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The impact of hosting refugees on the intra-household allocation of tasks

A gender perspective

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Abstract: This paper examines whether the presence of refugees alters the intra-household allocation of tasks across genders in the hosting population. Using panel data (pre- and post-refugee inflow) from Kagera, a rural region of Tanzania, we find that the refugee shock led to women being less likely to engage in employment outside the household and more likely to engage in household chores relative to men. This is probably the result of the environmental degradation that accompanied the arrival of refugees and the additional competition for natural resources such as wood and water. However, the results differ by (pre-shock) literacy and maths skill. For women who could read and perform simple written mathematical operations the refugee shock resulted in a higher likelihood of engaging in outside employment. On the other hand, higher exposure to the refugee shock resulted in illiterate women being more likely to engage in farming and household chores.

Keywords: forced migration, time use, labour markets, gender, Tanzania

JEL classification: F22, J16, J61

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1 Introduction

This paper examines the impact of refugee inflows on the intra-household allocation of tasks of the hosting population, paying particular attention to the differences of this impact across the genders. While there is a growing interest in estimating the economic impacts of hosting refugees (Azevedo et al. 2016; Balkan and Tumen 2016; Del Carpio and Wagner 2015; Ruiz and Vargas-Silva 2015, 2016; Tumen 2016; among others), we know little about the consequences of refugee inflows on different household members. In addition, the recent literature on the gender-specific impacts of immigration is focused on high-income countries (Barone and Mocetti 2011; Cortes and Tessada 2011; Furtado 2015). This limits our understanding of the potential consequences of hosting refugees, since, according to the United Nations High Commission for Refugees (UNHCR), over 80 per cent of refugees worldwide are located in neighbouring developing countries (UNHCR 2016).

We use panel survey data from Kagera—a rural region of Tanzania—for the analysis. In the early 1990s, Burundi and Rwanda experienced major conflicts that resulted in hundreds of thousands of casualties (Bundervoet 2009; Daley 2008; Kondylis 2008; Martin and Hiddleston 2006). Over one million residents of these two countries sought refuge in Western Tanzania during the 1990s and 2000s, and in some regions refugees outnumbered natives five to one (Whitaker 2002). Because of its geographic location, Kagera was one of the main destinations of refugees.

The focus on the gender consequences of hosting refugees is important for several reasons. For instance, the arrival of refugees in rural areas often leads to greater demand for resources such as firewood and water, resulting in deforestation of areas close to refugee settlements. In fact, refugees have often been categorized as ‘resource degraders’ (Jacobsen 1997).¹ In rural Tanzania it is common for households to collect firewood for cooking and fetch drinking water on a frequent basis—tasks that are typically the responsibility of women (Leavens and Anderson 2011). Additional time spent on these tasks can restrict their involvement in income-generating activities (Ellis et al. 2007; Whitaker 1999). While household members share income to some extent, evidence suggests that those who earn the income have greater bargaining power over spending and resource allocation (Antman 2014; Attanasio and Lechene 2002; Bobonis 2009; Duflo 2003; Duflo and Udry 2004). Consequently, more time dedicated to household chores, due to the presence of refugees, could affect the control of local women over household spending and other key decisions.

On the other hand, local women could employ refugees willing to work for low pay to help with household chores (including collecting firewood and fetching water) and dedicate more time to income-generating activities. This would result in greater autonomy of local women and potentially greater control over household spending decisions. Reports suggest that in some areas close to the camps, the wage rate for casual work decreased by 50 per cent after the arrival of the refugees (Whitaker 2002) and there is evidence that refugees substituted casual local workers (Ruiz and Vargas-Silva 2016).

We would also expect the impact of refugees to differ across skill levels. There is a large literature for high-income countries showing that immigration has a different impact across skill groups (Dustmann et al. 2013; Giuntella et al. 2016). Some of these studies have explored this difference

¹ For instance, Alix-Garcia et al. (2013) showed that in Darfur the presence of internally displaced persons in the periphery of cities led to a decrease in vegetation due to more intense land use.

in impact from a gender perspective and suggest that low-skilled immigration has a positive impact on the labour supply of higher-skilled women (Cortes and Tessada 2011). A similar dynamic could occur in the case of refugee inflows in a low-income country. Particularly, in this setting, even basic literacy could make a difference. For instance, literate women are less likely to compete with refugees in the labour market and could take advantage of new work opportunities (e.g. administrative work for camps or in international or non-governmental organizations) and of the cheaper labour supply represented by refugees to help with household chores. In fact, Ongpin (2008) reported that there were increased job opportunities for locals at international organizations and NGOs after the arrival of the refugees.

Another known consequence of the refugee shock in Tanzania was an increase in demand for specific agricultural products (Alix-Garcia and Saah 2009). For example, there are accounts of international agencies increasing the demand for wood and the price of tree farms (Whitaker 1999). As in much of Africa, although women participate in the activities, Tanzanian men are typically the ones responsible for managing cash-crop farming (Tibaijuka 1994; Warner and Campbell 2000). Reports from the region at the time of the shock suggest that this increase in demand for specific agricultural products led male members of the household to dedicate more time to cultivating crops that were traditionally managed by women. These crops were no longer exclusively for household consumption and had become a profitable business (Whitaker 2002).

Given the particularities of the refugee inflows and the available anecdotal evidence, Kagera is apt for the study of the gendered impacts of refugees on host communities. In addition, a number of exogenous factors affected the location of refugees within Kagera, allowing the use of this refugee inflow as a quasi-natural experiment. First, the overwhelming majority of refugees from Burundi and Rwanda migrated on foot (Fransen et al. forthcoming). Distance from the border was therefore a key factor in determining the number of refugees in each location. Second, the topography of the region is such that there were natural barriers (i.e. a chain of mountains and game reserves) that restricted the access of refugees to the eastern part of Kagera (Baez 2011). Third, government authorities selected locations for refugee camps that were very close to the borders of Burundi and Rwanda (Maystadt and Verwimp 2014), in order to minimize costs related to transportation and facilitate future repatriation.

We use the Kagera Health Development Survey (KHDS) for the empirical analysis. The KHDS contains information for the pre-shock (i.e. 1991) and the post-shock (i.e. 2004) periods. Several studies have used the KHDS to explore the effects of this refugee shock on the local population (i.e. Tanzanians). Baez (2011) found that the refugee shock resulted in a worsening of Tanzanian child anthropometrics and an increase in their incidence of infectious diseases. On the other hand, Maystadt (2011) and Maystadt and Duranton (2014) found that the refugee inflow improved the welfare of the hosting population by reducing poverty and transport costs as a result of increased road building. Maystadt and Verwimp (2014) found heterogeneous effects of the refugee shock. While the overall welfare impact of the shock was positive, agricultural workers faced more competition from refugees. Likewise, Ruiz and Vargas-Silva (2015, 2016) provide evidence of potential labour market competition between refugees and local workers, particularly for casual work. However, other workers benefited from the presence of refugees. While these papers have provided interesting insights, intra-household differences on the impact of the refugee shock on tasks and time allocation remain to be explored.

Our results suggest that hosting refugees had different impacts on tasks and time allocation for women and men. In general, greater exposure to the refugee shock resulted in women being less likely to engage in outside employment and more likely to engage in water fetching and firewood collection than men. Further examination suggests that the impact of the shock varies across skill levels. Women who can read and perform simple mathematical operations experienced an increase

in the likelihood of outside employment as a result of the refugee shock. We would expect these women to be more likely to take advantage of the additional supply of cheap labour represented by refugees to help with household chores. On the other hand, higher exposure to the refugee shock resulted in illiterate women being more likely to engage in farming or collecting firewood/fetching water. These results are in line with previous evidence on the impact of immigration on the labour supply of women in high-income countries.

The rest of the paper is organized as follows. The next section presents the historical background of the refugee shock. Section 3 presents the conceptual background. Section 4 presents the data and methodology. The fifth section presents the results. Section 6 concludes.

2 The refugee shock

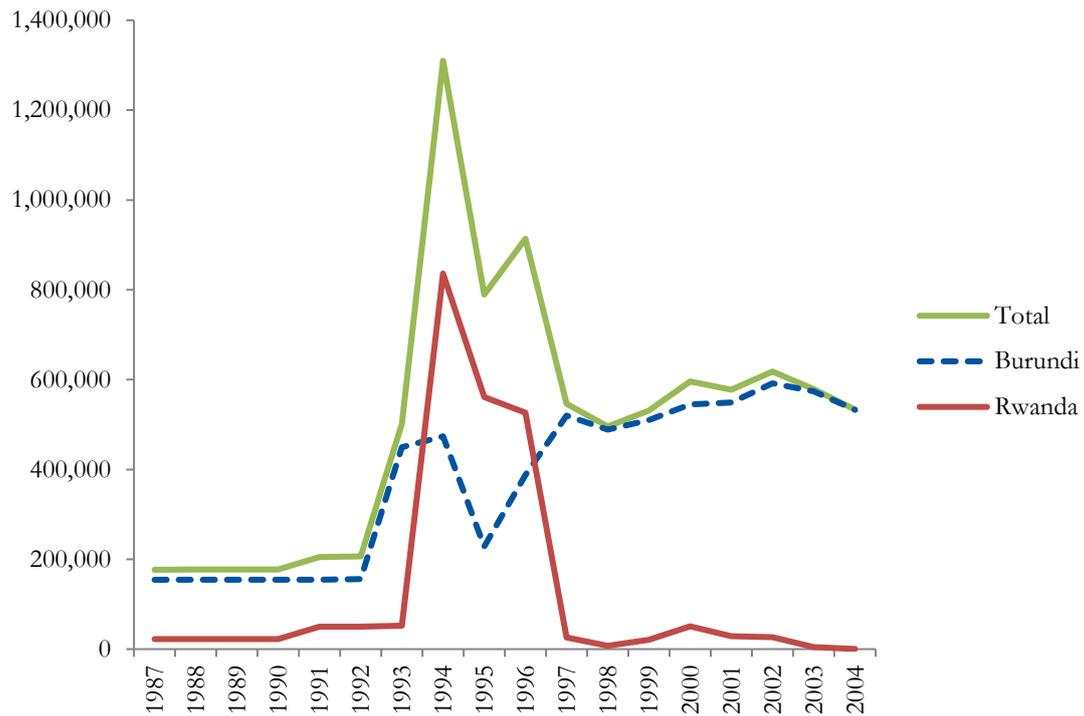
Burundi and Rwanda are two small countries in the Great Lakes Region of Africa that are divided along ethnic lines between Hutus and Tutsis. Ethnic tensions in the early 1990s led to a large-scale conflict in both countries, including what has been internationally condemned as the genocide of the Tutsi minority in Rwanda (Prunier 1995; Verwimp 2005).

Figure 1 shows the number of refugees from Burundi and Rwanda in Tanzania over time. It should be noted that there were a considerable number of refugees from Burundi in Tanzania before the events of 1993. This influx was mostly the result of a campaign of violence by the Tutsi-dominated government of Burundi against Hutus in 1972. These refugees were settled in the regions of Tabora and Rukwa, were given land for cultivation, and, by all accounts, became self-sufficient (Thomson 2009).² As shown in Figure 1, the number of Burundian refugees more than doubled after the 1993 events to reach over 400,000. The number of Rwandan refugees jumped even more dramatically from 1994 onwards to reach over 800,000. Overall, the number of Burundian and Rwandan refugees in Tanzania increased from less than 200,000 to over 1.2 million in just two years. The refugees from Rwanda returned home after a few years, but those from Burundi, which experienced a lengthier conflict, remained in the country for much longer.³

² Note that these refugees were not in the Kagera region.

³ The last camp in Kagera that hosted Burundian refugees from the 1993–2005 conflict was closed in 2008.

Figure 1: Refugees from Burundi and Rwanda in Tanzania



Source: Authors' construction from UNHCR time series statistics (UNHCR 2016).

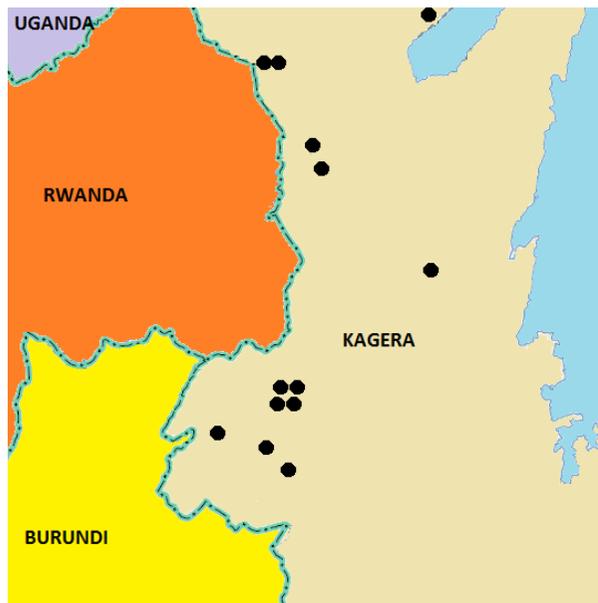
Kagera is located on the western shore of Lake Victoria in Tanzania (Panel A of Figure 2). It borders Uganda to the north and Rwanda and Burundi to the west. Given its geographical location, Kagera was one of the main destinations of refugees during the 1990s. However, a series of geographical and logistical factors as well as policy decisions led to an uneven spread of refugees across Kagera (see Section 4.3 for details). As shown in Panel B of Figure 2, the refugee camps were largely concentrated in the western part of Kagera.

Figure 2: Regional maps

Panel A: Great Lakes region



Panel B: Camps in Kagera



Panel C: Districts of Kagera

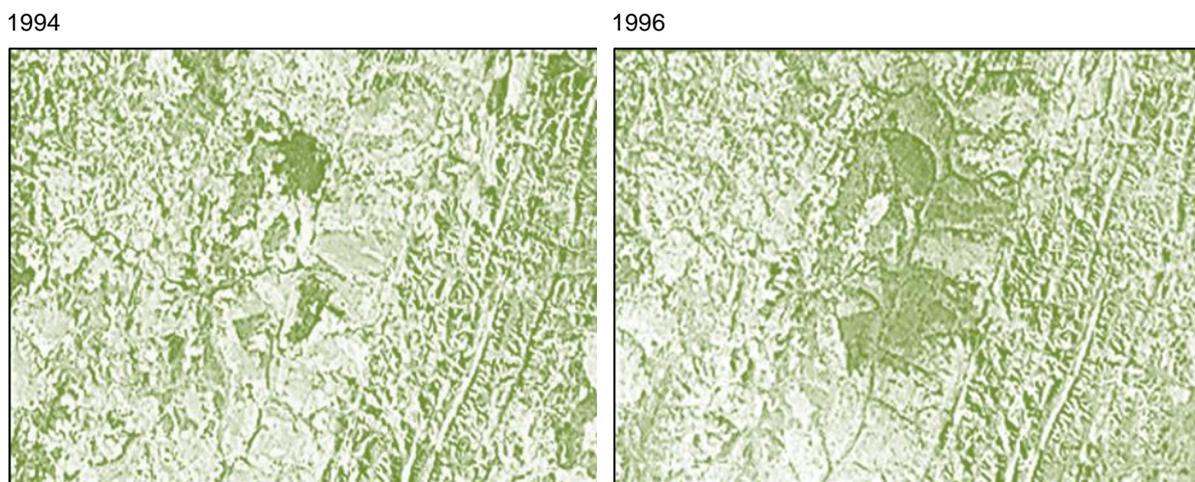


Note: The black dots in Panel B indicate the location of the refugee camps.

Source: Information on the location of the camps (Panel B) comes from UNHCR (2016).

The presence of refugees in Tanzania has been strongly linked to environmental degradation. Refugees cut down trees in order to use the wood for shelter and cooking and to clear space for cultivating crops, and this led to the deforestation of areas close to the refugee camps. Figure 3 presents satellite images from 1994 and 1996 of two of the camps in Kagera (Benaco and Mushuhura). Light areas indicate a greater density of vegetation, while darker areas indicate deforestation. From the figure it is possible to appreciate the deforestation that the zone experienced over this two-year period.

Figure 3: Deforestation in the region of the Benaco and Mushuhura refugee camps



Note: Dark green areas denote deforestation.

Source: Original information from UNHCR Environmental Database.

As explained by Berry (2008: 7), the presence of refugees meant that it was necessary to ‘travel much greater distances to find firewood and wood for construction than was necessary 10 years ago.’ Whitaker (1999) also explains that refugees in Tanzania used more firewood per person than the locals. Refugees used an average 2.8 kg of wood per person per day, whereas locals used 1.7 kg. Two reasons for this difference are that refugees were less likely to put out fires between meals because of a lack of matches and that they depended more on dried food, which takes longer to cook than the crops consumed by locals. UNHCR (2002) estimates that at the peak of the refugee crisis in Kagera, the camps consumed about 1,200 tonnes of firewood each day and that by 1996 225 km² had been completely deforested and 470 km² partially deforested. UNHCR and other organizations did establish tree-planting programmes later on in order to combat deforestation and soil erosion (Renner 2007). However, any benefits from these programmes would take several years to materialize.

The increased felling of trees also led to soil erosion and depletion and pollution of water supplies (Berry 2008). This is very important for Kagera. As shown in Table 1, the majority of communities in our sample depended on natural sources (e.g. springs, rivers, lakes) for drinking water.

Table 1: Sources of drinking water for the community

	Dry season		Rainy season	
	1991	2004	1991	2004
Public tap	4%	10%	6%	14%
Well without pump	12%	14%	8%	12%
Well with pump	2%	10%	2%	10%
Natural*	82%	65%	84%	63%

* Natural includes spring, river, lake, and rain.

Source: Community questionnaire of the KHDS.

3 Conceptual background

In this section, we present the conceptual framework behind the analysis of the paper. We separate tasks into three groups: household chores, farming, and outside employment. Household chores are required for the household to function properly, but do not earn any income. Farming can be for household consumption, income-generating purposes, or both. Employment outside the household generates income. The presence of refugees will have implications for the demand and supply factors related to these three groups of tasks.

The inflow of refugees to rural regions often increases the total amount of time that is necessary to dedicate to household chores in order for the household to function properly. For example, as explained before, in rural regions it is common for households to fetch water and collect firewood on a frequent basis. The presence of refugees leads to additional competition for these resources. In the context that we are exploring (i.e. Kagera) it is common for women to bear the main responsibility for the provision of household services. Consequently, women could be particularly affected by the increase in the time required to fulfil household chores and might need to decrease time dedicated to other activities such as outside employment and farming.

Refugees could also assist with the provision of household services. For instance, a series of studies have looked at the impact of low-skilled immigration on the price of household services in high-income countries (e.g. Cortes 2008). These studies suggest that low-skilled immigration increases the supply of individuals willing to provide household services and thereby lowers the price of these services. For individuals with high enough productivity outside the household it is optimal to outsource part or all of the household chores and increase the time dedicated to outside employment (Cortes and Tessada 2011). Similar dynamics could occur in a low-income country when there is an inflow of refugees willing to do household chores for a low price or, in some cases, simply in exchange for food (Whitaker 2002). In this case, the more productive individuals should respond to the presence of refugees by dedicating more time to outside employment and less time to household chores. Individuals with lower productivity are less likely to take advantage of the presence of the cheap refugee labour supply and would still need to make adjustments for the increase in competition for natural resources represented by the refugees.

The implication of the presence of refugees for farming activities is somewhat more complicated. First, in the context of rural Tanzania, women are typically responsible for crops that are meant for household consumption (food crops), while men are responsible for crops that are intended to generate income (cash crops). There is substantial evidence that the presence of the refugees led to increased demand for agricultural products (Alix-Garcia and Saah 2009). Therefore, household members, particularly male members, could dedicate more time to working on cash crops. On the other hand, Omari (1988) indicates that, though the appearance of cash crops in Tanzania could lead to greater involvement by men, there is not necessarily a corresponding reduction in the engagement of women, who might just move from producing food crops to working on cash crops. Finally, it was also common to hire refugees to work on crops (Whitaker 2002). As a consequence, the presence of refugees affects the demand and supply of farming labour.

4 Data and methodology

4.1 The Kagera Health and Development Survey

The KHDS was initially conducted in 51 communities spread across all districts of Kagera. It is a longitudinal dataset in which individuals were tracked over time even if they had moved out of the original community (De Weerd et al. 2012). After the initial round of the survey, which started in 1991 and ended in 1993, there were three follow-up rounds: one between 1992 and 1994, one in 2004, and one in 2010. In this paper we use the 1991–1993 (i.e. before the arrival of the refugees) and 2004 (i.e. after the arrival of the refugees) rounds of the survey. We cannot use the 2010 round, as some of the key questions for our study were not included in that round.⁴ Over 90 per cent of the original households were re-interviewed in the 2004 round of the survey.

The timing of the data collection for this dataset is particularly appropriate for our analysis. The first round of the survey was conducted between September 1991 and May 1993. The conflict in Burundi started in October 1993 and the conflict in Rwanda started in 1994. Therefore, the first round of the survey precedes the start of the conflict.

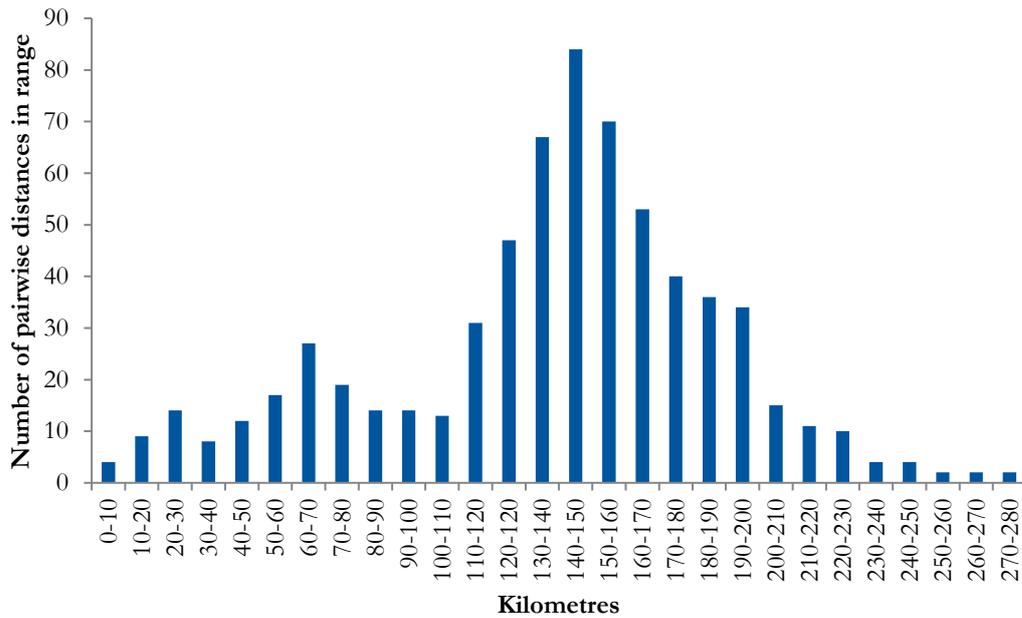
4.2 Estimations

The KHDS field team collected the GPS coordinates of the communities during the first round of the survey. Maystadt (2004) used this information, together with the GPS coordinates of the refugee camps from UNHCR, to create distance measures (spherical) from the 51 communities in the first round of the survey to the 13 refugee camps. In total there are 663 pairs of distance measures (51 communities x 13 camps). As shown in Figure 4, there is substantial variation in distance from the host locations to the refugee camps. Some communities were close to camps, while others were farther away.⁵

⁴ In particular, the information on collecting firewood and fetching water was not included in the 2004 round. We explored the 2010 round in two previous papers (see Ruiz and Vargas-Silva 2015, 2016).

⁵ Distance from a community to a specific refugee camp varied from 6 km (Lukole camp in Ngara) to 279 km (Rugwera camp close to the border of Uganda).

Figure 4: Pairwise distances between communities and refugee camps



Note: The top value of the range is not inclusive. For example, 0–10 means zero or more kilometres, but less than 10.

Source: Data obtained from Maystadt (2004).

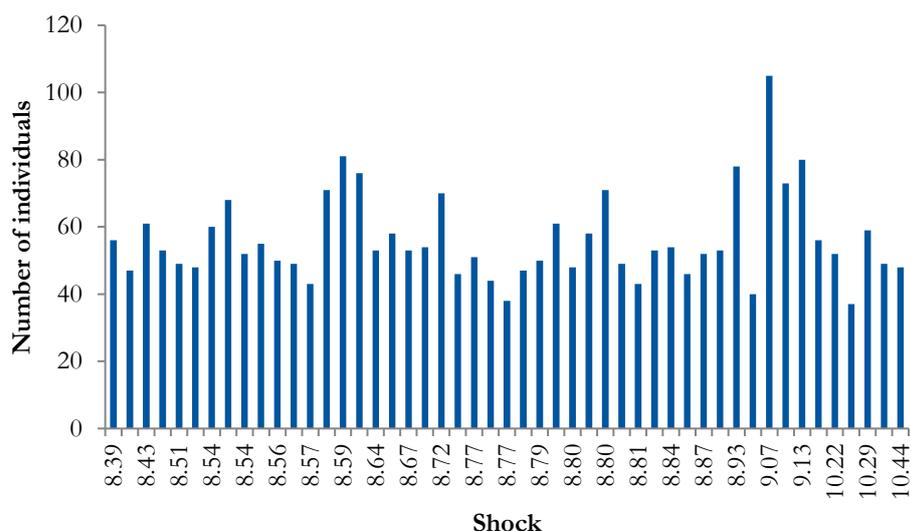
We use the information on distances to refugee camps to create a variable that proxies the refugee shock (S_j) experienced by each household j . S_j is based on the sum of the 1991–1993 (i.e. pre-shock) distance (D) of the community of residence to each refugee camp r , weighted by the peak population (P) of each camp.⁶ That is:

$$S_j = \log \left(\sum_{r=1}^{13} \frac{P_r}{D_{j,r}} \right) \quad (1)$$

This specification allows households closer to the most populated camps to have a higher value than other households. Different versions of this refugee shock have been used in other papers (e.g. Baez 2011; Maystadt 2011; Maystadt and Duranton 2014; Maystadt and Verwimp 2014; Ruiz and Vargas-Silva 2015, 2016). As shown in Figure 5, there is a substantial range of values for the shock variable.

⁶ Peak population is the highest population recorded by UNHCR.

Figure 5: Range of values for the refugee shock



Source: Authors' calculations.

We focus on the impact of the refugee shock on three different groups of tasks: farming, outside employment, and household chores (specifically fetching water and collecting firewood). Farming is the time dedicated to working on crops in household plots (i.e. *shambas*) and caring for household animals. One limitation of the data is that we cannot distinguish between time dedicated to farming activities for household consumption and for income-generating purposes.⁷ Outside employment refers to work outside the household as an employee or self-employed person.

As shown in Table 2, during the pre-shock period women and men were as likely to engage in farming and firewood/water collection. Close to 70 per cent of individuals engaged in these tasks, a share that is consistent for households that experienced an above- and below-the-median (future) refugee shock. On the other hand, males were more likely to engage in outside employment (a gap of 11 percentage points). The pattern is somewhat different for the post-shock period. The gap in outside employment between men and women increased to 27 percentage points. The increase was particularly large for those who experienced a below-the-median refugee shock. Likewise, the gap in firewood/water collection between women and men increased to 15 percentage points—an increase that was largely driven by those who experienced an above-average refugee shock.

⁷ This information is available in the first round of the survey, but not in the 2004 round.

Table 2: Share engaged in different tasks

Activity	1991 (pre-shock)		2004 (post-shock)	
	Women	Men	Women	Men
	All			
Farming	0.72	0.66	0.66	0.57
Outside employment	0.08	0.19	0.24	0.51
Firewood and water	0.71	0.68	0.60	0.45
Observations	1,418	1,257	1,418	1,257
	Below-median shock			
Farming	0.70	0.62	0.62	0.50
Outside employment	0.07	0.22	0.25	0.60
Firewood and water	0.68	0.67	0.56	0.46
Observations	685	629	685	629
	Above-median shock			
Farming	0.74	0.70	0.71	0.63
Outside employment	0.09	0.16	0.23	0.43
Firewood and water	0.75	0.68	0.63	0.43
Observations	733	628	733	628

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water.

Source: Authors' calculations.

Table 3 reports on the number of hours in the previous week spent on the different tasks. The numbers in brackets are the time spent on the activity if we exclude those who do not participate in the activity (i.e. exclude zeros). Consistent with Table 2, in the pre-shock period women and men dedicate about the same amount of time to farming (12–14 hours per week) and fetching water/collecting firewood (5 hours per week), but men dedicate more time to outside employment than women (a difference of 4 hours per week). However, the average time dedicated to different tasks did not change dramatically in the post-shock period. The main change was an increase to 13 hours in the difference between men and women in time dedicated to outside employment.⁸

⁸ There is some comparable data for other countries in the region. For instance, Charmes (2006) estimated the time spent fetching water and collecting firewood by gender for four Sub-Saharan countries around the same time as the information in our dataset was collected. His estimates for women in Benin (7 hours) and Ghana (9 hours) are higher than our estimates for Kagera, but his estimate for South Africa (1.6 hours) is lower. His estimate for Madagascar (4 hours) is close to our figures for Kagera.

Table 3: Hours spent per week on different tasks

Time spent on	1991 (pre-shock)		2004 (post-shock)	
	Women	Men	Women	Men
	All			
Farming	13.7 [18.9]	12.2 [18.5]	14.0 [21.1]	12.1 [21.3]
Outside employment	1.7 [21.0]	5.9 [31.1]	7.0 [29.4]	20.3 [39.7]
Firewood and water	4.7 [6.5]	5.1 [7.5]	3.9 [6.5]	2.6 [5.8]
Observations	1,418	1,257	1,418	1,257
	Below-median shock			
Farming	12.9 [18.3]	10.3 [16.6]	12.7 [20.6]	9.3 [18.5]
Outside employment	1.8 [26.1]	7.7 [34.8]	8.2 [32.7]	24.9 [42.0]
Firewood and water	4.2 [6.2]	5.5 [8.1]	3.5 [6.2]	2.5 [5.5]
Observations	685	629	685	629
	Above-median shock			
Farming	14.5 [19.5]	14.1 [20.2]	15.2 [21.5]	14.9 [23.5]
Outside employment	1.5 [17.1]	4.0 [25.8]	5.9 [26.0]	15.6 [36.5]
Firewood and water	5.1 [6.8]	4.7 [6.9]	4.3 [6.8]	2.7 [6.1]
Observations	733	628	733	628

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water. The numbers in brackets are the time spent on the activity if we exclude those who do not participate in the activity (i.e. exclude zero values).

Source: Authors' calculations.

The main estimations are a series of regressions along the following lines:

$$H_{ijt} = \beta_1 \mu_j + \beta_2 b_{jt} + \beta_3 r_{jt} + \beta_4 u_{jt} + \beta_5 \tau_t + \beta_6 m_{ijt} + \beta_7 f_i + \beta_8 (\tau_t * S_{jt}) + \beta_9 (f_i * \tau_t * S_{jt}) + \theta X_{ijt} + \varepsilon_{ijt} \quad (2)$$

where H_{ijt} is either a dummy indicating that individual i from household j engaged in a given task during the previous week or the number of hours the individual dedicated to the task during the previous week; μ_j is the household fixed effect; b_{jt} , r_{jt} , u_{jt} are controls for distance to the borders of Burundi, Rwanda, and Uganda;⁹ τ_t is a time dummy (2004 = 1); m_{ijt} controls for the month of the interview in order to capture seasonal effects; f_i indicates that the person is a woman; S_{jt} is the indicator of the refugee shock as presented in (1); X_{ijt} are a series of individual and household controls; and ε_{ijt} is the error term. The β 's and θ 's are the estimated coefficients. The main coefficient of interest is β_9 , which represents the relative gender impact of the shock. The tables with the main results (see Sections 5 and 6) also report the estimated values for β_7 and β_8 .

The individual variables included in X_{ijt} are a quartic on age and marital status and a dummy indicating that the individual is literate. At the household level the analysis controls for household size, ratio of children to adults, having a female head, and having a married head. Table 4 provides descriptive statistics on these control variables. Women are slightly older and, as found in other papers on Tanzania, less likely to be literate (i.e. be able to read, e.g. a newspaper). See Appendix A for a full description of the construction of all the variables included in the estimation.

⁹ These distance measures are constructed in the same way as the shock, as $\log(1/\text{distance})$, and are set to zero for the first period.

Table 4: Individual and household controls included in the estimation

Variable	1991		2004	
	Women	Men	Women	Men
Age	26.4	23.6	38.9	36.4
Literate	0.6	0.7	0.7	0.9
Married	0.3	0.3	0.6	0.7
Household size	7.7	7.5	5.4	4.9
Female head	0.2	0.2	0.3	0.1
Married head	0.7	0.7	0.7	0.7
Child to adult ratio	0.2	0.2	0.2	0.2
Observations	1,418	1,257	1,430	1,257

Source: Authors' calculations.

As explained above, there is a literature that suggests that the impact of immigration on women differs across skill levels. In order to explore this aspect further, we present separate estimations by gender and skill level. Kagera is a rural region with low educational levels, but literacy can have major implications for work opportunities outside the household. The overall estimated literacy rate in Kagera in the 2002 Census was 67.2 per cent, but this number was only 60.5 per cent for females (Population and Housing Census 2015).¹⁰ The analysis below also presents separate estimations for literate and illiterate men and women and for those with and without basic maths skill. The literacy indicators refer to the ability to read (e.g. a newspaper) while maths skill is measured as the ability to perform simple mathematical operations (e.g. addition) (self-assessment); both are based on the information provided on the first round of the survey (i.e. pre-shock).

We also expect that younger individuals, who are more flexible in the labour market, would be more likely to make adjustments for the presence of refugees than older ones. For instance, the literature on the labour market impacts of immigration in high-income countries suggests that younger native workers are the ones more likely to compete with migrants for jobs (Angrist and Kugler 2003). A similar dynamic could exist in the case of refugee inflows in low-income countries. The median age in our sample is 30 years (in 2004). In order to explore differences across age groups we also present separate estimations for those who are 30 years of age or below in 2004 and those who are above this age. It should be kept in mind that the information on activities and time use is available only for those who are 7 years of age or older in the 1991–1993 round (at least 18 years of age in 2004).

Finally, in order to explore whether the presence of refugees had an impact on the outcomes of the younger cohort, we also look at the tasks and time use of children in the 2004 round of the survey. Many of these children were not born at the time of the first round of the survey, but the presence of refugees could have increased the need for their involvement in household chores.

4.3 Exogeneity of refugee camp locations

Our identification strategy relies on the idea that the location of refugee camps in Kagera was exogenously determined. As we argue below, and as explained in other papers in the literature, topography, the sudden nature of the inflow, and policy considerations were the major drivers of

¹⁰ For those who are 15 years of age and above.

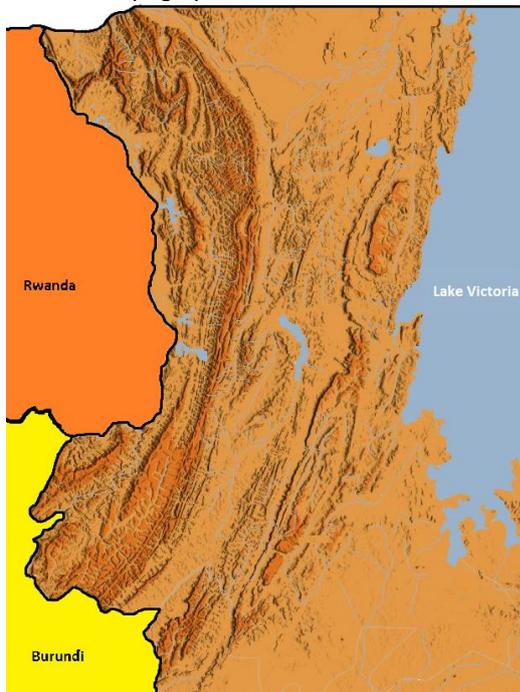
camp location (Baez 2011; Maystadt 2011; Maystadt and Durantou 2014; Maystadt and Verwimp 2014; Ruiz and Vargas-Silva 2015, 2016).

First, the overwhelming majority of refugees from Burundi and Rwanda travelled on foot (Fransen et al. forthcoming; Ruiz and Vargas-Silva 2016). Distance from the border was therefore a key factor in determining the original number of refugees in each location.

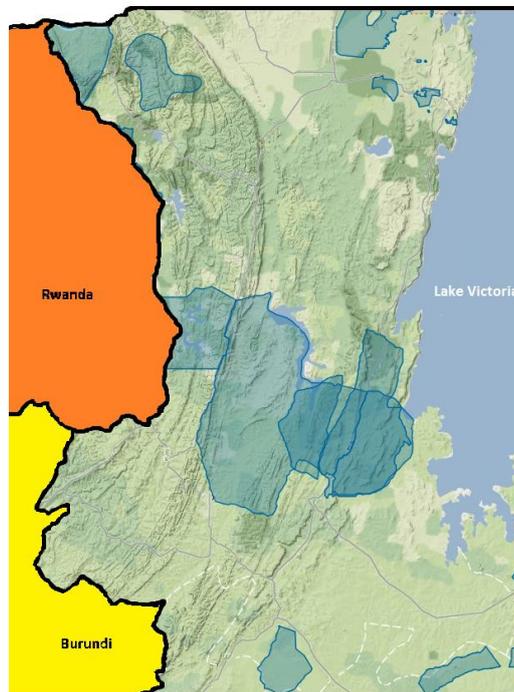
Second, a series of natural topographic barriers limited the access of refugees to the eastern part of Kagera. As shown in Panel A of Figure 6, a chain of mountains separates the eastern and western parts of Kagera. Furthermore, there are several game reserves that separate the southern and northern part of Kagera and further limit movement across these regions (see Panel B of Figure 6).

Figure 6: Topographic and protected areas maps of Kagera

Panel A: Topographic



Panel B: Protected areas



Note: The dark blue-green areas superimposed on the Panel B map are protected areas, in most cases game reserves.

Source: Information on the location of protected areas from World Database on Protected Areas (WDPA).

Third, the increase in the number of refugees was very sudden. For instance, more than 200,000 Rwandans crossed into Tanzania during a 24-hour period in what was described at the time as ‘the fastest and largest exodus of refugees in modern times’ (Wilkinson 1997). The scale and suddenness of the refugee inflow made it impossible for the Government of Tanzania to strategically direct the refugees to specific regions of the country (Baez 2011).

Fourth, contrary to other situations of displacement, in this case the large majority of refugees were hosted in camps. Based on costs and logistical considerations, UNHCR and the Government of Tanzania located the refugee camps close to the borders of Burundi and Rwanda (Maystadt and Verwimp 2014). Transporting refugees to other areas in Tanzania would have required a major financial investment, and repatriation was considered to be easier from locations closer to the border.

In order to check that the refugee shock variable is not capturing pre-shock differences between communities in variables related to activities, we estimated regressions between the 1991–1993 activities of the individuals and the refugee shock measure. As shown in Table 5, there is no significant relationship between the variables.¹¹

Table 5: Impact of refugee shock on likelihood of engaging and time spent on a task using 1991–1993 (i.e. pre-shock) data

Independent variable	Farming	Outside employment	Firewood and water
		Likelihood of engaging	
Refugee shock	0.07 (0.54)	-0.15 (-1.16)	-0.05 (-0.26)
		Time spent on task	
Refugee shock	2.80 (0.85)	-6.15 (-0.96)	0.54 (0.37)
Controls	X	X	X
Observations	2,625	2,625	2,625

Notes: The categories are not mutually exclusive. ‘Outside employment’ is work outside the household as an employee or self-employed person. ‘Firewood and water’ is collection of firewood or fetching water. The regressions control for the variables included in Table 4 and dummies for district within Kagera.

Source: Authors’ calculations.

5 Results

5.1 Baseline results

Table 6 reports the baseline results. Looking at column 4, which includes all controls and the fixed effects, it seems that greater exposure to the presence of refugees led to a higher probability of engaging in farming but had no impact on the likelihood of engaging in outside employment or collecting firewood/fetching water. Also, women are more likely to engage in farming and collecting firewood/fetching water, but less likely to engage in outside employment.

Turning to the main coefficient of interest, the results suggest that once we control for relevant factors, the refugee shock had gender-specific impacts. In particular, more exposure to the presence of refugees led to women being less likely to engage in outside employment than men (column 4). On the other hand, the refugee shock led to women being more likely to engage in fetching water and collecting firewood and to engage in farming than men. Estimates using the median value of the shock suggest that the presence of refugees leads to women being close to 9 percentage points more likely to engage in farming and fetching water/collecting firewood and 18 percentage points less likely to engage in outside employment than men.

¹¹ These estimations include the controls presented in Table 4.

Table 6: Impact of refugee shock on likelihood of engaging in task: women vs men

Independent variable	(1)	(2)	(3)	(4)
	Farming			
Refugee shock	0.07* (1.91)	0.07* (1.81)	0.04 (0.50)	0.01** (2.12)
Female	0.07*** (3.49)	0.04** (2.15)	0.05*** (2.70)	0.05* (1.70)
Refugee shock*Female	0.00 (1.51)	0.01** (2.40)	0.00 (1.50)	0.01** (2.12)
	Outside employment			
Refugee shock	-0.07 (-1.13)	-0.09 (-1.56)	0.06 (1.23)	0.06 (1.40)
Female	-0.11*** (-6.26)	-0.12*** (-6.78)	-0.11*** (-5.87)	-0.13*** (-6.51)
Refugee shock*Female	-0.02*** (-7.48)	-0.02*** (-6.53)	-0.02*** (-7.60)	-0.02*** (-6.46)
	Firewood and water			
Refugee shock	0.04 (0.73)	-0.00 (-0.08)	-0.05 (-0.88)	-0.03 (-0.44)
Female	0.03 (1.13)	0.06** (2.08)	0.04 (1.15)	0.07** (2.01)
Refugee shock*Female	0.01*** (4.10)	0.01*** (4.74)	0.01*** (4.07)	0.01*** (4.63)
Controls		X		X
Household fixed effects			X	X
Observations	5,350	5,350	5,350	5,350

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water.

Source: Authors' calculations.

Table 7 presents the results for the time allocated to each task. The results using fixed effects and the controls (columns 3 and 4) suggest that greater exposure to the refugee shock reduced the time allocated to outside employment by women relative to men. The results also suggest that the refugee shock led to women dedicating more time to fetching water and collecting firewood than men. In this case the estimates based on the median value of the shock suggest an increase of 1.4 and 1.8 hours per week in time dedicated to farming and fetching water/collecting firewood, respectively, as a result of the refugee shock for women relative to men. The equivalent relative decrease in outside employment for women is close to 8 hours per week.

In columns 5 and 6 of Table 7 we present results from a Tobit estimation in order to address the large number of zeroes in our dependent variable. The coefficient regarding outside employment is insignificant in the Tobit estimation, which suggests that the effect could be driven by the likelihood of participation in the activity. However, it should also be kept in mind that the Tobit estimation does not include household fixed effects. On the other hand, the coefficients for farming and for fetching water and collecting firewood are still significant.

Table 7: Impact of refugee shock on time allocation: women vs men

Dependent variable: time spent on	(1)	(2)	(3)	(4)	(5)	(6)
	Farming					
Refugee shock	3.15** (2.11)	2.93** (2.07)	1.49 (0.60)	0.77 (0.29)	4.38** (2.26)	4.02** (2.19)
Female	1.57*** (2.77)	0.54 (0.96)	1.38*** (2.64)	-10.78 (-0.41)	2.60*** (3.34)	1.10 (1.37)
Refugee shock*Female	0.06 (0.65)	0.17* (1.95)	0.06 (0.70)	0.16* (1.86)	0.15 (1.19)	0.31** (2.49)
	Outside employment					
Refugee shock	-0.98 (-0.89)	-2.47 (-1.26)	1.27 (0.68)	1.51 (0.86)	-9.42 (-1.13)	-8.33 (-1.11)
Female	-4.42*** (-6.93)	-4.60*** (-6.89)	-3.98*** (-5.90)	-4.64*** (-6.39)	-27.09*** (-7.06)	-29.91*** (-7.27)
Refugee shock*Female	-0.98*** (-8.99)	-0.89*** (-8.73)	-1.00*** (-9.21)	-0.91*** (-8.76)	-0.98** (-2.32)	-0.27 (-0.61)
	Firewood and water					
Refugee shock	0.37 (0.65)	0.03 (0.05)	-0.68 (-1.03)	-0.40 (-0.57)	0.55 (0.60)	-0.23 (-0.26)
Female	-0.45 (-1.02)	-0.23 (-0.54)	-0.34 (-0.71)	-0.09 (-0.19)	-0.31 (-0.49)	0.09 (0.15)
Refugee shock*Female	0.20*** (4.45)	0.20*** (4.75)	0.20*** (4.57)	0.20*** (4.88)	0.33*** (5.11)	0.35*** (5.61)
Controls		X		X		X
Tobit					X	X
Household fixed effects			X	X		
Observations	5,350	5,350	5,350	5,350	5,350	5,350

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water. Tobit estimates are marginal effects.

Source: Authors' calculations.

5.2 Results for different literacy and maths skill levels

Table 8 reports the results for the likelihood of engaging in different activities and time dedicated to those activities by gender, literacy, and maths skill. The literacy and maths skill information is from the pre-shock period. The literacy indicator means that the person can read (e.g. a newspaper), while maths skill indicates that the person is able to perform simple written calculations (e.g. addition).

The results are different for the skilled and unskilled, particularly for women. The refugee shock had a significant positive effect on the likelihood of outside employment for women who could read and perform simple mathematical operations, but had no impact on the likelihood of farming or collecting firewood/fetching water. The result is in the opposite direction for other women. For instance, the shock resulted in illiterate women being more likely to engage in farming and collection of firewood/fetching water. Thus, there is evidence that the shock had different effects on women and potentially benefited those who were more likely to take advantage of the additional supply of cheap labour represented by refugees. We do not find much of an impact on time dedicated to different activities.¹²

¹² In Table 8 we present only the results for time spent on different activities using the fixed effects estimation. The estimates with the Tobit estimation are very similar to these and are available from the authors on request.

Table 8: Impact of the refugee shock on likelihood of engaging in/spending time on different tasks: results by literacy and maths skill in first round

Independent variable	Women				Men			
	Literate	Illiterate	Maths	No maths	Literate	Illiterate	Maths	No maths
Likelihood of engaging								
Farming								
Refugee shock	0.05 (0.38)	0.19* (1.94)	0.02 (0.14)	0.24** (2.29)	-0.11 (-1.54)	3.99 (1.30)	-0.14** (-1.96)	-0.11 (-0.55)
Outside employment								
Refugee shock	0.28*** (2.68)	-0.07 (-0.93)	0.23*** (3.36)	-0.02 (-0.24)	0.05 (0.54)	5.03 (0.96)	0.12 (1.61)	-0.12 (-1.13)
Firewood and water								
Refugee shock	0.06 (0.57)	0.26*** (3.07)	0.06 (0.64)	0.26*** (2.98)	-0.23*** (-2.75)	1.12 (0.84)	-0.26*** (-3.37)	-0.17 (-1.08)
Time spent on task								
Farming								
Refugee shock	3.99 (1.30)	-0.34 (-0.13)	2.82 (1.01)	0.11 (0.04)	-0.22 (-0.06)	3.44 (0.62)	-1.29 (-0.37)	9.30 (1.38)
Outside employment								
Refugee shock	5.03 (0.96)	-1.54 (-0.71)	3.26 (0.81)	-0.11 (-0.05)	-1.21 (-0.34)	3.19 (0.62)	1.26 (0.39)	4.00 (0.70)
Firewood and water								
Refugee shock	1.12 (0.84)	0.37 (-0.36)	1.07 (0.79)	0.50 (0.55)	-2.22* (-1.74)	0.91 (0.49)	-1.87* (-1.88)	0.53 (0.25)
Controls	X	X	X	X	X	X	X	X
Household fixed effects	X	X	X	X	X	X	X	X
Observations	1,720	1,116	1,726	1,110	1,770	744	1,830	684

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water. 'Literate' means that the person is able to read (e.g. a newspaper). 'Maths' refers to the ability to perform simple mathematical operations (e.g. addition).

Source: Authors' calculations.

5.3 Results for different age cohorts

Below and above 30 years of age

Table 9 reports the results on the likelihood of engaging in different activities when the sample is split between those who are 30 years of age or younger and those who are above 30 years of age in 2004. As explained above, we expect that younger individuals will be more likely to adjust their behaviour in response to the refugee shock.

The results are substantially different across the age cohorts. First, the results for the full sample seem to be driven by those 30 years of age or younger. For this group the refugee shock results in women being less likely to engage in outside employment and more likely to engage in farming and fetching water/collecting firewood than men. On the other hand, for those over 30 the refugee shock does not have much of a gender-specific effect. Table 9 also reports on the gender impact of the refugee shock on time allocation when the sample is split by age cohort. Again, for this variable the results are driven by those in the 30 years of age or less group.

Table 9: Impact of the refugee shock on likelihood of engaging and time spent on task: results by age cohort

Dependent variable engaged on	30 or less in 2004		Over 30 in 2004	
	Likelihood of engaging	Time spent on task	Likelihood of engaging	Time spent on task
Farming				
Refugee shock	0.03 (0.34)	1.48 (0.42)	-0.00 (-0.04)	-0.71 (-0.30)
Female	0.01 (0.34)	-0.39 (-0.58)	0.08*** (2.85)	2.17*** (2.57)
Refugee shock*Female	0.01* (1.71)	0.25** (2.47)	0.01 (1.21)	0.05 (0.40)
Outside employment				
Refugee shock	-0.04 (-0.86)	-0.83 (-0.38)	0.18* (1.95)	5.55* (1.82)
Female	-0.01*** (-0.39)	0.26*** (0.34)	-0.14*** (-3.20)	-9.25*** (-6.83)
Refugee shock*Female	-0.03*** (-8.64)	-1.61*** (-8.79)	-0.25*** (-6.78)	-0.04 (-0.25)
Firewood and water				
Refugee shock	-0.11 (-1.42)	-0.36 (-0.34)	0.05 (0.90)	-0.63 (-0.88)
Female	0.04 (1.14)	-0.85* (-1.73)	0.12** (2.55)	1.14** (2.36)
Refugee shock*Female	0.24*** (6.03)	0.33*** (5.98)	0.01 (1.53)	0.06 (1.44)
Controls	X	X	X	X
Household fixed effects	X	X	X	X
Observations	2,680	2,680	2,670	2,670

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water.

Source: Authors' calculations.

Children

Child labour is common in Tanzania (Beegle et al. 2006; Bureau of International Labour Affairs 2015; Kondylis and Manacorda 2012) and activities such as fetching water and collecting firewood are typically associated with it (Ellis et al. 2007). In this section we explore the impact of the shock experienced by the household on the activities of those who were children (7 to 14 years of age) when the data was collected in 2004. It should be kept in mind that most of these children were not yet born at the time of the first round of the survey. Therefore, we have only cross-sectional data for 2004.

Table 10 shows that higher household exposure to the refugee shock is associated with girls dedicating more time to outside employment and collecting firewood/fetching water than boys. This suggests that hosting refugees could have an impact on girls by raising their participation in household chores and might lead to worse future outcomes. Table 10 also shows the impact of the shock on the schooling activities of children, including the likelihood of attending school and time spent on schooling. The refugee shock has no impact on school attendance, which suggests that the increase in time dedicated to other activities does not come at the expense of schooling.

Table 10: Impact of refugee shock on the likelihood of engaging and time dedicated to tasks for those who were children (7–14 years old) at the time of the shock

Dependent variable	Likelihood of engaging		Time spent on	
	(1)	(2)	(3)	(4)
Farming				
Refugee shock	0.12 (0.66)	0.09 (0.49)	3.37 (1.09)	3.36 (0.94)
Female	-0.64 (-0.86)	-0.56 (-0.73)	6.56 (0.42)	9.63 (0.48)
Refugee shock*Female	0.07 (0.84)	0.06 (0.71)	-0.94 (-0.53)	-1.26 (-0.55)
Outside employment				
Refugee shock	0.01 (0.20)	-0.00 (-0.04)	0.34 (0.45)	0.02 (0.04)
Female	-0.25 (-1.51)	-0.25 (-1.24)	-7.39** (-2.11)	-10.73* (-1.89)
Refugee shock*Female	0.03 (1.46)	0.03 (1.17)	0.73** (2.08)	1.11* (1.86)
Firewood and water				
Refugee shock	0.06 (1.00)	0.04 (0.59)	-1.53 (-0.95)	-2.06 (-1.59)
Female	0.54 (1.12)	0.59 (1.13)	-24.50** (-2.27)	-28.84*** (-2.91)
Refugee shock*Female	-0.06 (-1.11)	-0.06 (-1.11)	2.74** (2.26)	3.23*** (2.91)
Schooling				
Refugee shock	0.05 (0.68)	0.09 (0.83)	-2.43 (-0.61)	-1.63 (-0.28)
Female	0.59 (1.51)	0.55 (1.17)	14.54 (0.78)	3.89 (0.14)
Refugee shock*Female	-0.06 (-1.51)	-0.06 (-1.15)	-1.59 (-0.79)	-0.48 (-0.16)
Controls		X		X
Observations	312	312	312	312

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water.

Source: Authors' calculations.

6 Robustness

In this section we explore the robustness of the results to changes in the sample used. First, we exclude the residents of the Ngara district from the sample. As shown in Figure 1, the refugees from Rwanda returned home after a few years, while those from Burundi stayed in Tanzania for much longer. The majority of Burundian refugees in Kagera were hosted in Ngara, which means that residents of this region experienced a much 'extended' shock compared with those in other regions. As shown in columns 1 and 4 of Table 11, there are no significant changes in the results if we exclude Ngara residents from the estimations.

Next we exclude residents of Bukoba Urban from the sample. While Kagera is a predominantly rural region, Bukoba Urban (which includes the regional capital) has a much higher population density than the other districts and, consequently, different labour market dynamics. As shown in columns 2 and 5 of Table 11, the results are also robust to this exclusion from the sample.

Finally, columns 3 and 6 of Table 11 present the results if we exclude from the sample those households that moved out of Kagera between the two rounds of the survey. The results are robust to the exclusion of these emigrants. Thus, results are not driven by a particular likelihood to emigrate among households more (or less) affected by the refugee shock.

Table 11: Impact of refugee shock on likelihood of engaging in task: robustness checks

Independent variable	Likelihood of engaging			Time spent on		
	(1)	(2)	(3)	(4)	(5)	(6)
Farming						
Refugee shock	0.25 (0.87)	0.02 (0.23)	0.02 (0.24)	16.68 (1.60)	0.48 (0.17)	0.10 (0.04)
Female	0.04* (1.82)	0.02 (0.88)	0.03 (1.45)	0.23 (0.41)	0.03 (0.06)	0.22 (0.36)
Refugee shock*Female	0.01* (1.67)	0.01** (2.23)	0.01** (2.17)	0.22*** (2.28)	0.18* (1.74)	0.20** (2.10)
Outside employment						
Refugee shock	-0.08 (-0.27)	0.08** (2.05)	0.05 (1.15)	-9.51 (-0.87)	2.44 (1.53)	0.45 (0.25)
Female	-0.14*** (-6.46)	-0.11*** (-5.17)	-0.13*** (-6.30)	-4.83*** (-6.14)	-3.42*** (-5.28)	-4.28*** (-6.09)
Refugee shock*Female	-0.02*** (-6.09)	-0.02*** (-5.76)	-0.02*** (-6.14)	-1.00*** (-9.29)	-0.82*** (-7.38)	-0.87*** (-7.97)
Firewood and water						
Refugee shock	0.11 (0.33)	-0.03 (-0.43)	-0.01 (-0.21)	1.90 (0.57)	-0.37 (-0.53)	-0.33 (-0.41)
Female	0.05 (1.39)	0.10*** (2.67)	0.06* (1.77)	-0.43 (-0.86)	0.33 (0.63)	-0.12 (-0.25)
Refugee shock*Female	0.01*** (3.94)	0.01*** (3.52)	0.02*** (4.69)	0.22*** (4.93)	0.17*** (3.61)	0.21*** (4.80)
Controls	X	X	X	X	X	X
Household fixed effects	X	X	X	X	X	X
Excluding Ngara	X			X		
Excluding Bukoba Urban		X			X	
Excluding emigrants			X			X
Observations	4,768	4,360	4,904	4,768	4,360	4,904

Notes: The categories are not mutually exclusive. 'Outside employment' is work outside the household as an employee or self-employed person. 'Firewood and water' is collection of firewood or fetching water.

Source: Authors' calculations.

7 Conclusion

With more than 65 million forcibly displaced people around the world, there has been a growing interest in understanding the economic implications of hosting refugees. However, there is still very little understanding of the different factors and channels that determine the implications of refugee inflows for different members of the household and there is limited quantitative evidence on the gender implications. This paper examines the impact of hosting refugees on the intra-household allocation of tasks with a gender focus. It looks at a case in which the host community faced a large inflow of refugees (i.e. a refugee shock) and pays particular attention to how this shock altered the distribution and relative intensity of tasks across household members.

Using data from a panel survey from Tanzania for the pre-shock and the post-shock periods, we find that hosting refugees had different impacts on time allocation and activity choice for women and men. In particular, the presence of refugees resulted in women being less likely to engage in

outside employment and more likely to engage in household chores (i.e. water fetching and firewood collection) relative to men. This is likely due to the additional competition for natural resources represented by refugees and the need to walk further in order to find firewood and water. However, the results differ by literacy level, literate women being more likely to engage in outside employment in response to the shock and illiterate women being more likely to engage in farming and collecting firewood/fetching water. This coincides with previous evidence from high-income countries, which suggests that the impact of immigration on women differs according to skill level. However, there is scarce evidence on this type of adjustment by native women in the context of a low-income host country.

Overall, our results suggest that the consequences of hosting refugees are not gender-neutral. Future efforts and programmes led by hosting countries and international donors should take this into account.

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Appendix A: Variables

Dependent variables	
Farming	Work in household <i>shambas</i> or caring for household livestock during the previous week. This includes engaging in the activity and time dedicated to the activity.
Non-farming	Work in self-employment in a non-farm business or work for someone who is not a member of the household during the previous week. This includes engaging in the activity and time dedicated to the activity.
Firewood and water	Collected firewood or fetched water during the previous week. This includes engaging in the activity and time dedicated to the activity.
Independent variables	
Gender	Indicates that the respondent is a woman.
Married	Indicates that the respondent is married.
Age	In years.
Literacy	Indicates that the respondent is able to read (e.g. a newspaper).
Household size	Number of members.
Female head	Indicates that the head of the household is a woman.
Married head	Indicates that the head of the household is married.
Child-to-adult ratio	Number of children/number of adults in the household.
Month of the interview	Dummies to control for month of the interview.
Time	Indicates the 2004 round of the survey.
Distance to Uganda	Euclidian distance from base community to border with Uganda in kilometres. Variable is set to zero for first period. Enter as $\log(1/\text{distance})$ for second period. Source: Fisher (2004) with data from the Global Land Cover Network.
Distance to Rwanda	Euclidian distance from base community to border with Rwanda in kilometres. Variable is set to zero for first period. Enter as $\log(1/\text{distance})$ for second period. Source: Fisher (2004) with data from the Global Land Cover Network.
Distance to Burundi	Euclidian distance from base community to border with Burundi in kilometres. Variable is set to zero for first period. Enter as $\log(1/\text{distance})$ for second period. Source: Fisher (2004) with data from the Global Land Cover Network.
Refugee shock	The sum of the pre-shock distance to each refugee camp (source: Maystadt 2004), weighted by the peak population of each camp (from UNHRC reports). Variable is set to zero for first period (i.e. interaction with time dummy). See equation (1) in the Data and Methodology Section.