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# Refugee-host proximity and market creation in Uganda

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# Refugee-host proximity and market creation in Uganda

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## Abstract

Uganda currently hosts more than 1.4 million refugees and the relationship with the host population is complex. In this paper, we investigate the effect of the interactions between refugee and host-communities by using a unique dataset and by exploring a broad range of economic outcomes – such as employment opportunities, sources of income, agriculture production, and enterprises. We use the distance between refugee and host communities to measure the degree of interaction. To deal with potential endogeneity issues, we adopt an instrumental variable approach and carry out several robustness tests. We find positive effects on individual participation in paid employment and on household wage income. Discarding the role of assistance, we suggest that these positive effects can be driven by refugees' economic activities. However, the market creation is localized.

**Keywords:** forced migration, refugees, household data, distance, market creation.

**JEL codes:** O12, O15, R23.



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# 1 Introduction

The number of refugees has substantially increased in the recent past, reaching almost 25 million in 2017. The majority of the refugees stays in low- and middle-income countries and remains in the host communities for a long period. Uganda hosts one of the biggest refugee community, with more than 1.4 million as of 31 December 2020 (UNHCR, 2020), in 13 districts<sup>1</sup> within 31 settlements.<sup>2</sup>

In low- and middle-income countries, the impact of refugees – concentrated mainly in deprived areas – on local communities is open to question. On the one hand, they compete for the use of scarce resources like land and water, contribute to the depletion of the environment by increasing the environmental pressure on the place they move to, and may lead to demand-related price increases, especially for staple goods. On the other hand, the presence of refugee settlements can improve the economic situation of host communities in two interrelated ways. Benefits and services provided to the refugees may spill over to local population, as national and international assistance may in fact target both communities. Similarly, refugee communities may create job and market opportunities for the host communities because of the increased demand for goods and services and because of the economic activities carried out by refugees themselves.

A relatively small number of studies have analyzed the impact of the presence of refugees on the economic condition of the host communities.<sup>3</sup> Some of the aspects briefly referred to above have been considered in the literature, albeit not all the results available share the same level of robustness. For example, several papers have addressed the issue of the impact of refugee presence on agricultural prices, but only Alix-Garcia *et al.* (2018) and Kreibaum (2016) have looked at the impact on consumption with a non-descriptive approach. Using a more robust quantitative method, Valli *et al.* (2019) showed that social protection programs helped to improve social cohesion among Colombian refugees in the hosting community. These findings are in line with Hidrobo *et al.* (2014). Alix-Garcia *et al.* (2018) find that proximity to the Kakuma camp in Kenya exerts a positive effect on economic activity and consumption. In the case of Uganda, Kreibaum (2016) shows that the presence of refugees in three Southern districts tends to increase the consumption of the host communities and their access to private primary schools. Still from Uganda, the most thorough analysis of the impact on local economies comes from Zhu *et al.* (2018): the authors show that providing refugees with agricultural land significantly improves their welfare and resilience, while generating positive income spillovers within the host communities.

Our paper aims to contribute to this strand of literature looking at the experience of Uganda and focussing on the host households' response to the proximity of refugees. In particular, we try to assess whether and to what extent the proximity to refugees increases the welfare and the level of economic activity of host communities' households through "market creation". We add new evidence to the scarce literature that exist, and also, innovate in relation to two features.

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<sup>1</sup> Adjumani, Arua, Isingiro, Kampala, Kamwenge, Kikuube, Kiryandongo, Kyegegwa, Koboko, Lamwo, Madi-Okollo, Obongi and Yumbe.

<sup>2</sup> Adjumani, Bidibidi, Imvepi, Kiryandongo, Kyaka II, Kyangwali, Lobule, Nakivale, Oruchinga, Palabek, Parlorinya, Rhino Camp, Rwamanja plus the urban refugees in Kampala.

<sup>3</sup> For recent surveys the reader can refer to Maystadt *et al.* (2019) and Verme and Schuettler (2019).

We look at the possible mechanisms behind the impact of refugee presence on host households' welfare. Often, and this is the case in Uganda, agencies caring for refugees provide support and services also to the host population, especially in deprived and rural areas. It is therefore of interest to assess whether the observed increase in host households' welfare depends on transfers or other benefits received. Our analysis can shed some light on this issue by ascertaining whether the presence of refugees increases directly the host households' level of economic activity. Should this not be the case, then the observed increase in consumption and other indicators could be attributed only to the assistance offered by the agencies, with obvious different policy implications.

We also extend the work of Kreibaum (2016) on the impact of refugees from the Democratic Republic of Congo in South-western Uganda to include a substantially larger set of refugee settlements that host a very large number of South-Sudanese refugees, mainly located in the North West of the Country. Besides the broader coverage, our analysis is based on a set of geo-referenced individual and household level information and extends the outcome variables beyond aggregates like consumption to include labour market opportunities, changes in the sources of income, and entrepreneurial activities.

In this paper we use a unique data set containing detailed information on both refugee and host households within and in the proximity to settlements. This feature allows us to identify the effect of the interaction between hosts and refugees directly, while the studies present in the literature rely only on aggregate measures of the presence of refugees.<sup>4</sup>

Previous research has indicated that physical distance to potential trading partners is relevant for the level of economic activity both for the specific case of refugee communities (Alix-Garcia *et al.*, 2018; Maystadt *et al.*, 2019; Alloush *et al.*, 2017) and in more general terms of access to markets (e.g., Emran and Hou, 2013). Moreover, in the case of refugees the limited evidence available has indicated that the effects on host households can be rather localized. Therefore, we use a measure of the distance between refugees and hosts to identify the economic effects of the presence of the former on the latter. In particular, we use the minimum distance between each host household to all the refugee households in the area surrounding the settlements. In this way we capture the *exposure* of every single household to potential economic contacts with refugees. As a robustness check we also use the mean and the median distance between host and refugee households as alternative measures of distance.

The allocation of refugees to the different settlements is determined by the Government of Uganda in collaboration with United Nations High Commissioner for Refugees (UNHCR) – according to criteria like the county of origin, ethnicity, needs' assessment, and service availability (more details about the allocation criteria are presented in Section 3). Nonetheless, refugees are relatively free to move,<sup>5</sup> and, therefore, they could locate themselves in such a way as to make economic exchanges with the host community easier. For this reason, and also to correct for possible errors in the measurement of distance, we adopt a Two Stage Least

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<sup>4</sup> One exception is represented by Alloush *et al.*, 2017 that, however, carry out a mainly descriptive analysis focusing on different aspect.

<sup>5</sup> According to the Refugee Act (2006–2009), refugees in Uganda are free to move, reside, and work. Nonetheless, if they want to benefit from international assistance – namely UNHCR assistance – they have to live in the settlements.

Squares (2SLS) estimator, using as an instrument the distance between each host household to the administrative centre of the nearest settlement.

It is also plausible that host households could change their place of living for reasons correlated with the outcome of interest. For example, more entrepreneurial hosts could move closer to the host settlement area to exploit the trade potential, thus biasing our estimates. Most of the households in our sample did not move their residence and very few moved following the larger inflows of refugees. Therefore, we do not expect the endogenous movement of host households to substantially affect our results. Nevertheless, we run a series of robustness tests to verify this information, trimming the overall sample from households who moved to their current location after the larger inflows of refugees in the area began.

The results of this study indicate altogether that the presence of a large number of refugees did not negatively affect host communities and that, on the contrary, there are several positive effects of the presence of refugees on local households in relation to consumption outcomes, explained mainly to a larger participation by host households in paid employment as a result of refugee presence, and to the consequent increase in wage incomes. However, the effects observed are not sizeable, fade away relatively swiftly with an increase in distance. Maybe most importantly, the results indicate that the observed increase in consumption and income-generating activities is due to the effect of direct market creation due to the proximity of refugee households and not because of the benefits accruing to the host communities by agencies caring for the refugees.

The paper is organized as follows. Section 2 provides a review of the related literature. Section 3 depicts the Ugandan institutional setting and the dispersal policy of refugees. Section 4 describes the empirical analysis and the data used with it. Sections 5 and 6 show the main and further results. Section 7 tests the robustness of the analysis and Section 8 concludes.

## 2 Literature review

The relationship between refugee and host communities is complex and potentially involves several aspects.<sup>6</sup> In what follows we briefly discuss the evidence relative to the economic impact of refugees' presence, as this will be the focus of our analysis.

The results are far from being univocal, but the vast majority leans towards a positive or non-negative impact. The economic effects of refugees depend on the rules governing interactions between them and the host community, the structure of the receiving economy, and the characteristics of the refugee population. Simulations in Rwanda (Taylor *et al.*, 2016) indicate that refugees – given the opportunity to interact with the economic habitat around them – can create positive income spillovers for hosting-community households. Taylor *et al.* (2016) find that the presence of refugees increases total real income within a 10-km radius by significantly more than the amount of the aids the refugees receive. Alix-Garcia *et al.* (2018) show that refugee inflows enhance economic activity in the areas very close to refugees' camps in Kenya. They also show an increase in food consumption of local communities. This could be the effect of a growth in local prices which will potentially impoverish consumers but provides earning opportunities for property owners and suppliers of non-tradable goods (Alix-Garcia *et al.*, 2013). Maystadt and Verwimp (2014) find on average a positive impact on host households' welfare as measured by per adult equivalent consumption, albeit with heterogeneous effects across population groups.

Other studies show less positive results. Morales (2018) finds that a conflict-induced increase in population in Colombia leads to a short-run negative impact on wages of low-skilled population, but subsequent out-migration from the main receiving municipalities helps to mitigate this effect. Alix-Garcia and Saah (2010) find a significant increase in the prices of some agricultural goods and a decrease in the price of aid-delivered goods in Tanzania. Depetris-Chauvin and Santos (2018) look at the impact of refugees on the real estate market in Colombia and find that low-income rental prices increase and high-income rental prices decrease.

All the aforementioned studies look at the impact of refugees' presence on some aggregate indicators of welfare, mainly consumption, and possible price effects. The impact on labour market outcomes has not been analyzed, except for Fallah *et al.* (2019) that do not identify any significant impact of Syrian refugees on natives' labour market outcomes in Jordan.

In the case of Uganda, the attention has focused mainly on consumption too. The work of Kreibaum (2016) indicates that in South-western districts – hosting refugees from the Democratic Republic of the Congo – the flows appear to have a positive effect on hosting-community households' consumption and primary school enrolment.

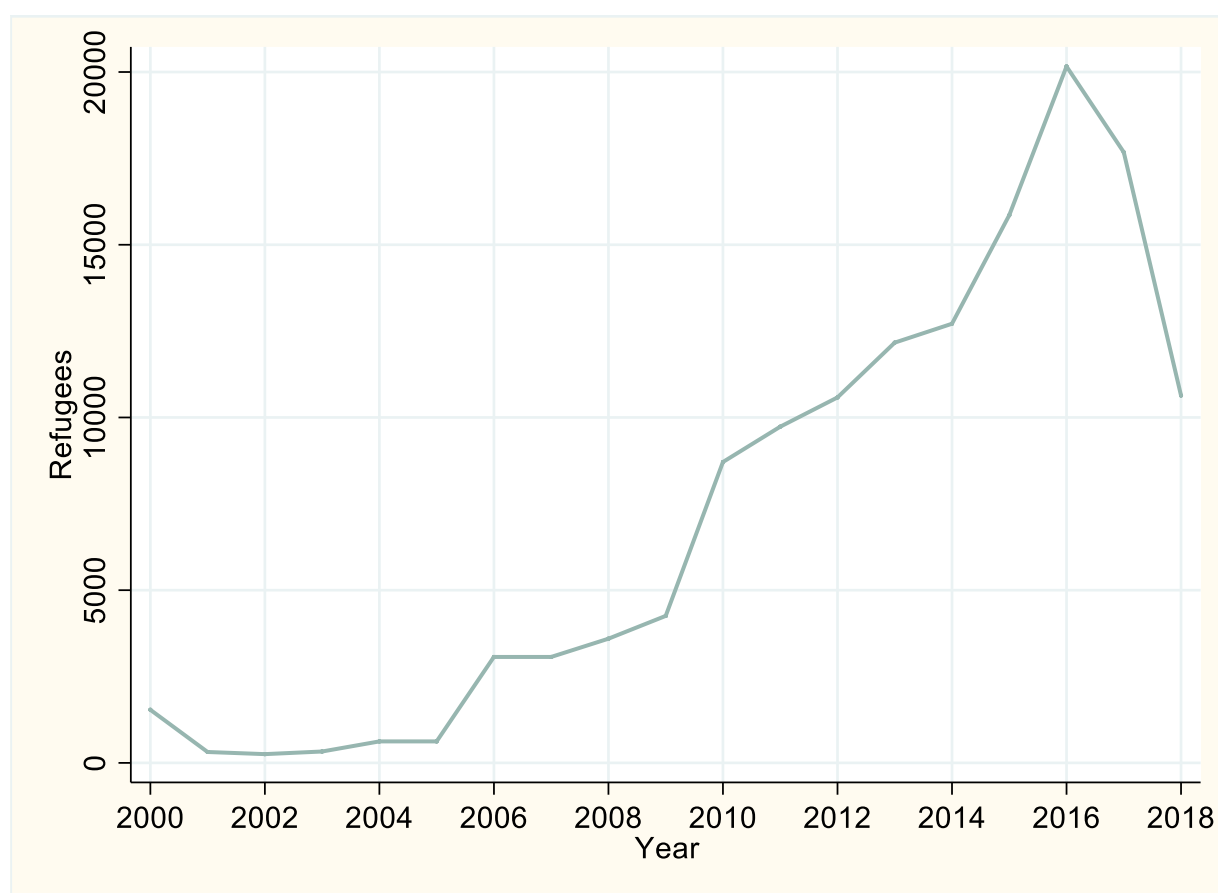
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<sup>6</sup> For a qualitative discussion of seeing Akuot (2003).

### 3 Institutional setting and the refugee dispersal policy

Uganda hosts the biggest refugee community in sub-Saharan Africa, with more than one million refugees, mainly originating from South Sudan, Burundi and Democratic Republic of Congo (UNHCR, 2020). The political uncertainty and the hostilities in the bordering countries have been the main push factors for refugees who arrived in Uganda during the past ten years. In particular, the conflict in Kivu – in the Eastern Democratic Republic of Congo, started in 2009 – and the civil war in South Sudan – started at the end of 2013 – led to the arrival of unanticipated flows of Congolese and South Sudanese within a short period (UNHCR, 2020). In the most recent years, the number of refugees somehow declined from about two million to the current value (see Figure 1). And during 2020 Uganda has announced measures to suspend the reception of new refugees and asylum seekers, as a result of COVID-19.

**Figure 1** Refugee Inflows in Uganda (2000–2018)



Source: UNHCR, 2020.

The political framework in Uganda is one of the most progressive and inclusive for refugees. The Uganda Refugee Policy (2006) and the Refugee Regulations (2010) grant the refugees wide-ranging rights – including allocation of land, freedom of movement and the possibility to seek employment and to access to national services. Ugandan asylum policy and refugee settlement approach is widely regarded as an exemplary model where refugees are integrated within the host communities and have access to the same services as nationals. Despite this,

the majority of the refugees remain within or near the official settlements in order not to lose the benefits granted by national and international agencies.

The allocation of the refugees in the different settlements is managed by UNHCR in close collaboration with the Office of the Prime Minister (OPM). Upon arrival in Uganda, refugees are received by the UNHCR and they are registered to understand their ethnic and socio-economic background and the kind of assistance they need. Then, they are allocated in the settlements administrated by OPM through the settlement Commandants and Assistant Commandants. Upon arrival in the settlement, the refugees receive a registration number, the allocated plot<sup>7</sup> and an initial shelter package for building a temporary shelter, in addition to essential non-food items (e.g., bedding and cooking utensils). Each settlement is organized in zones (equivalent to a parish in the national governance structure), and each zone is composed of blocks, the equivalent of villages.

More specifically, the allocation of the refugees to a settlement depends on:

- settlement assessed capacity based on available land, services and infrastructure determined in consultation with OPM, the Ministry of Land, Urban Development and Housing (MLUDH) and UNHCR;
- county of origin and ethnicity of the refugees;<sup>8</sup>
- family reunification.<sup>9</sup>

As a result, the refugees from South Sudan are mainly settled in the Northern districts while those from Democratic Republic of Congo in the Southern ones.

After the allocation, the refugees can be re-allocated to a different settlement because of the following reasons: (i) family reunification; (ii) request to UNHCR if they feel uncomfortable; (iii) tension/violence. Finally, the refugees (entire family or single household members) are free to decide to leave the settlement for migrating to the urban areas of Uganda or go back to the country of origin.

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<sup>7</sup> The refugee response follows two approaches for land allocation. In one, land for shelter and agriculture are allocated in one single plot. In the other, refugee households are allocated separate plots for shelter and agriculture. Minimum standards advocate the allocation of at least a 30 x 30 m agriculture plot with a separate 10 x 10 m shelter plot. For combined plots, the total area should be at least 50 x 50 m. However, the actual allocation might differ from these standards depending on the time of arrival and on characteristics of the specific settlement.

<sup>8</sup> Bidibidi, Palorinya, Adjumani, Palabeck, Imvepi, Rhinocamp, Kiryandongo, and Omugo mainly host refugees from South Sudan, while Kyaka II, Rwamwanja, Nakivale, Kyangwali and Lobule from the Democratic Republic of Congo. There is particular attention in keeping separated the ethnic groups Dinka and Nuer from South Sudan (between settlements or, if not possible, between zones in the same settlements).

<sup>9</sup> Arriving refugees with family members that have previously been settled may request to be settled in the same settlement as their family if they know it at the time of arrival.

## 4 Data and empirical analysis

### 4.1 The household survey

We make use of a recent survey carried by the Food and Agriculture Organization of the United Nations (FAO), in coordination with OPM, in Northern and South-western Uganda. The objective of the survey is to provide a comprehensive assessment of the living conditions of the refugees and the host communities to support policy design in the refugee-hosting districts (FAO and OPM, 2018, 2019). As mentioned, this is one of the few surveys that contains detailed information on both refugees and hosts households allowing to obtain causal inference. To carry out the survey several difficulties had to be overcome. First, when the survey design was prepared, the situation was very volatile with the refugee influx reaching its peak. Under time constraints, a strong collaboration between UN and the Government allowed the use of the most updated and reliable sampling frame with the refugees' figures changing on daily basis. Second, the logistical aspects of the data collection, conducted in a very fragile context, needed an intense preparation phase. For example, the enumerator teams' composition was designed to guarantee the necessary language skills (only the South Sudanese refugees can speak nine languages)<sup>10</sup> and gender balance. Additionally, physical access to the refugee settlements was made possible by an intense collaboration with OPM. Third, attention to sensitive issues was essential in the development of the survey. The questionnaire was discussed, tailored to the context avoiding sensitive questions (such as refugee ethnicity that was excluded from the last version of the tool) and piloted. Furthermore, during the training of the enumerators, particular attention was dedicated, in collaboration with UNHCR, to how interact with refugee population to guarantee the safety of the enumerators but also to avoid the onset of conflict situations.

The following map ( Settlements in Uganda) shows the location of the refugee camps in Uganda and their size. The survey covers the following settlements: Palabeck settlement in Lamwo district; Palorinya in Moyo; Bidibidi in Yumbe, the namesake settlements in Adjumani and Kiryandongo districts; Imvepi and Rhino in Arua, Kyaka II in Kyegegwa and Rwamwania in Kamwenge. The surveyed settlements host around 80 percent of the overall refugees.<sup>11</sup>

The sample consists of 3 799 households, including both refugees (2 107 households) and host communities in the proximity of the settlements (1 632 households). In each district only one settlement and the closest host community are included in the sample, except for Arua district where two settlements (Imvepi and Rhino) are sampled. Households are selected using a stratified two-stage cluster sampling method. Within each district, the Primary Sampling Units (PSU) are the settlement blocks (for refugee households) or the villages close to the settlement (for host households), with the probability of selection proportional to the size of the settlement or sub-county. Households are the Second Sampling Unit (SSU) randomly selected from either a list of households provided by the local authority or by walking through the village or settlement blocks.<sup>12</sup>

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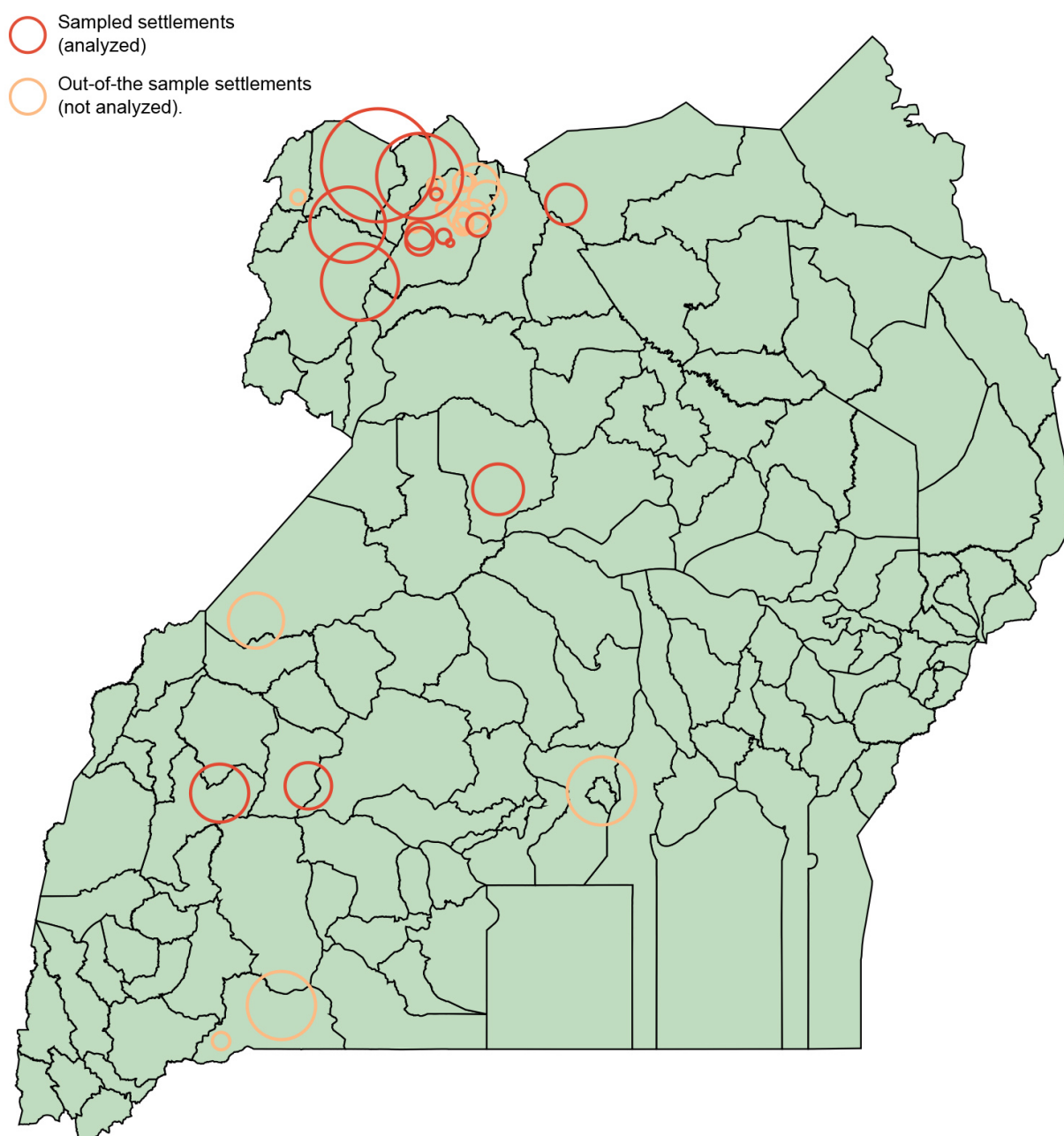
<sup>10</sup> Acholi, Alur, Arabic, Avokaya, Bari, Kakwa, Lango, Luo and Madi.

<sup>11</sup> During March 2018, 1 378 111 refugees were living in Uganda. 1 048 823 of these in the nine settlements covered by the household survey (UNHCR, 2020).

<sup>12</sup> The sample is self-weighting.



**Figure 2. Settlements in Uganda**



Notes: Red circles correspond to sampled settlements. Circles are proportional to the population of the settlement in March 2018. The map has been realized by using the shape files of the administrative level 2 (district) provided by the Uganda Bureau of Statistics. The shape files are compliant with the districts' boundaries at the time of the sampling design and collection of the data used in the paper.

Source: Authors' elaboration with UNHCR data of the refugee population. Conforms to map provided by the Uganda Bureau of Statistics (available at <https://data.humdata.org/dataset/uganda-administrative-boundaries-admin-1-admin-3>).

The fieldwork was implemented in December 2017 in the Northern districts and in March 2018 in the South-western ones. The data collection was carried out by employing Computer Assisted Personal Interviewing (CAPI) technologies and digital tablets.

The same questionnaire was utilized in all phases of data collection. The survey collects information on the socio-demographic characteristics of the households, food security – including a detailed food consumption module, and well-being – shocks, assistance, perceived resilience capacity, coping strategies and aspirations, access to basic services, employment, and agricultural and livestock production.

The household data are geo-referenced<sup>13</sup> and this allowed us to exploit the role of the distance between each host and refugee households living in the same district as discussed in the next paragraph.

## 4.2 The empirical strategy

As discussed in the previous sections, we rely on measures of proximity as proxies for the potential (economic) interaction between hosts and refugees. Since the focus of the analysis is the economic well-being of the hosting-community households, we make use of the distance of each host to all the refugee households living in the same district distance is computed as the earth-arc distance between two points – based on GPS coordinates. Table 1 presents different measures of the distance: minimum, mean and median. The minimum distance refers to the distance with the closest refugee household, while mean and median distance is computed for all the refugee households in the district. In our preferred estimates we use the minimum distance, but results are robust also to the use of the other measures of distance (some of these results are presented in Section 8). In Table 1, we present the distance of the host households also to the administrative centre of the refugee settlement, that, as we will discuss, we use as an instrument in the IV estimates.

**Table 1. Distance between host and refugee households (in km)**

	Mean	St. Deviation	Min	Max
<b>Distance to refugees (min)</b>	1.73	1.72	0	11.42
<b>Distance to refugees (mean)</b>	10.50	4.99	2.14	22.82
<b>Distance to refugees (median)</b>	10.65	5.57	2.00	29.08
<b>Distance to settlement (min)</b>	9.78	8.04	0.12	39.57
<b>Distance to settlement (mean)</b>	12.61	7.57	0.23	39.57
<b>Distance to settlement (median)</b>	12.78	7.72	0.23	39.57
<b>Observations</b>	1 572			

Note: Summary statistics are computed for hosting-community households.

Source: Authors' own elaboration based on the FAO dataset.

On average, the hosting-community households have at least one refugee household at a distance of 1.7 km, with a range that goes to the immediate proximity to about 11 km. The (average) distance to all the refugee households in the district is of course higher, with a mean of 10 km and a range from 2 to 22 km. Similar values are obtained for the median distance. As discussed, previous research has shown that the effects of the refugees on the economic outcomes of the hosting communities, if any, tend to fade away rather quickly with the increase

<sup>13</sup> The geo-localization has been reported for 1 572 host households, the sample used in our main specifications.

in distance. Therefore, the range of observed distance between the households in our sample looks well suited to identify any impact due to the proximity among communities.

To elicit the effect of the interaction with refugees on several hosting households' economic outcomes, we relate them to the distance to refugees using a linear regression model. Our baseline specification is the following:

$$Y_{i,j} = \alpha + \beta \cdot Dist_{i,j} + \gamma \cdot X_i + \delta_j + \varepsilon_{i,j} \quad (1)$$

where  $Y_{i,j}$  is the observed outcome of interest (detailed below) of the hosting-community household (or individual belonging to household)  $i$  in district  $j$ .  $Dist_{i,j}$  is the distance of household  $i$  to any refugee household living in district  $j$ .  $X_i$  is a vector of household or individual (as applicable) controls, including the number of male and female adults, a dummy for female household head, household head's age and education, or individual's sex, age, and education (summary statistics presented in Table A1).  $\delta_j$  is the district fixed effect and  $\varepsilon_{i,j}$  is the idiosyncratic error term. Therefore,  $\beta$  measures the effect of being exposed to the presence of refugee households on the outcome of interest. Because the greater the distance the lesser the exposure, we expect  $\beta$  to be negative if proximity affects the outcomes of host households.

Estimating the effect of proximity to refugees on host households' economic outcomes by OLS can lead to some identification issues. Indeed, both hosting-community and refugee households can choose where to establish their dwellings, so that their proximity may be endogenously related to the outcomes of interest. For example, refugees can decide to settle as near as possible to the most propertied and productive households to benefit from interactions with them. Conversely, hosting-community households can move to approach the most populated part of the settlement for similar reasons.

Nonetheless, the socio-economic context in which the analysis is conducted admits little margin for such a dynamic to occurs we will show later, 70 percent of the sampled households' heads never moved from their current residence and more than 95 percent did not move within the two years preceding the survey, i.e., following the large refugee inflows of 2015. Furthermore, as mentioned earlier, the Ugandan law allows refugees to freely move and work in the country, but if they want to continue receiving the support they must reside within an assigned area near the settlement. In other words, part of the distance between refugee and hosting-community households is exogenously determined by the institutions and depends on the distance to the center of the settlement.

We can exploit this fact for our identification strategy. In particular, to capture only that part of distance due to the requirement for refugees of living in assigned areas around the center of the settlement, we can use the distance to the camp as an instrument for the distance to refugees.

Using IV can also alleviate any bias deriving from measurement error when geocaching households' location. We cannot exclude that the data on households' location are collected with imprecision. When a *classical errors-in-variables problem* occurs – i.e., when a variable is measured with an additional error that is uncorrelated with its true value – the estimated coefficient is biased toward zero (see e.g., Klepper and Leamer, 1984). If this is the case, any instrument that is correlated with the true value of the variable, but uncorrelated with the error, will consistently estimate the regression coefficient. Since in our case the measurement error is due to potential technical imprecision, and so uncorrelated with the true value of the distance, it is possible to use IV also to alleviate the attenuation bias due to measurement error.

The instrument is defined as:

$$Z_{i,j} = Dist_{i,CAMP_j} \quad (2)$$

where  $CAMP_j$  is the refugee camp in district  $j$ . All the districts have one refugee camp only, but Arua, which has two. In the case of Arua and Adjumani,  $Dist_{i,CAMP_j}$  is the same measure of distance (minimum, average, or median) used in the OLS specification. Empirical results from the OLS and IV estimations of the model are presented in the following sections.

## 5 Impact of proximity on consumption and labour market outcomes

To assess the possible impact of proximity to refugees on host households' welfare and economic activity, we consider a broad set of indicators (see Table 2 and 3). In presenting our empirical results, we first look at consumption expenditures (both food and other non-durable) then to different sources of income. We analyze both incomes from work (salaried and casual) and indicators of the level of agricultural activity. The latter is a proxy of the income from agriculture that represents the main source of livelihood for the households in our sample. The results of the first stage estimates are presented in Appendix D.

**Table 2. Summary statistics for host community households (dependent variables)**

	Mean	St. dev.	Min	Max
Monthly food expenditure per capita (UGX)	18 537	16 628.3	0	136 400
Monthly non-food expenditure per capita (UGX)	19 760	64 426.4	0	2 251 204
Monthly income from wage employment (UGX)	45 571	138 037.8	0	1 450 000
Monthly income from casual employment (UGX)	41 685	73 812.25	0	700 000
Formal transfers (UGX)	34 723	125 773.2	0	1 500 000
Annual value of crop sales (UGX)	105 338	210 601.9	0	1 835 000
Annual value of livestock products sales (UGX)	8 217	77 854.3	0	1 500 000
Units of goats owned	3.11	4.19	0	30
Units of sheep owned	0.58	1.84	0	21
Units of pigs owned	0.27	0.89	0	9
Units of cattle owned	2.01	5.29	0	50
Units of poultry owned	5.08	6.72	0	50
Observations	1 632			

Notes: Summary statistics are computed for hosting-community households. UGX: Ugandan Shilling.

Source: Authors' own elaboration based on the FAO dataset.

**Table 3. Summary statistics for refugee households**

	Mean	St. Dev.	Min	Max
Monthly food expenditure per capita (UGX)	9 792.00	17 594.52	0	304 400
Monthly non-food expenditure per capita (UGX)	1 1158.96	24 424.44	0	819 550
Monthly income from wage employment (UGX)	10 950.25	26 501.64	0	466 666.7
Monthly income from casual employment (UGX)	31 874.05	72 551.21	0	760 000
Formal transfers (UGX)	15 474.13	67 912.11	0	1 000 000
Annual value of crop sales (UGX)	17 173.05	36 440.85	0	310 000
Annual value of livestock products sales (UGX)	74 586.1	93 244.97	0	900 000
Units of goats owned	28 646.59	81 454.3	0	750 000
Units of sheep owned	1 229.94	27 671.33	0	1 150 000
Units of pigs owned	0.22	0.41	0	1
Units of cattle owned	2 107			
Units of poultry owned	9 792.00	17 594.52	0	304 400
Observations	1 1158.96	24 424.44	0	819 550

Note: Summary statistics are computed for hosting-community households.

Source: Authors' own elaboration based on the FAO dataset.

Table 4 presents the results relative to the monthly per capita household expenditures for food and non-food non-durable goods. The estimates indicate a significant impact of proximity to refugees on hosts' food expenditures, while non-food expenditures do not appear to be affected. The impact on food expenditures is economically significant as, at the mean, a decrease of 1 km in the distance between host and refugee households implies an increase of food expenditures of about 12 percent of the variable mean.<sup>14</sup>

<sup>14</sup> In our comments, we refer to the IV estimates, where not otherwise indicated.

**Table 4. Household per capita food and non-food expenditure, and own-produced food consumption (host communities' households)**

	OLS			IV		
	(1) Food expenditure	(2) Non-food expenditure	(3) Own food consumption	(4) Food expenditure	(5) Non-food expenditure	(6) Own food consumption
Distance to refugees (min)	-830.6***	430.3	291.4	-2 219***	-475.2	200.3
	(249.5)	(283.7)	(458.4)	(713.8)	(811.8)	(1,231)
Observations	1 555	1 554	1 553	1 555	1 554	1 553
R-squared	0.117	0.094	0.092	0.098	0.087	0.092
Controls	YES	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES	YES
F Stat				107.79	110.90	110.30

Notes: Models in columns (1) (2) (4) and (5) refer to per capita expenditure in the last month. Model in column (3) and (6) refer to per capita own-produced food consumption. Controls include the number of male and female adult members, female household head, household head's age, and years of education. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

To ascertain the sources of the observed increase in food expenditure, we look at different components of the household income. Starting with the labour income, we find that proximity to refugee households does increase a household's total labour income.<sup>15</sup> However, when we disaggregate total labour income by casual and wage income, we find that the increase is mainly due to the change in wage income (see Table 5). In the context of the study, the difference between the two income sources can be explained by the formality of the working engagement. In the case of wage income, the working relationship is formal with payments received on a regular basis while the casual income is received in exchange for a desultory service. The effect on wage income is substantial as, at the mean, the reduction of the distance by about 1 km generates an increase in waged income of about 25 percent. Unfortunately, we do not observe wage rates and, therefore, we cannot ascertain whether the observed increase is due (more) to changes in employment or wages (but see below for estimates of changes in individual employment).

Refugees benefit from transfers of various kinds that are in most cases also extended to local communities. Even if there are no reasons a priori to assume that proximity does affect the probability of receiving such transfers, we tested for this possibility. Transfers from Government and International Agencies (columns (3) and (6) of Table 5) do not appear to depend on the proximity between host and refugee and, therefore, are not associated with the observed increase in expenditure.

<sup>15</sup> The total labour income is the sum of casual and wage income. Results are available upon request.

**Table 5. Household sources of income in host community households**

	OLS			IV		
	(1) Wage	(2) Casual	(3) Transfers	(4) Wage	(5) Casual	(6) Transfers
Distance to refugees (min)	-4 126**	88.86	-836.1	-11 501**	-4 743*	7 127
	(1 744)	(880.5)	(988.8)	(5 842)	(2 820)	(4 911)
Observations	1 541	1 538	1 543	1 541	1 538	1 543
R-squared	0.066	0.030	0.024	0.054	0.012	0.083
Controls	YES	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES	YES
F Stat				111.78	113.30	112.68

Notes: Controls include the number of male and female adult members, female household head, household head's age, and years of education. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

We could not identify any effect of proximity to refugees on the self-employment income of the host household both in agricultural and non-agricultural activities (results available on request).

In the context in which the study is carried out, the main source of subsistence is the agricultural activity. Therefore, in the following part of the empirical analysis we look at some indicators of household activity in this sector.

In Table 6 we present the results relative to the value of sales of crop and livestock products. The value of crop sales is considerably reduced by the proximity with the refugee households. As self-consumption is not increased by proximity to the refugee households (see columns 3 and 6 in Table 4) this suggests a substitution in work activities away from work on own land towards waged employment. There are also indications that proximity to refugee household triggers a substitution from crop to livestock products (like eggs, honey, etc.) production, but the coefficient is only marginally significant.<sup>16</sup>

<sup>16</sup> For a detailed analysis of livestock assets of hosting-community households refer to Annex B.



**Table 6. Yearly crop and livestock products sales (UGX)**

	OLS		IV	
	(1) Crop	(2) Livestock products	(3) Crop	(4) Livestock products
Distance to refugees (min)	3 639	-84.25	12 990**	-581.8*
	(3 144)	(77.20)	(5 738)	(308.1)
Observations	1 538	1 545	1 538	1 545
R-squared	0.216	0.010	0.208	-0.006
Controls	YES	YES	YES	YES
District FE	YES	YES	YES	YES
F Stat			107.52	109.09

Notes: Models in (1) and (3) refer to the monetary value of crop sales in 2017. Models in columns (2) and (4) refer to the monetary value of livestock sales in 2017. Controls include the number of male and female adult members, female household head, household head's age, and years of education. Robust standard errors in parentheses.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

The observed increase in household wage income appears to be generated by an increase in wage employment coupled with a reduction in casual employment. As shown in columns (1) and (2) of Table 7, where we make use of individual data on work activities (see Annex C for the summary statistics), the closer the host household to the refugees the higher the probability that individuals belonging to it work as employees and lower the probability that they are involved in casual work. At the mean, a reduction of 1 km in the distance to refugees decreases the probability of doing casual labour by 5 percent and increases the probability of doing waged labour by about 3 percent.

The latter effect is heterogeneous across industrial sectors. Indeed, wage employment increases in the agricultural sector and the non-agricultural private sector. The effect on public employment is only marginally significant (columns (3) to (5) in Table 7),<sup>17</sup> indicating that the increase in wage employment is not due to the demand stemming, directly or indirectly, from the agencies supporting the refugees.

<sup>17</sup> Sectors are classified according to NACE (rev. 1.1). The public sector encompasses public administration and defense; compulsory social security; education; health and social work; other community, social and personal services activities; extraterritorial organizations and bodies. The private sector encompasses mining and quarrying; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade; hotels and restaurants; transport, storage, and communications; financial intermediation; real estate, renting and business activities. Agriculture encompasses agriculture, hunting, and forestry; fishing.

**Table 7. Employment by type and sector of households in host communities**

Panel A:	OLS				
	(1) Casual	(2) Salaried	(3) Public	(4) Private	(5) Agriculture
Distance to refugees (min)	0.0186***	-0.00942***	-0.00501***	0.000356	-0.00445***
	(0.00579)	(0.00227)	(0.00151)	(0.00121)	(0.000982)
Observations	5 856	5 856	5 856	5 856	5 856
R-squared	0.019	0.031	0.012	0.006	0.037
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES

Panel B:	IV				
	(1) Casual	(2) Salaried	(3) Public	(4) Private	(5) Agriculture
Distance to refugees (min)	0.0516**	-0.0293***	-0.0104*	-0.0106**	-0.0106***
	(0.0217)	(0.00823)	(0.00585)	(0.00417)	(0.00326)
Observations	5 856	5 856	5 856	5 856	5 856
R-squared	0.010	0.018	0.010	-0.008	0.032
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES
F Stat	79.46	79.46	79.46	79.46	79.46

Notes: Controls are gender, age, and years of education. Individuals under 14 years of age are excluded from the analysis. Errors are clustered at the household level. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

To identify the source of the increase of wage employment in the private sector, we looked at the probability of both host and refugee households to run an enterprise.<sup>18</sup> The results are presented in Table 8. Proximity does not affect the probability that hosts run a non-agricultural enterprise, but it is positively correlated to the probability that refugees have an enterprise. Therefore, it appears that the additional wage employment of the host household members may be generated by small enterprises run by refugee households and that proximity increases the probability of being employed in them. This confirms the anecdotal evidence on job creation for Ugandan nationals through refugee enterprises (World Bank, 2019).

<sup>18</sup> Since we do not have an instrument for the distance of refugee households to hosting-community households, we run only OLS regressions.

**Table 8. Probability of operating an enterprise (OLS)**

	(1)	(2)
	Hosting community	Refugees
Distance to refugees (min)	0.00412	-0.0197***
	(0.00873)	(0.00745)
Observations	1 572	2 018
R-squared	0.047	0.059
Controls	YES	YES
District FE	YES	YES

Notes: Controls include the number of male and female adult members, female household head, household head's age, and years of education. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

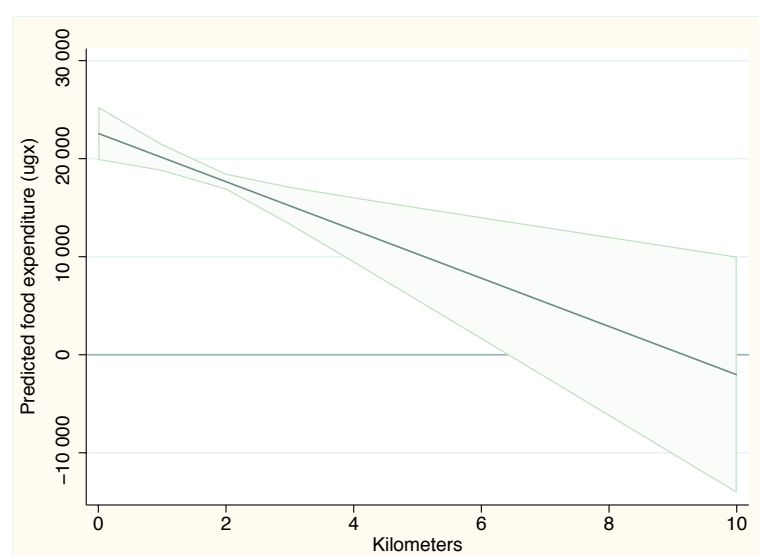
Source: Authors' own elaboration based on the FAO dataset.

## 6 How close is close?

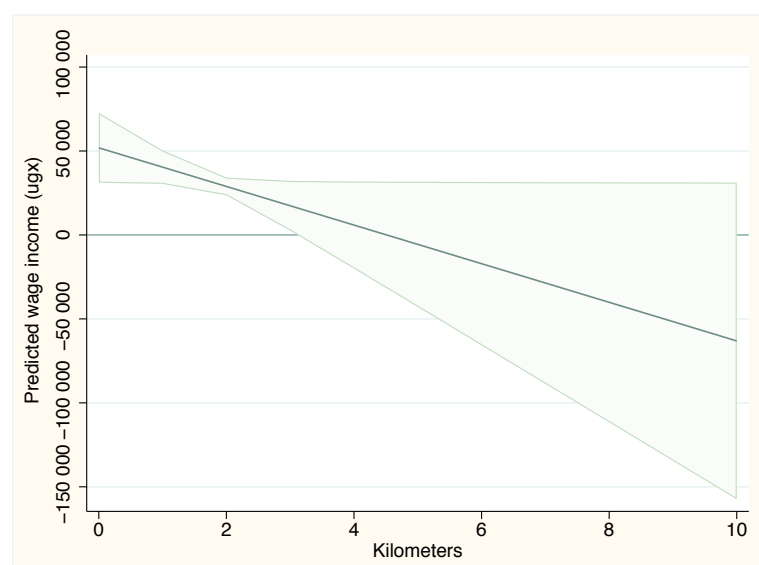
We have seen that proximity to refugee households exerts a positive effect on the host households' consumption and economic activity. To assess how far this effect goes, we have plotted the marginal effects for some of the outcome variables discussed above as a function of the distance between host and refugee households. As shown in Figure 3, the effects tend to disappear once the distance exceeds about 5 km on food expenditure and about 3 km on wage income. This result confirms the estimates of the related literature and shows that the effects are substantially circumscribed, possibly because of the lack of well-organized market and because of high transportation costs.

**Figure 3. Marginal effect of distance on household food expenditures and wage income**

### a) Marginal effect on food expenditure



### b) Marginal effect on wage income

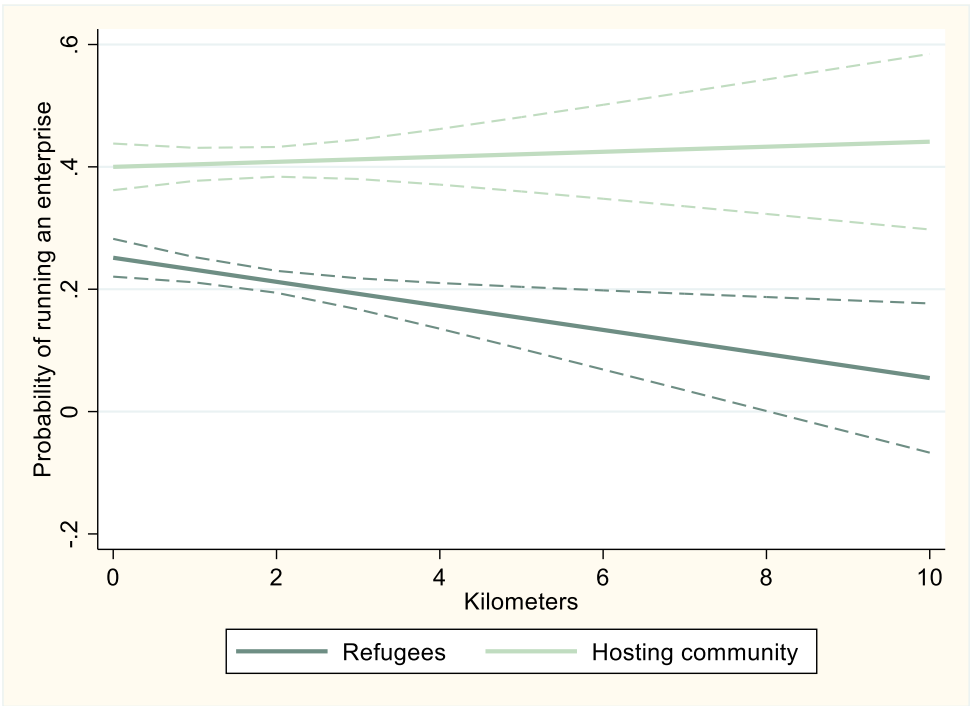


Note: The marginal effects are computed for IV estimates.

Source: Authors' own elaboration based on FAO dataset.

This finding is consistent also with the results on the probability of running an enterprise. As shown in Figure 4, the positive effect of refugees' proximity to the hosting community is null after 6 km. The constant marginal effect of the distance on hosts' probability of doing entrepreneurial activities, instead, is coherent with the non-significant effect reported in Table 8 of the previous section.

**Figure 4. Marginal effect of distance on the probability of running an enterprise**



Note: The marginal effects are computed for OLS estimates.

Source: Authors' own elaboration based on the FAO data.

## 7 Robustness

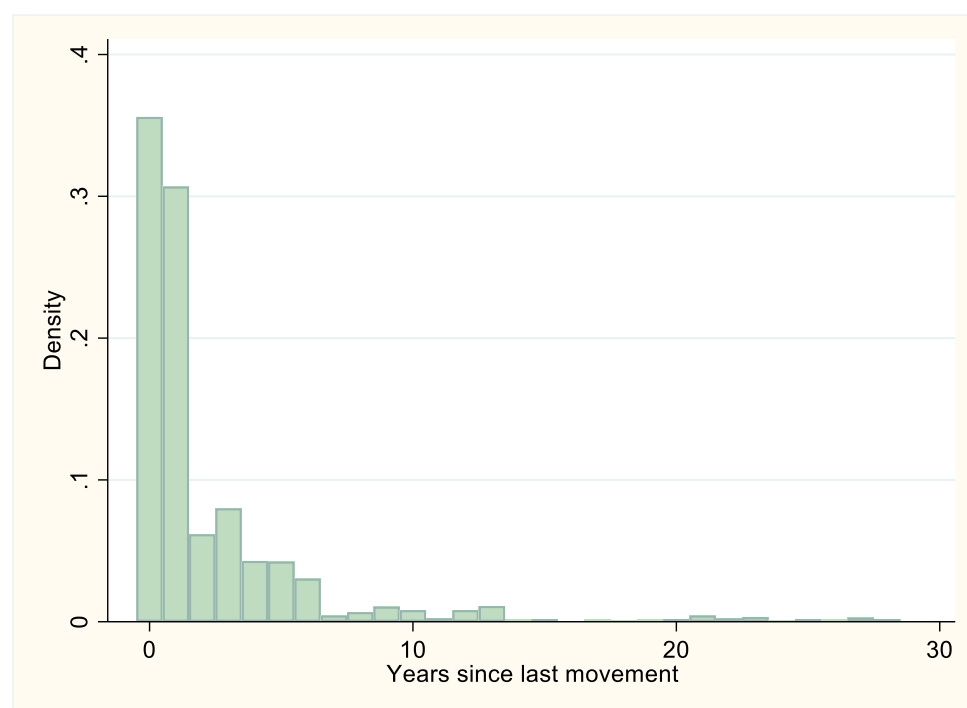
In this section we present some robustness tests relative to the possibility of endogenous location choice by host households and different measures of distance.

As we discussed above, host households might have moved in response to the presence of refugees in the area and, possibly, chosen a residence closer to them to exploit the possibility of the interchange. Should this be the case, our estimates could be biased. However, hosts' movements appear to be very limited: more than 70 percent of our sample never moved and more than 90 percent did not move in the five years preceding the survey.

Moreover, the refugee households present in our sample are in most cases relatively recent arrivals. As Figure 4 shows more than 80 percent of them arrived within two years from the date of the survey.

On this basis, to test the robustness of our results we have carried out the estimates presented above restricting the sample of host households to include only those who did not move in the 2 years or in the 5 years before the survey was carried out. The results for some of the main outcomes are presented in Table 9.<sup>19</sup> As it is possible to see, the results are robust to the restriction of the sample to households who moved only before the main flows of arrivals. The coefficients are fairly stable and so is their significance, except a couple of cases in which the standard errors become marginally larger.

**Figure 5. Arrival of refugee households**



Notes: Years of household head's arrival in the current place of residence are plotted on the horizontal axis, density for the total refugee households is plotted on the vertical axis.

Source: Authors' own elaboration on the FAO dataset.

<sup>19</sup> The results for the other outcomes are available upon request.

**Table 9. Robustness analysis. Estimation by years of household head's arrival in current residence (IV)**

Panel A:	Food expenditure		
	(1) All sample	(2) More than 2Y	(3) More than 5Y
Distance to refugees (min)	-2 219***	-1 944***	-1 680**
	(713.8)	(710.5)	(699.4)
Observations	1 555	1 505	1 446
R-squared	0.098	0.096	0.102
Controls	YES	YES	YES
District FE	YES	YES	YES
F Stat	107.79	105.58	103.70
Panel B:	Wage income		
	(1) All sample	(2) More than 2Y	(3) More than 5Y
Distance to refugees (min)	-11 501**	-10 726*	-10 699*
	(5 842)	(5 849)	(5 575)
Observations	1 541	1 493	1 436
R-squared	0.054	0.061	0.059
Controls	YES	YES	YES
District FE	YES	YES	YES
F Stat	111.78	108.70	106.68
Panel C:	Wage labour employment		
	(1) All sample	(2) More than 2Y	(3) More than 5Y
Distance to refugees (min)	-0.0293***	-0.0279***	-0.0280***
	(0.00823)	(0.00819)	(0.00814)
Observations	5 856	5 705	5 529
R-squared	0.018	0.022	0.025
Controls	YES	YES	YES
District FE	YES	YES	YES
F Stat	79.46	78.92	77.03

Notes: Models in Panel A refer to monthly food expenditure per capita. Models in Panel B refer to the household's monthly income. Controls include the number of male and female adult members, female household head, household head's age, and years of education. Models in Panel C refer to the individual probability of being employed as a salaried worker. Controls include gender, age, and years of education. In the regressions with the individual dataset (Panel C) errors are clustered at the household level. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

The main results show that the effect of living close to refugees on hosts' outcomes is statistically different from zero within 5 km of distance. Therefore, one can argue that households living close to refugees self-selected based on characteristics that are correlated with the outcomes of interest. As a further robustness test, we perform a balance test to compare the characteristics of hosts living within 5 km of distance to settlements' centers with those of hosts

living farther away. Without data relative to the period preceding the arrival of the refugees, we used only hosts' characteristics that are unlikely to be affected by the refugee presence: household head gender, age, and education. As shown in Annex A, in Table A1 there are no significant differences in the characteristics of the households living within and beyond the 5 km radius from the center of the settlement.

Finally, we check whether the different measures of distance between host and refugee households affect our results. In Table 10 we use the average distance between each host household and all the refugee households in the district instead of the minimum distance to a refugee household as a regressor on a subset of the outcomes. The estimate shows that the results do not change substantially and are robust to a different measure of the distance.<sup>20</sup>

**Table 10. Robustness analysis. Estimations on average distance to refugee households**

Panel A:	OLS		
	(1)	(2)	(3)
	Food	Wage	Salaried
Distance to refugees (mean)	-540.8***	-2,067**	-0.00525***
	(129.9)	(1,025)	(0.00145)
Observations	1 555	1 541	5 856
R-squared	0.119	0.065	0.031
Controls	YES	YES	YES
District FE	YES	YES	YES

Panel B:	IV		
	(1)	(2)	(3)
	Food	Wage	Salaried
Distance to refugees (mean)	-621.7**	-3,828*	-0.00951***
	(278.5)	(2,306)	(0.00331)
Observations	1 555	1 541	5 856
R-squared	0.119	0.063	0.029
Controls	YES	YES	YES
District FE	YES	YES	YES
F Stat	194.84	196.84	99.78

Notes: Columns (1) and (2) of Panel A and Panel B controls include the number of male and female adult members, female household head, household head's age, and years of education. Column (3) of Panel A and Panel B controls include individual gender, age, and years of education. Individuals under 5 and over 14 are excluded. Errors are clustered at the household level. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

<sup>20</sup> Results relative to the whole set of outcomes and other measures of distance are available on request.



## 8 Conclusions

The high number of refugees living in low- and middle-income countries has raised the questions of the impact of their presence on the welfare of local communities. As often the refugees are located in deprived and rural areas of the countries, the issue is whether their presence can further harm the living conditions of the hosting communities.

The few non-descriptive studies point to a positive impact of refugees on the economic conditions of local communities. In this paper, we have extended the previous literature by analyzing not only the impact of refugees on hosts' consumption but also by looking at the possible channels through which the change in consumption is generated. Moreover, we have extended the evidence relative to Uganda, the country with the highest number of refugees in sub-Saharan Africa (SSA), to consider the impact of refugees in most of the districts where they are hosted.

We have used the distance between host and refugee households as a proxy for the potential economic interaction among them. To take into consideration the possibility of endogenous location choices by the refugees, we have used an Instrumental Variable (IV) approach using the distance between each host household and the administrative centre of the nearest refugee camp as an instrument.

Our results indicate that proximity to refugees increases hosts' consumption, especially of food. This appears to be linked to an increase in wage income as host households' members are more likely to be employed the closer they are to refugee households. The increase in employment seems to have taken place mainly in the private sectors – both agricultural and non-agricultural, and public employment; furthermore, this seems to be likely correlated to the creation of small enterprises by the refugees themselves. Indeed, the probability that refugee households run an enterprise is positively correlated with the proximity to the hosting community.

The effects of market creation are, however, very localized. They tend to fade out when the distance between hosts and refugees become larger than about 5 km, confirming that the positive impact of the presence of refugees through direct market creation appears non-negligible but limited to household living close to each other. However, this does not exhaust the possible positive impacts as there might be spillover effects of the assistance to refugees, like, for example, improved access to far-away markets thanks to infrastructure improvements, provision of social protection, and the enhanced resilience to shocks. Of course, as funds are fungible, the benefits accruing to host households living close to refugees' settlements should be weighed against the benefits deriving from their alternative use.

Two broad policy implications can be drawn from the data driven evidence provided. One is the recognition that the presence of refugees possibly brings about more positive effects than negative ones for host communities, as determined by consumption and income outcomes. These effects are enabled by, for example, employment generation as well as cash being injected into the economy via cash transfer programmes.

The second policy implication is that more countries, following the example of Uganda, could reap more benefits from migration movements, including in the context of the hosting of refugees. This would be the case when these countries enable positive economic interactions between refugee populations and host communities – e.g., fostering growth of the local economy – rather than separating both communities and missing these potential positive impacts.

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## Annexes

### Annex A. Balance test

**Table A1. Balance test**

	(1)	(2)	(3)	(4)
	All sample	Host households living less than 5 km far from the settlement	Host households living more than 5 km far from the settlement	Difference between living less than and more than 5 km far
<b>Household members' characteristics</b>				
<b>Number of female adults</b>	1.765	1.787	1.701	0.0854
	(1.298)	(1.316)	(1.242)	(0.0727)
<b>Number of male adults</b>	1.766	1.781	1.721	0.0605
	(1.164)	(1.188)	(1.094)	(0.0645)
<b>Years of education of adults</b>	5.534	5.490	5.663	-0.173
	(2.787)	(2.716)	(2.984)	(0.168)
<b>Years of education of female adults</b>	5.574	5.572	5.577	-0.00433
	(3.414)	(3.348)	(3.599)	(0.209)
<b>Years of education of male adults</b>	5.522	5.485	5.628	-0.144
	(3.652)	(3.612)	(3.768)	(0.222)
<b>Household head's characteristics</b>				
<b>Female household head</b>	0.300	0.298	0.306	-0.00797
	(0.459)	(0.458)	(0.461)	(0.0266)
<b>Household's head age</b>	44.26	44.64	43.18	1.461
	(14.73)	(14.95)	(14.03)	(0.823)
<b>Legally divorced, separated female head</b>	0.292	0.292	0.291	0.000844
	(0.455)	(0.455)	(0.455)	(0.0262)
<b>Subjective resilience indicators</b>				
<b>Subjective resilience to shock</b>	29.28	29.21	29.49	-0.279
	(6.434)	(6.417)	(6.487)	(0.373)
<b>Subjective resilience to drought</b>	7.402	7.331	7.607	-0.277
	(2.498)	(2.451)	(2.619)	(0.149)
<b>Observations</b>	1 572	1 167	405	1 572

Notes: Subjective resilience indicators are constructed as in Jones and d'Errico (2019). A T-test on the differences of characteristics of households living 5 km far or close to the nearest settlement. Standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

## Annex B. Livestock

Table B1. Units of livestock owned looks in more detail at the livestock owned by the household. The results seem to indicate that proximity to refugees tends to raise the number of goats owned in the substitution of poultry.

**Table B1. Units of livestock owned**

Panel A:	OLS				
	(1) Goats	(2) Sheeps	(3) Pigs	(4) Cattle	(5) Poultry
Distance to refugees (min)	-0.210**	-0.0474	0.0341	-0.0830	0.156
	(0.0872)	(0.0462)	(0.0238)	(0.113)	(0.141)
Observations	1 219	1 219	1 219	1 219	1 219
R-squared	0.170	0.053	0.081	0.175	0.088
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES

Panel B:	IV				
	(1) Goats	(2) Sheeps	(3) Pigs	(4) Cattle	(5) Poultry
Distance to refugees (min)	-0.848**	0.136	-0.00217	-0.0106	0.995**
	(0.339)	(0.179)	(0.0558)	(0.437)	(0.473)
Observations	1 219	1 219	1 219	1 219	1 219
R-squared	0.132	0.038	0.079	0.175	0.062
Controls	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES
F Stat	69.00	69.00	69.00	69.00	69.00

Notes: Households that are not involved in any livestock production activities are excluded. Controls include the number of male and female adult members, female household head, household head's age, and years of education. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

## Annex C. Employment

**Table C1. Summary statistics for employment (individual data)**

	Mean	St. Dev.	Min	Max
Employment in casual labour	.2862331	.452037	0	1
Employment in wage labour	.0600858	.2376654	0	1
Employment in the public sector	.0285573	.1665723	0	1
Employment in the private sector	.0155167	.1236059	0	1
Employment in the agricultural sector	.0135358	.115563	0	1
Observations	6 058			

Note: Summary statistics are computed for individuals belonging to hosting-community households only.

Source: Authors' own elaboration based on the FAO dataset.

**Table C2. OLS Regressions on the distance to the nearest settlement**

	(1)	(2)	(3)
	Food	Wage	Salaried labour
Distance to settlement (min)	-176.8*** (57.16)	-961.1** (486.2)	-0.00201*** (0.000563)
Observations	1 555	1 541	5 856
R-squared	0.115	0.065	0.030
Controls	YES	YES	YES
District FE	YES	YES	YES

Notes: Controls include the number of male and female adult members, female household head, household head's age, and years of education. The model in Column (3) refers to the individual probability of being employed as a salaried worker. Controls include gender, age, and years of education. In Column (3) errors are clustered at the household level. Robust standard errors in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Source: Authors' own elaboration based on the FAO dataset.

## Annex D. First stage

**Table D1. First-stage estimation**

Dependent variable	Minimum distance between host and refugee
Distance to settlement (min)	<b>0.0687***</b>
	(12.63)
Number of male adults (15+)	-0.0198
	(-0.94)
Number of female adults (15+)	-0.000160
	(-0.01)
Female headed household	-0.00752
	(-0.16)
Age head of household	-0.00135
	(-0.85)
Average years of education of adults	0.00934
	(1.17)
district==Adjumani	0.280***
	(2.97)
district==Arua	-0.605***
	(-7.29)
district==Kiryandongo	-1.375***
	(-15.15)
district==Lamwo	-1.202***
	(-15.13)
district==Moyo	-1.071***
	(-12.56)
district==Yumbe	-1.607***
	(-12.31)
district==Kamwenge	1.662***
	(11.71)
Constant	1.716***
	(15.42)
Observations	3 558

Source: Authors' own elaboration based on the FAO dataset.





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