053)	(0.033)	(0.071)
	[-0.19, -0.02]	[-0.28, -0.01]	[-0.15, 0.07]	[-0.02, 0.17]	[-0.03, 0.08]	[-0.24, -.00]
June	0.360***	0.337***	0.110**	-0.223***	-0.050	0.014
	(0.045)	(0.038)	(0.044)	(0.044)	(0.034)	(0.024)
Panel B: Has wage income						
Kakuma x June	-0.081	-0.143*	-0.054	0.051	0.045	-0.114
	(0.049)	(0.078)	(0.044)	(0.056)	(0.034)	(0.072)
	[-0.17, 0.01]	[-0.28, -0.01]	[-0.13, 0.03]	[-0.05, 0.16]	[-0.01, 0.10]	[-0.24, 0.02]
Kakuma x has	-0.221***	-0.024	0.059	0.172	-0.174***	-0.031
wage x June	(0.063)	(0.088)	(0.162)	(0.145)	(0.034)	(0.267)
	[-0.33, -0.11]	[-0.19, 0.14]	[-0.21, 0.35]	[-0.10, 0.44]	[-0.23, -0.11]	[-0.52, 0.46]
June	0.339***	0.335***	0.115***	-0.209***	-0.068*	0.011
	(0.048)	(0.039)	(0.029)	(0.035)	(0.035)	(0.043)
Panel C: Has enterprise income						
Kakuma x June	-0.138**	-0.128	-0.104**	0.179*	0.130	-0.128
	(0.056)	(0.073)	(0.038)	(0.088)	(0.100)	(0.092)
	[-0.23, -0.04]	[-0.26, -0.01]	[-0.18, -0.04]	[0.02, 0.35]	[-0.03, 0.28]	[-0.29, 0.02]
Kakuma x has	0.088	-0.009	0.112	-0.191**	-0.147	-0.019
business x June	(0.071)	(0.128)	(0.078)	(0.077)	(0.103)	(0.085)
	[-0.03, 0.22]	[-0.24, 0.22]	[-0.03, 0.25]	[-0.34, -0.04]	[-0.31, 0.02]	[-0.18, 0.14]
June	0.282***	0.288***	0.107**	-0.287***	-0.159	0.053
	(0.051)	(0.066)	(0.044)	(0.081)	(0.098)	(0.055)
Panel D: Has income from selling animals						
Kakuma x June	-0.028	-0.047	-0.069	0.030	-0.019	-0.191*
	(0.068)	(0.102)	(0.079)	(0.072)	(0.027)	(0.086)
	[-0.15, 0.10]	[-0.22, 0.14]	[-0.20, 0.08]	[-0.09, 0.15]	[-0.07, 0.03]	[-0.35, -0.04]
Kakuma x animal	-0.185**	-0.226***	0.068	0.099	0.122	0.300*
income x June	(0.067)	(0.070)	(0.063)	(0.110)	(0.069)	(0.136)
	[-0.31, -0.07]	[-0.35, -0.10]	[-0.05, 0.18]	[-0.10, 0.30]	[0.01, 0.24]	[0.05, 0.56]
June	0.310***	0.280***	0.139**	-0.210**	-0.025	0.072**
	(0.053)	(0.045)	(0.054)	(0.070)	(0.027)	(0.029)
Observations	660	660	660	510	473	228
Mean dep. var. non-Kakuma April	0.680	0.607	0.297	1.265	0.181	0.561

Regressions include households weights as well as interactions between has wage and June in Panel B, has business and June in Panel C, and has animal income and June in Panel D. All estimations include an interaction between June and assets in 2005. Clustered standard errors in parentheses, bootstrapped clustered standard errors in []. * p < .10, ** p< .05, *** p<.01. The mean of the dependent variable is for non-Kakuma households in April.

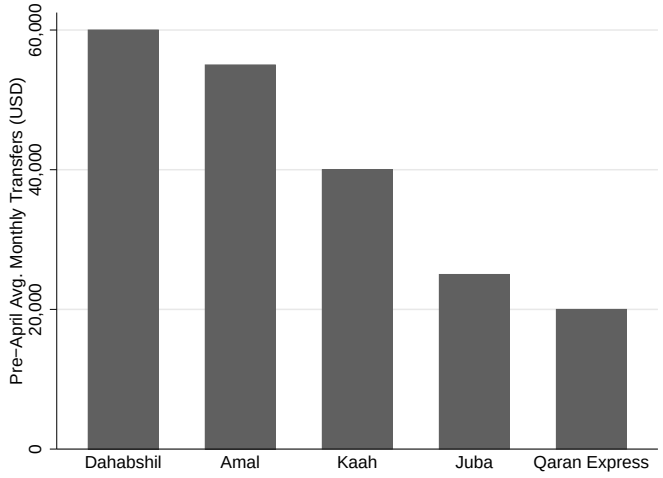
8 Figures

Figure 1: Number of refugees in Kakuma has increased substantially since 1992



The figure shows monthly counts of refugees in Kakuma camp, collected by the UNHCR. "m1" indicates the first month of the year.

Figure 2: Average monthly transfers through *hawala* networks, pre-shut down



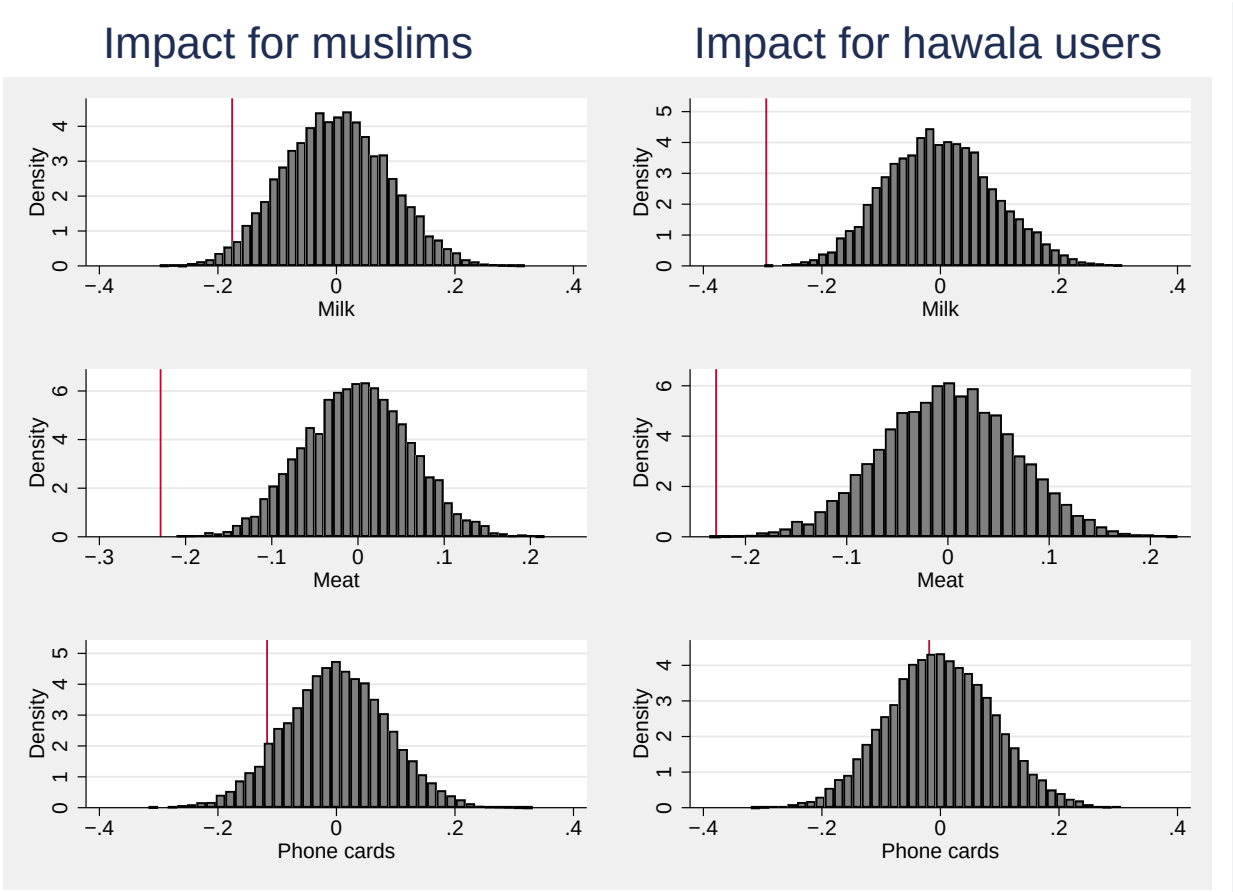
The bars show estimated monthly transfers by five different *hawaladeers*. Their names are listed on the x-axis.

Appendix A Online Appendix Figures

Figure A1: Turkana County

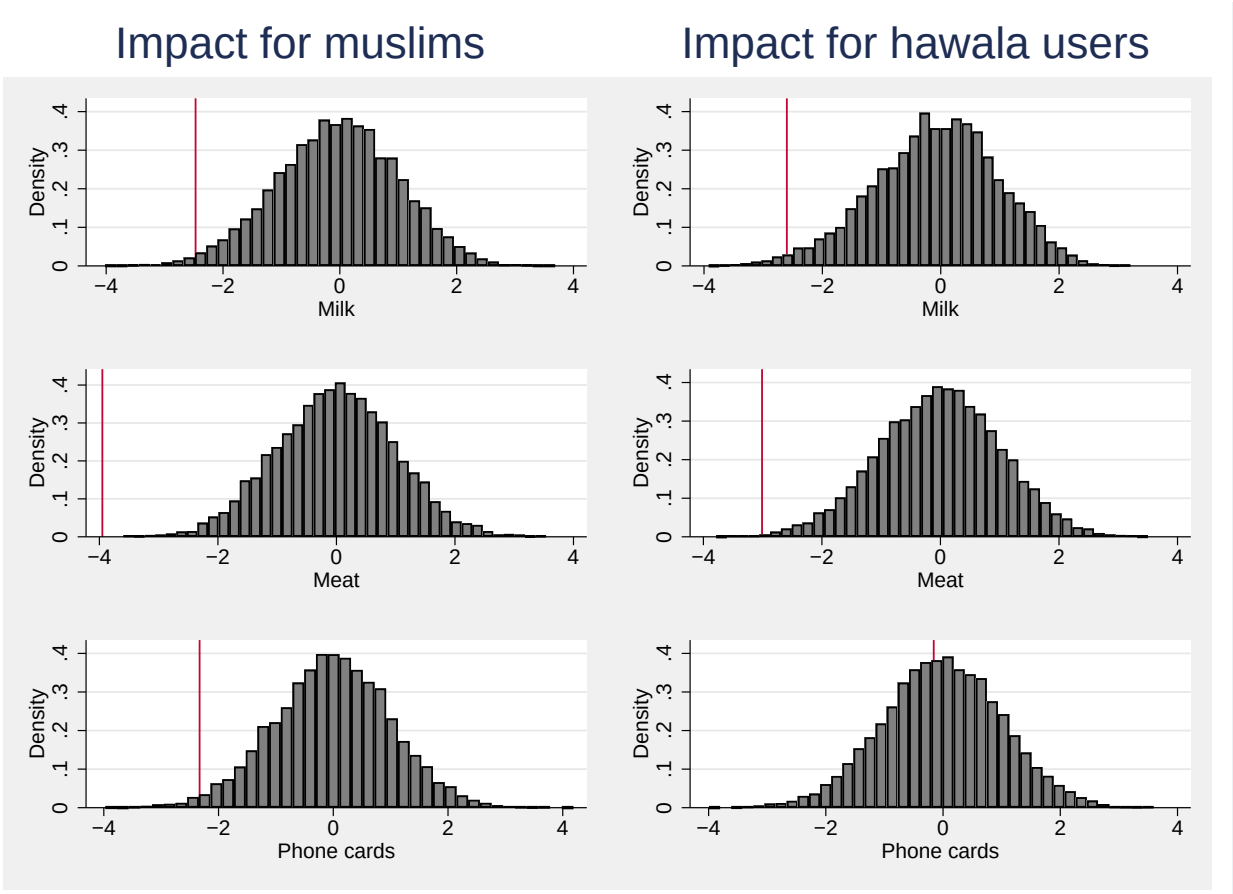


Figure A2: Estimated coefficients using randomization inference



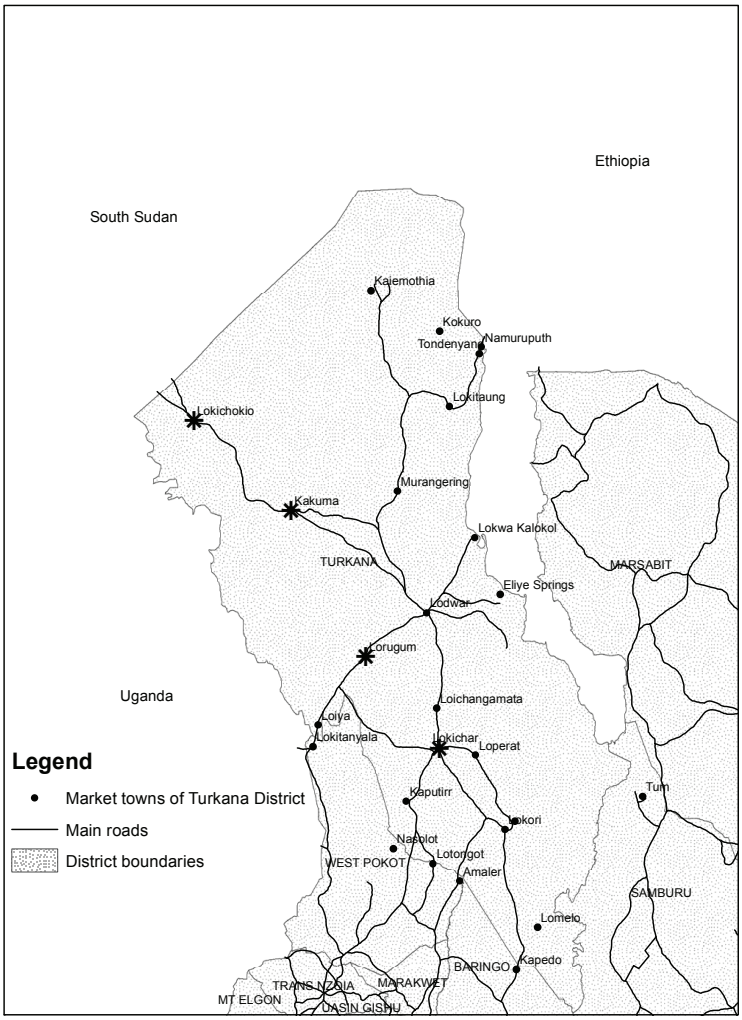
The figure shows the results of randomizing the vector of the identifying variable for Muslim population (left panel) or past hawala users (right panel) 10,000 times. The coefficients shown are the interaction between these variables and the month of June, and thus show differential consumption of goods in the post-shutdown period. Red lines indicate estimates from the regresssions using the actual data. In the cases of meat and milk, the proportion of the randomized coefficients that are greater than the estimated coefficients is less than 0.01.

Figure A3: Estimated t-statistics using randomization inference



The figure shows the results of randomizing the vector of the identifying variable for Muslim population (left panel) or past hawala users (right panel) 10,000 times. The t-statistics shown are for interaction between these variables and the month of June. Red lines indicate t-statistics from the regressions using the actual data.

Figure A4: Final sample of towns for household survey



Appendix B Online Appendix Tables

Table B1: Sampling by ethnicity among refugee population

Ethnicity	Number surveyed	Percentage of surveyed	Number in camp (official statistics)	Percentage in camp
Somali	40	23.4	56,178	31
Dinka	50	29.4	89,973	50
Nuba	11	6.5		
Darfuri	20	11.8	9,785	5
Congolese	20	11.8	9,045	5
Ethiopian	29	17.1	7,821	4

Note: The camp number for Dinka/Nuba is for camp residents classified as South Sudanese, who are not separated by ethnicity for UNHCR statistics. The official camp number also does not break down Sudanese refugees by ethnicity. We apply the Sudan number to the Darfur population.

Table B2: Sample, Turkana household survey

Subsample	Number of households
Kakuma	111
Lokichar	116
Lorugum	103
Total	330

Table B3: Proportion households purchasing particular goods in April – refugees

	Mean	SD	Obs
Purchased sugar April	0.965	0.185	170
Purchased tea April	0.918	0.276	170
Purchased milk April	0.553	0.499	170
Purchased meat April	0.818	0.387	170
Purchased fish April	0.371	0.484	170
Purchased rice April	0.647	0.479	170
Purchased fruit April	0.347	0.477	170
Purchased coffee April	0.300	0.460	170
Purchased home-produced alcohol, April	0.012	0.108	170
Purchased commercial alcohol, April	0.047	0.212	170
Purchased tobacco, April	0.106	0.309	170
Purchased mirat April	0.024	0.152	170
Purchased henna April	0.124	0.330	170
Purchased incense April	0.159	0.367	170
Purchased phone cards, April	0.929	0.257	170
Purchased cloth April	0.312	0.465	170
Purchased soap April	0.618	0.487	170
Purchased diapers April	0.235	0.425	170
Foods purchased, April	4.918	1.792	170
Luxuries purchased, April	2.600	1.334	170

Table B4: Changes in consumption between April and June, 2015 – refugees excluding groups surveyed after June 20

	April	June	p-value
Purchase sugar (0/1)	0.98	0.97	0.46
Purchase tea (0/1)	0.95	0.95	0.83
Purchase milk (0/1)	0.58	0.57	0.92
Purchase meat (0/1)	0.88	0.89	0.90
Purchase rice (0/1)	0.83	0.85	0.80
Purchase phone cards (0/1)	0.94	0.95	0.82
Kg sugar	12.13	10.95	0.51
Kg tea	0.86	0.90	0.85
Kg milk	1.19	1.18	0.98
Kg meat	5.38	4.88	0.60
Kg rice	11.47	12.00	0.81
KSH phone cards	470.77	430.89	0.73

Means and p-values are calculated using sampling weights, and so are representative of the population. Tests are two-sided. There are 170 observations for all of the probabilities of purchasing, but the observations vary for the amounts.

Table B5: Changes in consumption between April and June, 2015 – including refugees who never purchased goods

	IHS(amount of...)					
	Sugar	Tea	Milk	Meat	Rice	Phone
Panel A: Impact on Muslim-language households						
Ever receives transfers x June	0.143*	0.065	0.039	-0.008	-0.043	0.207
	(0.077)	(0.039)	(0.041)	(0.047)	(0.038)	(0.192)
Islamic language x June	-0.056	0.036	-0.104**	-0.189***	-0.046	0.016
	(0.082)	(0.040)	(0.043)	(0.049)	(0.040)	(0.173)
June	-0.090	-0.046	0.074*	0.111**	0.064**	-0.223
	(0.075)	(0.040)	(0.042)	(0.047)	(0.030)	(0.224)
MDE	0.231	0.113	0.119	0.137	0.112	0.484
Panel B: Impact of hawala *in past*						
Ever receives transfers x June	0.237**	0.038	0.159**	0.145***	0.016	0.170
	(0.096)	(0.029)	(0.065)	(0.051)	(0.058)	(0.252)
Hawala x June	-0.146	0.030	-0.168**	-0.182***	-0.087	0.061
	(0.115)	(0.040)	(0.074)	(0.068)	(0.058)	(0.226)
June	-0.126***	-0.023	0.008	-0.009	0.035	-0.213
	(0.043)	(0.022)	(0.025)	(0.031)	(0.028)	(0.135)
Observations	340	340	340	340	340	340
MDE	0.321	0.111	0.208	0.189	0.163	0.633
Mean dep. var. April	1.573	0.511	0.440	0.938	1.219	4.760

Fixed effects estimation with cluster robust standard errors in parentheses. All estimations include a dummy variable for the month of June. Panel B. also includes interaction terms for if the household ever received transfers and June. We define Muslim languages as Somali, Nuba, or Darfuri. Estimates use sampling weights. MDE standards for minimum detectable effect. In Panel A., this is calculated for the interaction between Muslim and June, and in Panel B., between hawala and June. This table differs from Table 4 in that we include zero consumption.

Table B6: Heterogeneity in refugee effects by income source

	IHS(amount of...)					
	Sugar	Tea	Milk	Meat	Rice	Phone
Panel A: Impact on wage-earning households						
Wage worker x June	-0.002	0.004	0.176	0.117*	0.063	0.103
	(0.080)	(0.026)	(0.106)	(0.066)	(0.071)	(0.094)
Hawala x June	-0.146	0.031	-0.264**	-0.206***	-0.130	-0.000
	(0.115)	(0.041)	(0.107)	(0.070)	(0.095)	(0.118)
June	-0.128***	-0.027	-0.035	-0.042	0.036	-0.084
	(0.048)	(0.029)	(0.062)	(0.039)	(0.046)	(0.065)
Panel B: Impact on business-owning households						
Enterprise x June	0.018	0.030	0.113	0.075	0.027	-0.042
	(0.082)	(0.044)	(0.083)	(0.058)	(0.071)	(0.094)
Hawala x June	-0.147	0.030	-0.297***	-0.232***	-0.145	-0.017
	(0.115)	(0.041)	(0.109)	(0.076)	(0.103)	(0.118)
June	-0.142*	-0.049	-0.074	-0.068	0.031	-0.021
	(0.073)	(0.050)	(0.076)	(0.055)	(0.066)	(0.088)
Observations	334	316	192	288	226	316
Mean dep. var. April	1.601	0.550	0.779	1.108	1.834	5.122

Fixed effects estimation with robust standard errors in parentheses. All estimations include a dummy variable for the month of June. Regressions also include interaction terms for if the household ever received transfers and June. Estimates use sampling weights.

Table B7: Refugee estimates of heterogeneous impact excluding those surveyed after reopening of hawala network

	IHS(amount of...)					
	Sugar	Tea	Milk	Meat	Rice	Phone
Panel A: Impact on Muslim-language households						
Ever receives transfers x June	0.064	0.084*	-0.029	-0.023	-0.139**	-0.049
	(0.100)	(0.048)	(0.055)	(0.056)	(0.068)	(0.081)
Islamic language x June	0.169	-0.004	-0.120	-0.124**	0.067	0.006
	(0.170)	(0.047)	(0.087)	(0.060)	(0.138)	(0.070)
June	-0.280*	-0.015	0.117	0.042	-0.001	-0.098
	(0.166)	(0.040)	(0.107)	(0.054)	(0.124)	(0.068)
MDE	0.477	0.130	0.244	0.169	0.387	0.196
N	234.000	226.000	130.000	212.000	182.000	226.000
Panel B: Impact of hawala *in past*						
Ever receives transfers x June	-0.201	0.111*	0.052	0.282**	-0.308	-0.125
	(0.289)	(0.058)	(0.069)	(0.111)	(0.382)	(0.142)
Hawala x June	0.308	-0.033	-0.084	-0.360***	0.184	0.093
	(0.297)	(0.078)	(0.053)	(0.117)	(0.382)	(0.143)
June	-0.138***	-0.018	0.013	-0.061*	0.057	-0.093
	(0.051)	(0.013)	(0.049)	(0.032)	(0.046)	(0.059)
MDE	0.831	0.217	0.147	0.328	1.069	0.401
N	234.000	226.000	130.000	212.000	182.000	226.000

Fixed effects estimation with robust standard errors in parentheses. All estimations include a dummy variable for the month of June. Panel B. also includes interaction terms for if the household ever received transfers and June. We define Muslim languages as Somali, Nuba, or Darfuri. Estimates use sampling weights. MDE standards for minimum detectable effect. In Panel A., this is calculated for the interaction between Muslim and June, and in Panel B., between hawala and June. This table excludes households surveyed after June 20.

Table B8: Consumption behavior and assets – Turkana households

	Kakuma	Non-Kakuma	P-value diff	Obs (1)	Obs (2)
Purchased sugar April	0.631	0.680	0.184	111	219
Purchased water April	0.108	0.018	1.000***	111	219
Purchased tea April	0.568	0.607	0.244	111	219
Purchased milk April	0.297	0.297	0.504	111	219
Purchased meat April	0.207	0.242	0.240	111	219
Purchased fish April	0.054	0.009	0.994**	111	219
Purchased coffee April	0.009	0.005	0.688	111	219
Purchased home brewed alcohol, April	0.045	0.032	0.725	111	219
Purchased tobac April	0.243	0.187	0.882	111	219
Purchased khat April	0.000	0.014	0.108	111	219
Purchased incense April	0.018	0.027	0.301	111	219
Purchased phone cards, April	0.180	0.201	0.327	111	219
Purchased cloth April	0.180	0.128	0.898	111	219
# food items, April	1.874	1.858	0.534	111	219
# luxury items, April	0.378	0.356	0.619	111	219

Table B9: Consumption change regressions, Turkana survey – linear distance effect

	If purchased			IHS(Amt. purchased)		
	Sugar	Tea	Milk	Sugar	Tea	Milk
Panel A: Simple effect						
Km to camp x June	0.001**	0.001*	0.000	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
June	0.252***	0.192***	0.065**	-0.153***	-0.023**	-0.107
	(0.024)	(0.052)	(0.027)	(0.043)	(0.009)	(0.069)
Panel B: Has wage income						
Km to camp x June	0.001*	0.001*	0.000	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Km to camp x has wage * June	0.001**	0.000	-0.000	-0.002**	0.001***	-0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)
June	0.257***	0.190***	0.060**	-0.159***	-0.021**	-0.104
	(0.021)	(0.053)	(0.026)	(0.049)	(0.009)	(0.061)
Panel C: Has enterprise income						
Km to camp x June	0.001**	0.001**	0.001***	-0.001**	-0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Km to camp x has business x June	-0.001	-0.000	-0.001	0.001***	0.001	0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
June	0.142***	0.157***	0.001	-0.103**	-0.024*	-0.074
	(0.021)	(0.036)	(0.017)	(0.040)	(0.013)	(0.071)
Panel D: Has income from selling animals						
Km to camp x June	0.000	0.000	0.000	-0.000	0.000	0.001*
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Km to camp x animal income x June	0.001**	0.001***	-0.000	-0.000	-0.001	-0.002*
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
June	0.281***	0.231***	0.069**	-0.178***	-0.042**	-0.120*
	(0.044)	(0.071)	(0.030)	(0.021)	(0.018)	(0.066)
Observations	660	660	660	510	473	228
Mean dep. var. non-Kakuma April	0.680	0.607	0.297	1.265	0.181	0.561

Regressions include households weights as well as interactions between has wage and June in Panel B, has business and June in Panel C, and has animal income and June in Panel D. All estimations include an interaction between June and assets in 2005. Clustered standard errors in parentheses , * p < .10, ** p< .05, *** p<.01. The mean of the dependent variable is for non-Kakuma households in April. Estimator contains fixed effects at the village level.

Table B10: Consumption change regressions, Turkana survey – including zeros

	IHS(Amt. purchased)		
	Sugar	Tea	Milk
Panel A: Simple effect			
Kakuma x June	-0.086	0.016	-0.017
	(0.070)	(0.028)	(0.048)
Panel B: Has wage income			
Kakuma x June	-0.084	0.037	-0.009
	(0.068)	(0.031)	(0.051)
Kakuma x has wage x June	-0.021	-0.199	-0.086
	(0.187)	(0.136)	(0.076)
Panel C: Has enterprise income			
Kakuma x June	-0.171*	-0.013	-0.085**
	(0.093)	(0.023)	(0.037)
Kakuma x has business x June	0.185	0.060	0.127
	(0.146)	(0.060)	(0.135)
Panel D: Has income from selling animals			
Kakuma x June	0.033	0.001	-0.092*
	(0.124)	(0.042)	(0.043)
Kakuma x animal income x June	-0.294*	0.038	0.177***
	(0.165)	(0.034)	(0.037)
Observations	660	660	660
Mean dep. var. non-Kakuma April	0.837	0.110	0.166

Regressions include households weights as well as interactions between has wage and June in Panel B, has business and June in Panel C, and has animal income and June in Panel D. All estimations include an interaction between June and assets in 2005. Clustered standard errors in parentheses , * p < .10, ** p< .05, *** p<.01. The mean of the dependent variable is for non-Kakuma households in April. Zeros are included for households that never consume these goods.