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Amidst Sahel's unrest: Labor market and consumption effects of Malian refugee camps in rural Niger

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Amidst Sahel's Unrest: Labor Market and Consumption Effects of Malian Refugee Camps in rural Niger *

Fatou Fall

Abstract

Instability and ongoing conflict across the Sahel have led to conflict-induced migration and the displacement of populations across borders. As host countries face the challenges associated with refugee inflows, it becomes increasingly important to understand how these movements affect the host communities that are indirectly impacted by the conflict. By combining geocoded household panel data from Niger with administrative data on refugee settlements, I exploit spatial variation in exposure to refugee camps to assess how refugee exposure affects labor market outcomes, labor on household plots, and household consumption among households in areas hosting refugees. A higher exposure to refugees increases the likelihood that households diversify into secondary and non-farm activities, decreases family labor on plot, and improves the Food Consumption Score during the harvest season. Collectively, these results suggest that refugee inflows can generate positive local economic effects in rural settings, potentially through increased demand and humanitarian aid.

JEL Classification: J43, O12, O15, R23

Keywords: Refugee impacts, Labor markets, Consumption, Rural households, Niger

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1 Introduction

The security situation in the Sahel region has been deteriorating over the years, leading to a record number of fatalities annually (ACLED, 2024). In 2012, the coup d'état in Mali and the ensuing conflict triggered a refugee outflow into neighboring countries, particularly Niger. Since then, the region has continued to experience political instability, with coups d'état in Mali in 2020, Sudan and Guinea in 2021, Burkina Faso in 2022, and Niger in 2023. By the end of 2025, the Sahel hosted 4.1 million forcibly displaced people, including 951,000 refugees and asylum seekers (UNHCR, 2025). As most displaced people seek safety in nearby countries, refugee camps are generally established close to international borders before being relocated further inland when security conditions deteriorate (Fransen et al., 2017; Ruiz and Vargas-Silva, 2017; Steiner et al., 2003). Although hosting refugees provides protection to displaced populations, refugee inflows also reshape the economic and social conditions faced by households living in refugee-hosting areas.

While a growing literature has examined the effects of refugee inflows on host populations, evidence from low-income, rural settings remains limited. In particular, the Sahel has received relatively little attention despite experiencing some of the world's largest and most persistent displacement crises. Existing evidence from Africa relying on household panel data is also scarce and largely confined to a series of studies using the same panel dataset from Tanzania (Maystadt and Duranton, 2019; Maystadt and Verwimp, 2014; Ruiz and Vargas-Silva, 2015, 2016, 2017; Tsuda, 2022). Consequently, little is known about the short- to medium-term effects of refugee inflows on host households in rural Sahelian contexts.

This paper examines how the sudden influx of Malian refugees into Niger in 2012 affected labor market outcomes, labor on household plots, and household consumption in refugee-hosting areas. I exploit the establishment of refugee camps in Niger following the 2012 Malian conflict as a quasi-natural experiment and combine geocoded household panel data with administrative information on refugee settlements to construct a refugee exposure index. By exploiting both the spatial variation in exposure to refugee camps and the temporal variation provided by observations before and after the refugee inflow, I estimate the short- to medium-term effects of refugee exposure on households in 2014. The results show that greater refugee exposure increases the likelihood that household members engage in additional work activities outside their own farming activities, reduces family labor on agricultural plots, and improves household food consumption, particularly during the harvest season. Overall, the findings suggest that refugee inflows reshape household labor allocation between on-farm and off-farm activities while improving household consumption in refugee-hosting areas.

Understanding how refugee inflows affect host households is essential for assessing the broader economic consequences of forced displacement in refugee-hosting areas. This is particularly important in Sub-Saharan Africa, where almost one-third of the world's refugee population resides (UNHCR, 2024). The socioeconomic fabric in the region is often fragile, with limited capacity to absorb large refugee inflows and increasing pressure on already constrained resources, including food, healthcare, and employment opportunities. Moreover, livelihoods in these settings

rely heavily on agriculture and informal labor markets, making local economies particularly sensitive to sudden changes in labor supply and demand. The evidence presented in this paper suggests that refugee inflows are not necessarily detrimental to host households in this context. Instead, the accompanying humanitarian response and the economic activity generated around refugee camps may help mitigate potential adverse effects and even create opportunities for host populations. These findings highlight the importance of considering both refugee inflows and the broader humanitarian response when assessing the consequences of forced displacement.

The existing literature suggests several channels through which refugee inflows may affect host populations. Conflict-induced displacement in a neighboring country, when the host country is not directly affected, generates an exogenous inflow of immigrants. This sudden migration can affect local labor markets by increasing labor supply and altering employment opportunities and wage structures. Several studies have documented these labor market effects. Card (1990)'s seminal paper analyzes the Mariel boatlift, during which the sudden arrival of Cuban refugees increased Miami's labor force by 7%. Refugees' effects on employment and wages, however, depend on the composition of the refugee shock (Borjas and Monras, 2017; Clemens and Hunt, 2019). In rural Sub-Saharan Africa, where refugees are primarily employed in agriculture, refugee inflows may also induce agricultural labor adjustments. Farmers who hire labor may benefit from lower labor costs (Maystadt and Verwimp, 2014), whereas those competing for similar jobs may face greater competition and downward pressure on wages. Beyond labor market effects and agricultural labor adjustments, refugee inflows may also generate consumption effects (Verme and Schuettler, 2021). The arrival of refugees increases the demand for food and other essential goods, while humanitarian organizations simultaneously influence local markets through the provision of food aid and other resources. Consequently, the overall effects on host households reflect both the refugee inflow itself and the accompanying humanitarian response.

This paper contributes to the literature on refugees in three ways. First, it provides novel evidence from a low-income, rural Sahelian context, a setting that remains largely overlooked despite becoming one of the world's main regions of forced displacement. Second, it addresses the identification challenges common in this literature by exploiting the quasi-experimental nature of the 2012 Malian refugee influx together with household panel data collected before and after the establishment of refugee camps. This empirical strategy makes it possible to isolate the effects of spatial exposure to refugees from pre-existing unobserved heterogeneity across refugee-hosting areas. Third, the paper extends the literature by examining labor on household plots, a dimension that has received little attention in studies of refugee-hosting economies. By analyzing changes in family labor allocation on agricultural plots alongside labor market and consumption effects, the paper provides a more comprehensive understanding of how rural households adjust to refugee inflows.

The paper is organized as follows. The next section presents the case and context of the Malian refugees in Niger. Section 3 offers a literature review on hosting refugees. Section 4 outlines the data used and presents the empirical strategy. Section 5 discusses the main findings. Section 6 provides robustness checks. Finally, Section 7 concludes.

2 Refugees in Niger

2.1 Niger and the Malian crisis

Niger is a landlocked country bordered by Algeria to the north, Mali and Burkina Faso to the west, Nigeria to the south, and Chad to the east. The population is ethnically diverse, with major groups including the Hausa, Djerma, Songhai, and Tuareg. Ranked 186th out of 187 countries in the Human Development Index (HDI) in 2012, the baseline year of our analysis, Niger has consistently been low on the HDI since 2010; this low ranking highlights the challenges the country faces in education, health, and income. These challenges are particularly pronounced in the regions of Tahoua and Tillaberi, which border Mali and record the lowest HDI scores. Poverty is widespread, with over 80% of the population experiencing multidimensional poverty in 2011. Predominantly rural with about 83.8% of the population living in rural areas,[1] approximately 76% of the working population is engaged in agriculture in 2012 (RGPH, 2012). Agricultural activities are typically low-intensity and low-productivity, primarily serving subsistence needs, with about 85% of the production being for self-consumption. The average farm size is about 5 hectares, supporting around twelve people, including six active agricultural workers (RGPH, 2012).

In 2012, a crisis emerged in Mali from a complex interplay of factors, including long-standing political grievances, ethnic tensions, and the fallout from the Libyan civil war. The primary catalyst was the Tuareg rebellion in northern Mali, led by the National Movement for the Liberation of Azawad (MNLA), seeking autonomy for the Tuareg-dominated regions. The rebellion was fueled by the return of Tuareg fighters from Libya, where they had served in Muammar Gaddafi's army and gained access to weapons (Shaw, 2013). Amidst the chaos, Islamist groups, notably Ansar Dine and Al-Qaeda in the Islamic Maghreb (AQIM), capitalized on the instability, seizing control of key towns and imposing their version of Sharia law. This complex situation led to the collapse of the Malian state's authority in the north and prompted a military coup in Bamako, the capital, by disgruntled soldiers who felt the government was not adequately addressing the crisis (Calvo et al., 2020).

The crisis in Mali in 2012 led to a significant refugee influx due to the escalating armed conflict and deteriorating security situation. As violence intensified, civilians faced profound threats to their safety and livelihoods, prompting widespread displacement within Mali and across its borders. Geographical proximity played a pivotal role in directing the flow of refugees. Niger, which shares a long and porous border with Mali, became one of the destinations for those fleeing the conflict. Moreover, historical and cultural ties between communities on both sides of the border, including shared ethnicities and languages with northern Mali, facilitated the movement of displaced populations and explain the role of these regions as hosts for Malian refugees. Thousands of Malians and Nigeriens found refuge in Niger to flee the instability following the Malian crisis of 2012, and this number stood at more than 50,000 at the height of the crisis

[1] The urbanization rate was a mere 16.2% in 2012, significantly lower than the sub-region's average of 37% (RGPH, 2012; World Bank, 2012).

(UNHCR, 2015). While this figure may appear modest in absolute terms compared to refugee inflows studied in other contexts, it represents a substantial demographic shock in a region characterized by very low population density.[2] To make the magnitude of the shock explicit, Table A1 in Appendix reports for each department hosting refugees (excluding the capital city of Niamey), the number of registered refugees, the resident population, and the resulting population shock. Refugees fled and settled in the Tillaberi and Tahoua regions in western Niger, across the five host departments. The refugee inflow represented between 2.3% and 17.8% of the local population at the height of the crisis. In 2012, these regions had the lowest urbanization rates in the country (9.4% for Tahoua and 6.3% for Tillaberi), highlighting the concentration of the shock in relatively rural and vulnerable areas (RGPH, 2012).

The refugee population is predominantly Tuareg, with smaller populations of Songhai, Hausa, Peul, and Arabs. Rather than replicating host-area proportions, the camps capture the same underlying ethnic diversity, concentrated heavily in districts where Tuareg communities already dominate. In Tahoua region, where Hausa represent 68% of the local population and Tuareg 28%, the refugee camps population is 99% Tuareg and 1% Hausa. In Tillaberi, where the host population consists of 10% Hausa and 13% Tuareg, the camp population is roughly 80% Tuareg, with the remaining share split among the other listed groups.[3] The camps residents are predominantly women and children, with a relatively small share of working-age individuals (IFORD and UNHCR, 2015). Refugees remain highly dependent on humanitarian aid, particularly for food, although many complement this support through market purchases and small income-generating activities such as petty trade, daily labor, and livestock-related activities. Despite limited resources, most households report having at least one source of income and express a strong willingness to engage in economic activities.[4]

2.2 Refugees Camps in Niger

At the beginning of the crisis, refugees initially settled spontaneously in areas of Niger close to the border, within the Tillaberi and Tahoua regions. The proximity to the border presented challenges in securing these areas although Armed Conflict Location and Event Data (ACLED) show that these immediate border zones did not report any incidents prior to 2014.[5] As the situation evolved, the Nigerien government, in collaboration with the UNHCR and various NGOs, relocated these refugees to managed sites in 2012 and 2013. These camps operate without movement restrictions, allowing refugees to freely travel and interact with host populations. This strategy was adopted to ensure that the refugees were protected according to national and international standards.

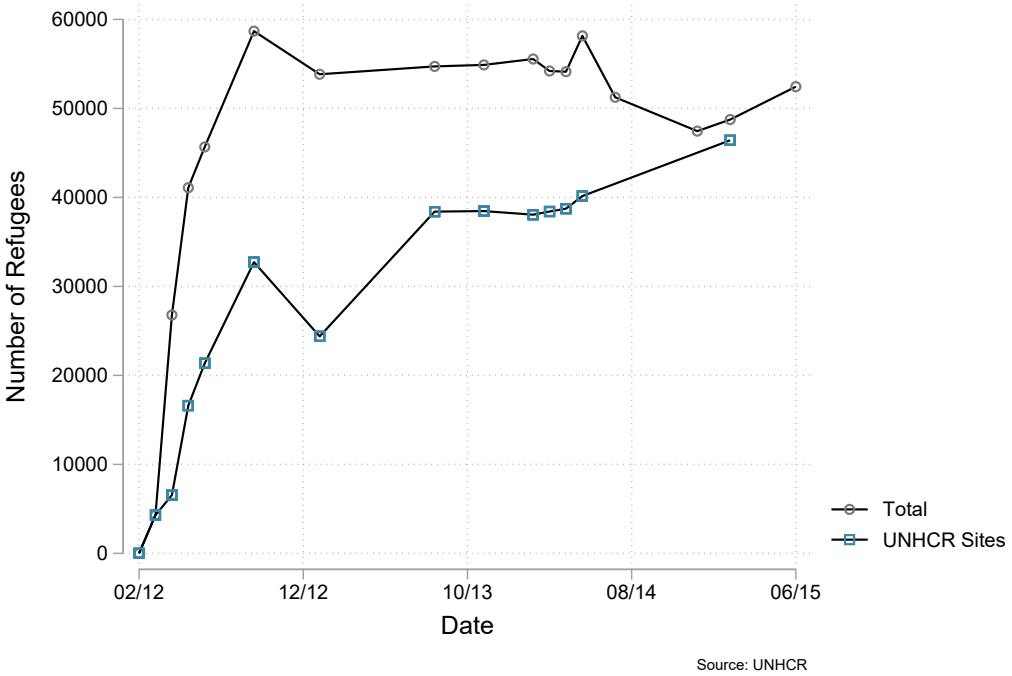
Selection of these sites involved consultation with traditional and administrative authorities

[2] See Appendix Figure A1 for a population density map of Niger.
[3] A complete ethnic breakdown by camp site is available in Appendix A.1.
[4] See Appendix A.2 for additional details.
[5] In the years following the Malian crisis, insecurity increased in neighboring countries. In 2015, Boko Haram expanded its operations in Nigeria, which corresponded with isolated incidents in Niger along its Nigeria border. These events were confined to the Lake Chad basin and the Diffa region in southeastern Niger, far from the border zones hosting Malian refugees.

as well as local communities. The data concerning refugee settlements, their locations, and the changes in their population over time are sourced from UNHCR's documentation of their activities and registered refugee populations.[6]

The establishment of the camps began in March 2012 with Mangaize and Abala and continued in June 2012 with Tabareybarey. Locations were selected based on the proximity of an area to the self-established refugee camps (which were not far from the border) and its capacity to accommodate incoming refugees. All three camps are situated in the Tillaberi region and provide essential infrastructure, including shelter, water, sanitation, health services, education, and psychosocial support. In October 2012, the refugee population in each camp was as follows: 4,964 refugees in Mangaize camp in Ouallam department (1.52% of the department population), 18,573 refugees in Abala camp in Abala department (12.87%), and 9,189 refugees in Tabareybarey camp in Ayorou department (16.11%). In 2013, the United Nations and the Nigerien government introduced Refugee Hosting Areas (ZAR) to accommodate nomadic refugees in pasture-based settings. Two areas were established: Intikane and Tazalite. In the Tillia department, Intikane hosted approximately 8,000 refugees, representing 20.52% of the local population. In the Tassara department, Tazalite hosted around 1,000 refugees, corresponding to 4.09% of the population.[7] Figures 1 shows the evolution of the number of Malian refugees registered by the UNHCR over time.

Figure 1: Number of Malian refugees registered by the UNHCR (2012-2015)



Source: UNHCR

[6] This information is made publicly available through UNHCR Data Portal: Niger. Refugee data is not available for every month during the two years under study, all accessible data for each site where the UNHCR registered refugees is used to document the refugee population across time.

[7] More information on the sites can be found in Section A

Following camp establishment in 2012, the refugee population remained largely stable through 2014, with only minor fluctuations and a modest overall decline. This persistent situation placed pressure on UNHCR's operations and resources, underscoring the need for sustained support and adaptation to the ongoing refugee situation in Niger. As the crisis evolved from an emergency to a prolonged situation, funding levels dropped from $300 per capita in 2013 to under $150 in 2015. This decrease was exacerbated by the withdrawal of self-financing NGOs and other UN agencies, further straining Niger's capacity to manage the increased population. The evolving situation with rising refugee numbers and reduced funding highlighted the challenges and the necessity for continued international support to ensure the well-being of both refugees and host communities in Niger. Despite these challenges, UNHCR has made significant achievements in supporting the refugees. Food distribution centers were established, initially relying on in-kind donations and food aid to ensure basic nutrition for the refugees. Over time, the scope of support expanded to include education, vocational training, and livelihood opportunities aimed at improving self-sufficiency and resilience among the refugee population.

NGOs and international organizations such as the UNHCR help support refugees by providing essential services and advocating for refugee rights, which includes access to the labor market. This support can stabilize host regions and reduce the burden on local resources, promoting economic development (Alloush et al., 2017). The demand for goods and services by NGO staff, including food, housing, and transportation, generates local economic activity. The settlement of refugee camps and the operations of humanitarian organizations can improve local infrastructure, benefiting both refugees and host populations (Maystadt and Verwimp, 2014). Collaboration between NGOs and local community groups is often instrumental in delivering aid, offering vocational training, and supporting small businesses. This support helps refugees establish themselves while fostering positive opportunities for host populations. By coordinating relief and development initiatives, humanitarian organizations support refugee settlement while buffering host communities against the potential burdens of large-scale displacement.

Additionally, the operations of these organizations require local labor, which also benefits host populations. NGOs also employ both refugees and local residents, helping to integrate the two groups and foster economic stability. They also prioritize hiring locals to benefit the host communities economically and ensure a better understanding of the local context and needs. For instance, the UNHCR engages locals in various capacities, such as administration, logistics, and program management, to support refugee camps and host communities. This approach is part of broader strategies to integrate environmental and socio-economic considerations into humanitarian efforts, ensuring sustainable and community-driven responses to refugee crises (UNHCR, 2011).

3 Effects of refugee inflows on refugee-hosting areas

The sudden arrival of refugees generates two simultaneous shocks to the host community: a rapid increase in population within a specific geographical area and a surge in public expenditure resulting from increased financial flows, such as international aid and heightened government

spending (Ludolph et al., 2022). These shocks alter demand and supply in local labor markets while also affecting consumer markets, with implications for host communities' welfare and levels of inequality (Verme and Schuettler, 2021). The following subsections present findings from studies examining the effects of forced displacement and refugee presence on labor market participation and consumption in host communities.

3.1 Labor market effects

Refugee inflows represent a labor supply shock affecting local economies through changes in the workforce. The literature on their labor market impacts finds highly heterogeneous results across contexts, institutions, and time horizons. Verme and Schuettler (2021) reviews this evidence and shows that many estimated effects are statistically insignificant, highlighting the importance of local labor market structures and absorption capacity in shaping outcomes

Several studies document adverse short-run labor market effects of large refugee inflows, particularly in urban or non-agricultural labor markets. Leveraging the unexpected large-scale exodus of ethnic Turks from Bulgaria in 1989, Aydemir and Kırdar (2017) observe a substantial increase in unemployment among native males following the influx of repatriates, underscoring the complexities of immigrant-native labor market interactions. Similarly, Peñaloza Pacheco (2019) find that Venezuelan migration to Colombia significantly reduced real hourly wages in regions with high inflows, reflecting difficulties in adjusting to increased labor supply. Consistent with this evidence, Lebow (2022) review studies on the Venezuelan migration crisis in Latin America and report systematic negative wage effects, particularly among low-skilled and informal workers in Ecuador, Brazil, and Peru.[8] In addition, Lebow (2024) documents migrant occupational downgrading in Colombia, which increases wage pressure on less-educated natives and reduces productivity due to skill mismatches. In contrast, other studies find limited or null effects when refugee labor force participation is low. Fallah et al. (2019) show that the Syrian refugee influx in Jordan had no significant impact on employment, unemployment, or job characteristics among Jordanians in high-refugee areas, largely due to low refugee participation in the labor market. More broadly, Aksoy and Ginn (2022) find no evidence of a short-term decline in average wages or employment in low- and middle-income countries hosting large refugee populations between 2000 and 2017, regardless of refugees' legal access to work.

These different findings suggest that the effects of refugee inflows are highly context-specific, and different adjustment mechanisms might emerge in rural, agriculture-based economies. In sub-Saharan Africa, several studies highlight distinct adjustment mechanisms. Loschmann et al. (2019), studying Congolese refugee camps in Rwanda, find that proximity to camps increases the likelihood of both wage employment and self-employment, alongside higher asset ownership and improved perceived welfare, suggesting complementarities between refugee presence and local labor demand. Similarly, Kofol and Naghsh Nejad (2022) show that in Tanzania's Kagera region, refugee inflows led to the substitution of child labor with adult labor in agriculture, increasing

[8] See Lebow (2022) for a comprehensive review.

productivity and household income, consistent with a relaxation of labor constraints rather than increased competition.

Longer-term evidence further emphasizes structural adjustments in rural labor markets. Ruiz and Vargas-Silva (2015) document that 17 years after the Rwandan and Burundian refugee shock in Tanzania, individuals were less likely to engage in wage employment outside the household and more likely to shift toward self-employment in agriculture or livestock, while moving away from agricultural wage labor. In a related analysis, Ruiz and Vargas-Silva (2016) show that refugee exposure increased self-employed farming and reduced agricultural wage employment, suggesting labor market reallocation and substitution between refugees and natives. Extending this evidence, Maystadt and Verwimp (2014) find that although overall consumption increased after the establishment of refugee camps, gains were lower for initially agricultural workers, reflecting increased competition in labor markets and heterogeneous welfare effects. Finally, Tsuda (2022) show that refugee inflows increased both farm and off-farm labor supply, reducing agricultural wages and accelerating the transition toward food crop commercialization, thereby reshaping rural production structures with heterogeneous household-level effects.

3.2 Consumption effects

According to Verme and Schuettler (2021), forced displacement affects host economies through consumption and price channels, with ambiguous short- and medium-term effects depending on market conditions. On the one hand, increased demand may raise prices in local markets with limited supply responsiveness; on the other, humanitarian aid and inflows of goods may mitigate or even reduce price pressures. This dual mechanism highlights the context dependence of price responses to forced displacement.

Empirical evidence reflects these contrasting channels. Alix-Garcia and Saah (2010) show that refugee inflows in Tanzania increased agricultural prices in nearby markets, while Alix-Garcia et al. (2012) find similar price increases in Sudan, particularly for food and housing, alongside shifts in local business activity and land use. In contrast, Rozo and Sviatschi (2021) document higher housing expenditures in Jordan for households located closer to refugee camps, whereas Balkan and Tumen (2016) find that Syrian refugee inflows in Turkey reduced consumer prices through lower labor costs and expanded informal employment. These mixed results underline the interaction between labor and consumer markets in shaping price adjustments.

Given this ambiguity in price effects, the literature has increasingly focused on broader welfare outcomes. Overall, most studies find that refugee inflows do not reduce host community welfare and are often associated with consumption gains (Verme and Schuettler, 2021). Kreibaum (2016) show that Congolese refugee settlements in Uganda increased local consumption and business activity, although effects varied across employment groups and were accompanied by shifts in public service provision and NGO reliance. Similarly, Maystadt and Duranton (2019) find long-term increases in real consumption in Tanzania following the Rwandan and Burundian refugee shock, driven in part by reductions in transport costs and persistent infrastructure improvements.

Recent evidence from Uganda further supports positive welfare effects. Kadigo and Maystadt (2023) show that rural households engaged in subsistence farming benefited from refugee presence through increased commercialization, while d'Errico et al. (2022) find that proximity to refugees raises food consumption and labor income, with effects declining with distance, highlighting the spatially concentrated nature of spillovers.

Evidence from internally displaced populations points to similar but context-dependent outcomes. Foltz and Shibuya (2023) find that internally display persons (IDP) presence in Mali is associated with higher household consumption and no adverse economic effects on hosts, whereas George and Adelaja (2022) document negative impacts on food security in Nigeria due to increased demand pressures. In addition, Taylor et al. (2016) show that refugee camps in Rwanda generate local income gains through increased demand for goods and services, producing positive spillovers to host communities.

Overall, while consumption effects are generally neutral to positive, Schneiderheinze and Lücke (2020) highlight substantial heterogeneity across contexts. Consumer market outcomes depend critically on aid provision, market integration, and institutional capacity, leading to highly context-specific effects of forced displacement.

4 Data & Empirical strategy

4.1 Data

For the analysis, I use the nationally representative panel data from the Niger Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA). This survey dataset includes socio-demographic, health, employment, and agricultural information for a representative subset of households across Niger. The survey is designed to ensure national coverage, encompassing both urban and rural areas across all regions of the country. It features a detailed spatial breakdown, including 270 enumeration areas (EAs). It also includes geographical coordinates of the enumeration areas and the household's distance to several nearest locations: major road, town with 20,000 inhabitants, market, department capital, and regional capital.

The LSMS-ISA survey was conducted in two waves: the first starting in July 2011 and ending in January 2012 [9], and the second starting in September 2014 and ending in March 2015 [10]. Each wave involved visiting households twice, once after the planting season and once after the harvest season. This bi-seasonal approach allows for capturing the dynamic aspects of agricultural cycles. This dataset provides valuable insights into household movements, including relocation, although some households were lost during follow-up. Data about UNHCR refugees are derived from UNHCR documentation. It allows us to have the coordinates of the localisation of UNHCR sites as well as the number of refugees.[11]

[9] Survey and Census Division, National Institute of Statistics (2011)
[10] Survey and Census Division (2014)
[11] Distance between communities and UNHCR sites are presented in Figure A2 in the Appendix.

To investigate the influence of refugee presence on rural household well-being, I build a refugee exposure index similar to the one built by Kadigo and Maystadt (2023):

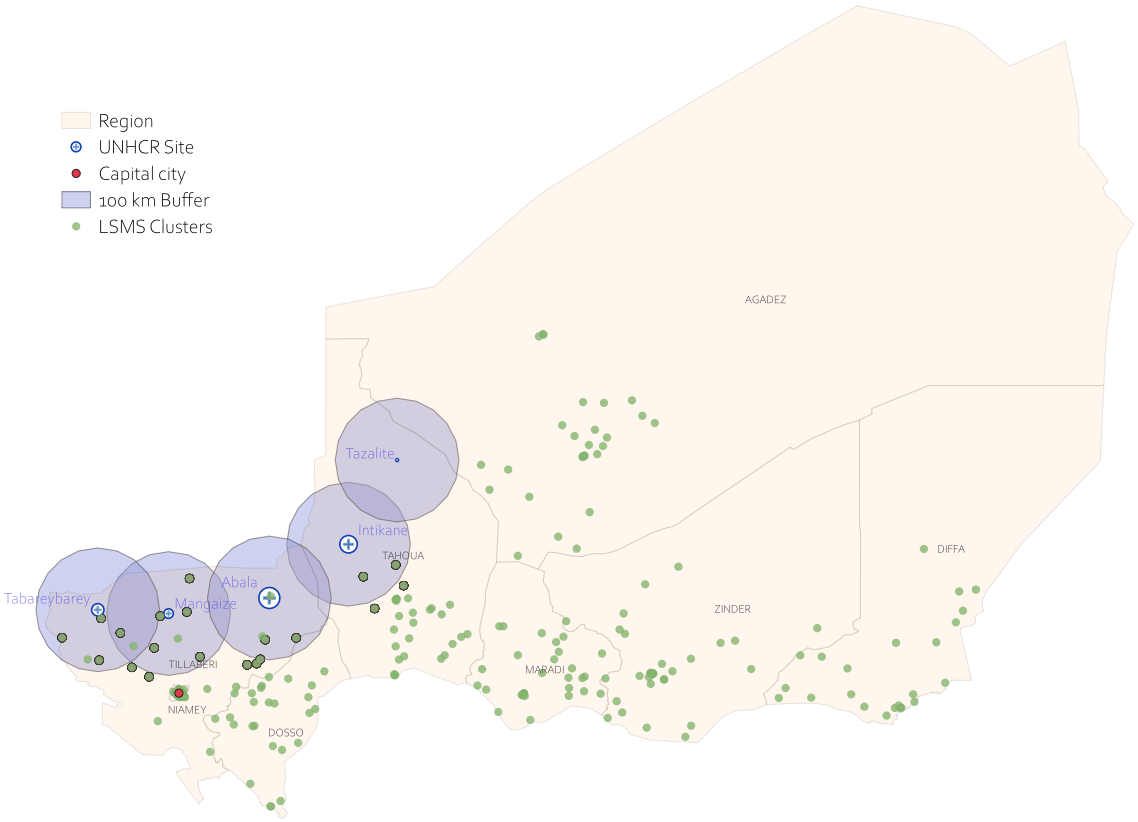
$$\text{Index Refugee} = \frac{Refugee_{camp}}{Distance_c}$$

This index weights the number of refugees in the closest refugee settlements by the inversed distance from those settlements to the clusters within a certain distance (buffer). Because the Refugee Index is defined as the ratio of the number of refugees to the distance from the nearest refugee settlement, changes in the index can be interpreted as resulting either from an increase in the refugee population, holding distance constant, or from greater proximity to a refugee settlement of a given size. In this study, the index starts at zero at the baseline because the refugee influx only happened in 2012, i.e. after the first survey wave (baseline). In contrast, Kadigo and Maystadt (2023) starts with a non-zero index at baseline due to the presence of refugees from the outset. Consequently, they instrument the index to address potential endogeneity in baseline camp placement. In our setting, baseline exposure is structurally zero, so identification comes from within-household changes in exposure after 2012, eliminating concerns about pre-existing camp placement. Given this clean separation between baseline placement and subsequent exposure, I do not rely on an instrumental variable strategy.

Figure 2 displays the locations of the UNHCR-managed sites, and the location of LSMS-ISA clusters. For the analysis, I focus on households located within a 100-kilometer radius of a UNHCR refugee site.[12] This criterion ensures the inclusion of households with similar geographic conditions and varying exposure levels to refugee populations and, at the same time, ensures that I have a number of households that is not too small for the analysis. Existing studies have used a range of bandwidths from 10 to 150 km (Alix-Garcia et al., 2018; Kadigo and Maystadt, 2023; Loschmann et al., 2019).

[12] The overall attrition rate in the entire dataset, including households that moved but were still tracked, is 10.4%. In the buffer of 100 kilometer(km), when I exclude households that moved and were found, the attrition rate is 7.78%. Furthermore, when I restrict the sample to rural households within this area, the attrition rate is even lower at 6.9%.

Figure 2: Map of Niger showing UNHCR refugee settlement sites in 2013 and LSMS-ISA clusters



Source: UNHCR and LSMS-ISA

Table 1 presents the key characteristics of the sample. The average household size is 7.20 members, with an average of 3.45 adults and 3.42 females per household. The mean age within households is 20.87 years. A significant majority (76%) of households own livestock. Regarding the household head, the average age is 46.59 years, and 95% are male. Nearly all household heads are or were married (99%), with 78% in monogamous marriages, 18% in polygamous relationships, and 4% divorced or widowed. Educational attainment is low, with 30% having attended some form of schooling, 10% formal schooling, and only 2% having completed secondary education or higher. Most household heads (94%) work, with 97% working in farming. The average yearly household head income is $857.43, with 55% having a secondary work activity. Regarding plot characteristics, millet is the predominant crop grown by 98% of households, followed by sorghum (59%), niebe (51%), and other crops (37%). The average plot size is around 2,83 hectares, and merely 2% of households sold a part of their production. Geographically, 22% of households are closest to the Mangaize refugee site, 25% to Abala, 22% to Tabareybarey, and 31% to Intikane. This sample does not comprise households within 100 km of the Tazalite site, as no LSMS-ISA observations are available in this area.

Table 1: Household and head of household characteristics in 2011

	Mean	Std. Dev.	Min	Max	Obs.
HH size	7.20	3.21	1.00	18.00	234
No. adults in HH	3.45	1.80	1.00	13.00	234
Share of women in HH	0.48	0.16	0.14	1.00	234
Has Livestock	0.76	0.43	0.00	1.00	234
HH head marital status					
Age	46.59	15.48	17.00	89.00	234
Male	0.95	0.21	0.00	1.00	234
Married	0.99	0.11	0.00	1.00	234
Monogamous	0.78	0.41	0.00	1.00	230
Polygamous	0.18	0.39	0.00	1.00	230
Divorced/widowed	0.04	0.19	0.00	1.00	230
HH head education level					
Attended School	0.30	0.46	0.00	1.00	234
Attended Formal school	0.10	0.30	0.00	1.00	234
Attended Koranic school	0.20	0.40	0.00	1.00	234
Primary school completed	0.08	0.13	0.00	1.00	234
Secondary or above completed	0.02	0.15	0.00	1.00	234
HH head source of income					
Work	0.94	0.24	0.00	1.00	234
Yearly income ($)	857.43	3876.23	0.00	46662.58	216
Farming	0.97	0.18	0.00	1.00	216
Has a secondary work activity	0.55	0.50	0.00	1.00	216
HH plot characteristics					
Grow millet	0.98	0.13	0.00	1.00	224
Grow sorghum	0.59	0.49	0.00	1.00	224
Grow niebe	0.51	0.50	0.00	1.00	224
Grow another crop	0.37	0.48	0.00	1.00	224
Plot size (Ha)	2.83	1.60	0.00	8.00	208
Sold part of crop production	0.02	0.14	0.00	1.00	207
Closest UNHCR site					
Mangaize	0.22	0.41	0.00	1.00	234
Abala	0.25	0.43	0.00	1.00	234
Tabareybarey	0.22	0.41	0.00	1.00	234
Intikane	0.31	0.46	0.00	1.00	234
Tazalite	0.00	0.00	0.00	0.00	234

Notes: This table presents the mean and standard deviations of household characteristics in 2011. The sample consists of households residing within a 100 km radius of a UNHCR refugee site.

4.2 Empirical strategy

This study aims to provide causal evidence of the effect of refugee presence on host communities. Such a population movement functions as a migration shock and within this framework, self-

selection typically emerges as a primary concern. In this specific context, however, that issue is diluted not to say dismissed as there forced migration is orthogonal to country migration preferences. The setting of Malian refugees fleeing to the other side of the border in Niger provide the design of a quasi experiment. The dataset used is panel data, allowing us to use fixed effects models to correct for heterogeneity bias by specifying the unmeasured time-invariant factors (Greene, 2008). I also include time fixed effects, thus modeling two-way fixed effects to correct for unobserved heterogeneity that is both time-invariant within households and cross-sectionally invariant within years. I focus on households within a specific distance from refugee settlements, initially adopting a 100-kilometer buffer. As a robustness check, alternative thresholds at 80, 90 and 120 km are considered. The analysis does not rely on a binary treatment-control comparison. Instead, refugee exposure varies continuously across households and over time, and the estimated coefficients capture how outcomes change with the intensity of exposure.[13] This empirical approach compares households with varying degrees of exposure to the refugee population, using the index of exposure described in Section 4.1.[14] By exploiting the spatial and temporal variation in refugee exposure, I assess its impact on several outcomes of interest.

First, I assess the impact of refugee presence on the labor supply among Nigeriens by constructing household-level outcomes from individual-level data on employment status and work activities. Only individuals who are 15 years of age and older are included. In addition to the share of household members working in each sector, I also use the Simpson's Diversity Index developed by Simpson (1949) as an outcome, which is closely related to the Hirschman-Herfindahl Index (Adajar et al., 2019). This index is used to quantify diversity within a dataset.[15] It accounts for both the number of categories (e.g., different types of work) and the relative abundance (e.g., the proportion of workers in each activity category). The formula is the following :

$$D = \frac{\sum_{i=1}^{N} n_i(n_i - 1)}{N(N-1)}$$

where n_i is the number of individuals in category i, and N is the total number of individuals. In order to make the coefficient easier to understand, results are reported using $1 -$ Simpson Diversity Index, so that the higher the index, the more diversified the livelihoods in the household. This analysis assesses whether camp establishment affects host-community employment. The sudden arrival of refugees modifies labor demand across economic sectors, which in turn influences both aggregate employment rates and the occupational distribution of household members. Evaluating these effects reveals how forced migration reshapes local labor markets and employment patterns.

Then, I examine consumption aspects through Food Consumption Scores (FCS), Food Expenditure Share (FES), and the value of consumption per adult equivalent (AE). The arrival of refugees can affect household expenditures by altering local supply and demand dynamics, potentially

[13] A potential concern is that households farther from refugee camps also differ in ways that could generate diverging trends unrelated to refugee inflows. This concern is addressed later in this section.
[14] Descriptive statistics are presented in the Appendix Table A2.
[15] Originally developed in ecology to describe species diversity, it can be adapted to measure work or income diversification in economics (Musumba et al., 2022).

changing prices and availability of goods. This, in turn, can impact household spending patterns and overall welfare. The FCS, developed by the World Food Programme (WFP), assesses food security and dietary diversity at the household level by surveying the types and frequency of food items consumed over the past seven days. Each food group is assigned a weight based on its nutritional value, and the consumption frequency of each food group is multiplied by its weight to calculate a score. This total score classifies households into different categories of food security, such as poor, borderline, or acceptable food consumption. The FES is an indicator of households' economic vulnerability, assessing their exposure to food insecurity without relying on a specific poverty line or minimum expenditure basket. A higher proportion of household consumption expenditures allocated to food—relative to total consumption expenditures—indicates greater vulnerability to food insecurity.

By analyzing these outcomes, I aim to understand how the influx of refugees influences household welfare in host communities through changes in work activities and consumption. For this analysis, I estimate the following regression, applying the survey weights provided in the dataset to ensure national representativeness:

$$Y_{hct} = \beta_1 \ln(\text{Refugee Index})_c * 2014_t + \beta_2 X_{hct} + \alpha_h + \theta_t + \epsilon_{hct} \tag{1}$$

where h denotes household, c denotes community, and t denotes time. Y_{hct} is the outcome at the household level and X_{hct} is a vector of time-varying household socio-demographic characteristics, including household composition and education. A two-way fixed effects (TWFE) model is estimated, accounting for both time and household fixed effects.

The analysis is extended to the plot level by examining the impact on agricultural labor through the use of external and family labor on each plot, with data available for both the planting and harvest seasons. This approach helps determine whether farmers could leverage the increased labor supply from the influx of refugees. Additionally, it allows us to observe if households substitute external labor for family labor. Hiring external workers can alleviate time constraints on family members, enabling them to engage in other activities. I run the following two-way fixed effects regression similar to equation 1 but with the plot as the unit of observation:

$$Y_{phct} = \beta_1 \ln(\text{Refugee Index}_c) * 2014_t + \beta_2 X_{phct} + \alpha_h + \theta_t + \epsilon_{phct} \tag{2}$$

where p denotes plot, h denotes household, c denotes community, and t denotes time. Y_{phct} is the outcome at the plot level, and X_{phct} includes control variables at the plot level.

By comparing households with different levels of exposure to refugees and analyzing the changes over time, the strategy aims to isolate the causal impact of refugee presence on employment, consumption, and agricultural labor outcomes in host communities.

The approach of this paper leverages both proximity to the nearest refugee camp and the number of refugees to estimate their impact on local households. This strategy rests on the assumption that the placement of Malian refugee camps in Niger was exogenous, meaning the locations of

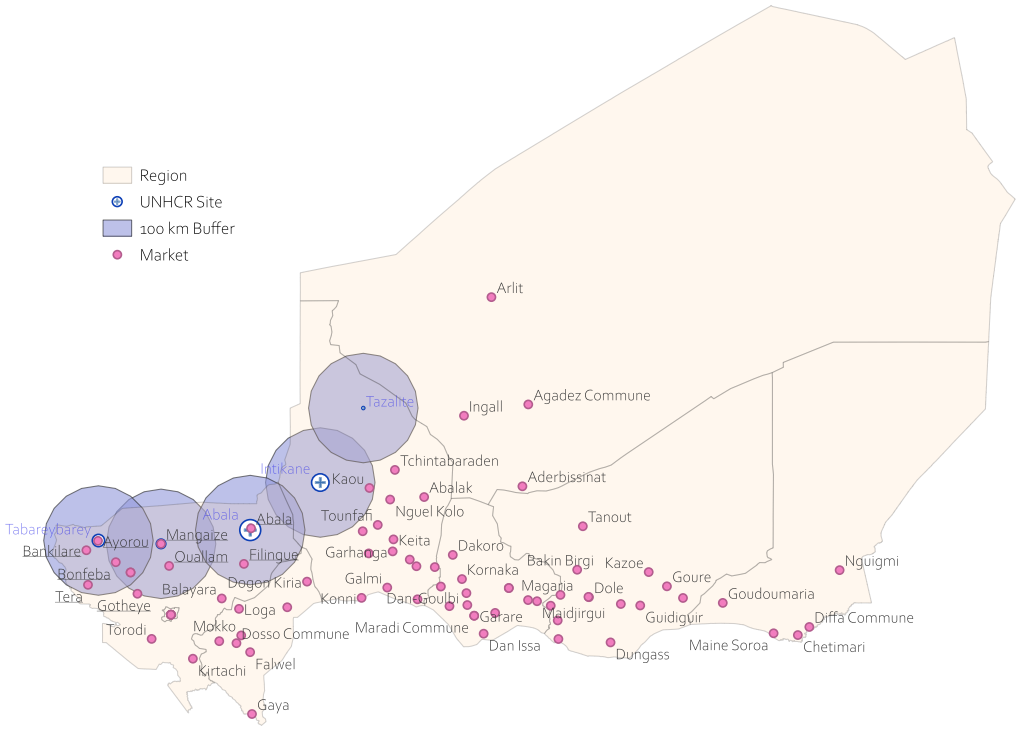
these camps were not chosen based on pre-existing economic conditions in host villages. The remainder of this section examines the main threats to identification and evaluates whether they compromise a causal interpretation of the estimated effects of refugee presence on host communities.

Endogeneity of Locations — A common concern in migration studies is the issue of self-selection, where migrants may choose to settle in areas that already offer better economic opportunities. However, this study analyzes forced displacement, as refugees did not voluntarily select their timing and their destinations. Due to limited mobility, refugees initially settled in areas based on their proximity to the border and where they could find immediate safety. Later, UNHCR and local authorities relocated refugees to designated camps that were often close to markets to ensure access to basic commodities and simplify logistics, but near the initial, self-settled locations. This process helps mitigate concerns that refugee camp locations were chosen entirely based on economic conditions, reducing the likelihood of location bias. The establishment of these camps was well-documented by UNHCR. For example, the Mangaize camp was formalized after refugees spontaneously settled near the town of Mangaize, about 75 kilometers from the Malian border. Similarly, the Abala camp was set up after refugees spread across different areas, with many settling temporarily in Miel before being consolidated into Abala. In Ayorou, informal refugee settlements eventually gave way to the creation of the Tabareybarey camp, designed to provide more structured aid and support [16]

Parrallel Trend Assumption — A legitimate concern remains that the location of these camps could be correlated with unobserved characteristics of nearby villages, such as their levels of development prior to the refugee inflow. If so, the observed relationship between refugee presence and welfare outcomes could be confounded by these unobserved factors. To address this concern, I explore price dynamics in markets near refugee camps and those further away. I examine the evolution of monthly food prices in different Nigerien markets using data from (Andrée, B. P. J., 2021), which provides machine-learning-based estimates of food prices in fragile countries. The dataset is using price data from the World Food Programme (WFP), FAO, and other sources and includes real-time price information for key commodities like millet, sorghum, and rice. A map showing the locations of these markets is provided in Figure 3 below.

[16] UNHCR Operational Data Portal

Figure 3: Map of Niger showing markets within a 100-kilometer buffer from a UNHCR site

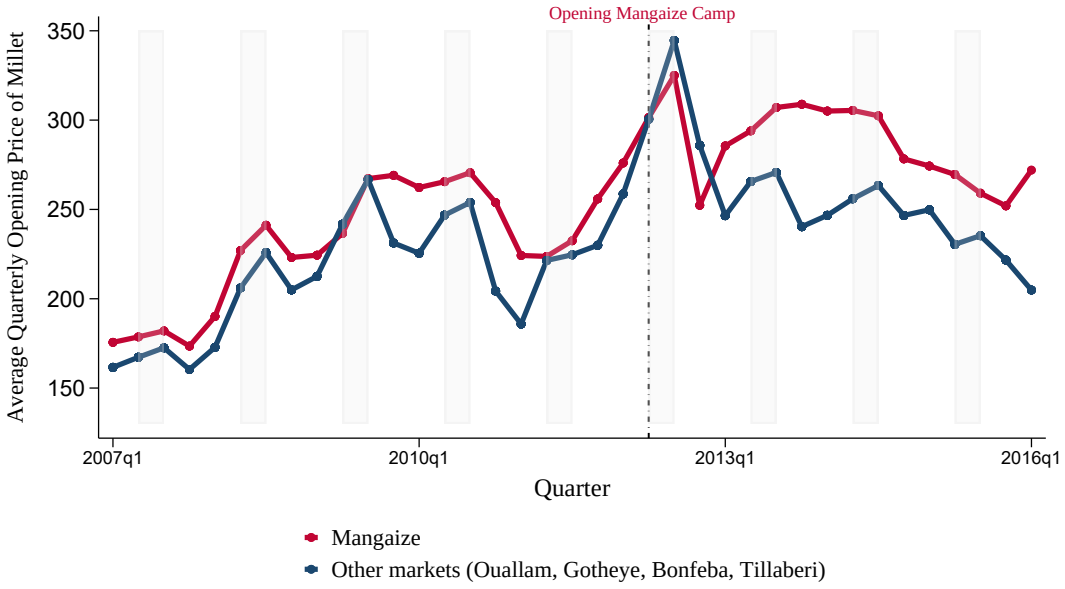


Source: UNHCR and World Bank, Development Data Group

To assess the parallel trends assumption, price trends in markets near refugee camps are compared with those in a 100-kilometer buffer zone.[17] This comparison helps assess whether economic conditions in these regions evolved similarly before the refugee shock, thereby supporting the validity of the identification strategy. Figures 4 to 6 present the evolution over time of the mean quarterly opening price of millet (the main cereal crop in the region). Markets neighboring camps are compared with those located within a 100 km buffer. As there are no surveyed households within 100 km of the Tazalite Refugee Hosting Area and no markets near the Intikane Refugee Hosting Area, these two sites are excluded from this analysis. The comparison therefore comprises consists of three groups: the market of Abala for the Abala camp, the market of Mangaize for the Mangaize camp, and the market of Ayorou for the Tabareybarey camp.

[17] Data available at World Bank Micro Data Library.

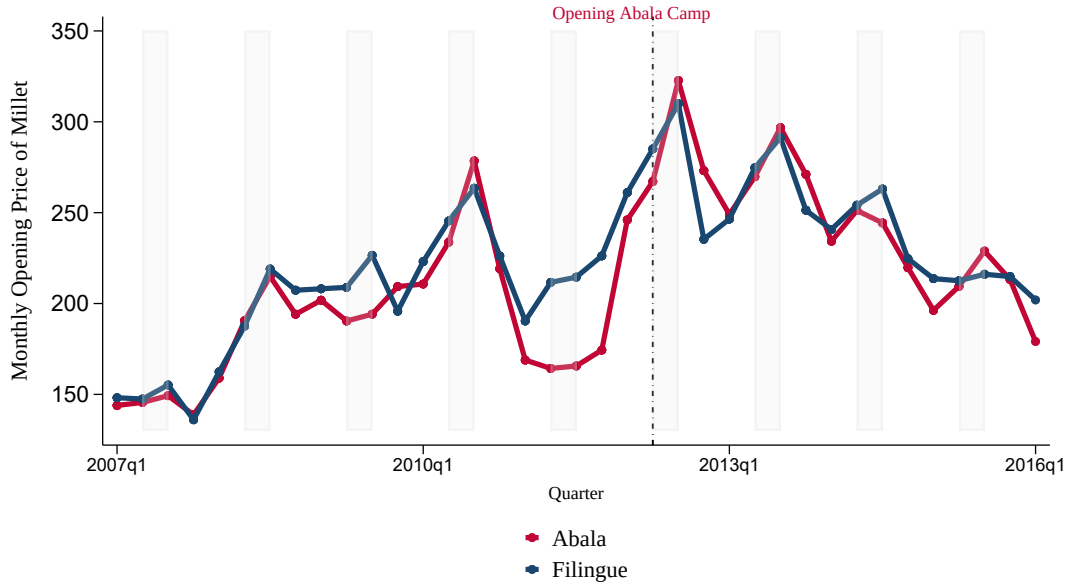
Figure 4: Evolution of the opening price of Millet: Markets in a 100km radius of the Mangaize Camp



Notes: Grey shading indicates the rainy season, and dashed lines mark the opening of the camp

Source: Development Data Group (2021)

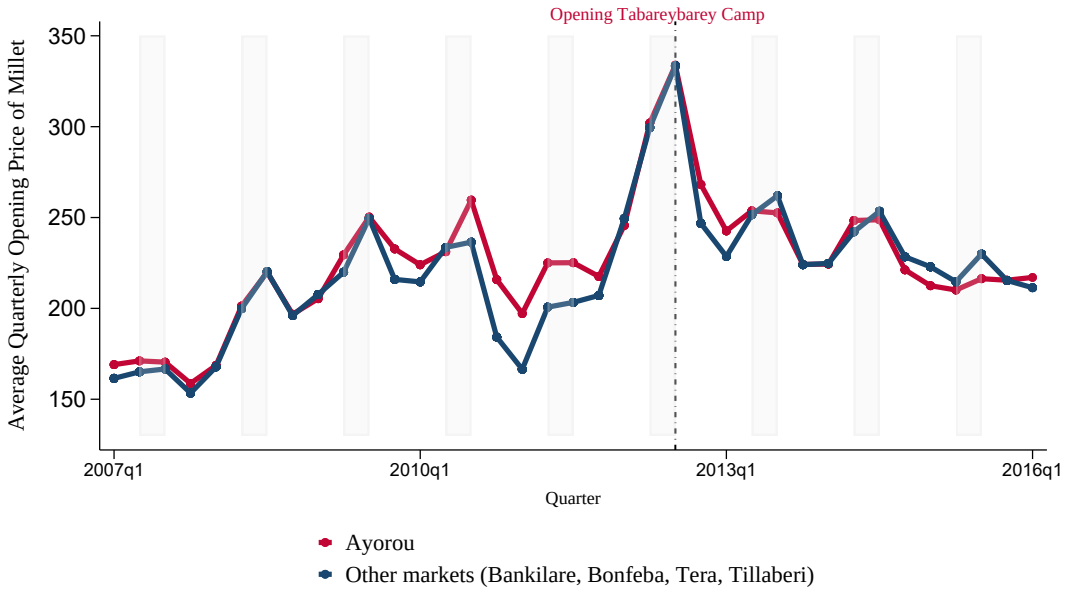
Figure 5: Evolution of the quarterly opening price of Millet: Markets in a 100km radius of the Abala Camp



Notes: Grey shading indicates the rainy season, and dashed lines mark the opening of the camp

Source: Development Data Group (2021)

Figure 6: Evolution of the quarterly opening price of Millet: Markets in a 100km radius of the Ayorou Camp



Notes: Grey shading indicates the rainy season, and dashed lines mark the opening of the camp

Source: Development Data Group (2021)

The analysis of price trends across markets near refugee camps and those further away reveals overall similarities. For the Ayorou and Abala camps, both markets neighboring the refugee camps and markets located farther away exhibit comparable patterns of millet price movements over time, with noticeable fluctuations occurring at similar periods before the arrival of refugees. Concerning the Mangaize camp, there is a similar trend before the camp's opening, but trends diverge afterward. The market neighboring the camp experiences an increase in millet prices, whereas prices in more distant markets decline. The divergence in the Mangaize market likely reflects its relative remoteness. As the most rural of the three camp sites, Mangaize features weaker linkages trade networks. Among the three study sites, Mangaize sits in the most rural setting, where limited road infrastructure and thinner market integration amplify localized demand shocks. The influx of refugees generates a localized demand shock for staple cereals, but the rural setting restricts the supply response and limits cross-market arbitrage. With limited market integration, the increased demand cannot be smoothed through trade, allowing camp proximity to exert direct upward pressure on local millet prices.

In summary, despite some minor variations, the general price trends between camp markets and non-camp markets appear to move in the same direction prior to the opening of the camps. This suggests that economic conditions and market dynamics in these regions evolved similarly before the opening of camps, supporting the assumption of parallel trends in the economic situation of households within the buffer zones.

Self-Selection of Host Households — Another concern is whether households living near refugee camps may have chosen to live in these areas based on characteristics that could also influence

economic outcomes. However, in the current case, this concern is reduced by the fact that households were already living in their current locations before the arrival of refugees. The households who lived within 100 km of the buffer zone in 2011 and left the panel, and could not be interviewed in 2014, either relocated outside of Niger or were difficult to locate elsewhere within the country. If these households had relocated closer to refugee camps within the survey area, they would likely have been easier to track and re-interview. Their absence from the follow-up survey instead suggests that they moved farther away, potentially outside the study area or into more remote locations.

In conclusion, the identification strategy employed in this study, which leverages both the proximity to refugee camps and the number of refugees, addresses several potential concerns. The exogenous placement of refugee camps and the forced displacement of refugees mitigate the risk of endogeneity related to camp locations being chosen based on favorable economic conditions. Additionally, the analysis of price trends in nearby and distant markets shows parallel trends before the refugee influx, supporting the assumption that the economic conditions in the host areas evolved similarly. Moreover, the concern regarding self-selection of host households is alleviated by the fact that households were already residing in these areas before the arrival of refugees, with little evidence to suggest that they moved closer to the camps following the refugee crisis.

5 Results

5.1 Labor market effects

5.1.1 Employment outcomes

The arrival of refugees is hypothesized to boost local economic activity, thereby increasing employment opportunities for host communities. The presence of refugee camps can stimulate local businesses and generate more diverse income-generating activities beyond traditional farming. This section examines participation in the labor market, with a specific focus on household labor diversification. I hypothesize that the creation of camps has increased opportunities for off-farm work. The increase in employment opportunities brought about by the opening of camps can represent an opportunity for households to diversify their work activities. In this context, off-farm employment refers to work undertaken outside the household's own agricultural production, rather than a complete exit from agriculture. Dedehouanou et al. (2018) show that in Niger, off-farm activities are often informal and low-skilled non-agricultural activities, such as petty trade, small-scale services, transport, food processing, or casual labor. These activities typically require little or no prior formal training and are commonly used as income diversification and risk-management strategies. In the context of refugee camp establishment, such off-farm opportunities may expand due to the increased demand for goods and services generated by refugees, humanitarian organizations, and NGOs, including food vending, small retail, transport services, construction-related labor, and other service activities linked to camp operations.

Changes in the labor market are one of the main determinants of diversification (Janvry and Sadoulet, 2016). In this setting, the opening of camps serves as a push factor for labor reallocation within households. I examine the labor activities of individuals who are 15 years old and older at the household level. Table 2 presents the results associated with an increase in the refugee index on various employment outcomes. Column 2 shows that a 10% increase in the Refugee Index is associated with a a 0.99 percentage point increase in the share of household members having a secondary work activity. The same 10% increase in the Refugee Index also has a significant positive effect on the share of household members working for a formal institution such as a firm, government, or NGO in column 5. The results suggest that refugee presence contributes to labor diversification within host households. These findings may reflect the emergence of new employment opportunities linked to economic actors introduced by the refugee crisis. Table 3 disaggregates labor diversification by reporting the share of household members working in different sectors. The results indicate that refugee presence does not significantly impact employment in specific sectors but is associated with an overall broader diversification of household work activities. A 10% increase in the number of refugees in nearby camps increases the livelihood diversity index by approximately 0.003 points.

Table 2: Work activities

	Share of household members who				
	(1) Work	(2) Have a second work activity	(3) Do non-farm work	(4) Are salaried	(5) Work for a firm, government or NGO
Ln(Refugee Index) x 2014	-0.026	0.099***	0.041	0.051	0.024**
	(0.020)	(0.030)	(0.033)	(0.038)	(0.009)
Mean in 2011	0.81	0.38	0.35	0.10	0.03
Observations	468	448	448	448	448
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes:Column 1: Share of individuals aged 15 and above in the household who work; Column 2: Share of individuals aged 15 and above who have a second work activity; Column 3: Share of individuals aged 15 and above who do non-farm work; Column 4: Share of individuals aged 15 and above who are salaried; Column 5: Share of individuals aged 15 and above who work for a firm, government, or NGO. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 3: Work activities by sector

	Share of household members working in					Diversification index
	(1)	(2)	(3)	(4)	(5)	(6)
	Crop farming	Livestock	Trade	Crafts and manual work	Other	Simpson index
Ln(Refugee Index) x 2014	0.020	0.011	0.004	0.028	-0.004	0.031**
	(0.021)	(0.016)	(0.064)	(0.040)	(0.004)	(0.014)
Mean in 2011	0.95	0.04	0.22	0.08	0.01	0.26
Observations	448	448	448	448	448	448
FE	HH	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: share of individuals aged 15 and above working in crop farming; Column 2: share of individuals aged 15 and above working in livestock production; Column 3: share of individuals aged 15 and above working in trade; Column 4: share of individuals aged 15 and above working in crafts and manual activities; Column 5: share of individuals aged 15 and above working in any other sector. Column 6: Simpson diversity index.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

The results from the analysis of labor market activities provide nuanced insights into how the presence of refugees influences household employment outcomes. A higher exposure to refugees increases the share of members having a having a secondary work activity, reflecting a strategic diversification of income sources. In terms of changes in work activities, the significant positive effect on the share of household members working for a firm, government, or NGO suggests that the presence of refugee camps may create new work opportunities through humanitarian efforts and local economic adaptations. This phenomenon highlights how such external shocks can contribute to diversification in household work activities, as evidenced by an increase in the Simpson Diversification Index.

Employment outcomes are also examined at the individual level. Results presented in Tables A3, A4 and A5 in the Appendix are consistent with those obtained at the household level. There is a higher probability that individuals engage in a second work activity, do non-farm work, or work for a firm, government, or NGO, suggesting that refugee presence is associated with greater diversification of individual work activities (IFORD and UNHCR, 2015). However, at the individual level, there is no statistically significant change in the sector in which individuals work, indicating that while individuals diversify their activities, this does not translate into a measurable shift across broad employment sectors. Table A5 reports the amount of time worked in different work activities at the individual level.The refugee index does not have a significant impact on time spent in the primary work activity. However, it does have a significant impact on the amount of time worked in the second work activity and on overall weekly hours. The results support the idea that household members engage in a second work activity while maintaining their primary work activity, rather than adjusting their main economic activities. Overall, the findings suggest that households more exposed to refugee camps diversify their work portfolios by engaging in additional work activities rather than transitioning entirely away from farming toward other types of work.

Overall, the results show a positive impact on the employment of host communities, particularly by increasing the share of household members engaging in a secondary work activity and the

overall number of work hours. This supports the hypothesis that refugee camps can stimulate local economic activity and create additional employment opportunities for nearby households. The findings from the analysis of labor market activities highlight the significant influence of refugee presence on employment outcomes within host communities. As households increasingly diversify their work activities and engage in secondary work activity, it is essential to examine how these labor market changes affect consumption patterns. In particular, the enhanced employment opportunities resulting from the establishment of refugee camps may not only lead to increased income but also impact households' consumption behaviors. With a broader range of income sources and greater financial stability, households are likely to adjust their consumption strategies, reflecting shifts in both needs and preferences.

In the following subsection, I delve into the consumption dynamics of households in host communities, exploring how the labor market and consumer market changes induced by the presence of refugees can translate into alterations in consumption patterns and overall economic well-being.[18]

5.1.2 Labor on household plots

The arrival of refugees introduces an increase in the labor force in the area, with many refugees seeking employment opportunities due to limited job prospects. This influx of potential laborers, often willing to work for lower wages, provides an affordable labor source for local households. Consequently, Nigerien households may increasingly hire external labor for their agricultural activities, potentially leading to a decrease in reliance on family labor.

Table 4 illustrates labor dynamics on the plots during the planting season, represented by the first wave of the survey. The regression results indicate that the presence of refugees does not significantly affect the probability of using external labor or the number of days worked by external laborers. This suggests no substantial change in external labor usage over time due to refugee presence. However, there is a significant reduction in the number of family members working on the plots when the refugee index increases. A 10% increase in the number of refugees in nearby camp decreases the number of family members working on the plot by 0.02, significant at the 10% level, indicating that households more exposed to refugee settlements rely less on family labor during the planting season. This shift suggests that families may be adapting to changes in the labor market prompted by the refugee presence, potentially reallocating their time and resources to alternative economic activities. Table 5 examines the same labor dynamics on the plots but during the harvest season, represented by the second wave of the survey. The findings from this table suggest that the presence of refugees significantly increases the hiring of external labor while significantly decreases the number of days family members work on the farm. Households with increased refugee presence are likely to engage more external labor due to the availability of labor in the market, which may help them maintain their agricultural output.

[18] Data on income are not available in 2014.

Table 4: Farm labor during planting season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Ln(Refugee Index) x 2014	0.014	-0.354	-0.202**	-2.104
	(0.021)	(0.980)	(0.081)	(3.172)
Mean in 2011	0.11	1.16	2.32	11.59
Observations	1121	1121	1121	1121
FE	HH	HH	HH	HH
Controls	Plot & HH	Plot & HH	Plot & HH	Plot & HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the planting season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the planting season; Column 3: Number of family members working on the plot during the planting season; Column 4: Number of days worked by family members on the plot during the planting season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 5: Farm labor during harvest season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Ln(Refugee Index) x 2014	0.036**	-0.034	-0.004	-5.831**
	(0.017)	(0.034)	(0.113)	(2.364)
Mean in 2011	0.11	0.24	2.58	57.36
Observations	878	878	878	878
FE	HH	HH	HH	HH
Controls	Plot	Plot	Plot	Plot

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the harvest season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the harvest season; Column 3: Number of family members working on the plot during the harvest season; Column 4: Number of days worked by family members on the plot during the harvest season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

The evidence from both tables indicates that the presence of refugees has led to significant changes in agricultural labor outcomes within households. While there is an observable increase in the utilization of external labor, this shift remains modest in magnitude. This limited adoption of external labor can be attributed to the characteristics of the refugee population in the region. Notably, approximately 20% of refugees leave the camp to seek daily work for cash payments, suggesting that their engagement in the local labor market is primarily driven by immediate financial needs rather than long-term agricultural employment opportunities. Furthermore, the results highlight a reduction in both the number of family members working on agricultural plots and the total time they spend on these activities. This reduction implies that households are reallocating their labor efforts, possibly in response to changing economic conditions and the availability of external labor options. This dynamic is consistent with findings on employment (Section 5.1), which reveals that family members are increasingly participating in the labor market and exploring additional employment opportunities. Such shifts may reflect a strategic

adjustment by households to enhance their overall economic livelihood following the shock brought by the influx of refugees. The interplay between refugee labor and household labor dynamics underscores a broader transformation in the agricultural labor landscape as families adapt to both opportunities and challenges arising from their environment.

5.2 Consumption effects

Increased exposure to refugees can potentially raise the Food Consumption Score (FCS) due to supplies provided by humanitarian organizations. However, as refugees and locals share the same markets, this increased demand can lead to higher prices, making the overall effect on consumption ambiguous.

Results concerning consumption using data on the FCS at the household level are presented in Table 6. During the planting season, the refugee index does not show a significant impact on the FCS. The coefficient for the interaction term between the refugee index and the year 2014 is positive but not statistically significant, indicating no significant change in food consumption scores linked to refugee exposure during this period. In contrast, during the harvest season, refugee exposure has a significant positive impact on the FCS. A 10% increase in the refugee exposure index in 2014 increases the FCS by 1.07 points, significant at the 1% level. This suggests that households more exposed to refugee settlements experience improved food security and dietary diversity during this season. When considering the overall period (column 3), a 10% increase in the refugee exposure index increases the FCS by 0.6 points, also significant at the 1% level, indicating that refugee exposure has a positive effect on food consumption scores.[19]

Table 7 reports the Food Expenditure Share (FES) and the total annual value of food consumed by the household. Findings suggest that the presence of refugees positively influences certain aspects of household food consumption, particularly food purchases and consumption from gifts. Households exposed to a higher refugee index are likely to spend more on food purchases, with an increase of $5.6 per adult equivalent annually for a 10% increase in the index, and receive higher-value gifts, with an increase of $0.59 annually for a 10% increase in the index. In contrast, the share of food expenditure and consumption from own production does not appear to be significantly impacted by refugee presence, indicating that households may maintain their production levels despite changes in the labor market and economic environment. The stable FES, the budget share devoted to food, rules out a pure price-driven mechanism. If refugee-induced demand simply bid up food prices, one would expect the FES to rise as households allocated more resources to maintain food security. Instead, households increase food spending in absolute terms while keeping the same proportional budget share, consistent with an income effect from secondary employment.

One aspect that could enhance the understanding of the results is the quantity of food. If the amount spent on food purchases is higher for the same quantity, households may be facing increased prices, and the rise in value would be driven by that rather than by an increase in the

[19] Table A9 shows results using the standardized score.

quantity purchased. However, the way the data were collected makes it difficult to calculate the quantity in a common unit of measure. Nevertheless, reconciling these results with the food consumption score, may suggest that an upgrade in the quantity or quality of food consumed drives the observed effects. The FES remains stable despite higher absolute food spending; if households were experiencing higher food costs impacting their consumption, their vulnerability would increase, leading to changes in the FES, which is not the case. This pattern is consistent with an income effect, where households use additional earnings to purchase more food while maintaining their consumption priorities. Beyond income gains, a second channel may operate through humanitarian assistance. The positive coefficient on consumption received as gifts could suggest aid spillovers to host communities. Since gifts in this context could include food assistance transfers and community sharing, the higher gift consumption among households closer to refugee camps might reflect aid organizations' distributions and refugee assistance programs reaching neighboring communities. However, the source of these gifts cannot be observed, so this interpretation remains suggestive.

Table 6: Food Consumption Score

	(1) Food Consumption Score (Planting season)	(2) Food Consumption Score (Harvest season)	(3) Food Consumption Score
Ln(Refugee Index) x 2014	1.371	10.662**	6.016**
	(2.127)	(4.497)	(2.170)
Mean in 2011	40.28	43.29	41.78
Observations	468	468	468
FE	HH	HH	HH
Controls	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Food Consumption Score in the household during the planting season; Column 2: Food Consumption Score in the household during the harvest season; Column 3: Average Food Consumption Score across both seasons. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 7: Expenditures

		Total annual value ($)		
	(1)	(2)	(3)	(4)
	FES	Food purchase (AE)	Cons. from own production (AE)	Cons. from gift (AE)
Ln(Refugee Index) x 2014	0.002	55.529***	-8.885	5.892***
	(0.008)	(16.528)	(17.891)	(1.435)
Mean in 2011	0.79	187.31	56.81	18.41
Observations	468	454	454	454
FE	HH	HH	HH	HH
Controls	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Monthly Food Expenditure Share of the household; Column 2: Annual value of food purchases per adult equivalent in $; Column 3: Annual value of consumption from own production per adult equivalent in $; Column 4: Annual value of consumption received as gifts per adult equivalent in $. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

This section investigates how refugee camp establishment shapes food consumption outcomes among host households. The analysis first considers the Food Consumption Score (FCS), which captures dietary diversity and food security, across different agricultural seasons. The results indicate that refugee exposure is associated with improvements in food consumption, with higher FCS during the harvest season and increases in the value of food purchases and consumption received as gifts. These findings suggest that refugee camp establishment is associated with changes in both market-based and non-market sources of food consumption.These findings suggest that refugee camp establishment is associated with changes in the availability and sources of food consumption among host households, reflecting broader transformations in local economic and food market conditions.

Qualitative evidence noted by the fieldwork by Sidibé (2019) show that the local markets of Abala (near Abala camp) and Ayorou (near Tabareybarey camp) have experienced significant growth due to refugees reselling food and other non-food items. The field surveys revealed that refugees sell about one-third of the food supplies they receive in local markets to obtain some cash, with local traders purchasing these goods and reselling them to populations in nearby villages surrounding the refugee camps. This commercial dynamic emphasizes how refugee presence can stimulate local economies by increasing the diversity and availability of food options for both refugees and host communities.

The data shows that among the types of food most impacted, cereals are significant. I provide additional tables that display the annual value of consumption of cereal-based food items included in the WFP Food Consumption Score (FCS), disaggregated by source of consumption. Tables A6, A7, and A8 show an increase in expenditure on transformed cereals (pasta, flour, and pastries) and in gifts received from other cereal groups. This finding aligns with the qualitative evidence from Sidibé (2019), which indicates that the WFP introduces cereals other than millet and sorghum into the market, leading to an increased supply of alternative cereals.

The analysis of food consumption scores and expenditure shares provides valuable insights into the effects of refugee presence on local households. The positive correlations observed suggest that while refugee camps may introduce challenges, they can also enhance food security and diversity through increased economic activity and the contributions of NGOs. Moreover, the commercial activities generated by refugees contribute to a dynamic local market, demonstrating the importance of considering both the economic and humanitarian dimensions of refugee presence in shaping consumption patterns and overall well-being.

The influx of refugees into host communities often represents an increase in the availability of cheap labor, which can significantly impact agricultural labor outcomes. As refugees seek employment opportunities, they may accept lower wages than local workers, potentially driving down wage levels in the agricultural sector. This dynamic can reshape labor market conditions, influencing the hiring practices of local farmers and altering the competitive landscape for agricultural jobs. This access to affordable labor can allow farmers to allocate their time to other activities.

6 Robustness Checks

A series of robustness checks is presented in this section to investigate the causal relationship between refugee presence and the outcomes of interest in host communities. These robustness checks include varying the distance thresholds used to define household exposure to refugee settlements and employing alternative model specifications. By examining the consistency of the findings across different specifications, I aim to strengthen the credibility of the results and address potential sources of bias or uncertainty associated with the empirical strategy.

A first potential concern is that the estimated effects may depend on how refugee exposure is measured. To assess whether the results are driven by the construction of the refugee exposure index, I employ an alternative measure of refugee exposure, replicating the main tables in Tables A10 to A14. Instead of an index, I use the distance to the nearest UNHCR site. The first line of the tables reports the results replacing the index with the distance in kilometers, and the second line reports the results using the natural logarithm of the distance. With this specification, there remains a significant effect of the distance to the nearest UNHCR refugee camp in 2014 on the share of household members having a secondary work activity or working with a firm, a government, or an NGO, the number of family members working on a plot during the planting season, the number of days worked by family members during the harvest season, the FCS in the second wave, and the value of consumption received as a gift.

A second potential concern relates to the choice of the 100-kilometer buffer used to define refugee exposure. Using a large geographic area to define treatment may dilute the precision of the estimates, as refugee camps closer to households are likely to have stronger effects than those farther away. To address this concern, the same analysis is performed using varying buffer distances around the camps—80, 90, and 120 kilometers—instead of the baseline 100-kilometer distance, as reported in Tables A16 to A21. This approach requires balancing the trade-off

between improving the precision of the estimates and reducing the number of observations as the buffer distance decreases. Results remain robust and change very little across specifications.

A third potential concern is that the standard errors may be underestimated because of spatial correlation across nearby observations. To address this concern, I estimate Conley (1999) standard errors with a Bartlett kernel, which imposes a linear distance decay in the correlation structure between observations within the cutoff, as reported in Tables A22 to A27. The results remain significant for having a secondary work activity and being salaried, but not for working with a firm, the government, or an NGO, or for the Simpson index. However, statistical significance is lost for the use of external hired labor as well as for the value of consumption received as a gift.

A final potential concern is that the household-specific effects may be correlated with the explanatory variables or that the unbalanced nature of the panel may introduce bias. To address this issue, I incorporate a correlated random effects (CRE) model. The CRE model extends the random effects framework by allowing the individual-specific effects to be correlated with the explanatory variables, making it particularly well suited to situations where the strict exogeneity assumption may not hold—such as in this study, where unobserved heterogeneity is likely correlated with observed factors. This method is useful for both balanced and unbalanced panel data, which is relevant to my dataset. The advantage of using the CRE model lies in its ability to account for time-invariant unobserved heterogeneity while retaining the efficiency of random effects models. By incorporating within-individual means of time-varying covariates, the CRE approach helps address the potential endogeneity problem arising from the correlation between the unobserved individual-specific effects and the regressors. This approach is an extension of the Chamberlain-Mundlak device, which has been widely applied in panel data settings for endogenous regressors. In this study, where fixed effects panel models are estimated and might face issues with sample selection, the CRE model also allows us to assess whether selection is correlated with unobserved heterogeneity. This is particularly valuable, as the data come from an unbalanced panel. This robustness check allows for robust Hausman tests and ensures that the estimates are not biased by misspecification of the error structure. Moreover, as Wooldridge (2019) and Wooldridge (2021) suggest, even in the presence of sample selection, the CRE model provides consistent estimates. The results continue to hold, with significant effects also observed for doing non-farm work and doing salaried work.

7 Conclusion

This study investigates the impacts of refugee inflows on local communities in Niger, focusing on employment, plot labor, and household consumption. By analyzing detailed household-level data, I have uncovered the nuanced ways in which the presence of refugee camps affects host communities. The findings indicate that the arrival of refugees can significantly alter local labor markets and economic activities, with implications for the local population.

Firstly, this study documents an increase in secondary work activity among local household members, indicating that the influx of refugees is associated with greater economic opportunities

in host areas. This is coupled with a higher probability of engaging in non-farm work, showing diversification in household work activities. Additionally, the results show a significant reduction in family labor on agricultural plots during the planting season, suggesting that local households reallocate family labor toward other work activities. On consumption effects, this study finds that higher exposure to refugees positively impacts food consumption scores during the harvest season, highlighting a complex interaction between humanitarian assistance, market dynamics, and household food security.

The increased economic activity and additional work opportunities can be attributed to the demand for goods and services created by the refugee population and the presence of humanitarian actors operating around refugee camps. International organizations and refugees often need various services, which can boost local businesses and create new employment opportunities. The reduction in family labor on plots can be explained by the availability of other work opportunities, allowing local households to reallocate family labor to other productive activities. The positive impact on food consumption scores likely reflects the role of humanitarian assistance and increased access to food resources, which can improve food availability and diversity. The mechanisms underlying these results likely include the increased demand for local goods and services generated by refugees and humanitarian organizations, as well as the spillover effects of assistance provided in hosting areas. Together, these factors suggest that refugee inflows accompanied by humanitarian responses can create economic opportunities and support household welfare in host areas.

Despite these findings, this study has some limitations. The observational nature of the data limits the ability to establish causality definitively, especially given the sample size. While I use robust statistical techniques to address potential biases, unobserved factors may still influence the results. Additionally, I lack specific data on food aid and humanitarian organizations, which could help clarify the mechanisms at play. I can only rely on reports from organizations, and some might be missing. From a policy perspective, the findings suggest that refugee inflows can reshape local economic activity and household welfare in host areas, particularly when accompanied by humanitarian responses and economic activity around camps. Supporting host communities through appropriate economic and institutional responses may help enhance local resilience and adjustment capacities. Coordination with international organizations and NGOs can also play a role in aligning assistance with local needs and improving the functioning of local markets. Given the persistence of refugee situations in contexts such as the Sahel, understanding these dynamics remains important for both short- and medium-term policy responses. Future research could further benefit from more detailed data on the implementation and logistics of refugee assistance programs, in order to better assess their economic implications and effectiveness.

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Appendix

A Refugees in Niger

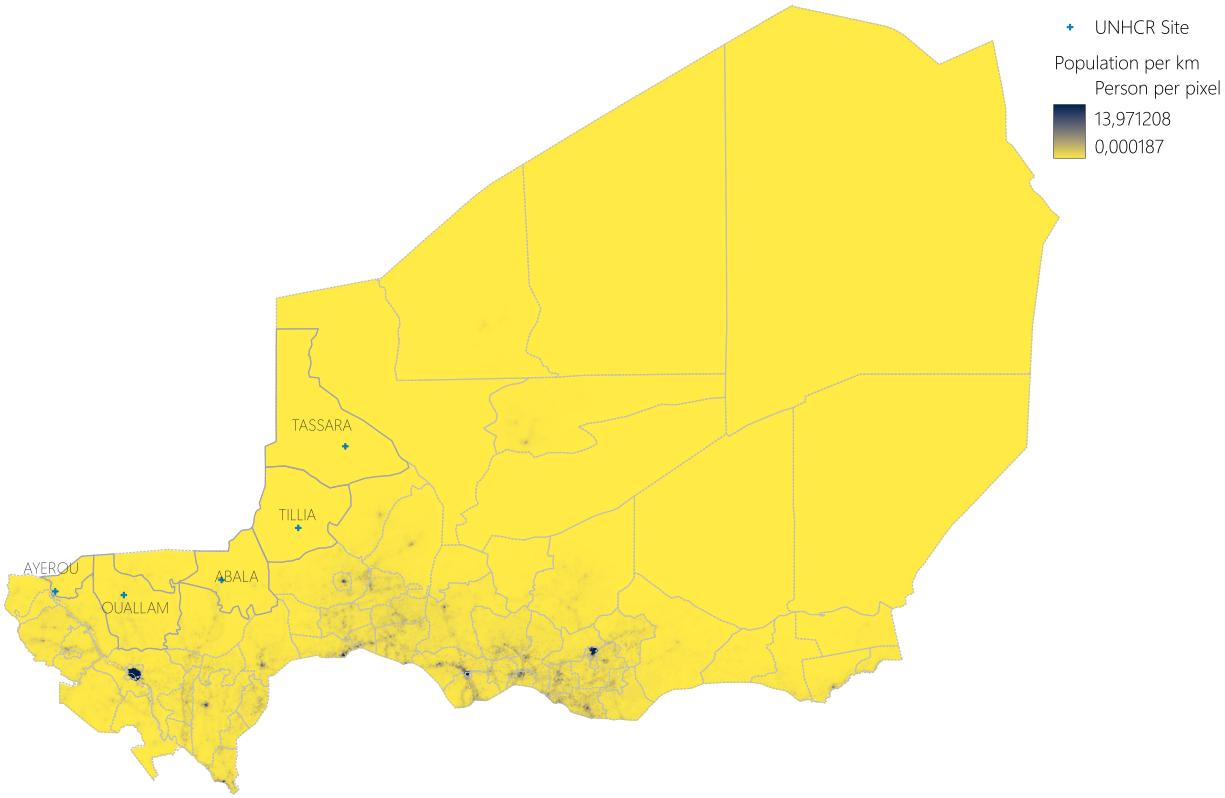


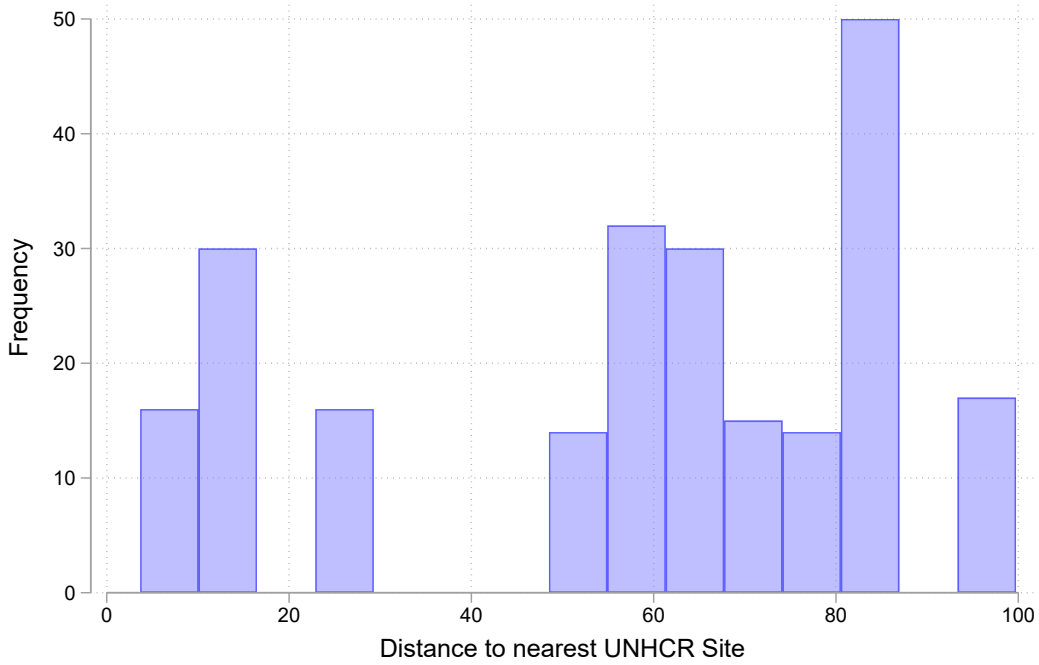
Figure A1: Niger population density

Table A1: Refugees by department in September 2014

Camp	Department	N. refugees	N. inhabitants in dept.	Pct. shock
Tabareybarey	Ayerou	8,947	57,030	15.7%
Mangaize	Ouallam	7,407	327,224	2.3%
Abala	Abala	14,092	144,287	9.8%
Intikane	Tillia	6,934	38,994	17.8%
Tazalite	Tassara	1,027	24,457	4.2%

Source: UNHCR and RGPH-4 2012 Niger

Figure A2: Distance between LSMS-ISA communinites and UNHCR site



Source: LSMS-ISA 2011

A.1 Information about refugee camps

1. **Tabareybarey** : In May 2012, Tabareybarey camp received refugees who were relocated from Mbeidoum and Gaoudel spontaneous refugee sites situated at the border. The camp has a capacity to host 10,000 people. In April 2013, UNHCR and the Government launched the "Safety Net" programme in the camp with a view to offer a durable solution for Nigeriens who fled the violence in Mali and live alongside Malian refugees in the camp. Ethnicity of refugees : Tuareg (79%), Songhai (10%), Peul (10%). Main occupations : Pastoralists (livestock herding: goats, cows, sheep and donkeys).

2. **Mangaize** : In February 2013, Mangaize camp received refugees who were relocated from Banibangou and Chinegodar spontaneous sites situated at the border the Malian border. The camp has a capacity to host 10,000 people. In April 2013, UNHCR and WFP launched the Cash Voucher programme, which allows refugees to purchase their own food in local markets instead of receiving food in-kind. Ethnicity of refugees : Tuareg (82%) ,Songhai (9%), Arab (4%), Hausa (3%), Peul (2%). Main occupations : Pastoralists (livestock herding: goats, cows, sheep and donkeys).

3. **Abala** : In March 2012, Abala camp received refugees who were moved from spontaneous sites (Chinegodrar, Miel, Tigizefan, Kizamwe and others who settled in Abala town) situated at the Malian border. The camp has a capacity to host 10,000 people. In April 2013, UNHCR Niger launched the Gas project, to provide alternative domestic energy to

refugee households. Ethnicity of refugees : Tuareg (85%), Hausa (9%) ,Songhai (5%), Arab (1%). Main occupations: Pastoralists (livestock herding: goats, cows, sheep and donkeys).

4. **Intikane** : The refugee hosting area (nomadic area) is a new concept developed by UNHCR with local authorities and communities in an attempt to adapt to the lifestyle of nomadic refugees. It differs from the traditional set-up of a refugee camp and allows refugees to settle freely in a vast pasture area with their livestock. The first "hosting area" was opened in Intekan in April 2013 with the successful relocation of nearly 8,000 people and their animals to the area. Previously, the refugees lived in spontaneous sites located at the border (Agando and Chinwaren). Ethnicity of refugees : Tuareg (99%), Hausa (1%) For all camps, to avoid conflict over resources with host communities, they are included in the water and health assistance.

A.2 Information on Malian refugees in UNHCR-managed zones in 2015

Based on IFORD and UNHCR (2015) report.

Over half of the refugees are women, and approximately 43% are children under ten years old. The working-age population constitutes about 38% of the refugees residing in camps and Refugee Hosting Areas. The average household size is 4.7 members, with the largest averages found in Intikane (5.6) and the smallest in Tabareybarey (3.8). A notable proportion of refugees have expressed a desire to settle permanently in Niger, with 47% planning to remain, particularly those in Tazalite (96.7%) and Intikane (84.3%). Among those intending to settle, nearly 95% wish to stay in their current location.

A significant proportion of households (66.6%, up from 56% in 2013) reported that the food aid they received was inadequate for their monthly needs, with 50.1% indicating this shortfall compared to 34.4% in 2013. Many refugees resort to selling or exchanging food aid to meet dietary preferences or other needs, with 47.7% of households dissatisfied with the provided food. Additionally, 10.2% of household heads sell or exchange food to purchase clothing and non-food items, 5.8% for firewood, and 1.5% to pay off debts.

The most commonly consumed food groups among refugees are cereals, oils, and sugar/sweet products, with 66% of food in camps and hosting areas sourced from aid. This reliance is highest in Tazalite (89.5%) and Intikane (87.7%). The market serves as the second major food source, with refugees in camps preferring markets outside the camp. Specifically, 74.7% of refugees in Abala, 93.6% in Mangaize, and 30.6% in Tabareybarey shop exclusively outside the camp. Conversely, only 2.4% of refugees in Abala, 1.8% in Mangaize, and 10.8% in Tabareybarey shop exclusively within the camp. Refugees in Tazalite and Intikane hosting areas, however, shop exclusively at on-site markets.

Food purchases are primarily made at markets outside the camps (73.5%) or at site markets for hosting areas. Refugees reported that 36% and 48% of households buy food weekly and daily, respectively. Notably, most purchases in camps are made weekly, while in hosting areas, they are predominantly made daily (nearly everyone in Tazalite). Over half (51.7%) of refugees walk 30

to 60 minutes to reach the market, with 11.5% walking over an hour. There is a strong desire among refugees to engage in income-generating activities to reduce reliance on aid.

Regarding income, 96.2% of households have at least one source of income, with 51.1% having only one source. Petty trade is the primary income source for 18% of households, particularly in Mangaize (23.5%) and Abala (22.2%) camps. In hosting areas, significant income sources include livestock and livestock products (38% and 30% for Intikane and Tazalite, respectively) and craftsmanship (22.4% and 18.7% for Intikane and Tazalite, respectively). For camps, food aid sales also contribute significantly (20.6% in Tabareybarey, 20% in Abala, and 9.1% in Mangaize). Daily work with cash payment is a notable income source across all sites (28.4% in Abala, 18% in Mangaize, 12.2% in Intikane, 10.7% in Tazalite, and 7.9% in Tabareybarey). Livestock ownership has markedly improved, with 61% of households reporting ownership compared to 36.5% in 2013. Intikane boasts the highest livestock ownership at 82.2%, while Mangaize has the lowest at 28.5%. The most commonly owned animals are goats (79%), followed by sheep (51.5%), donkeys (44.3%), cattle (19.9%), and camels (10.1%).

Though infrequent, conflicts with other refugees, camp staff, or the host population have risen, with 4.1% of households experiencing conflicts in 2015, up from 1.5% in 2013. Female-headed households report slightly more conflicts (4.2%) compared to male-headed households (3.7%). Conflicts with the host population are minimal (0.7%) but have increased from 0.3% in 2013, primarily related to water and sanitation issues.

B Appendix Tables

Table A2: Descriptive statistics index

	(1)				
	Buffer 100 km				
	Mean	Std. Dev.	Min	Max	Obs.
No. refugees in the closest site	8830.35	2868.56	5843.00	12840.00	234
Distance to nearest UNHCR Site	57.61	28.45	3.66	99.76	234
Refugee index	406.74	849.22	68.60	3504.66	234
Refugee index (ln)	5.24	0.95	4.23	8.16	234

Table A3: Work activities at the individual level

	(1) Works	(2) Has a secondary work activity	(3) Does non-farm work	(4) Is salaried	(5) Works for a firm, government or NGO
Ln(Refugee Index) x 2014	-0.038	0.099**	0.064**	0.097	0.049**
	(0.025)	(0.034)	(0.026)	(0.062)	(0.020)
Mean in 2011	0.80	0.34	0.36	0.14	0.04
Observations	1550	1200	1200	1200	1200
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations at the individual level with household fixed effects.Individual fixed effects are not included because the data do not allow for consistent identification of the same individual within households across survey waves. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to individuals aged 15 and above living in a household within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Individual works; Column 2: Individual has a secondary work activity; Column 3: Individual does non-farm work; Column 4: Individual is salaried; Column 5: Individual works for a firm, government, or NGO. Controls: Age, gender, can read, attended school, still in school, married, djerma/songhai ethnicity,household head age, household head gender, number of adult in the household and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A4: Work activities by sector at the individual level

	Individual works in				
	(1) Crop farming	(2) Livestock	(3) Trade	(4) Crafts and manual work	(5) Other
Ln(Refugee Index) x 2014	0.030	-0.000	0.011	0.058	-0.008
	(0.023)	(0.015)	(0.051)	(0.059)	(0.006)
Mean in 2011	0.96	0.04	0.21	0.10	0.01
Observations	1200	1200	1200	1200	1200
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations for individuals with household fixed effects. Individual fixed effects are not included because the data do not allow for consistent identification of the same individual within households across survey waves. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to individuals aged 15 and above living in a household within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Indicator equal to one if the individual is engaged in crop farming; Column 2: Indicator equal to one if the individual is engaged in livestock production; Column 3: Indicator equal to one if the individual works as an employee or is self-employed in the trade sector; Column 4: Indicator equal to one if the individual works as an employee for a firm, the government, or an NGO; Column 5: Indicator equal to one if the individual is engaged in any other non-agricultural sector.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A5: Weekly working hours

	(1) Weekly hours in primary work activity	(2) Weekly hours in secondary work activity	(3) Total weekly hours
Ln(Refugee Index) x 2014	-0.683	4.954***	4.271**
	(1.752)	(1.071)	(1.975)
Mean in 2011	41.15	13.53	54.69
Observations	1200	1200	1200
FE	HH	HH	HH
Controls	Indiv & HH	Indiv & HH	Indiv & HH

Notes: This table shows results from OLS estimations with household fixed effects. Individual fixed effects are not included because the data do not allow for consistent identification of the same individual within households across survey waves. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to individuals living in households within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Weekly hours worked in an individual's primary work activity; Column 2: Weekly hours worked in an individual's secondary work activity; Column 3: Total weekly workload in hours for an individual. Controls: age, gender, household head status, literacy status, school attendance, education level, marital status, and ethnic background (Djerma or Songhai), household head age, household head male, number of adults and whether the household has animals.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A6: Cereal-based food expenditure

	Annual expenditure per AE ($)				
	(1) Millet & Sorghum	(2) Other cereals	(3) Flour	(4) Pasta	(5) Pastries
Ln(Refugee Index) x 2014	-6.882	-0.529	1.870***	1.458*	2.820***
	(8.097)	(4.751)	(0.337)	(0.823)	(0.640)
Mean in 2011	62.91	23.69	4.14	2.95	2.59
Observations	454	454	454	454	454
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Annual expenditure in $ per adult equivalent in millet and sorghum; Column 2: Annual expenditure in $ per adult equivalent in other cereals ; Column 3:Annual expenditure in $ per adult equivalent in flour ; Column 4: Annual expenditure in $ per adult equivalent in pasta ; Column 5: Annual expenditure per adult equivalent in pastries. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A7: Cereal-based food consumption from own production

	Annual value from own production per AE ($)				
	(1)	(2)	(3)	(4)	(5)
	Millet & Sorghum	Other cereals	Flour	Pasta	Pastries
Ln(Refugee Index) x 2014	5.416	0.124	-0.332	0.000	0.108
	(10.663)	(0.497)	(0.299)	(.)	(0.065)
Mean in 2011	30.69	4.09	0.01	0.00	0.00
Observations	454	454	454	454	454
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Annual value of consumption from own production per adult equivalent in millet and sorghum; Column 2: Annual value of consumption in $ from own production per adult equivalent in other cereals ; Column 3: Annual value of consumption in $ from own production per adult equivalent in flour ; Column 4: Annual value of consumption in $ from own production per adult equivalent in pasta ; Column 5: Annual value of consumption in $ from own production per adult equivalent in pastries. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A8: Cereal-based food consumption received as gifts

	Annual value from gifts per AE ($)				
	(1)	(2)	(3)	(4)	(5)
	Millet & Sorghum	Other cereals	Flour	Pasta	Pastries
Ln(Refugee Index) x 2014	0.564	1.609**	-0.197	0.078	0.027
	(0.938)	(0.604)	(0.156)	(0.097)	(0.026)
Mean in 2011	3.57	5.33	0.00	0.00	0.01
Observations	454	454	454	454	454
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Annual value in $ of millet and sorghum received as gift; Column 2: Annual value in $ of other cereals received as gift ; Column 3: Annual value in $ of flour received as gift ; Column 4: Annual value in $ of pasta received as gift ; Column 5: Annual value in $ of pastries received as gift. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A9: Standardized Food Consumption Score

	Standardized		
	(1) Food Consumption Score (Planting season)	(2) Food Consumption Score (Harvest season)	(3) Food Consumption Score
Ln(Refugee Index) x 2014	0.052	0.307*	0.234**
	(0.107)	(0.145)	(0.089)
Mean in 2011	-0.00	0.00	0.00
Observations	468	468	468
FE	HH	HH	HH
Controls	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Standardized Food Consumption Score in the household during the planting season; Column 2: Standardized Food Consumption Score in the household during the harvest season; Column 3: Standardized Average Food Consumption Score across both seasons. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

C Robustness checks

C.1 Measure of distance

Using the distance in KM and the natural logarithm (ln) transformation of the distance instead of the index.

Table A10: Work activities

	Share of household members who				
	(1) Work	(2) Have a second work activity	(3) Do non-farm work	(4) Are salaried	(5) Work for a firm, government or NGO
Dist. closest UNHCR site x 2014	0.000	-0.003**	-0.002*	-0.002	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Ln(Dist. closest UNHCR site) x 2014	0.014	-0.076**	-0.038	-0.049	-0.022**
	(0.031)	(0.030)	(0.032)	(0.033)	(0.009)
Mean in 2011	0.81	0.38	0.35	0.10	0.03
Observations	468	448	448	448	448
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Share of individuals aged 15 and above in the household who work; Column 2: Share of individuals aged 15 and above who have a second work activity; Column 3: Share of individuals aged 15 and above who do non-farm work; Column 4: Share of individuals aged 15 and above who are salaried; Column 5: Share of individuals aged 15 and above who work for a firm, government, or NGO. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A11: Work activities by sector

	Share of household members working in					Diversification index
	(1)	(2)	(3)	(4)	(5)	(6)
	Crop farming	Livestock	Trade	Crafts and manual work	Other	Simpson index
Dist. closest UNHCR site x 2014	0.000	-0.001*	-0.001	0.000	0.000	-0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.000)	(0.000)
Ln(Dist. closest UNHCR site) x 2014	-0.007	-0.031	0.000	-0.012	0.005	-0.023
	(0.023)	(0.018)	(0.066)	(0.051)	(0.005)	(0.014)
Mean in 2011	0.95	0.04	0.22	0.08	0.01	0.26
Observations	448	448	448	448	448	448
FE	HH	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: share of individuals aged 15 and above working in crop farming; Column 2: share of individuals aged 15 and above working in livestock production; Column 3: share of individuals aged 15 and above working in trade; Column 4: share of individuals aged 15 and above working in crafts and manual activities; Column 5: share of individuals aged 15 and above working in any other sector. Column 6: Simpson diversity index. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A12: Food Consumption Score

	(1) Food Consumption Score (Planting season)	(2) Food Consumption Score (Harvest season)	(3) Food Consumption Score
Dist. closest UNHCR site x 2014	0.106	-0.338	-0.116
	(0.085)	(0.210)	(0.116)
Ln(Dist. closest UNHCR site) x 2014	2.250	-11.266*	-4.508
	(3.350)	(5.484)	(3.013)
Mean in 2011	40.28	43.29	41.78
Observations	468	468	468
FE	HH	HH	HH
Controls	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Food Consumption Score in the household during the planting season; Column 2: Food Consumption Score in the household during the harvest season; Column 3: Average Food Consumption Score across both seasons. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A13: Expenditures

		Total annual value ($)		
	(1)	(2)	(3)	(4)
	FES	Food purchase (AE)	Cons. from own production (AE)	Cons. from gift (AE)
Dist. closest UNHCR site x 2014	-0.000	-0.368	0.197	-0.325***
	(0.000)	(0.953)	(0.652)	(0.101)
Ln(Dist. closest UNHCR site) x 2014	-0.000	-34.255	11.404	-9.364***
	(0.008)	(28.228)	(18.509)	(2.692)
Mean in 2011	0.79	187.31	56.81	18.41
Observations	468	454	454	454
FE	HH	HH	HH	HH
Controls	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Monthly Food Expenditure Share of the household; Column 2: Annual value of food purchases per adult equivalent in $; Column 3: Annual value of consumption from own production per adult equivalent in $; Column 4: Annual value of consumption received as gifts per adult equivalent in $. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A14: Farm labor during planting season

	(1)	(2)	(3)	(4)
	Used external labor	No. days worked by external labor	No. family member on plot	No. days worked by family member
Dist. closest UNHCR site x 2014	0.000	0.031	0.006***	0.055
	(0.001)	(0.024)	(0.002)	(0.085)
Ln(Dist. closest UNHCR site) x 2014	0.008	0.813	0.185**	1.651
	(0.018)	(0.959)	(0.084)	(2.633)
Mean in 2011	0.11	1.16	2.32	11.59
Observations	1121	1121	1121	1121
FE	HH	HH	HH	HH
Controls	Plot & HH	Plot & HH	Plot & HH	Plot & HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the planting season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the planting season; Column 3: Number of family members working on the plot during the planting season; Column 4: Number of days worked by family members on the plot during the planting season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A15: Farm labor during harvest season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Dist. closest UNHCR site x 2014	-0.001	0.001	0.001	0.192
	(0.001)	(0.001)	(0.004)	(0.110)
Ln(Dist. closest UNHCR site) x 2014	-0.036	0.032	0.047	7.440*
	(0.026)	(0.031)	(0.126)	(3.848)
Mean in 2011	0.11	0.24	2.58	57.36
Observations	878	878	878	878
FE	HH	HH	HH	HH
Controls	Plot & HH	Plot & HH	Plot & HH	Plot & HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the harvest season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the harvest season; Column 3: Number of family members working on the plot during the harvest season; Column 4: Number of days worked by family members on the plot during the harvest season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

C.2 Different cutoffs

Table A16: Work activities

	Share of household members who				
	(1) Work	(2) Have a second work activity	(3) Do non-farm work	(4) Are salaried	(5) Work for a firm, government or NGO
Cutoff: 120 km					
Ln(Refugee Index) x 2014	-0.015	0.075***	0.028	0.103**	0.006
	(0.024)	(0.020)	(0.022)	(0.044)	(0.012)
Mean	0.82	0.37	0.34	0.14	0.04
Observations	630	600	602	602	602
Cutoff: 90 km					
Ln(Refugee Index) x 2014	-0.026	0.092**	0.039	0.053	0.024**
	(0.02)	(0.03)	(0.04)	(0.04)	(0.01)
Mean	0.82	0.37	0.34	0.11	0.03
Observations	434	418	418	418	418
Cutoff: 80 km					
Ln(Refugee Index) x 2014	-0.029	0.075*	-0.001	0.025	0.019**
	(0.018)	(0.036)	(0.030)	(0.034)	(0.007)
Mean in 2011	0.81	0.37	0.35	0.09	0.03
Observations	334	320	320	320	320
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 120, 90 and 80 km buffer from a UNHCR site. Outcomes: Column 1: Share of individuals aged 15 and above in the household who work; Column 2: Share of individuals aged 15 and above who have a second work activity; Column 3: Share of individuals aged 15 and above who do non-farm work; Column 4: Share of individuals aged 15 and above who are salaried; Column 5: Share of individuals aged 15 and above who work for a firm, government, or NGO. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A17: Work activities by sector

	Share of household members working in					Diversification index
	(1)	(2)	(3)	(4)	(5)	(6)
	Crop farming	Livestock	Trade	Crafts and manual work	Other	Simpson index
Cutoff: 120 km						
Ln(Refugee Index) x 2014	0.005	0.009	-0.002	0.022	-0.001	0.010
	(0.021)	(0.011)	(0.051)	(0.036)	(0.003)	(0.011)
Mean	0.95	0.04	0.21	0.08	0.01	0.26
Observations	602	602	602	602	602	602
Cutoff: 90 km						
Ln(Refugee Index) x	0.018	0.010	0.001	0.030	-0.004	0.032*
2014	(0.02)	(0.02)	(0.07)	(0.04)	(0.00)	(0.02)
Mean	0.95	0.05	0.20	0.08	0.01	0.26
Observations	418	418	418	418	418	418
Cutoff: 80 km						
Ln(Refugee Index) x 2014	0.041**	-0.000	-0.014	0.016	-0.004	0.009
	(0.015)	(0.017)	(0.068)	(0.046)	(0.004)	(0.012)
Mean in 2011	0.93	0.03	0.22	0.09	0.01	0.26
Observations	320	320	320	320	320	320
FE	HH	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 120, 90 and 80 km buffer from a UNHCR site. Outcomes: Column 1: share of individuals aged 15 and above working in crop farming; Column 2: share of individuals aged 15 and above working in livestock production; Column 3: share of individuals aged 15 and above working in trade; Column 4: share of individuals aged 15 and above working in crafts and manual activities; Column 5: share of individuals aged 15 and above working in any other sector. Column 6: Simpson diversity index. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A18: Food Consumption Score

	(1) Food Consumption Score (Planting season)	(2) Food Consumption Score (Harvest season)	(3) Food Consumption Score
Cutoff: 120 km			
Ln(Refugee Index) x 2014	3.479	9.541**	6.510***
	(2.256)	(3.819)	(1.836)
Mean	40.36	44.44	42.40
Observations	630	630	630
Cutoff: 90 km			
Ln(Refugee Index) x 2014	1.711	9.629*	5.670**
	(2.05)	(4.47)	(2.24)
Mean	40.24	43.20	41.72
Observations	434	434	434
Cutoff: 80 km			
Ln(Refugee Index) x 2014	1.255	9.629*	6.629**
	(2.748)	(4.473)	(2.544)
Mean in 2011	38.65	42.78	40.72
Observations	334	434	334
FE	HH	HH	HH
Controls	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 120, 90 and 80 km buffer from a UNHCR site. Outcomes: Column 1: Food Consumption Score in the household during the planting season; Column 2: Food Consumption Score in the household during the harvest season; Column 3: Average Food Consumption Score across both seasons. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A19: Expenditures

		Total annual value ($)		
	(1)	(2)	(3)	(4)
	FES	Food purchase (AE)	Cons. from own production (AE)	Cons. from gift (AE)
Cutoff: 120 km				
Ln(Refugee Index) x 2014	0.010	64.274***	8.102	1.365
	(0.009)	(11.277)	(21.295)	(4.232)
Mean	0.78	192.72	56.48	18.07
Observations	630	612	612	612
Cutoff: 90 km				
Ln(Refugee Index) x	0.002	58.443***	-6.746	5.634***
2014	(0.01)	(17.06)	(18.44)	(1.39)
Mean	0.78	183.40	56.36	18.29
Observations	434	420	420	420
Cutoff: 80 km				
Ln(Refugee Index) x 2014	0.001	67.960***	-9.103	6.628**
	(0.008)	(18.443)	(18.518)	(2.227)
Mean in 2011	0.78	184.18	55.05	19.28
Observations	334	322	322	322
FE	HH	HH	HH	HH
Controls	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 120, 90 and 80 km buffer from a UNHCR site. Outcomes: Column 1: Monthly Food Expenditure Share of the household; Column 2: Annual value of food purchases per adult equivalent in $; Column 3: Annual value of consumption from own production per adult equivalent in $; Column 4: Annual value of consumption received as gifts per adult equivalent in $. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A20: Farm labor during planting season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Cutoff: 120 km				
Ln(Refugee Index) x 2014	0.004	-0.514	-0.109	3.714
	(0.017)	(0.638)	(0.070)	(3.257)
Mean	0.11	0.90	2.38	11.97
Observations	1539	1544	1544	1544
Cutoff: 90 km				
Ln(Refugee Index) x	0.018	-0.111	-0.201**	-1.848
2014	(0.02)	(0.96)	(0.08)	(3.33)
Mean	0.11	1.27	2.32	12.02
Observations	1033	1033	1033	1033
Cutoff: 80 km				
Ln(Refugee Index) x 2014	0.004	0.312	-0.165*	-0.657
	(0.027)	(1.418)	(0.089)	(2.340)
Mean in 2011	0.12	1.64	2.28	11.09
Observations	780	780	780	780
FE	HH	HH	HH	HH
Controls	Plot	Plot	Plot	Plot

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 120, 90 and 80 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the planting season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the planting season; Column 3: Number of family members working on the plot during the planting season; Column 4: Number of days worked by family members on the plot during the planting season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A21: Farm labor during harvest season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Cutoff: 120 km				
Ln(Refugee Index) x 2014	0.033***	-0.036	-0.188*	-3.041
	(0.010)	(0.022)	(0.104)	(2.873)
Mean	0.11	0.18	2.45	52.44
Observations	1264	1264	1264	1264
Cutoff: 90 km				
Ln(Refugee Index) x	0.038**	-0.034	0.007	-5.313**
2014	(0.02)	(0.03)	(0.11)	(2.31)
Mean	0.10	0.27	2.60	58.36
Observations	826	826	826	826
Cutoff: 80 km				
Ln(Refugee Index) x 2014	0.044**	-0.068	0.053	-6.833*
	(0.019)	(0.073)	(0.140)	(3.473)
Mean in 2011	0.12	0.36	2.66	62.59
Observations	592	592	592	592
FE	HH	HH	HH	HH
Controls	Plot	Plot	Plot	Plot

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 120, 90 and 80 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the harvest season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the harvest season; Column 3: Number of family members working on the plot during the harvest season; Column 4: Number of days worked by family members on the plot during the harvest season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

C.3 Correction for spatial correlation

Table A22: Work activities

	Share of household members who				
	(1) Work	(2) Have a second work activity	(3) Do non-farm work	(4) Are salaried	(5) Work for a firm, government or NGO
Ln(Refugee Index) x 2014	-0.026	0.099***	0.041	0.051*	0.024
	[0.020]	[0.035]	[0.035]	[0.030]	[0.016]
Mean in 2011	0.81	0.38	0.35	0.10	0.03
Observations	468	457	457	457	457
FE	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and Conley standard errors with correction for spatial dependency in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Share of individuals aged 15 and above in the household who work; Column 2: Share of individuals aged 15 and above who have a second work activity; Column 3: Share of individuals aged 15 and above who do non-farm work; Column 4: Share of individuals aged 15 and above who are salaried; Column 5: Share of individuals aged 15 and above who work for a firm, government, or NGO. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A23: Work activities by sector

	Share of household members working in					Diversification index
	(1) Crop farming	(2) Livestock	(3) Trade	(4) Crafts and manual work	(5) Other	(6) Simpson index
Refugee index (ln) x 2014	0.020	0.011	0.004	0.028	-0.004	0.031
	[0.027]	[0.013]	[0.054]	[0.034]	[0.004]	[0.020]
Mean in 2011	0.95	0.04	0.22	0.08	0.01	0.26
Observations	457	457	457	457	457	457
FE	HH	HH	HH	HH	HH	HH
Controls	HH	HH	HH	HH	HH	HH

Notes: This table shows results from OLS estimations with household fixed effects. Sampling weights are considered, and Conley standard errors with correction for spatial dependency in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: share of individuals aged 15 and above working in crop farming; Column 2: share of individuals aged 15 and above working in livestock production; Column 3: share of individuals aged 15 and above working in trade; Column 4: share of individuals aged 15 and above working in crafts and manual activities; Column 5: share of individuals aged 15 and above working in any other sector. Column 6: Simpson diversity index. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A24: Food Consumption Score

	(1) Food Consumption Score (Planting season)	(2) Food Consumption Score (Harvest season)	(3) Food Consumption Score
Ln(Refugee Index) x 2014	1.371	10.662***	6.016***
	[1.954]	[3.317]	[1.728]
Mean in 2011	40.28	43.29	41.78
Observations	468	468	468
FE	HH	HH	HH
Controls	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and Conley standard errors with correction for spatial dependency in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Food Consumption Score in the household during the planting season; Column 2: Food Consumption Score in the household during the harvest season; Column 3: Average Food Consumption Score across both seasons. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A25: Expenditures

		Total annual value ($)		
	(1) FES	(2) Food purchase (AE)	(3) Cons. from own production (AE)	(4) Cons. from gift (AE)
Refugee index (ln) x 2014	0.002	55.529***	-8.885	5.892
	[0.008]	[16.061]	[13.270]	[4.724]
Mean in 2011	0.79	187.31	56.81	18.41
Observations	468	461	461	461
FE	HH	HH	HH	HH
Controls	HH	HH	HH	HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and Conley standard errors with correction for spatial dependency in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Household Food Expenditure Share (FES); Column 2: Food purchase per adult equivalent in $; Column 3: Consumption from own production per adult equivalent in $;Columns 4 : consumption received as a gift in $. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A26: Farm labor during planting season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Ln(Refugee Index) x 2014	0.014	-0.354	-0.202**	-2.104
	[0.047]	[1.164]	[0.100]	[2.074]
Mean in 2011	0.11	1.16	2.32	11.59
Observations	1134	1134	1134	1134
FE	HH	HH	HH	HH
Controls	Plot & HH	Plot & HH	Plot & HH	Plot & HH

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and Conley standard errors with correction for spatial dependency in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the planting season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the planting season; Column 3: Number of family members working on the plot during the planting season; Column 4: Number of days worked by family members on the plot during the planting season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A27: Farm labor during harvest season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Ln(Refugee Index) x 2014	0.036	-0.034	-0.004	-5.831
	[0.046]	[0.021]	[0.170]	[5.871]
Mean in 2011	0.11	0.24	2.58	57.36
Observations	908	908	908	908
FE	HH	HH	HH	HH
Controls	Plot	Plot	Plot	Plot

Notes: This table shows results from an OLS estimation with household fixed effects. Sampling weights are considered, and Conley standard errors with correction for spatial dependency in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the harvest season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the harvest season; Column 3: Number of family members working on the plot during the harvest season; Column 4: Number of days worked by family members on the plot during the harvest season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

C.4 Correlated random effect

Table A28: Work activities

	Share of household members who				
	(1) Work	(2) Have a second work activity	(3) Do non-farm work	(4) Are salaried	(5) Work for a firm, government or NGO
Ln(Refugee Index) x 2014	-0.016	0.113***	0.052***	0.057*	0.025***
	(0.028)	(0.023)	(0.018)	(0.034)	(0.008)
Mean in 2011	0.81	0.38	0.35	0.10	0.03
Observations	468	457	457	457	457
RE	Yes	Yes	Yes	Yes	Yes
Controls	HH	HH	HH	HH	HH

Notes: This table presents results from a Correlated Random Effects model. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes:Column 1: Share of individuals aged 15 and above in the household who work; Column 2: Share of individuals aged 15 and above who have a second work activity; Column 3: Share of individuals aged 15 and above who do non-farm work; Column 4: Share of individuals aged 15 and above who are salaried; Column 5: Share of individuals aged 15 and above who work for a firm, government, or NGO. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A29: Work activities by sector

	Share of household members working in					Diversification index
	(1) Crop farming	(2) Livestock	(3) Trade	(4) Crafts and manual work	(5) Other	(6) Simpson index
Ln(Refugee Index) x 2014	0.018	0.012	-0.013	0.051*	-0.002	0.037***
	(0.014)	(0.014)	(0.039)	(0.028)	(0.003)	(0.009)
Mean in 2011	0.95	0.04	0.22	0.08	0.01	0.26
Observations	457	457	457	457	457	457
RE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	HH	HH	HH	HH	HH	HH

Notes: This table presents results from a Correlated Random Effects model. Sampling weights are considered, and standard errors are clustered at the community level. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: share of individuals aged 15 and above working in crop farming; Column 2: share of individuals aged 15 and above working in livestock production; Column 3: share of individuals aged 15 and above working in trade; Column 4: share of individuals aged 15 and above working in crafts and manual activities; Column 5: share of individuals aged 15 and above working in any other sector. Column 6: Simpson diversity index. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A30: Food Consumption Score

	(1) Food Consumption Score (Planting season)	(2) Food Consumption Score (Harvest season)	(3) Food Consumption Score
Ln(Refugee Index) x 2014	1.250	7.715**	4.479*
	(2.006)	(3.911)	(2.361)
Mean in 2011	40.28	43.29	41.78
Observations	468	468	468
RE	Yes	Yes	Yes
Controls	HH	HH	HH

Notes: This table presents results from a Correlated Random Effects model. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Food Consumption Score in the household during the planting season; Column 2: Food Consumption Score in the household during the harvest season; Column 3: Average Food Consumption Score across both seasons. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A31: Expenditures

		Total annual value ($)		
	(1) FES	(2) Food purchase (AE)	(3) Cons. from own production (AE)	(4) Cons. from gift (AE)
Ln(Refugee Index) x 2014	-0.001	55.710***	-13.963	6.052***
	(0.005)	(18.230)	(14.877)	(1.515)
Mean in 2011	0.79	187.31	56.81	18.41
Observations	468	461	461	461
RE	Yes	Yes	Yes	Yes
Controls	HH	HH	HH	HH

Notes: This table presents results from a Correlated Random Effects model. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Monthly Food Expenditure Share of the household; Column 2: Annual value of food purchases per adult equivalent in $; Column 3: Annual value of consumption from own production per adult equivalent in $; Column 4: Annual value of consumption received as gifts per adult equivalent in $. Controls: share of females and children, household head age, male headship, school attendance of the head, mean age, share of members who attended school, share still in school, and household animal ownership.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table A32: Farm labor during planting season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Ln(Refugee Index) x 2014	0.019	0.064	-0.169**	-0.032
	(0.015)	(0.714)	(0.073)	(3.762)
Mean in 2011	0.11	1.16	2.32	11.59
Observations	1152	1152	1152	1152
RE	Yes	Yes	Yes	Yes
Controls	Plot & HH	Plot & HH	Plot & HH	Plot & HH

Notes: This table presents results from a Correlated Random Effects model. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the planting season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the planting season; Column 3: Number of family members working on the plot during the planting season; Column 4: Number of days worked by family members on the plot during the planting season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A33: Farm labor during harvest season

	(1) Used external labor	(2) No. days worked by external labor	(3) No. family member on plot	(4) No. days worked by family member
Ln(Refugee Index) x 2014	0.052***	-0.046	-0.126	-6.001
	(0.018)	(0.047)	(0.088)	(5.772)
Mean in 2011	0.11	0.24	2.58	57.36
Observations	959	959	959	959
RE	Yes	Yes	Yes	Yes
Controls	Plot & HH	Plot & HH	Plot & HH	Plot & HH

Notes: This table presents results from a Correlated Random Effects model. Sampling weights are considered, and standard errors are clustered at the community level in all regressions. Observations restricted to plots of households living within a 100 km buffer from a UNHCR site. Outcomes: Column 1: Dummy variable equal to 1 if external labor was used on the plot during the harvest season, and 0 otherwise; Column 2: Number of days worked by external laborers on the plot during the harvest season; Column 3: Number of family members working on the plot during the harvest season; Column 4: Number of days worked by family members on the plot during the harvest season. Controls: Owner status of the plot, distance from household to the plot, type of soil, slope type, irrigation status, erosion status, infrastructure erosion, and household size.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$