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Welfare Impact of Hosting Refugees in Ethiopia

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Abstract: This paper examines the welfare impact of hosting refugees in Ethiopia, one of the largest refugee-hosting countries worldwide. The findings reveal different implications depending on the type of household welfare metric. While reducing consumption expenditure per capita and increasing the probability of falling into consumption poverty, it has no effect on wealth and the status of wealth poverty. Decomposing consumption expenditure per capita into food, education, and other non-food components, the results further reveal that it alters the composition of consumption, as it solely affects food consumption expenditure. The consumption effects prevail in rural areas with no effects in urban centers while no heterogeneity is found concerning wealth and wealth poverty results. Key mechanisms explaining the adverse consumption effects include displacement of hosts from salaried employment and a spike in prices of agricultural inputs but not changes in the extent of societal cooperation.

Key words: Refugees, Consumption, Wealth, Poverty, Employment, Price, Cooperation

JEL Codes: O12, O15, E24, Z13

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1. Introduction

The global population of forcibly displaced people has been on the rise recently. In 2018, it reached 70.8 million, the highest since after World War II. About one-third of these people are refugees, of whom more than three-quarters are hosted in developing countries, mainly in Africa (UNHCR, 2018). This triggered increased interest in understanding the economic implications of hosting refugees in developing countries. Changes in household welfare outcomes constitute among the most comprehensive measures of the implications. In light of this, I examine the welfare impact of hosting refugees in the context of a developing country, sheltering one of the largest numbers of refugees worldwide.

An influx of refugees generates two broadly defined shocks that may affect the welfare of host communities: population and humanitarian intervention (Alix-Garcia and Saah, 2009; Maystadt and Verwimp, 2014; Balkan et al., 2018; Verme and Schuettler, 2019). The population shock increases labor supply, which, through triggering fiercer competition in the labor market, may drive down wages paid for tasks that could be undertaken by refugees, which are usually less skill-intensive tasks. On the one hand, this adversely affects the welfare of hosts with similar skills as the refugees. And, this effect is severe for those hosts whose employment gets crowded out because of the intensified competition. On the other hand, the availability of cheaper labor could be welfare enhancing for local producers. The population shock additionally boosts the market demand for goods and services. This induces price spikes whereby improved productivity is additionally incentivized and could be welfare enhancing for local producers. On the contrary, these spikes stifle the welfare of consumers. The boost in demand may lead to greater labor market opportunities and thereby welfare gains, while it may also put a strain on existing public services, which may adversely affect social cohesion and cooperation, health, and human capital accumulation, and thus stifle welfare outcomes.

The population shock is almost always accompanied by humanitarian intervention, which is financed by international aid and home government expenditure. Such intervention solidifies the population shock through an increased number of humanitarian workers, but its effects are not necessarily similar to that of a refugee-induced population shock, as the former would be composed of mainly better-skilled persons, with jobs and likely different tastes for goods and services. The provision of public goods and services within such intervention benefits the welfare of hosts, while food provision may generate positive or negative welfare effects,

depending on whether the food is locally procured or imported, the relative size of producers to consumers in the host community, and so forth. An increase in job opportunities following the arrival of humanitarian organizations is one of the potential welfare enhancing outcomes that may accrue for better skilled hosts.

As all of these effects occur almost simultaneously, theoretically, the net impact of refugee influx on the welfare of host communities is ambiguous. Further, the effect may not be uniform across different welfare metrics, as the metrics may not respond similarly depending on the intensity and duration of the two shocks, among others.

Existing empirical evidence on the short-term welfare impact of hosting refugees is slim despite the large increase in the refugee crisis, especially in the past decade (for reviews, see Ruiz and Vargas-Silva, 2013; Becker and Ferrara, 2019; Verme and Schuettler, 2019).[1] Further, the evidence is mixed with documented positive (Alix-Garcia and Saah, 2009; Kreibaum, 2016; Taylor et al., 2016; Alix-Garcia et al., 2018), negative (Alix-Garcia and Saah, 2009; Al-Hawarin et al., 2018; Rozo and Sviastchi, 2018), and zero (Rozo and Sviastchi, 2018) effects. Although there is a wide range of welfare metrics available (such as income, consumption expenditure, wealth, output, and nighttime light intensity) each of which measures different welfare aspects of households, the evidence also relies on a single welfare metric and thus lacks evidence on the generalizability of the results to other aspects of welfare, or it uses inferior metrics, such as ownership of a few assets (e.g., a radio or bicycle) or applications for housing improvements, which are less credible measures of aggregate welfare. The only exception of which I am aware is Rozo and Sviastchi (2018), who show that hosting Syrian refugees in Jordan has no effect on consumption expenditure while negatively affecting the number of assets owned, mainly luxury goods.

In the absence of clear theoretical predictions and empirical evidence, the welfare impact of hosting refugees remains an empirical question. This is more so owing to the differences in the legal framework governing refugees, the perceptions of natives, and other sociocultural barriers to refugee integration across host countries. Understanding such impacts is crucial,

[1]Scant but closely related literature assesses the long-term welfare impact of hosting refugees (Maystadt and Verwimp, 2014; Maystadt and Duranton, 2019) while other strands of related literature investigate the short- or long-term welfare impacts of hosting internally displaced persons (Alix-Garcia and Bartlett, 2015; Depetris-Chauvin and Santos, 2017) or expellees (Braun and Kvasnicka, 2012; Murard and Sakalli, 2018).

however, as support in designing robust development strategies that facilitate the integration of refugees without jeopardizing the welfare of hosts.

In this paper, I leverage the recent upsurge in the flow of refugees into Ethiopia, almost entirely from its neighboring countries, to investigate the welfare effect of hosting refugees using alternative objective measures of household welfare: consumption expenditure per capita and wealth. Additionally, I investigate the effect of hosting refugees on household consumption and wealth poverty status and the validity of potential mechanisms in linking the net influx of refugees to changes in household welfare and poverty outcomes along three lines: labor market, societal cooperation, and price.

The upsurge in refugees forms a unique opportunity to investigate the effects. First, it constitutes a large increase in the number of refugees within just few years, i.e., from around 125,910 in 2009 to 660,987 in 2014. Second, about 98% of these refugees are hosted in formal camps, semi-formal settlement sites (such as entry points and transit centers), and informal settlement sites with fairly precisely known locations in five of the 11 administrative regions of the country (i.e., Afar, Benishangul Gumuz, Gambella, Somali, and Tigray),[2] major refugee-hosting regions hereafter, with about 15% of the country's population. Third, the temporal changes in refugee intensity vary greatly even within these major refugee-hosting regions. These factors altogether imply that the recent upsurge offers large spatial heterogeneity in within-village temporal changes in refugee intensity in the country, which is particularly relevant from an empirical point of view. In addition, the legal framework that governs the situation of refugees offers refugees, for example, the right, although limited, to engage in the labor market[3] in addition to the customary physical and human rights protection it provides. This implies that the interaction between refugees and hosts is likely deeper, making understanding the effects attractive from a policy perspective.

Exploiting this opportunity for rigorously addressing the study objectives, I combine geo-referenced settlement site-level panel data on the number of refugees sheltered in Ethiopia from the UNHCR and detailed nationally representative and geo-referenced household- and individual-level panel data from the Ethiopian Socioeconomic Survey (ESS), a part of the

[2]Ethiopia is sub-divided into nine regional states and two city administrations, in the study period. I refer all of them as regions.
[3]See article 21(3) of Refugee Proclamation No. 409/2004 and articles 17 and 18 of the 1951 UN Convention Relating to the Status of Refugees. Additionally, see the next footnote concerning article 17(2) of the convention.

LSMS-ISA project, both covering the period of the recent uptick in the flow of refugees into the country.

Identification of the impact of hosting refugees comes from the spatial differences in within-village temporal variations in refugee intensity, i.e., the intensity of the net influx of refugees, conditional on household- and round-specific fixed effects and a rich set of time-varying covariates. However, I also show that the main findings are sensible to a number of falsification and variables specification tests and to extending the empirical strategy to an instrumental variables approach, using a weighted sum of the number of refugees hosted in Ethiopia by country of origin, in which the weights are the inverse geographic distances between a survey village and each of refugees' countries of origin, as an instrument for refugee intensity.

I find evidence that hosting refugees has different implications on household welfare depending on the type of welfare measure. While negatively affecting consumption expenditure per capita with an estimated elasticity of about 0.19, it has no statistically significant effect on wealth. The finding on consumption is not in line with 80%-90% of the existing evidence from the broader literature that examines the short- or long-term welfare impacts of hosting refugees, expellees, or internally displaced persons, as per a recent survey in Verme and Schuettler (2019). Similarly, while increasing households' probability of falling into consumption poverty, it has no effect on wealth poverty status. In particular, I estimate that a 1% increase in refugee intensity increases the probability of falling into consumption poverty by about 18 percentage points. Decomposing household consumption expenditure per capita into food, education, and other non-food components, the results further reveal that hosting refugees changes the composition of consumption, as it solely affects food consumption expenditure. The consumption effects prevail in rural areas with no effects in urban centers, while no heterogeneity is found between the two areas concerning wealth and wealth poverty results.

Key mechanisms explaining the adverse consumption effects include displacement of individual hosts from salaried employment—in temporary labor activities, on the extensive margin—and a spike in prices of agricultural inputs (seed and fertilizer) but not changes in self-employment in non-farm businesses, societal cooperation within the customary labor-sharing arrangements, and prices of food items.

The remainder of the paper is structured as follows. Section 2 provides background information on refugees and hosts in Ethiopia. Section 3 presents the data sources and

construction of the main variables. Section 4 lays out the empirical strategy. Section 5 describes the summary statistics. Section 6 presents and discusses the empirical results. Section 7 presents several robustness checks. The final section concludes.

2. Background

Ethiopia has an open-door policy toward refugees. The legal framework governing the situation of refugees adheres to the international and regional standards to which the country is a signatory: the 1951 UN Convention Relating to the Status of Refugees,[4] the 1967 UN Protocol Relating to the Status of Refugees, and the 1969 Organization of African Unity Convention Governing Specific Aspects of Refugee Problems in Africa. Refugee Proclamation No. 409/2004 served as the major national law governing the situation of refugees in the country from July 2004 until February 2019, when Refugees Proclamation No. 1110/2019 replaced it.

Refusal of entry of refugees into the country and their expulsion or repatriation to another country where they may be subjected to persecution are prohibited under the legal framework: Refugee Proclamation No. 409/2004.[5] Except for health, security, and some nationality-related reasons,[6] refugees are required to be settled in formal camps or semi-formal settlement sites, in the latter case until they are relocated to formal camps, where humanitarian intervention is better structured. The government decides on the location of these settlement sites. In 2010, however, implementation of an out-of-camp policy (OCP) began. The OCP offers refugees the right to live outside camps conditional on proving that they can finance themselves through their own means or support from relatives living in areas where they aim to settle (World Bank Group and UNHCR, 2015). This policy benefits Eritrean refugees, but there is an ongoing effort to extend it to others. The framework further offers refugees the right to work, yet with restrictions limiting refugees' legal access to formal employment. Most refugees find employment only in the informal economy or are self-employed, as per existing anecdotal evidence (Zetter and Ruaudel,

[4]Ethiopia is a party to the 1951 Convention with reservations to articles 8, 9, 17(2), and 22(1).

[5]As this study focuses mainly on the period 2009-2014, the legal framework discussed in this section relates to this particular period. There are considerable changes in the legal framework governing the situation of refugees in the country since the beginning of 2019 that are not discussed here.

[6]Refugees from Iraq, the Syrian Arab Republic, the Republic of Yemen, and others without any designated camps or refugees who are very few in number and as a result are not capable of integrating with others in camps are allowed to be a part of the urban assistance program. This program provides refugees medical and education assistance within the available national structures and outside these structures provided that it is authorized in advance. Additionally, it offers them a fixed monthly allowance to finance their basic needs. The allowance is calculated based on household size (number of members in a case) and is adjusted on a yearly basis to correct for inflation. In 2019, it stands at Br 2,100 (approximately US$72) per household head (principal applicant) and an additional Br 300 per an additional household member (member in a case) for up to a maximum of nine such members.

2016). This results because, in practice, refugees' participation in the labor market without official permits used to be tolerated by the authorities and there are no restrictions regarding refugees' mobility to nearby villages and towns from the formal camps and semi-formal settlement sites where they are sheltered.

Among others, Ethiopia has borders with four countries that are among the top 10 countries worldwide whence the largest number of refugees originates: South Sudan, Somalia, Eritrea, and Sudan (UNHCR, 2018). Political instability, conflict and violence, gross human rights violations, compulsory national services such as military conscription, and natural hazards such as drought have been the major push factors for the outflow of refugees in these countries (Zetter and Ruaudel, 2016; World Bank Group and UNHCR, 2015). This together with the open-door policy in the country makes Ethiopia the ninth largest refugee-hosting country worldwide, and the third largest in Africa (next to Uganda and Sudan) (UNHCR, 2018). As of August 2018, it hosts about 905,831 refugees (Figure 1), of which 44.3%, 28%, 12.4%, and 6.9% are South Sudanese, Somali, Eritrean, and Sudanese refugees, respectively. The rest are from 25 other countries, such as Burundi, Djibouti, Kenya, Uganda, Rwanda, the Democratic Republic of Congo, and the Republic of Yemen.

This refugee population came about after a sharp upsurge from 2010 (see Figure 1). Intensified violence, ethnic conflicts, and an outbreak of civil war[7] between the government and opposition forces in South Sudan following its independence in 2011 and the ongoing instability and drought in Somalia are the major reasons for the upsurge, which is predominantly composed of refugees from these two countries. The heightened tension between Sudan and South Sudan and conflicts around the common border following their separation have also played a part in the upsurge in refugees (Maystadt and Verwimp, 2014; World Bank Group and UNHCR, 2015; UNHCR, 2018).

Focusing on the period 2009-2014, the total number of refugees increased from 125,910 at the end of 2009 to 660,987 at the end of 2014. During this period, there were 23 formal camps and 14 informal and semi-formal settlement sites, including transit centers and entry points, where refugees were hosted.[8] About 98% of the refugees are hosted in all of the camps or 11 semi-formal and informal settlement sites with fairly precisely known locations in the major

[7]The civil war began in December 2013 and has not been resolved until February 2020.
[8]Three new refugee camps have opened after 2014.

refugee-hosting regions in the country (Afar, Benishangul Gumuz, Gambella, Somali, and Tigray), accounting for about 15% of the country's population. As can be seen from Figure 1, there is a large disparity in temporal changes in the number of refugees hosted even within these major refugee-hosting regions. Considering the refugee-to-population ratio in Figure 2, the highest increase is recorded in the Gambella region, reaching roughly 60% in 2014 from about 6% in 2009, followed, respectively, by the Benishangul Gumuz and Somali regions.[9]

Despite achieving one of the fastest rates of economic growth globally in the past decade, Ethiopia remains as one of the poorest countries, with average annual income per capita of just US$772 as of 2018. Poverty is pervasive, as 27 million people, close to one-third of the population, live on less than US$1.90 a day as of 2015 (World Bank, 2018). As a result, improving welfare and reducing the number of people living in poverty are among the top policy priorities in the country.

Given the increasing instability in the region, which remained as the major cause of forced displacement, and the open-door policy toward refugees and the pervasive poverty in the country, understanding the wellbeing implications of hosting refugees in Ethiopia is important. The evidence could support policymaking that aims at easing refugee integration, a relevant precondition for them to rebuild their lives, without overburdening the host economies as envisioned in the Global Compact for Refugees (GCR).

3. Data Sources

I use data from two sources: (1) the Ethiopian Socioeconomic Survey (ESS) data from the Central Statistical Agency of Ethiopia (CSA) and the World Bank, and (2) data on refugees in Ethiopia from the United Nations High Commissioner for Refugees (UNHCR).

3.1. ESS Data

The individual- and household-level information comes from the ESS data. The ESS is a three round panel survey, at the individual and household levels. The first round (ESS1) was collected in 2011/12 and contains 3,969 sample households from 333 rural and small urban enumeration

[9]Figures 1 and 2 shall only serve as an exposition to the existence of a large spatial difference in within-location (within-village/EA) temporal changes in refugee intensity. They shall not be interpreted as implying the location of refugee settlement sites located in any one region are closer to all points (sample EAs) in that region compared with the points (sample EAs) in other regions. As an example, some of the largest refugee-hosting camps that are located in the Somali region are closer to a large part of the Oromia region than more than half of the Somali region.

areas (EAs)[10] in 10 of the 11 administrative regions of Ethiopia.[11] Of these sample households, 3,466 are from rural areas. The second round (ESS2) was collected in 2013/14. In this round, the survey was expanded to cover large urban centers by including an additional 100 EAs, and the number of sample households grew to 5,262, coming from all 11 regions of the country. Of these households, 3,323 are from rural areas. The urban sample households became nationally representative of all urban households of the country since this round, making the whole sample of households nationally representative of households from all areas of Ethiopia,[12] as the rural sample households have been nationally representative since ESS1. The attrition rate across these two rounds was about 5%. The final round (ESS3) was collected in 2015/16, successfully tracking and interviewing 4,954 of the sample households in the ESS2, implying that the attrition rate from the ESS2 was about 6%. Of these households, 3,272 resided in rural areas. One of the rural EAs was not visited in the ESS3 for security reasons.

The sample households were selected following a stratified, two-stage sampling design. The sample frames are the 2011/12 Agricultural Sample Survey of Ethiopia and the 2007 Population and Housing Census of Ethiopia (PHC) for rural and urban households, respectively. Each of the regions of Ethiopia served as a stratum. The first stage of the two-stage sampling process involved the selection of sample EAs, which is undertaken under the condition of drawing at least a prespecified number of EAs per stratum. The second stage involved selecting an equal number (15 from large urban EAs while 12 from others) of households from each sample EA, using a simple random sampling method (CSA and World Bank, 2015, 2017).

The ESS contains rich individual-level information including basic demographics (age, gender, and so forth), employment condition, and participation in labor-sharing arrangements. It further has household-level information including consumption expenditure, asset ownership, housing conditions, ownership of non-farm enterprises, total annual rainfall, and total rainfall during the wettest quarter. It also has EA-level information such as access to healthcare facilities and zone-level information such as change in greenness in the main growing season (*Meher)*.

All the information used in this study comes from the household module, which is fielded from January to March in 2012 for ESS1, and from February to April in 2014 and 2016 for ESS2

[10]EA is a sub-village geographic unit with 150-200 households. On average, CSA subdivides each village into about 4 EAs. Despite this, I use the word village in the paper to refer to EA.
[11]Small urban centers have a population of fewer than 10,000 persons in the 2007 PHC (CSA and World Bank, 2015).
[12]This excludes three zones in the Afar and six zones in the Somali regional states (CSA and World Bank, 2015, 2017). Zone is the third largest administrative region in Ethiopia.

and ESS3, respectively. In addition, I use four environmental covariates (rainfall and greenness variables) that are merged with the ESS from external sources by the LSMS-ISA team.

Construction of the Outcome Variables. I use two different measures of household welfare: consumption expenditure per capita and wealth. Consumption expenditure has three components: food, education, and other non-food. The ESS has information on each household's consumption expenditure on 25 commonly consumed food items in Ethiopia,[13] for a one-week recall period, which is annualized by multiplying the aggregate value by 52.[14] It further has annual household education expenditure, which is household expenditure on school fees, uniforms, books, stationary, and so on, and the value of scholarships and assistance received by household members from the government or other organizations. The ESS further has household expenditure on 11 basic household goods (batteries, charcoal, matches, and so forth) for a one-month period and 12 other goods (furniture, clothing, kitchen equipment, and so forth) for a 12-month period. Expenditure on basic goods is annualized and together with expenditure on other goods it yields annual household other non-food consumption expenditure. These components are converted into per capita terms and added together to construct annual household consumption expenditure per capita.[15] Region-specific spatial and countrywide temporal price indices from the CSA and World Development Indicators, respectively, are applied to convert all the values into 2016 prices.

The ESS has rich information on each household's housing conditions, ownership of a wide array of assets, and access to other indicators of wealth. I use this to construct a round-specific composite wealth score for each household using principal component analysis, following Rutstein (2015).[16] In the interest of retaining spatial and temporal comparability of the

[13]The (25) food items that are included in the food consumption aggregate are cereals (*teff,* wheat, barley, maize, sorghum, and millet), pulses (horse beans, chickpeas, field peas, lentils, and haricot beans), oil seeds (Niger seed and linseed), fruits and vegetables (onions and bananas), tubers and stems (potatoes and *kocho/bula*), stimulants (coffee and chat) and others (meat, milk, cheese, eggs, sugar, and salt). These items are comprehensive enough to capture the most commonly consumed food items not just nationally but also regionally for each of the 11 regions of the country.

[14]These items could be purchased, own produced, or gifted from others. The value of purchased items is directly collected while the median price from the lowest geographical unit for which there are at least 10 purchase price observations is used to construct the value of food items that are own produced or gifted from others.

[15]Before calculating the total consumption expenditure, a few adjustments are made to food consumption expenditure. First, households with zero reported aggregate consumption from all of the food items are excluded. Next, food consumption expenditure per capita for each of the food items is winsorized at the 98th percentile in the ESS1 to correct for outliers while the winsorization is at the 99th percentile for the other two rounds of surveys, as these rounds have fewer outliers. Finally, the bottom 2nd percentile of aggregate food consumption expenditure per capita is winsorized in each round of the survey.

[16]I constructed the ESS wealth index in the same fashion as the wealth index in the Demographic and Health Surveys (DHSs) (Rutstein, 2015). Specifically for the Ethiopia DHS wealth index construction, see: http://www.dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm.

composite wealth score, I constructed it at once using the entire household-round observations. In particular, in constructing the wealth score, I include whether a household lives in its own house, and a household's number of members per number of sleeping rooms in the main dwelling, access to domestic servant, ownership of agricultural land proxied using whether any member of a household has undertaken any farming activity on its household's land in the last seven days, ownership of 14 different assets (radio, TV, telephone, refrigerator, electric stove, and so forth), main source of drinking water (piped into dwelling, piped into yard/plot, public tap/standpipe, tube well, and so forth), toilet facility type (flush toilet, ventilated pit latrine, composting toilet, and so forth) and whether the facility is private or shared, and main cooking fuel type (wood, charcoal, crop residue/leaves, and so forth). I also include the main construction material in the household's main dwelling's floor (mud/dung, bamboo/reed, wood planks, and so forth), walls (wood and mud, wood and thatch, wood only, and so forth), and roof (corrugated iron sheet, cement/concrete, thatch, and so forth) in the construction of the score.

I further construct and use two alternative measures of household poverty status from the two measures of welfare. Specifically, I use household sample weights, household size, and each of the measures of welfare all from the ESS2[17] to construct the consumption or wealth poverty line as the value of consumption expenditure per capita or wealth score, respectively, on the 40th percentile of the distribution in the population of individuals.[18] Then, the two measures are constructed as binary variables indicating whether the round-specific value of a household's consumption expenditure per capita or wealth score is at most as large as the value defining the respective poverty line.

Additionally, I use five individual-level variables reflecting salaried labor market engagement in the 12 months immediately before the data collection in each round of the survey. Two of these are binary variables indicating whether an individual has had permanent or temporary salaried employment, while the other two variables capture the number of hours and days an individual has worked in permanent and temporary salaried employment, respectively. The fifth is a binary variable indicating whether an individual has had permanent or temporary salaried employment.

[17]Alternatively, I constructed the poverty lines using household sample weights, household size, and household welfare measures from the ESS3. Usages of these poverty lines provide similar results.
[18]The poverty lines for consumption expenditure per capita and wealth are 3683.062 (Br) and -1.507, respectively.

I use two household-level variables to capture self-employment in non-farm businesses in the 12 months immediately before the data collection in each round of the survey: a binary variable indicating whether a household has a non-farm enterprise and a continuous variable measuring the number of non-farm enterprises a household owns. I further use a binary variable indicating whether a household has a plan to open a new non-farm enterprise in the 12 months immediately after the data collection in each round of the survey.

I capture societal cooperation using the extent of cooperation within the customary labor-sharing arrangements, which are known by various names, such as *debbo*, *wenfel*, and so on, across different parts of the country. In particular, I use two individual-level variables to capture the extent of cooperation in such arrangements in the 12 months immediately before the data collection in each round of the survey: a binary variable indicating whether an individual has undertaken unpaid work for any other household and the number of other households for which an individual has undertaken such work.

I further use three household-level binary variables each indicating whether a household is negatively affected by a fall in prices of food items, a rise in prices of food items, or a rise in prices of agricultural inputs (seed and fertilizer) in the 12 months immediately before the data collection in each round of the survey.

In the main empirical analyses, I use the standard (natural) logarithmic transformation of the continuous outcome variables that take only positive values (total and food consumption expenditure per capita) while I use the "started log" of the continuous outcome variables that take non-positive values (x: wealth score, education expenditure per capita, and other non-food consumption expenditure per capita), i.e., $\ln(x + z)$, where z is the negative of the minimum of x plus 0.001, ensuring that $x + z > 0$ for all possible values of each of the variables. The rest are either binary or count variables which are used in levels.

*Sample Construction***.** The ESS contains GPS coordinates of the entire sample EAs,[19] enabling usage of observations from all 433 EAs, spread across 317 woredas, the fourth biggest administrative region. Figure 3 presents the locations of these sample EAs. In the empirical analyses, I weight every sample unit by the inverse of its probability of inclusion in the ESS2. This implies that 193 sample households that were surveyed only in the ESS1 are excluded from

[19]These coordinates are randomly shifted to maintain the anonymity of sample households (and EAs) by 0-2 kilometers in urban EAs, 0-5 kilometers in 99% of rural EAs, and 0-10 kilometers in 1% of rural EAs.

the analyses. Further, I excluded 67 households from the ESS3, since they moved outside their original woreda between data collections for the ESS2 and ESS3. Having done so, the final number of household-round observations becomes 13,925. For the individual-level analyses, I further restrict the sample to individual's ages 15-64 in every survey round, and the final number of individual-round observations becomes 33,858.[20]

3.2. Data on Refugees

Data on refugees in Ethiopia come from the UNHCR. The data contain the location (GPS coordinates) of each of the refugee camps or settlement sites in the country and yearly time series data on the refugee population hosted in each of these locations from 2008 to 2018.[21] The refugee population is the end-of-year measure reflecting the number of refugees recorded in December[22] of the corresponding year, except for 2018 it reflects the number of refugees recorded in August. Moreover, the data include yearly time-series information on the aggregate number of refugees hosted in Ethiopia by country of origin.

I present some of the descriptive statistics (Figures 1 and 2) using all the available data. However, the main empirical analyses make use of the refugee data for the period 2009-2014, when the number of refugees in the country increased from 125,910 in 2009 to 660,987 in 2014. About 98% of these refugees are hosted in 23 refugee camps and 11 semi-formal settlement sites, including transit centers and entry points, and informal settlement sites with fairly precisely known locations in five of the 11 administrative regions of the country—Afar, Benishangul Gumuz, Gambella, Somali, and Tigray—where approximately 15% of the county's population resides. The rest are spontaneously settled refugees located mainly in Addis Ababa, and small others in the Tigray region and Borena zone in the Oromia region.[23] Most of these spontaneously

[20]About 24% (19%) of the sample household/individual-round observations reside in EAs that are within a 70-kilometer (50-km) buffer from the closest refugee settlement sites. How does this compare with related studies? For instance, the smallest distance between the markets (for the price analyses) and the corresponding closest refugee camps in the Alix-Garcia and Saah (2009) is 70 kilometers. Moreover, only 6% of their sample households (for the welfare analyses) reside within a 100-kilometer buffer from the closest refugee camps. On the other hand, I also show that the main findings are robust to restricting the sample to the aforementioned (70- and 50-kilometer) buffers in section 7.5.

[21]As discussed, the ESS data has information on the location (GPS coordinates) of each of the sample EAs, permitting linking the refugee data from UNHCR to the ESS EAs and thereby constructing refugee intensity for each round-EA.

[22]Due to incompleteness of the records in December 2008 and December 2009, I have the records in the following month (January) for each of these cases.

[23]I do not have the locations of these three semi-formal and informal settlements, since refugees are settled spontaneously over a larger geographical area. I assigned locations as follows. For Addis Ababa, I use the location of the center of the city. In Tigray, most of the refugees are urban refugees under the OCP. I use the location of the center of Mekelle city, the largest and capital city of the Tigray region. Most of the refugees in the Borena zone of the Oromia region are Kenyan Borenas settled in the Megado settlement site located close to the Ethiopian-Kenyan border. As a result, I use the location of this settlement site for Kenyan Borena refugees.

settled refugees in Addis Ababa and Tigray regions are either urban assisted refugees or those under the OCP, while those in the Oromia region are refugees living in semi-formal and informal settlements.

4. Empirical Strategy and Identification

This section discusses the empirical methodology, followed by the identification threats and how I assuage these threats.

4.1. Empirical Strategy

The ESS is a panel household survey, providing room for investigation of the welfare effect of hosting refugees in a household fixed effects specification. In particular, I specify a linear model with fixed effects as follows:

$$Y_{hvt} = \alpha_h + \beta Refugee\_Intensity_{vt} + \theta_j' X_{hvt} + \alpha_t + \varepsilon_{hvt} \ , \qquad (1)$$

where Y_{hvt} is the outcome variable (e.g., one of the welfare outcomes) of a household h residing in EA v during survey round t. α_h stands for household-specific fixed effects. These fixed effects absorb any observed and unobserved time-invariant household heterogeneity, which might otherwise bias the estimates. $Refugee\_Intensity_{vt}$ is an index capturing the refugee intensity in a particular EA v during survey round t, which varies across EAs and rounds. It is measured as a weighted sum of the average number of refugees in the two years right before the year the outcome variables are measured over all of the refugee camps or settlement sites s in the country, whereby the weights are the inverse geographic distances between a survey EA v and each of the refugee camps or settlement sites s, i.e.,

$$Refugee\_Intensity_{vt} = \sum_{s=1}^{37} \left(\frac{R_{s(t-1)} + R_{s(t-2)}}{2D_{vs}} \right), \qquad (2)$$

where $R_{s(t-1)}$ and $R_{s(t-2)}$ stand for the number of refugees in a refugee camp or settlement site s in the two years ($(t-1)$ and $(t-2)$, respectively) immediately before the year the outcome variables are measured during survey round t; 37 stands for the total number of unique refugee camps or settlement sites, of which 23 are formal camps and 14 are semi-formal settlement sites, including transit centers and entry points, and informal settlement sites in the country during the period under consideration (2009-2014); and D_{vs} stands for the ellipsoidal distance in kilometers

from EA v to the location of refugee camp or settlement site s. I use two years in the construction of refugee intensity, as there are two years between successive surveys. Given that the outcome variables reflect values (almost entirely) in 2011, 2013, and 2015, the information on refugees that I use in the empirical analyses covers the period 2009-2014, during which the total number of recorded refugees sheltered in the country increased from 125,910 at the end of 2009 to 660,987 at the end of 2014.

Equation (1) further has α_t denoting round-specific fixed effects. These fixed effects eliminate all round-specific correlated shifts in the outcome variable of interest, explanatory variables, and any other variables that are not directly controlled for in the regression, such as policy and economic shifts, political events, and other disasters that might affect the outcome variable of interest. X_{hvt} is a vector of j (12) different time-varying demographic (e.g., household size, number of young dependents in the household, and household head characteristics such as age, gender, and education) and environmental (e.g., rainfall and enhanced vegetation index) characteristics that may affect welfare outcomes. These variables are measured at the household or zone level.[24] ε_{hvt} is a white noise residual. β (a scalar) and θ_j (a vector of j elements) are the parameters to be estimated.

The ESS sample selection followed a two-step process in which the selection of sample EAs is carried out followed by the selection of sample households in the selected EAs. This clustering in the sampling design, as only the EAs that are included in the final sample are observed while all other EAs from the population of EAs in the country are unobserved, and the likelihood of having heterogeneity in the effect of hosting refugees necessitate clustering of standard errors (Abadie et al., 2017). I thus cluster the standard errors at the EA level, which allows for cross-sectional and temporal correlation in the errors within an EA. Such clustering of standard errors further assumes that the correlation in the errors that comes because of how the main explanatory variable of interest is constructed is at the EA level. The possibility of this correlation at a larger geographical level than the EA is addressed in the robustness checks section.

Moreover, the sample selection led to the inclusion of 143 urban EAs of the total 433 sample EAs. This created oversampling of EAs from urban areas, where only approximately

[24]A complete list and summary statistics of these variables is available in panel (d) of Table 1, while their description is given in panel (d) of Table A10.

one-fifth of the total population resides. Additionally, the second stage of the sample selection process involved the selection of an equal number of households (12 from rural and small urban areas and 15 from large urban centers) from each EA. This, in turn, led to the oversampling of households in less densely populated areas. In light of these, assuming an equal probability of inclusion in the sample for every sample unit (household/individual) could bias estimates of the population effects (Cameron and Trivedi, 2005). To account for these aspects of the sampling design and obtain nationally representative estimates, I weight each sample observation (round-household/round-individual) by the inverse of its probability of inclusion in the sample in the ESS2.

The main parameter of interest is β. It captures the average impact of refugee intensity on the welfare of host households. To identify the impact, I leverage a large spatial difference in within-village temporal variations in refugee intensity, i.e., the intensity of the net influx of refugees, accounting for household- and round-specific fixed effects and a rich set of time-varying covariates.

4.2. Identification

The estimates of the main coefficient of interest (β) will have causal interpretation if the concerns of reverse causality and omitted variable bias are properly addressed. To assuage the former concern, the index capturing refugee intensity is time-lagged relative to the period over which the outcome variables are measured. Omitted variable bias could stem from two decisions: the decision to leave refugees' home countries (selection into migration to Ethiopia) and the decision relating to where to settle in Ethiopia (selection into places of settlement). To the extent any of these decisions involve refugees' self-selection may lead to a bias in the estimates. Self-selection into migration is less important in the present case as refugees are forced migrants suddenly fleeing mainly conflict and violence, and small others political persecution (mandatory national service such as military conscription, gross human rights violation, detention, and others) and natural calamities.

The overwhelming majority of refugees in Ethiopia are hosted in formal camps or semi-formal settlement sites (transit centers and entry points), in the latter case only until they are relocated to formal camps, which are located close to the country's borders with the neighboring countries whence the majority of the refugees come (Eritrea, Somalia, South Sudan, and Sudan).

The government decides on the location of these settlement sites[25] and undertakes relocation of refugees from semi-formal settlement sites to (usually nearby) formal camps. Refugees being forcibly and suddenly displaced naturally cross the border to go to the nearest refugee settlement site, implying that refugees' self-selection is less of an issue when it comes to the places of settlement.[26] Thus, this selection concern mainly comes from the choice of the government on where to locate the refugee settlement sites. If this choice, which by default is correlated with refugee intensity, creates other factors that are correlated with the outcome variable(s), the analyses should deal with them. Equation (1) includes household-specific (EA-specific) fixed effects that effectively eliminate such factors that are time-invariant.

This leaves me with the potential concern of omitted variable bias from time-varying factors. Absent such factors, the outcome variables in places that experienced high and low temporal variations in refugee intensity during the study period should have followed parallel trends if there was no difference in temporal variations in refugee intensity between them. As the existence of such parallel trends cannot naturally be tested directly, ideally, I would want to give indirect (suggestive) evidence, such as showing its existence going back in time to when there was no refugee in the country. I am not aware of any panel data on household welfare during early times, but there is repeated cross-section information on agricultural income since the 1990s from the Agricultural Sample Survey of Ethiopia. Nevertheless, I cannot provide such suggestive evidence using these data from the 1990s since there was a temporally and spatially varying degree of refugee intensity in Ethiopia owing to its openness to refugees during these times and way before that.[27] However, I partially circumvent this concern by including many (12) household- or zone-level (plausibly predetermined) time-varying control variables (X_{ht}) in equation (1). I discuss and conduct tests to falsify and employ alternative empirical strategy to allay the concern from other potential time-varying variables in sections 7.4, 7.5, and 7.6.

5. Descriptive Statistics

This section presents the summary statistics of the main variables, followed by a description of the association between the two household welfare metrics.

[25]See article 21(2) of Refugee Proclamation No. 409/2004.

[26]Refugees may, however, influence their settlement site across the existing ones by altering when or where to cross the border. If this influence is based on their anticipation of future living conditions across the settlement sites, it leads to reverse causality and thereby a bias in the estimates. I present and discuss (results from) a falsification test (section 7.4) to rule out this possibility.

[27]Ethiopia has always maintained open door policy to refugees although this is legalized for the first time in 1969, when it adopted the 1951 UN Convention Relating to the Status of Refugees and its 1967 Protocol.

Table 1 presents aggregate summary statistics for all the sample observations and disaggregated statistics based on whether the observations are from round-specific major or minor refugee-hosting EAs, which is respectively defined as with above or below the average refugee intensity—which is about 955—across all rounds and EAs. About 40% of the household-round observations are from major refugee-hosting round-EAs.

The average household consumption expenditure per capita is 6,256 Ethiopian birr (Br),[28] of which about 74%, 2%, and 24% is spent on food, education, and other non-food items, respectively. On average, while there is no statistically significant difference in total consumption expenditure per capita, other non-food consumption expenditure per capita, and consumption poverty status between households in the major and minor refugee-hosting round-EAs, households in the former round-EAs spend significantly more on education and less on food compared with households in the latter round-EAs. Taking into account wealth score and wealth poverty status, households in the major refugee-hosting round-EAs are significantly well off than households in the minor refugee-hosting round-EAs. As expected, the wellbeing of urban households is better than rural households, in all of the metrics (see Table 2).

The probabilities of salaried permanent employment and ownership of non-farm enterprises are significantly larger in major than minor refugee-hosting round-EAs and in urban than rural EAs, while the opposite is true for the probability of salaried temporary employment and both measures of engagement in the customary labor-sharing arrangements.

A rise in prices of food items that negatively affect households is significantly more prevalent in urban than rural areas, while the opposite is true for a rise in prices of agricultural inputs (seed and fertilizer).

Consumption expenditure per capita and wealth are widely used as interchangeable household welfare metrics. Theoretically, the former captures more of the short-term fluctuations in household welfare, compared with the latter, implying that these metrics capture different aspects of household welfare.

I next empirically explore how good a proxy these metrics are for one another, to shed light on the generalizability of empirical results from one of them to the other. Particularly, I run alternative regressions of the logarithm of household consumption expenditure per capita on the "started log" of household wealth score. Table 3 presents the results. In column (1), I relate

[28]The dollar to birr exchange rate was approximately 22 in 2016.

within-woreda variations in these variables conditional on round-specific fixed effects, while in column (2) I restrict the variation to be within EA. In both specifications, the partial correlation (coefficient estimate) is positive and significant but rather low. In column (3), I further restrict the variation to be within a household, and in column (4) I additionally control for 12 household- or zone-level time-varying characteristics. Although significant, the strength of the correlation weakens in these latter specifications compared with the first two specifications, due mainly to the large drop in the size of the partial correlation, implying that the two household welfare metrics are relatively poorer within-household variation proxies for one another, at least in the present case. Thus, empirical results exploiting such variations may not be strongly generalizable from one to the other metric, unless substantiated empirically.

6. Empirical Results

This section presents the main empirical results, followed by the results on the potential mechanisms that may explain the main findings.

6.1. Main Results

I present the main empirical results in this section. I begin by presenting the impact of hosting refugees on household consumption expenditure per capita and its components, followed by wealth and the status of poverty.

6.1.1. Impacts on Consumption Expenditure

Table 4 reports alternative estimates of the impact of hosting refugees on household consumption expenditure per capita. I start by estimating a less conservative variant of equation (1) and then extend it through stepwise inclusion of relevant fixed effects and other covariates. In light of this, column (1) provides the estimate of this impact from an ordinary least squares (OLS) estimation that controls for woreda fixed effects (about 317 fixed effects) and round-specific correlated shifts. The coefficient estimate is negative but insignificant, suggesting that hosting refugees may not significantly affect household consumption expenditure per capita. This specification relates within-woreda variations in the refugee intensity to household consumption. This implies that it could be biased if there is any EA-level time-invariant characteristic that is correlated with refugee intensity and may affect household consumption expenditure per capita. To circumvent this concern, I run an OLS estimation of equation (1) controlling for EA fixed effects (about 433 fixed effects) and round-specific correlated shifts and present the result in column (2). As refugee intensity is invariant within each round-EA, this is a linear EA fixed effects

specification. The estimate remains negative but turns out to be significant, suggesting that hosting refugees adversely affects household consumption expenditure per capita. This estimate could in turn be biased if there is any time-invariant household characteristic that is correlated with consumption expenditure per capita and the location of refugee settlement sites. I estimate a household fixed effects variant of equation (1) to eliminate the concern from such characteristics and present the result in column (3). To partially circumvent the remaining concern from time-varying factors, I additionally control for many (12) household- or zone-level time-varying variables in the household fixed effects specification and report the result in column (4). The estimates in these last two specifications remain consistent with the estimate in column (2), confirming that hosting refugees has a significant negative effect on household consumption expenditure per capita. Specifically, on average, the estimated elasticity of household consumption expenditure per capita to refugee intensity is about -0.19.

This finding is not in line with the existing empirical evidence on the short-term household consumption impact of hosting refugees (Kreibaum, 2016; Rozo and Sviastchi, 2018). Kreibaum (2016) shows that hosting Congolese refugees in Uganda is beneficial and Rozo and Sviastchi (2018) find that hosting Syrian refugees in Jordan is immaterial. Unlike the case in my paper, it is important to note that these studies employ repeated cross-section data and the overwhelming majority of refugees considered in Rozo and Sviastchi (2018) are out-of-camp refugees.

Additionally, the documented adverse consumption effect of hosting refugees is not consistent with 80%-90% of the existing evidence if the broader literature that examines the short- or long-term welfare impacts of hosting refugees, expellees, or internally displaced persons is considered, as per the survey in Verme and Schuettler (2019).

As there are differences between rural and urban areas in, among others, the economic structure, the skill levels and skill mix of individuals, and access to and type of financial services, which may be useful in smoothing household consumption, the aggregate estimate may mask important difference in the consumption impact of hosting refugees between these areas. Thus, I next examine if there is heterogeneity in the estimated impact according to urbanity. Columns (5) and (6) in Table 4 present separate results for rural and urban households, respectively. For brevity, I only report estimates from a household fixed effects specification, controlling for numerous (12) time-varying characteristics. The findings show that hosting

refugees adversely affects household consumption expenditure per capita in rural areas while it has no statistically significant effect in urban centers.

Decomposing household consumption expenditure per capita into food, education, and other non-food components, I next explore whether hosting refugees alters the composition of household consumption. Specifically, I run separate regressions for each of these components using a household fixed effects specification of equation (1), controlling for numerous (12) time-varying characteristics. The columns labeled "All" in Table 5 present the results. The results reveal that hosting refugees affects neither education nor other non-food consumption expenditures, while it adversely affects food consumption expenditure per capita.

These aggregate estimates may mask heterogeneities in the impacts, for instance, along the urbanity line, as shown for aggregate consumption expenditure per capita. To test this, I run similar specifications as those in the columns labeled "All" separately for rural and urban households for each of the components of consumption expenditure per capita. The results are presented in columns labeled "Rural" and "Urban" in Table 5. The findings show that there is no heterogeneity in the impacts of hosting refugees on education and other non-food consumption expenditures between rural and urban areas. However, I find evidence that hosting refugees adversely affects food consumption expenditure per capita in rural areas while it has no effect in urban centers.

I thus conclude that hosting refugees alters the composition of household consumption, which prevails only in rural areas.

I am not aware of any study that examines the impact of hosting refugees on the composition of household consumption expenditure except Rozo and Sviastchi (2018) finding a similar result to mine, in that hosting Syrian refugees predominantly outside camps in Jordan alters the composition of Jordanian households' consumption expenditure.

6.1.2. Impacts on Wealth

I next turn to examining the impact of hosting refugees on another commonly used metric of household welfare, that is, wealth.

I present alternative estimates of this impact in columns (1) to (4) in Table 6. These columns are from similar specifications as in the same column labels in Table 4. The results consistently show that hosting refugees has no effect on household wealth score.

This finding is not consistent with the existing empirical evidence on the impact of hosting refugees on alternative measures of household wealth (Al-Hawarin et al., 2018; Rozo and Sviastchi, 2018). Al-Hawarin et al. (2018) find a negative effect on housing conditions and Rozo and Sviastchi (2018) document a negative effect on the number of assets owned, mainly luxury assets, both from hosting Syrian refugees, predominantly outside camps, in Jordan.

I next examine the heterogeneity in the wealth impact of hosting refugees along the urbanity line. Specifically, I run a household fixed effects variant of equation (1), controlling for numerous (12) time-varying characteristics, separately for rural and urban households. I report the results in columns (5) and (6) in Table 6. I find no heterogeneity in the impact of hosting refugees on household wealth between rural and urban areas.

Alix-Garcia and Saah (2009) examine similar heterogeneity in the impact of hosting refugees on ownership of a few assets (radio, bicycle, and cement floor). My results are not consistent with theirs, as they find a negative wealth effect in urban areas and a positive wealth effect in rural areas of hosting Burundian and Rwandan refugees in Tanzania. However, on top of relying on repeated cross-section data, the findings in Alix-Garcia and Saah (2009) reflect the effects of proximity to the nearest refugee camp, without any regard to the population of refugees in the nearest camp or the distance to and population of refugees in other refugee camps within Tanzania.

In addition to the welfare metrics employed in my paper, the empirical literature uses income and nighttime light intensity in assessing the welfare impact of hosting refugees (Alix-Garcia et al., 2018; Taylor et al., 2016). The findings from these studies are contradictory to mine. In particular, Taylor et al. (2016), based on calibrated Monte Carlo simulations, show that hosting Congolese refugees in Rwanda boosts household income and Alix-Garcia et al. (2018) find that hosting refugees in Kenya increases nighttime light intensity.

6.1.3. Impacts on Poverty

Given the results on household welfare, the next natural question is whether hosting refugees affects household poverty status. I examine this question in this section using the two measures of household poverty status: consumption and wealth poverty.

Columns labeled “All” in Table 7 present the results. These results are from a household fixed effects specification, controlling for a rich set of (12) time-varying characteristics. The results show that hosting refugees increases households’ probability of falling into consumption

poverty while it has no effect on wealth poverty status. In particular, I estimate that a 1% increase in refugee intensity increases the probability of falling into consumption poverty by about 18 percentage points.

As these estimates may mask heterogeneities in the impacts, for each of the measures, I run separate regressions for rural and urban households using a household fixed effects specification and controlling for numerous (12) time-varying characteristics. I report the results in columns labeled "Rural" and "Urban" in Table 7 for rural and urban households, respectively. The results reveal that hosting refugees increases household consumption poverty status in rural areas while it has no effect in urban areas. Concerning the impact of hosting refugees on household wealth poverty status, I find no heterogeneity between the two areas.

6.2. Potential Mechanisms

In this section, I examine the validity of potential mechanisms in driving the adverse consumption effects, i.e., the average effect across the entire consumption distribution and on consumption poverty status, of hosting refugees along three dimensions: labor market, societal cooperation, and price.

6.2.1. Labor Market

I examine if labor market effects are the factors driving the adverse consumption effects of hosting refugees by investigating the implications of hosting refugees on the status of the salaried employment and non-farm self-employment of the hosts. Evidence of crowding out of hosts' employment from either or both of the labor market activities could form among the mechanisms mediating the adverse consumption effects of hosting refugees through its negative effect on income, among others.

(a) Salaried Employment

Table 8 presents alternative estimates of the impact of hosting refugees on a binary variable indicating whether an individual has had salaried employment, using variants of equation (1). The columns in this table are from similar specifications as in the same column labels in Table 4, except household fixed effects are replaced with individual fixed effects (h indexes an individual in this case), since the status of salaried employment is available at the individual level. The results in columns (1) to (4) consistently show that hosting refugees crowds out hosts' salaried employment, on the extensive margin. In particular, I estimate that a 1% increase in refugee intensity reduces the probability of hosts' salaried employment by about 9 percentage points.

I next examine the heterogeneity in the estimated impact along the urbanity line. I do this by running an individual fixed effects variant of equation (1), controlling for 12 time-varying characteristics, separately for rural and urban households. Columns (5) and (6) in Table 8 present the results. I find that hosting refugees crowds out salaried employment of hosts in rural areas while it has no statistically significant effect in urban centers.

I further examine the heterogeneity in the estimated impact between permanent and temporary (casual) labor activities. This is done for the extensive and intensive margins. I use binary employment indicators in each of the two types of labor activities to capture the effects on the extensive margin and hours and days worked in salaried permanent and temporary employment, respectively, to capture the intensive margin effects. The columns labeled "All" in Table 9 report these results from an individual fixed effects specification, controlling for numerous (12) time-varying characteristics. I find that the crowding out effect of hosting refugees on hosts' salaried employment occurs from temporary labor activities, and only on the extensive margin, while I find no effect of hosting refugees on permanent labor activities.

Distinguishing between rural and urban areas (columns labeled "Rural" and "Urban" in Table 9), I further show that the adverse effect on hosts' salaried temporary employment prevails in rural areas, with no effects in urban centers. I document no heterogeneity between these areas when it comes to the effect on salaried permanent employment, on the extensive and intensive margins.

I thus conclude that displacement of individual hosts from salaried temporary employment—on the extensive margin, in rural areas—is one of the mechanisms driving the adverse consumption effects of hosting refugees.

(b) Self-Employment

The first six columns in Table 10 present alternative estimates of the impacts of hosting refugees on the two household-level measures of ownership of non-farm enterprises, used as proxies for self-employment in non-farm businesses. These measures are whether a household owns a non-farm enterprise and the number of such enterprises a household owns. These columns report separate results for all, rural, and urban households, which are respectively labeled "All," "Rural," and "Urban." All these results are from a household fixed effects specification, controlling for 12 time-varying characteristics. The results reveal that hosting refugees has no

effect on the two measures of ownership of non-farm enterprises, with no heterogeneity in the results between rural and urban areas.

I therefore conclude that a change in self-employment of hosts in non-farm businesses is not among the mechanisms driving the adverse consumption impacts of hosting refugees.

In the interest of generating suggestive evidence on the impact of hosting refugees on self-employment in non-farm businesses in the medium-term, I assess the impact of hosting refugees on households' plans for opening a new non-farm enterprise in the coming year. The last three columns in Table 10 report these results for all, rural, and urban households, respectively. These results are from a similar specification as in the first six columns. The results show that hosting refugees has no effect on households' plans for opening a new non-farm enterprise in the coming year, with no heterogeneity in the impact between rural and urban areas.

These results suggest that a change in self-employment of hosts in non-farm enterprises may not drive adverse consumption effects of hosting refugees in the medium-term, as documented to be the case in the short-term.

6.2.2. Cooperation

I next assess whether a change in the extent of cooperation is among the factors driving the adverse consumption effects of hosting refugees by investigating the impacts of hosting refugees on two related proxies of societal cooperation: whether an individual has worked for other households and the number of other households an individual has worked for, both for free, within the customary labor-sharing arrangements. Evidence of lowered societal cooperation could form among the mechanisms driving the adverse consumption effects of hosting refugees through its adverse effect on productivity, production, and income, among others.

Table 11 presents alternative estimates of the impacts of hosting refugees on these two proxies of societal cooperation. The columns labeled (1) report EA fixed effects estimates, and the other columns report individual fixed effects estimates. The columns labeled (3), (4), and (5) additionally include numerous (12) time-varying characteristics. The columns labeled (4) and (5) report separate results for rural and urban individuals, respectively. The results reveal that hosting refugees has no effect on the two measures of the extent of societal cooperation. Further, I find no heterogeneity in these results between rural and urban areas.

I thus conclude that a change in the extent of societal cooperation—measured using the change in the level of participation within the customary labor-sharing arrangements, on the

extensive or intensive margin—is not among the mechanisms driving the adverse consumption impacts of hosting refugees.

6.2.3. Price

I investigate whether changes in prices are among the factors mediating the adverse consumption effects of hosting refugees, by assessing whether hosting refugees leads to changes in prices that negatively affect households. Specifically, I consider three cases of changes in prices: a fall in the prices of food items, a rise in the prices of food items, and a rise in the prices of agricultural inputs (seed and fertilizer). Evidence of a significant effect on prices that affect households negatively could constitute among the factors mediating the adverse consumption effects of hosting refugees via reducing the (real) incomes of households, among others.

Table 12 presents alternative estimates of the impacts of hosting refugees on the three price changes considered. I report the results from a household fixed effects specification controlling for numerous (12) time-varying characteristics. Each column reports separate results for all, rural, and urban households, which are respectively labeled "All," "Rural," and "Urban." The results show that hosting refugees has no effect on food prices that negatively affect households. However, heterogeneity test results show that hosting refugees causes a rise in the prices of food items that negatively affect households only in urban areas. Given the results on household welfare, I conclude that this effect is not translated into adverse effects on consumption expenditure per capita or wealth. Unlike the effects on food prices, I find that hosting refugees leads to a rise in prices of agricultural inputs (seed and fertilizer) that negatively affect households. Further, heterogeneity test results reveal that this effect prevails in rural areas with no statistically significant effect in urban centers.

I thus conclude that an increase in prices of agricultural inputs (seed and fertilizer) in rural areas is one of the mechanisms driving the adverse consumption effects of hosting refugees.

7. Robustness Checks

I conducted several tests to check the robustness of the main findings.

7.1. Clustering

The main analyses allow for potential non-independence in the errors within an EA because of the EA-level clustering in the sampling design and the possibility of heterogeneous welfare effects of hosting refugees, such as based on urbanity (Abadie et al., 2017). However, clustering in the temporal changes in refugee intensity could be an additional potential source of correlation

in the error terms. The main analyses implicitly assume that this change is clustered at the EA level. Realistically, however, it is likely clustered at a larger geographical level than an EA. As a result, this robustness check tests whether the main findings are robust to clustering the standard errors at the woreda level, reducing the number of clusters from 433 to 317.[29] Table A1 presents estimates of the impact of refugee intensity on the measures of household welfare and the status of poverty considered in the main analyses. The main findings remain robust quantitatively and qualitatively to this test.

7.2. Representativeness of the Sample

The national representativeness of the sample is affected by attrition of observations (e.g., households) across rounds. The household-level attrition rate is 5% and 6% between the first and the last two rounds of surveys, respectively. In the main analyses, I run weighted regressions whereby each sample observation is weighted by its sample weight, the inverse of its probability of inclusion, in the ESS2. This implies that the main results account for attrition across the first two rounds, as the sample weights in ESS2 are adjusted weights of ESS1 taking into account relisting, nonresponse and attrition of households across the two rounds (CSA and World Bank, 2015). However, these estimates may not be fully nationally representative, since attrition across the last two rounds is not taken into consideration. To assess if the national representativeness of the main results are significantly affected by attrition across the last two rounds, I replaced the sample weights used in the main analyses by the weights from the ESS3, which are adjusted weights of the ESS2 taking into account relisting, nonresponse and attrition of households across these rounds of surveys (CSA and World Bank, 2017). Table A2 presents estimates of the impact of refugee intensity on the measures of household welfare and the status of poverty used in the main analyses. The main findings remain valid. Additionally, I excluded a small number of households (67) from the ESS3. These are households that moved from their location in the ESS2 to outside their woreda after the ESS2. I assume that these households are small to significantly change the national representativeness of the main results.

7.3. Specification of the Main Variables

In the main analyses, household consumption expenditure and its components are specified in per capita terms. In this robustness exercise, I test whether the findings are robust to specifying

[29]Alternatively, I cluster the errors at the zone level, which reduces the number of clusters from 433 to 84, and find similar results. These results could be available on request.

these outcome variables in per adult equivalent terms. I present the results of this test in Tables A3 and A4. The main findings remain robust.

Additionally, I use the "started log" transformation of the wealth score, which takes values of all signs, in the main analyses. And, I applied the standard logarithmic transformation to variables that take only positive values: household consumption expenditure per capita and the main explanatory variable of interest, i.e., refugee intensity. In this robustness test, I check whether the main findings are robust to using alternative transformations of these variables. In particular, I applied an inverse hyperbolic sine (IHS) transformation to household consumption expenditure per capita and a hybrid hyperbolic sine and its inverse transformation of the wealth score, in the latter case following Ravallion (2017). In Table A5, I report the results based on these transformations of the main continuous outcome variables and using the logarithmic or IHS transformation of refugee intensity. Moreover, I present the results for the levels of the main binary outcome variables and using an IHS transformation of refugee intensity in the same table. All the main findings remain robust.

7.4. Falsification Test

I discussed that potential reverse causality between refugee intensity and the outcome variable(s) is a threat to causally identifying the impact of hosting refugees. I use time-lagged refugee intensity in the main analyses to assuage this threat. Nonetheless, such a technique may not circumvent all the potential sources of the threat. For instance, refugees may anticipate the living standards across host areas and adjust their decisions, such as where or when to cross the border, to influence their subsequent settlement site. Such anticipation effects, if present, cause reverse causality and will not be addressed by the strategy I followed. As refugees arguably follow adaptive expectations, their anticipation about the living standards of hosts in the near future is highly dependent on the current level of living standards. This implies that a significant correlation between the current living standards (welfare) of hosts and future refugee intensity is an indication of the existence of such anticipation effects, causing reverse causality. I formally test whether this is the case by including future refugee intensity, constructed from the numbers of refugees hosted in the refugee settlement sites in the two years immediately after the year outcome variables are measured, as an additional explanatory variable in the main specification, which controls for household- and round-specific fixed effects, lagged refugee intensity, and 12

other time-varying covariates.[30] Table A6 presents the results of this test for the main outcome variables capturing household welfare and the status of poverty. The results show that future refugee intensity is not significantly related to any of the four outcome variables, suggesting nonexistence of such anticipation effects.

7.5. Restricted Sample

I discussed that potential non-random choice of the location of refugee settlement sites, and thus non-randomness in refugee intensity, is a threat to causally identifying the impact of hosting refugees. The main analyses effectively eliminate all time-invariant factors that may cause this threat. To partially circumvent the concern from time-varying factors, I included many (12) household- or zone-level time-varying covariates in all of the preferred regressions. Nonetheless, there could be other (e.g., unobservable) time-varying variables causing this concern. To examine the extent to which the main findings are driven by such factors, I restrict the sample to EAs that are closer to the location of refugee settlement sites and exclude those EAs located farther away, which are expected to be significantly different from the refugee settlement sites in terms of the potential time-varying factors causing the concern. Getting closer to these sites to restrict the sample encounters a tradeoff between having samples with potentially similar time-varying characteristics as the location of these settlement sites and losing the power to detect any effect, as the restricted sample gets increasingly smaller. With this in mind, I start with a 70-kilometer buffer and successively consider smaller buffers of 60- and 50-kilometer from the sites to restrict the sample.[31] The existence of many refugee settlement sites and the substantial difference in temporal variations in refugee intensity across these sites (see Figure 1) enables estimation of the impacts of interest while restricting the sample to these alternative buffers. Divergence in the estimated impacts compared with those in the main analyses may signal the relevance of time-varying factors that are not controlled for in the main regressions in driving the main findings. Table A7 presents the impacts of refugee intensity on household welfare and the status of poverty using these alternative restricted samples. The results show that the main findings are valid, regardless of non-randomness in the selection of the refugee settlement sites based on time-varying factors as long as these factors are the same across all of the sites up until

[30]Data on refugees in the period 2011-2017 is used to construct future refugee intensity.
[31]In addition, I consider alternative buffers of 100-, 90-, and 80-km from the refugee settlement sites. Restricted samples based on these buffers provide similar results, which can be made available on request.

the alternative buffers, no matter the differences in the (12) time-varying factors that are controlled for in the regressions.

7.6. Instrumental Variables Estimation

Potential non-random selection of refugee settlement sites based on time-varying factors, and as a result non-randomness in temporal variations in refugee intensity, is a concern that may preclude causal interpretation of the main coefficient of interest. To assuage this concern, on the one hand, I control for a rich set of (12) time-varying covariates in the main specification. However, there could be other time-varying factors that may be the source of the concern. On the other hand, I show that the main findings are valid regardless of the existence of these other factors as long as they are the same across the refugee settlement sites and up until a 50-kilometer buffer from each of the sites. Again, these other factors may not be the same across the refugee settlement sites, within the aforementioned buffer from the sites, or both. As a result, the two techniques do not guarantee the elimination of the concern. In this section, I extend the empirical strategy from a household fixed effects specification used in the main analyses to a household fixed effects - instrumental variables (FE-IV) specification aiming at providing a more credible evidence on the potential elimination of the concern. In particular, I instrument refugee intensity with Bartik-type receptivity (Bartik, 1991; Depetris-Chauvin and Santos, 2018), applying to the case of refugees, constructed as a weighted sum of the average number of refugees sheltered in Ethiopia in the two years immediately before the year the outcome variables are measured by country of origin, whereby the weights are the inverse geographic distances between a survey village v and each of refugees' countries of origin. Formally, it can be written as:

$$Receptivity_{vt} = \sum_{c=1}^{10} \left(\frac{R_{c(t-1)} + R_{c(t-2)}}{2D_{vc}} \right), \quad (3)$$

where $R_{c(t-1)}$ and $R_{c(t-2)}$ stand for the total number of refugees from country c hosted in Ethiopia in the two years ($(t-1)$ and $(t-2)$) immediately before the year the outcome variables are measured during survey round t, 10 stands for the total number of countries of origin of almost all of the refugees hosted in Ethiopia during the period under consideration

(2009-2014),[32] and D_{vc} stands for the average ellipsoidal distance in kilometers from EA v to two points in refugees' country of origin c—its centroid and EA v's closest border point—with the potential of better accommodating the possibility that refugees may originate from around the border and elsewhere in c. Given receptivity reflects the potential to attract refugees, I expect it to positively affect refugee intensity.

For consistency of household FE-IV estimates of β, receptivity needs to fulfill two criteria. It needs to be correlated with refugee intensity. And, it should affect the outcome variable(s) only through its effect on refugee intensity.

The FE-IV approach exploits the interaction between a static geographic factor (inverse geographic distances) and a dynamic factor (temporal change in outflow of refugees from refugees' countries of origin). Temporal change in the underlying causes of displacement and thus changes in the outflow of refugees in these countries are arguably exogenous to within-village/household temporal changes in village/household outcomes in Ethiopia, conditional on the 12 time-varying covariates. However, the static geographic factor may affect host outcomes on its own, but this potential relevance would be avoided by the household- and round-specific fixed effects. As a consequence, receptivity is arguably orthogonal to the residual of equation (1). Further, it is less likely for the interaction of these two factors (forming receptivity) to have a direct effect on household outcomes in Ethiopia. Thus, the second criterion plausibly holds.

As the first criterion is an empirical issue, I run alternative regressions of (logarithm of) refugee intensity on (logarithm of) receptivity, controlling for household- and round-specific fixed effects and numerous (12) time-varying covariates, and present the results, called first-stage results, in Table A8. As expected, receptivity has a positive and significant effect on refugee intensity. The estimated elasticity is about 0.84. Further, the first-stage F-statistic is well above the conventional value of 10 (Kleibergen-Paap rk Wald F > 10), implying that receptivity is a strong instrument.

In the second stage, I use the predicted refugee intensity from the first-stage regression to explore the effect of refugee intensity on household welfare and poverty outcomes considered in the main analyses. The results from two-stage least squares (2SLS) (household FE-IV)

[32]The 10 countries are Burundi, Djibouti, Eritrea, Kenya, Rwanda, Somalia, Sudan, South Sudan, the Democratic Republic of Congo, and Uganda. These countries are the source of more than 99% of the refugees in Ethiopia every year during the period 2009-2014. South Sudan got its independence in 2011, implying that the number of countries is 9 prior to 2011. Despite the separation, I have the total number of refugees from the two countries in 2011. For convenience, I disaggregated this figure between the two countries based on the proportion of refugees in the following year.

estimations are reported in Table A9, which reveal that the main findings are qualitatively robust to using this alternative empirical strategy. Quantitatively, however, there is sizable discrepancy in the estimates between these and those from the non-instrumented (household fixed effects) estimations. For instance, the 2SLS estimations show that the adverse consumption effects of hosting refugees are about twice as large as the corresponding effects from the non-instrumented estimations.

8. Concluding Remarks

The global population of forcibly displaced people reached 70.8 million in 2018, the highest since after World War II. About one-third of these people are refugees, of whom more than three-quarters are hosted in developing countries, mainly in Africa (UNHCR, 2018). This triggered increased interest in understanding the economic implications of hosting refugees in developing countries. Changes in household welfare outcomes are powerful in reflecting the net such implications. In light of this, I examine the impact of hosting refugees on household welfare in Ethiopia, a developing country hosting one of the largest numbers of refugees worldwide and the third largest in Africa.

To identify the impact, I exploit a large spatial difference in within-village temporal variations in refugee intensity, which followed the recent uptick in the flow of refugees into the country, conditional on household- and round-specific fixed effects and a rich set of time-varying covariates. However, I also confirm the main findings by extending the empirical strategy to an instrumental variables approach, instrumenting refugee intensity with a weighted sum of the number of refugees hosted in Ethiopia by country of origin, whereby the weights are the inverse geographic distances between a survey village and each of refugees' countries of origin.

I find evidence that hosting refugees has different implications on household welfare depending on the type of welfare metric. While reducing consumption expenditure per capita with an estimated elasticity of about 0.19, it has no statistically significant effect on wealth. The finding on consumption is not in line with 80%-90% of the existing evidence if the broader literature that examines the short- or long-term welfare impacts of hosting refugees, expellees, or internally displaced persons is considered, based on a recent survey in Verme and Schuettler (2019). Similarly, while increasing households' probability of falling into consumption poverty, it has no effect on wealth poverty status. In particular, I estimate that a 1% increase in refugee intensity increases the probability of falling into consumption poverty by about 18 percentage

points. Decomposing household consumption expenditure per capita into food, education, and other non-food components, the results further reveal that hosting refugees alters the composition of consumption, as it solely affects food consumption expenditure. The consumption effects prevail in rural areas with no effects in urban centers, while no heterogeneity is found between the two areas concerning wealth and the status of wealth poverty results.

One plausible attribution to the different implications of hosting refugees on household welfare (the status of poverty) depending on the type of welfare (poverty) metric comes from the nature of the metrics themselves in that wealth (wealth poverty status) is less sensitive than consumption expenditure (consumption poverty status) to short-term shocks.

Displacement of individual hosts from salaried employment—in temporary labor activities, on the extensive margin—and a spike in prices of agricultural inputs (seed and fertilizer) but not changes in self-employment in non-farm businesses, societal cooperation within the customary labor-sharing arrangements, and prices of food items are among the key mechanisms driving the adverse consumption effects of hosting refugees.

The findings highlight the need for robust development interventions that can offset the welfare loss of hosting refugees, as reflected in lower consumption expenditure per capita, and thereby ease refugee integration. Cash transfer programs are available and have been shown to be successful in improving household welfare in many parts of the developing world (Bastagli et al., 2019). Thus, inclusion of the degree of participation in temporary (casual) labor as one of the targeting parameters of such programs in major refugee-hosting rural areas is a potential avenue of the interventions. Investing in skills and entrepreneurship training to capacitate rural hosts to engage more in self-employment in non-farm businesses or take up salaried permanent employment, as opposed to salaried temporary employment, is another potential avenue to keep them from the stiffer labor market competition that is induced by the inflow of refugees, which is peculiarly concentrated in salaried temporary labor activities. The provision of subsidized agricultural inputs (seed and fertilizer) to major refugee-hosting farm households could also be another potential avenue of the interventions.

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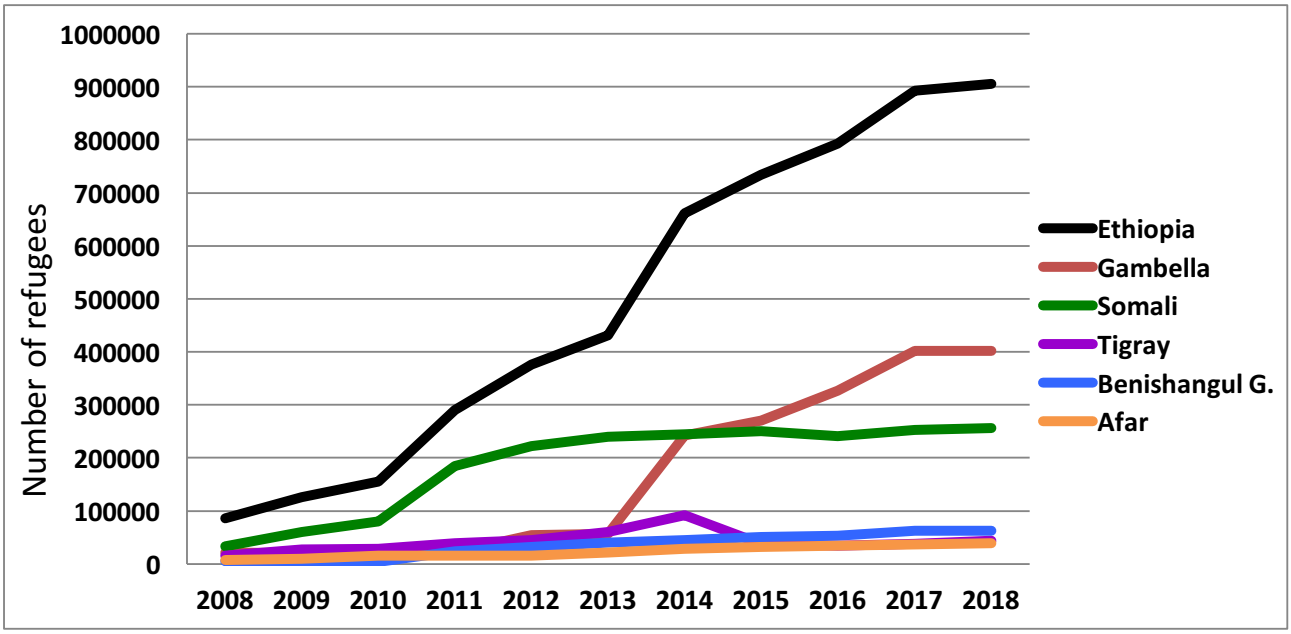
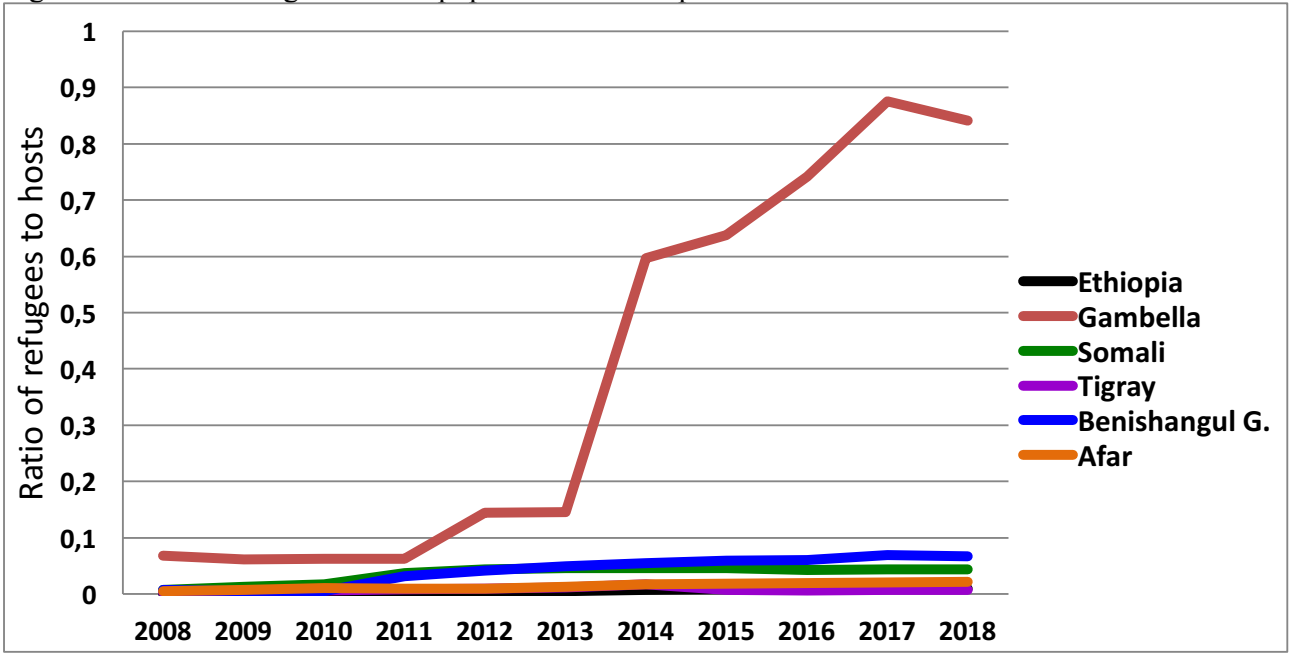
Figure 1: Number of refugees hosted in Ethiopia



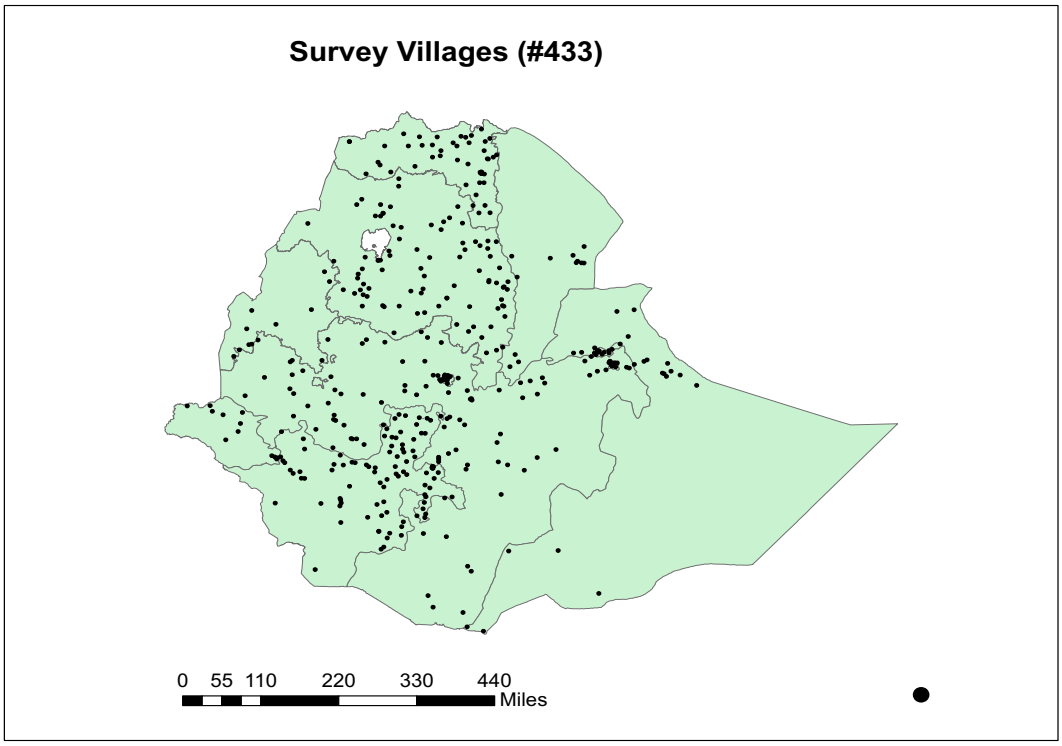
Notes: This figure presents the total number of refugees hosted in Ethiopia and its five largest refugee-hosting regions in the period 2008-2018. The horizontal axis is years while the vertical axis is the number of refugees, as recorded in December of the corresponding year except for 2018 it reflects the refugee population in August.

Figure 2: Ratio of refugees to host population in Ethiopia



Notes: This figure presents the ratio of refugees to host population in Ethiopia and its five largest refugee-hosting regions in the period 2008-2018. The horizontal axis is years while the vertical axis is the ratio of refugees to host population. The number of refugees is as recorded in December of the corresponding year except for 2018 it is in August.

Figure 3: Location of the ESS sample villages (Enumeration Areas (EAs))



Note: This figure presents the location of 433 sample villages (EAs) of the ESS.

Table 1: Descriptive statistics

	Observations from all, major, and minor refugee-hosting round-EAs									Mean Difference
	All			Major hosts			Minor hosts			
	N	Mean	SD	N	Mean	SD	N	Mean	SD	Major-Minor
Panel (a): Outcome variables										
Total consumption expenditure	13391	6255.255	6210.662	5331	6195.617	6546.654	8060	6294.700	5978.154	(-)
Food consumption expenditure	13391	4645.919	5019.261	5331	4522.487	5449.857	8060	4727.559	4711.468	(-)**
Education expenditure	13391	143.623	745.448	5331	193.004	825.692	8060	110.961	685.347	(+)***
Other non-food expenditure	13391	1465.713	2391.347	5331	1480.126	1954.538	8060	1456.181	2640.931	(+)
Consumption poverty (=1)	13391	0.347	0.476	5331	0.351	0.477	8060	0.344	0.475	(+)
Wealth	13925	0.008	2.881	5590	0.693	3.244	8335	-0.451	2.507	(+)***
Wealth poverty (=1)	13925	0.393	0.489	5590	0.301	0.459	8335	0.456	0.498	(-)***
Employed (=1)	33691	0.194	0.395	14845	0.195	0.396	18846	0.193	0.394	(+)
Permanently employed (=1)	33858	0.105	0.306	14931	0.119	0.324	18927	0.093	0.291	(+)***
Hours worked, permanent	33853	171.321	597.256	14931	204.571	653.410	18922	145.084	547.499	(+)***
Temporarily employed (=1)	33738	0.096	0.294	14869	0.082	0.275	18869	0.106	0.308	(-)***
Days worked, temporary	33725	5.052	24.946	14866	4.811	25.415	18859	5.243	24.569	(-)
Owns an NFE (=1)	13889	0.337	0.473	5588	0.369	0.483	8301	0.315	0.465	(+)***
Number of NFEs owned	13889	0.406	0.699	5588	0.488	0.769	8301	0.350	0.641	(+)***
Plans to open a new NFE (=1)	13811	0.199	0.399	5581	0.208	0.406	8230	0.192	0.394	(+)**
Worked for other HHs for free (=1)	33741	0.232	0.422	14861	0.207	0.405	18880	0.251	0.434	(-)***
# of other HHs worked for	33740	1.015	2.865	14861	0.859	2.584	18879	1.137	3.062	(-)***
A fall in prices of food items (=1)	13924	0.029	0.168	5590	0.038	0.191	8334	0.023	0.150	(+)***
A rise in prices of food items (=1)	13923	0.214	0.410	5590	0.248	0.432	8333	0.191	0.393	(+)***
A rise in prices of agri. inputs (=1)	13924	0.094	0.292	5590	0.105	0.307	8334	0.087	0.282	(+)***
Panel (b): Measures of refugee intensity										
Refugee intensity	1198	954.556	1639.084	488	1626.140	2404.409	710	492.960	202.379	(+)***
Refugee intensity (future)	1198	1796.334	2890.862	488	2622.614	4267.171	710	1228.413	899.452	(+)***
Panel (c): A measure of receptivity										
Receptivity	1198	621.251	325.743	488	911.738	242.303	710	421.592	202.027	(+)***

Table 1: Descriptive statistics (continued)

	Observations from all, major, and minor refugee-hosting round-EAs									Mean Difference
	All			Major hosts			Minor hosts			
	N	Mean	SD	N	Mean	SD	N	Mean	SD	Major-Minor
Panel (d): Control variables										
Head is male (=1)	13871	0.711	0.453	5586	0.694	0.461	8285	0.723	0.447	(-)***
Head's age	13871	44.995	15.571	5586	46.126	15.265	8285	44.233	15.728	(+)***
Head's education in years	13797	3.411	5.025	5564	3.907	5.402	8233	3.075	4.724	(+)***
Head is married (=1)	13873	0.705	0.456	5587	0.690	0.462	8286	0.715	0.451	(-)***
Head is born in the residence region (=1)	13873	0.875	0.331	5587	0.829	0.376	8286	0.906	0.292	(-)***
Household size	13925	4.809	2.422	5590	4.903	2.428	8335	4.746	2.416	(+)***
# of young dependents in the HH	13925	2.128	1.787	5590	2.043	1.770	8335	2.185	1.796	(-)***
# of elderly dependents in the HH	13925	0.185	0.430	5590	0.196	0.439	8335	0.178	0.424	(+)**
Total annual rainfall (mm)	13883	1114.200	494.981	5588	986.405	461.425	8295	1200.291	498.236	(-)***
Rainfall in wettest quarter (mm)	13883	561.641	219.022	5588	523.581	234.982	8295	587.281	203.622	(-)***
Change in greenness in *Meher* (EVI)	13883	41.767	14.529	5588	39.626	16.617	8295	43.209	12.735	(-)***
Peak of EVI value in *Meher*	13883	0.441	0.120	5588	0.423	0.127	8295	0.454	0.113	(-)***

Notes: Consumption expenditure measures are in per capita terms. HH, N, SD, EVI, and NFE stand for household, number of observations, standard deviation, Enhanced Vegetation Index, and non-farm enterprise, respectively. Rainfall and greenness related variables consider the fiscal year immediately before the survey year in each round of the survey. Rainfall related variables are measured at the household-round-level while greenness related variables are at the zone-round-level (averaged by zone-round). Despite this, greenness related variables are reported here at the household level. *Meher* is the main growing season in Ethiopia running from June to September. The symbols (+) and (-) indicate whether the corresponding mean difference is positive and negative, respectively. Asterisks: *, **, and *** indicate statistical significance of the mean difference at 10%, 5%, and 1% levels, respectively, based on the standard two-sided t-test. The source of all the variables in panel (d) is the ESS.

Table 2: Summary statistics of the main variables disaggregated based on urban status

	Observations from all, rural, and urban areas									Mean Difference
	All			Rural			Urban			
	N	Mean	SD	N	Mean	SD	N	Mean	SD	Rural-Urban
Total consumption expenditure	13391	6255.255	6210.662	9472	5236.817	4885.779	3919	8716.763	8096.422	(-)***
Food consumption expenditure	13391	4645.919	5019.261	9472	4241.888	4212.748	3919	5622.441	6469.122	(-)***
Education expenditure	13391	143.623	745.448	9472	50.866	246.679	3919	367.809	1296.514	(-)***
Other non-food expenditure	13391	1465.713	2391.347	9472	944.063	1861.122	3919	2726.512	2987.065	(-)***
Consumption poverty	13391	0.347	0.476	9472	0.424	0.494	3919	0.160	0.367	(+)***
Wealth	13925	0.008	2.881	9868	-1.352	1.248	4057	3.317	3.042	(-)***
Wealth poverty	13925	0.393	0.489	9868	0.544	0.498	4057	0.027	0.162	(+)***
Employed	33691	0.194	0.395	23974	0.147	0.354	9717	0.308	0.462	(-)***
Permanently employed	33858	0.105	0.306	24095	0.044	0.204	9763	0.255	0.436	(-)***
Hours worked, permanent	33853	171.321	597.256	24090	55.684	344.298	9763	456.652	911.073	(-)***
Temporarily Employed	33738	0.096	0.294	23991	0.109	0.311	9747	0.063	0.243	(+)***
Days worked, temporary	33725	5.052	24.946	23984	4.799	21.657	9741	5.676	31.612	(-)***
Owns an NFE	13889	0.337	0.473	9835	0.280	0.449	4054	0.476	0.499	(-)***
# of NFEs owned	13889	0.406	0.699	9835	0.377	0.676	4054	0.476	0.747	(-)***
Plans to open a new NFE	13811	0.199	0.399	9769	0.164	0.370	4042	0.282	0.450	(-)***
Worked for other HHs for free	33741	0.232	0.422	24004	0.286	0.452	9737	0.099	0.299	(+)***
# of other HHs worked for	33740	1.015	2.865	24003	1.268	3.041	9737	0.390	2.257	(+)***
A fall in prices of food items	13924	0.029	0.168	9868	0.030	0.171	4056	0.026	0.159	(+)
A rise in prices of food items	13923	0.214	0.410	9867	0.199	0.399	4056	0.250	0.433	(-)***
A rise in prices of agri. inputs	13924	0.094	0.292	9868	0.117	0.322	4056	0.038	0.192	(+)***
Refugee intensity	1198	954.556	1639.084	869	833.355	905.654	329	1274.691	2737.182	(-)***

Notes: Consumption expenditure measures are in per capita terms. N, SD, and NFE stand for number of observations, standard deviation, and non-farm enterprise, respectively. The symbols (+) and (-) indicate whether the corresponding mean difference is positive and negative, respectively. Asterisks: *, **, and *** indicate statistical significance of the mean difference at 10%, 5%, and 1% levels, respectively, based on the standard two-sided t-test.

Table 3: Association between household consumption expenditure per capita and wealth

	OLS	OLS	FE	FE
	(1)	(2)	(3)	(4)
Household Wealth	0.347***	0.329***	0.099***	0.090**
	(0.027)	(0.030)	(0.037)	(0.044)
Constant	8.111***	8.130***	8.478***	8.646***
	(0.031)	(0.033)	(0.031)	(0.311)
Round FEs	YES	YES	YES	YES
Fixed Effects (FEs)	WOREDA	EA	HH	HH
Controls	NO	NO	NO	YES
R-squared	0.348	0.362	0.021	0.069
# of EAs	433	433	433	433
N	13391	13391	13062	12937

Notes: This table provides estimates of the partial association between logarithm of total household consumption expenditure per capita and "started log" of household wealth score. Household sample weights from the ESS2 applied. All columns control for round fixed effects. Further, column (1) controls for woreda FEs, column (2) controls for EA FEs, and the other two columns control for household (HH) FEs. Column (4) additionally controls for 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. The overall and the within R-squared are given in the first and last two columns, respectively. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 4: Impact of hosting refugees on household consumption expenditure per capita

	Households					
	All				Rural	Urban
	OLS	FE	FE	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Refugee Intensity	-0.085	-0.177**	-0.168**	-0.189***	-0.228***	0.036
	(0.073)	(0.072)	(0.073)	(0.070)	(0.076)	(0.133)
Constant	8.927***	9.503***	9.453***	9.725***	9.835***	8.856***
	(0.458)	(0.451)	(0.414)	(0.410)	(0.450)	(0.767)
Round FEs	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	WOREDA	EA	HH	HH	HH	HH
Controls	NO	NO	NO	YES	YES	YES
R-squared	0.298	0.325	0.021	0.068	0.074	0.071
# of EAs	433	433	433	433	290	143
N	13391	13391	13062	12937	9337	3600

Notes: This table provides estimates of the impact of logarithm of refugee intensity on logarithm of total household consumption expenditure per capita. Household sample weights from the ESS2 applied. The first four columns report results for all households while columns (5) and (6) report results for rural and urban households, respectively. All columns control for round FEs. Further, column (1) controls for woreda FEs, column (2) controls for EA FEs, and all other columns control for household (HH) FEs. Columns (4) to (6) additionally control for 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. The overall and the within R-squared are given in the first two and other columns, respectively. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 5: Impacts of hosting refugees on the components of household consumption expenditure per capita

	Food			Education			Other non-food		
	Households								
	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban
Refugee Intensity	-0.163**	-0.220**	0.126	0.365	0.584	-0.562	-0.207	-0.238	-0.007
	(0.082)	(0.087)	(0.162)	(0.453)	(0.523)	(1.000)	(0.146)	(0.174)	(0.176)
Constant	9.366***	9.651***	7.779***	-5.706*	-7.819**	4.157	7.559***	7.263***	8.250***
	(0.488)	(0.529)	(0.881)	(3.010)	(3.570)	(5.120)	(0.928)	(1.109)	(1.237)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.067	0.078	0.048	0.066	0.075	0.056	0.029	0.029	0.069
# of EAs	433	290	143	433	290	143	433	290	143
N	12937	9337	3600	12937	9337	3600	12937	9337	3600

Notes: This table provides estimates of the impact of logarithm of refugee intensity on logarithm (first three columns) or "started log" (last six columns) of the components of total household consumption expenditure per capita. Household sample weights from the ESS2 applied. The first, middle, and last three columns report results for food, education, and non-food consumption expenditure per capita, respectively. Columns labeled (1), (2), and (3) report results for all, rural, and urban households, respectively. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 6: Impact of hosting refugees on household wealth

	Households					
	All				Rural	Urban
	OLS	FE	FE	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Refugee Intensity	0.123	0.024	0.028	0.047	0.055	-0.000
	(0.077)	(0.050)	(0.050)	(0.049)	(0.058)	(0.042)
Constant	0.051	0.676**	0.508*	0.455	0.221	1.739***
	(0.478)	(0.313)	(0.283)	(0.340)	(0.410)	(0.263)
Round FEs	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	WOREDA	EA	HH	HH	HH	HH
Controls	NO	NO	NO	YES	YES	YES
R-squared	0.612	0.670	0.180	0.188	0.203	0.076
# of EAs	433	433	433	433	290	143
N	13925	13925	13687	13522	9734	3788

Notes: This table provides estimates of the impact of logarithm of refugee intensity on "started log" of household wealth score. Household sample weights from ESS2 applied. The first four columns report results for all households while columns (5) and (6) report results for rural and urban households, respectively. All columns control for round FEs. Further, column (1) controls for woreda FEs, column (2) controls for EA FEs, and all other columns control for household (HH) FEs. Columns (4) to (6) additionally control for 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. The overall and the within R-squared are reported in the first two and other columns, respectively. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 7: Impacts of hosting refugees on alternative measures of household poverty status

	Consumption poverty			Wealth poverty		
	Households					
	All	Rural	Urban	All	Rural	Urban
Refugee Intensity	0.179***	0.211***	0.001	-0.007	0.004	-0.052
	(0.051)	(0.055)	(0.077)	(0.045)	(0.049)	(0.033)
Constant	-0.896***	-1.108***	0.144	0.651**	0.678*	0.351*
	(0.336)	(0.369)	(0.445)	(0.328)	(0.374)	(0.187)
Round FEs	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES
R-squared	0.043	0.051	0.018	0.115	0.128	0.020
# of EAs	433	290	143	433	290	143
N	12937	9337	3600	13522	9734	3788

Notes: This table provides estimates of the impact of logarithm of refugee intensity on status of household consumption poverty (first three columns) and wealth poverty (last three columns). Household sample weights from ESS2 applied. Columns labeled "All," "Rural," and "Urban" report results for all, rural, and urban households, respectively. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 8: Impact of hosting refugees on salaried employment

	Individuals					
	All	All	All	All	Rural	Urban
	OLS	FE	FE	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Refugee Intensity	-0.073**	-0.083**	-0.093**	-0.092**	-0.109**	0.068
	(0.032)	(0.038)	(0.039)	(0.042)	(0.046)	(0.062)
Constant	0.830***	0.890***	0.650***	0.329	0.229	0.054
	(0.194)	(0.236)	(0.220)	(0.248)	(0.270)	(0.387)
Round FEs	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	WOREDA	EA	ID	ID	ID	ID
Controls	NO	NO	NO	YES	YES	YES
R-squared	0.115	0.124	0.026	0.030	0.044	0.010
# of EAs	433	433	433	433	290	143
N	33691	33691	28806	28548	20907	7641

Notes: This table provides estimates of the impact of logarithm refugee intensity on whether an individual has had salaried employment. Individual sample weights from ESS2 applied. The first four columns report results for all individuals while columns (5) and (6) report results for rural and urban individuals, respectively. All columns control for round FEs. Further, column (1) controls for woreda FEs, column (2) controls for EA FEs, and all other columns control for individual (ID) FEs. Columns (4) to (6) additionally control for 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. I report the overall and the within R-squared in the first two and other columns, respectively. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 9: Impacts of hosting refugees on alternative forms of salaried employment

	Permanent employment						Temporary (casual) employment					
	Employed (=1)			Hours worked			Employed (=1)			Days worked		
	Individuals											
	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban
Refugee Intensity	-0.014	-0.025	0.059	10.624	-13.722	167.399	-0.077*	-0.084*	0.019	1.648	1.814	0.548
	(0.025)	(0.026)	(0.060)	(30.351)	(18.833)	(137.356)	(0.040)	(0.047)	(0.028)	(2.616)	(3.011)	(3.825)
Constant	0.163	0.192	-0.140	48.318	126.555	-598.599	0.137	0.006	0.106	-23.943	-33.625*	14.086
	(0.152)	(0.153)	(0.352)	(169.613)	(104.267)	(761.697)	(0.240)	(0.278)	(0.191)	(15.921)	(18.450)	(25.160)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.002	0.003	0.010	0.003	0.006	0.010	0.034	0.047	0.010	0.010	0.015	0.010
# of EAs	433	290	143	433	290	143	433	290	143	433	290	143
N	28714	21017	7697	28710	21013	7697	28599	20923	7676	28585	20915	7670

Notes: This table provides estimates of the impact of logarithm of refugee intensity on individual hosts' salaried permanent (the first six columns) and temporary (the last six columns) employment. The first and third three columns report results for a binary measure of permanent and temporary salaried employment, respectively. The second three columns report results for number of hours worked in permanent salaried employment while the fourth three columns report results for number of days worked in temporary salaried employment. Columns labeled "All," "Rural," and "Urban" report results for all, rural, and urban individuals, respectively. Individual sample weights from ESS2 applied. All columns control for individual (ID) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 10: Impacts of hosting refugees on ownership of non-farm enterprise (NFE) and plans to start a new NFE

	Owns an NFE (=1)			# of NFEs owned			Plans to start a new NFE (=1)		
	Households								
	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban
Refugee Intensity	0.035	0.058	-0.086	0.060	0.088	-0.058	-0.093	-0.102	0.006
	(0.059)	(0.072)	(0.071)	(0.072)	(0.085)	(0.122)	(0.064)	(0.073)	(0.102)
Constant	-0.000	-0.150	0.805**	0.207	-0.124	1.046	0.707*	0.751	0.221
	(0.334)	(0.403)	(0.390)	(0.427)	(0.469)	(0.805)	(0.409)	(0.466)	(0.646)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.037	0.041	0.046	0.055	0.025	0.265	0.018	0.023	0.021
# of EAs	433	290	143	433	290	143	433	290	143
N	13519	9731	3788	13519	9731	3788	13436	9664	3772

Notes: This table provides estimates of the impacts of logarithm of refugee intensity on a binary measure of ownership of an NFE (the first three columns), number of NFEs owned (the middle three columns), and a binary measure of whether a household plans to open a new NFE in the next 12 months (the last three columns). Household sample weights from ESS2 applied. Columns labeled "All," "Rural," and "Urban" report results for all, rural, and urban households, respectively. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Table 11: Impact of hosting refugees on societal cooperation

	Worked for other HHs for free (=1)					# of other HHs an ID has supplied free labor for				
	Individuals									
	All	All	All	Rural	Urban	All	All	All	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Refugee Intensity	-0.023	-0.011	0.023	0.050	-0.109	0.206	0.291	0.556	0.699	-0.193
	(0.060)	(0.064)	(0.062)	(0.071)	(0.105)	(0.347)	(0.392)	(0.419)	(0.484)	(0.397)
Constant	0.633*	0.367	0.249	0.154	0.657	0.938	-0.143	0.141	-0.212	1.696
	(0.375)	(0.362)	(0.464)	(0.542)	(0.580)	(2.124)	(2.180)	(2.804)	(3.302)	(2.452)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	EA	ID	ID	ID	ID	EA	ID	ID	ID	ID
Controls	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
R-squared	0.163	0.001	0.006	0.009	0.026	0.155	0.002	0.007	0.010	0.019
# of EAs	433	433	433	290	143	433	433	433	290	143
N	33741	28869	28609	20944	7665	33740	28868	28608	20943	7665

Notes: This table provides estimates of the impact of logarithm of refugee intensity on alternative measures of societal cooperation: a binary variable indicating an individual's participation (the first five columns) and number of households an individual has worked for (the last five columns) within the labor sharing arrangements. Individual sample weights from ESS2 applied. Columns labeled (1) to (3) report results for all individuals while columns labeled (4) and (5) report results for rural and urban individuals, respectively. All columns control for round FEs. Further, columns labeled (1) control for EA FEs while all other columns control for individual (ID) FEs. Columns labeled (3) to (5) additionally control for 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. I report the overall and the within R-squared in columns labeled (1) and other columns, respectively. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 12: Impacts of hosting refugees on whether households are negatively affected by alternative price changes

	A fall in prices of food items			A rise in prices of food items			A rise in prices of agricultural inputs		
	Households								
	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban
Refugee Intensity	-0.098	-0.096	-0.112	0.006	-0.063	0.266**	0.209**	0.213**	0.096
	(0.076)	(0.087)	(0.126)	(0.069)	(0.079)	(0.125)	(0.091)	(0.106)	(0.066)
Constant	0.893	0.945	0.711	0.415	0.705	-0.973	-1.050*	-1.011	-0.501
	(0.561)	(0.666)	(0.745)	(0.459)	(0.527)	(0.904)	(0.629)	(0.746)	(0.398)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.019	0.021	0.058	0.043	0.054	0.070	0.026	0.036	0.064
# of EAs	433	290	143	433	290	143	433	290	143
N	13520	9734	3786	13518	9732	3786	13520	9734	3786

Notes: This table provides estimates of the impacts of logarithm of refugee intensity on whether a household is negatively affected by a fall in prices of food items (the first three columns), a rise in prices of food items (the middle three columns), and a rise in prices of agricultural inputs (seed and fertilizer) (last three columns). Household sample weights from ESS2 applied. Columns labeled "All," "Rural," and "Urban" report results for all, rural, and urban households, respectively. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Appendices

Table A1: Clustering — Impacts of hosting refugees on household welfare and poverty

	All households			
	Consumption	Consumption poverty	Wealth	Wealth poverty
	(1)	(2)	(3)	(4)
Refugee Intensity	-0.189**	0.179***	0.047	-0.007
	(0.076)	(0.059)	(0.049)	(0.044)
Constant	9.725***	-0.896**	0.455	0.651**
	(0.446)	(0.375)	(0.339)	(0.324)
Round FEs	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH
Controls	YES	YES	YES	YES
R-squared	0.068	0.043	0.188	0.115
# of Woredas	317	317	317	317
# of EAs	433	433	433	433
N	12937	12937	13522	13522

Notes: This table provides estimates of the impacts of logarithm of refugee intensity on logarithm of total household consumption expenditure per capita (column (1)), a binary measure of household consumption poverty status (column (2)), "started log" of household wealth score (column (3)), and a binary measure of household wealth poverty status (column (4)). Household sample weights from ESS2 applied. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 characteristics are not reported here, but can be available on request. Robust standard errors clustered at woreda level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A2: ESS3 weights — Impacts of hosting refugees on household welfare and poverty

	All households			
	Consumption	Consumption poverty	Wealth	Wealth poverty
	(1)	(2)	(3)	(4)
Refugee Intensity	-0.175**	0.167***	0.047	-0.007
	(0.071)	(0.051)	(0.044)	(0.043)
Constant	9.599***	-0.814**	0.478	0.623**
	(0.417)	(0.337)	(0.318)	(0.311)
Round FEs	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH
Controls	YES	YES	YES	YES
R-squared	0.068	0.042	0.185	0.112
# of EAs	432	432	432	432
N	12711	12711	13274	13274

Notes: This table provides estimates of the impacts of logarithm of refugee intensity on logarithm of total household consumption expenditure per capita (column (1)), a binary measure of household consumption poverty status (column (2)), "started log" of household wealth score (column (3)), and a binary measure of household wealth poverty status (column (4)). Household sample weights from ESS3 applied. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 characteristics are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A3: Impact of hosting refugees on household consumption expenditure per adult equivalent

	Households					
	All	All	All	All	Rural	Urban
	OLS	FE	FE	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Refugee Intensity	-0.083	-0.177**	-0.166**	-0.189***	-0.227***	0.034
	(0.072)	(0.069)	(0.070)	(0.069)	(0.075)	(0.134)
Constant	9.137***	9.728***	9.654***	9.886***	9.994***	9.002***
	(0.449)	(0.432)	(0.397)	(0.403)	(0.442)	(0.766)
Round FEs	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	WOREDA	EA	HH	HH	HH	HH
Controls	NO	NO	NO	YES	YES	YES
R-squared	0.293	0.319	0.024	0.059	0.065	0.062
# of EAs	433	433	433	433	290	143
N	13391	13391	13062	12937	9337	3600

Notes: This table provides estimates of the impact of logarithm of refugee intensity on logarithm of total household consumption expenditure per adult equivalent. Household sample weights from ESS2 applied. The first four columns report results for all households, while columns (5) and (6) report results for rural and urban households, respectively. All columns control for round FEs. Further, column (1) controls for woreda fixed effects, column (2) controls for EA FEs, and all other columns control for household (HH) FEs. Columns (4) to (6) additionally control for 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. I report the overall and the within R-squared in the first two and other columns, respectively. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A4: Impacts of hosting refugees on the components of household consumption expenditure per adult equivalent

	Food			Education			Other non-food		
	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Refugee Intensity	-0.163**	-0.219**	0.123	0.376	0.598	-0.565	-0.208	-0.238	-0.009
	(0.081)	(0.086)	(0.163)	(0.460)	(0.530)	(1.001)	(0.147)	(0.175)	(0.175)
Constant	9.527***	9.810***	7.925***	-5.725*	-7.868**	4.292	7.721***	7.423***	8.397***
	(0.481)	(0.521)	(0.884)	(3.062)	(3.632)	(5.149)	(0.930)	(1.112)	(1.227)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.061	0.072	0.043	0.068	0.077	0.057	0.024	0.024	0.062
# of EAs	433	290	143	433	290	143	433	290	143
N	12937	9337	3600	12937	9337	3600	12937	9337	3600

Notes: This table provides estimates of the impacts of logarithm of refugee intensity on logarithm (first three columns) or "started log" (last six columns) of the components of total household consumption expenditure per adult equivalent. Household sample weights from ESS2 applied. The first, middle, and last three columns report results for food, education, and other non-food per adult equivalent consumption expenditures, respectively. Columns labeled (1), (2), and (3) report results for all, rural, and urban households, respectively. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 characteristics variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A5: Specification of variables — Impacts of hosting refugees on household welfare and poverty

	Households					
	Consumption	Wealth	Consumption	Consumption poverty	Wealth	Wealth poverty
	(1)	(2)	(3)	(4)	(5)	(6)
Ln (Refugee Intensity)	-0.189***	0.257				
	(0.070)	(0.248)				
IHS Refugee Intensity			-0.189***	0.179***	0.257	-0.007
			(0.070)	(0.051)	(0.248)	(0.045)
Constant	10.418***	-3.704**	10.550***	-1.020***	-3.882**	0.656*
	(0.410)	(1.725)	(0.445)	(0.365)	(1.868)	(0.356)
Round FEs	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES
R-squared	0.068	0.190	0.068	0.043	0.190	0.115
# of EAs	433	433	433	433	433	433
N	12937	13522	12937	12937	13522	13522

Notes: This table provides estimates of the impacts of logarithm of (the first two columns) or inverse hyperbolic sine (IHS) of (the last four columns) refugee intensity on IHS of total household consumption expenditure per capita (columns (1) and (3)), a hybrid hyperbolic sine and its inverse transformation of the wealth score (columns (2) and (5)), a binary measure of household consumption poverty status (column (4)), and a binary measure of household wealth poverty status (column (6)). Household sample weights from ESS2 applied. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A6: Falsification tests — Impacts of future refugee intensity on household welfare and poverty

	All households			
	Consumption	Consumption poverty	Wealth	Wealth poverty
	(1)	(2)	(3)	(4)
Refugee Intensity	-0.184***	0.172***	0.030	-0.007
	(0.069)	(0.051)	(0.047)	(0.046)
Refugee Intensity (Future)	-0.031	0.040	0.091	0.001
	(0.084)	(0.055)	(0.062)	(0.053)
Constant	9.892***	-1.114**	-0.041	0.644
	(0.662)	(0.474)	(0.445)	(0.447)
Round FEs	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH
Controls	YES	YES	YES	YES
R-squared	0.068	0.043	0.189	0.115
# of EAs	433	433	433	433
N	12937	12937	13522	13522

Notes: This table provides estimates of the effects of logarithm of future refugee intensity on logarithm of total household consumption expenditure per capita (column (1)), a binary measure of household consumption poverty status (column (2)), "started log" of household wealth score (column (3)), and a binary measure of household wealth poverty status (column (4)). Household sample weights from ESS2 applied. All columns control for the logarithm of (lagged) refugee intensity, household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for the 12 characteristics are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A7: Restricted samples — Impacts of hosting refugees on household welfare and poverty

	Households within the respective buffer											
	Consumption			Consumption poverty			Wealth			Wealth poverty		
	Buffer											
	70km	60km	50km	70km	60km	50km	70km	60km	50km	70km	60km	50km
Refugee Intensity	-0.162***	-0.154**	-0.131**	0.145**	0.131**	0.130**	-0.001	0.008	0.008	-0.018	-0.033	-0.011
	(0.060)	(0.060)	(0.057)	(0.061)	(0.060)	(0.059)	(0.048)	(0.043)	(0.045)	(0.045)	(0.037)	(0.033)
Constant	9.875***	10.069***	9.874***	-0.450	-0.556	-0.426	1.233***	1.253***	1.209***	0.595	0.354	0.138
	(0.560)	(0.621)	(0.613)	(0.480)	(0.471)	(0.495)	(0.342)	(0.349)	(0.349)	(0.414)	(0.371)	(0.322)
Round FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.075	0.082	0.091	0.048	0.043	0.049	0.194	0.175	0.160	0.085	0.067	0.074
# of EAs	107	95	86	107	95	86	107	95	86	107	95	86
N	3049	2679	2404	3049	2679	2404	3185	2803	2515	3185	2803	2515

Notes: This table provides estimates of the impacts of logarithm of refugee intensity on logarithm of total household consumption expenditure per capita (the first three columns), a binary measure of household consumption poverty status (the second three columns), "started log" of household wealth score (last third three columns), and a binary measure of household wealth poverty status (the last three columns). I use samples restricted to buffers of 50-, 60-, and 70-kilometer from refugee settlement sites. Household sample weights from ESS2 applied. All columns control for household (HH) FEs, round FEs, and 12 time-varying characteristics. The coefficient estimates for these 12 characteristics are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A8: First-stage — Refugee intensity and receptivity

	(1)	(2)
Receptivity	0.833***	0.839***
	(0.078)	(0.078)
Round FEs	YES	YES
Fixed Effects (FEs)	HH	HH
Controls	YES	YES
R-squared	0.977	0.977
First-stage F	114.30	114.50
# of EAs	433	433
N	12937	13522

Notes: This table provides the first-stage results. The dependent variable is logarithm of refugee intensity and the instrument is logarithm of receptivity. Household sample weights from ESS2 applied. Column (1) is the first-stage result for consumption and consumption poverty regressions, while column (2) is the first-stage result for wealth and wealth poverty regressions. Both first-stages control for household FEs, round FEs, and 12 time-varying control variables. The coefficient estimates for the 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A9: Second-stage — Impacts of hosting refugees on household welfare and poverty

	Consumption	Consumption poverty	Wealth	Wealth poverty
	FE-IV	FE-IV	FE-IV	FE-IV
	(1)	(2)	(3)	(4)
Refugee Intensity	-0.447**	0.345**	0.122	0.093
	(0.222)	(0.145)	(0.120)	(0.130)
Round FEs	YES	YES	YES	YES
Fixed Effects (FEs)	HH	HH	HH	HH
Controls	YES	YES	YES	YES
R-squared	0.064	0.036	0.187	0.114
# of EAs	433	433	433	433
N	12937	12937	13522	13522

Notes: This table provides 2SLS (household FE-IV) estimates of the impact of logarithm of refugee intensity on logarithm of household consumption expenditure per capita (column (1)), a binary indicator of household consumption poverty status (column (2)), "started log" of household wealth score (column (3)), and a binary indicator of household wealth poverty status (column (4)). Household sample weights from ESS2 applied. All regressions control for household FEs, round FEs, and 12 time-varying control variables. The coefficient estimates for the 12 control variables are not reported here, but can be available on request. Robust standard errors clustered at EA level are given in parenthesis. Asterisks: *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table A10: Description of variables

Variable	Description
Panel (a): Outcome variables	
Total consumption expenditure	Annual household consumption expenditure per capita
Food consumption expenditure	Annual household food consumption expenditure per capita
Education expenditure	Annual household education expenditure per capita
Other non-food expenditure	Annual household other non-food expenditure per capita
Consumption poverty	=1 if a household is poor based on consumption expenditure per capita
Wealth	Household wealth score
Wealth poverty	=1 if a household is poor based on wealth score
Employed	=1 if an individual has had salaried employment, 12M
Employed permanently	=1 if an individual has had salaried permanent employment, 12M
Hours worked, permanent	Hours worked by an individual in salaried permanent employment, 12M
Employed temporarily	=1 if an individual has had salaried temporary employment, 12M
Days worked, temporary	Days worked by an individual in salaried temporary employment, 12M
Owns an NFE	=1 if a household owns a non-farm enterprise (NFE), 12M
Number of NFEs owned	# of NFEs a household owns, in the last 12 months (12M)
Plans to open a new NFE	=1 if a household plans to open a new NFE, in the coming 12 months
Worked for other HHs for free	=1 if an individual has supplied free labor for other households, 12M
# of other HHs worked for	# of other households an individual has supplied free labor for, 12M
A fall in prices of food items	=1 if a household is negatively affected by a fall in food prices, 12M
A rise in prices of food items	=1 if a household is negatively affected by a rise in food prices, 12M
A rise in prices of agri. inputs	=1 if a household is negatively affected by a rise in the prices of agricultural inputs (seed and fertilizer), 12M
Panel (b): Measures of refugee intensity	
Refugee intensity (RI)	RI based on the average # of refugees hosted in the last two years
Refugee intensity (RI) (Future)	RI based on the average # of refugees hosted in the future two years
Panel (c): A measure of receptivity	
Receptivity	Receptivity based on the average # of refugees in the last two years by country of origin
Panel (d): Control variables	
Head is male	=1 if head of a household is male
Head's age	Age in years of head of a household
Head's education in years	Education in years of head of a household
Head is married	=1 if head of a household is married
Head is born in the residence region	=1 if head of a household is born in the region of current residence
Household size	# of household members
# of young dependents in the HH	# of household (HH) members below 15 years old
# of elderly dependents in the HH	# of household members above 64 years old
Total annual rainfall (mm)	Total annual rainfall (household level)
Rainfall in wettest quarter (mm)	Total rainfall in the wettest quarter (household level)
Change in greenness in *Meher*	Change in Enhanced Vegetation Index (EVI) in *Meher* (zone level)
Peak of EVI value in *Meher*	Peak of EVI value in *Meher* (zone level/averaged by round-zone)