

The impact of hosting refugees on the intra-household allocation of tasks and time: A gender perspective

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Abstract

This paper examines the impact of hosting refugees on the intra-household allocation of tasks and time. We pay particular attention on whether the arrival of refugees altered the distribution and relative intensity of tasks across genders. Using panel data (pre and post refugee inflow) from Tanzania, we find that the refugee shock led to women being less likely to engage in non-farm employment and more likely to engage in household chores (i.e. water fetching and firewood collection) than men. Moreover, the results suggest that the higher exposure to the refugee shock resulted in a reduction (increase) in the time women allocated to non-farm work (household chores) relative to men. Our estimates also show that these results are driven by women who are less than 50 years of age.

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

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1. Introduction

There is a growing interest in estimating the economic impacts of hosting refugees. Recent studies have looked at the impact of refugees on labour market outcomes (Del Carpio and Wagner, 2015; Ruiz and Vargas-Silva, 2015; 2016; Tumen, 2016), prices (Balkan and Tumen, 2016) and poverty (Azevedo et al., 2016), among others. However, we still know little about the impact of hosting refugees on the allocation of tasks among household members and the time that members dedicate to different tasks. This is an important omission in the literature as the evidence suggests that the impact of external shocks on time allocation of individuals and households has major consequences for overall wellbeing (Blackden and Wodon, 2006; Esquivel et al, 2006; Harvey and Taylor, 2000; Miller and Urdinokla, 2010).

This paper examines the impact of hosting refugees on the intra-household allocation of tasks and time with a gender focus. It looks at a case in which the host community faced a massive sudden inflow of refugees (i.e. a refugee shock). Using data from a panel survey in Kagera – a region of Tanzania – for the pre-shock and the post-shock period, we find that hosting refugees had different impacts on tasks and time allocation for women and men. In particular, greater exposure to the refugee shock resulted in women being less likely to engage in non-farm employment and more likely to engage in household chores (i.e. water fetching and firewood collection). Moreover, the results suggest that the refugee shock also led to a reduction (increase) in the time women allocated to non-farm work (household chores) relative to men. Our estimates also show that these results are largely driven by women who were less than 50 years of age at the time of the last survey.

Kagera is located on the western shore of Lake Victoria in Tanzania. It borders Uganda to the north and Rwanda and Burundi to the west. 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 (Panel A of Figure 1). However, the refugees were not evenly spread across Kagera. As explained by Maystadt and Verwimp (2014) based on costs and logistic considerations, the United Nations High Commission for Refugees and the Tanzanian Ministry for Home Affairs selected locations for refugee camps that were very close to the borders of Burundi and Rwanda.¹ Transporting refugees to other locations in Tanzania would have required a major financial investment and repatriation was easier with locations close to the border. The black dots in Panel B of Figure 1 indicate the location of the refugee camps.

We use information from the Kagera Health Development Survey (KHDS), a dataset with information on households and individuals in Kagera. The KHDS contains information for the pre-shock period (i.e. 1991) and the post-shock period (i.e. 2004). Several previous studies have used the KHDS to explore the impact of this refugee shock. Baez (2011) found that the refugee shock resulted in a worsening of Tanzanian children anthropometrics and an increase in their

¹ Contrary to other situations of displacement, in this case the large majority of refugees were hosted in refugee camps. The Tanzanian government also restricted the movement of refugees to four kilometers from the camps (Millner, 2013; Ruiz and Vargas-Silva, 2016).

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 following 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 local casual workers. However, other workers benefited from the presence of refugees. While these papers have provided interesting insights, gender differences on the impact of the refugee shock in activity choice and time use have not been fully explored.

The focus on gender to explore the impact of hosting refugees is important as several factors suggest that the potential burden and benefits of hosting refugees differ across genders. For instance, the arrival of refugees to rural areas such Kagera often leads to more competition for resources such as firewood and water. Women in Tanzania are primarily responsible for fetching water and collecting firewood (Leavens and Anderson, 2011) and additional time spent on household chores can restrict their involvement in income generating activities (Ellis, 2007). On the other hand, local women can employ refugees willing to work for a low pay to help with their household chores and dedicate more time to income generating activities.

2. Hosting refugees and time use

The tasks and time allocation of an individual can be thought of as a household decision that factors in the individual's abilities and opportunity costs relative to

those of other household members. A household member would allocate more time to activities that are better rewarded (or in which they have the lowest opportunity cost) relative to other household members. Previous evidence for other countries suggests that in rural and agricultural regions, such as Kagera, the compensation for each activity is also likely to differ by gender and age (Chang et al., 2011).

Based on economic intuition, but also on anecdotal evidence, one could hypothesize on the channels through which hosting refugees has an impact on the allocation of tasks and time among members of the household. The possible channels include:

(i) Competition for resources: In Tanzania it is common for households to use firewood for cooking and fetch drinking water on a daily basis. These chores are vital for the survival of many households. Women are primarily responsible for fetching water and collecting firewood (Ellis, 2007; Leavens and Anderson, 2011). The presence of refugees led to an increase in demand for firewood and water and resulted in deforestation of some regions closed to the camps (Whitaker, 1999). As such, the presence of the refugees could have led to an increase in total time allocated by locals to these tasks. Whitaker (1999) explains that after the refugee inflow many Tanzanian women had to choose between collecting firewood and farming, while previously they could do both things on the same day.

(ii) Transition to other activities due to the availability of inexpensive labour: The presence of refugees might have led to additional economic activity in the community and many women could have taken advantage of this opportunity, particularly because they could employ refugees to do basic household chores

(Whitaker, 1999). Reports suggest that in some areas close to the camps, the wage rate for casual work decreased by 50% (Whitaker, 2002).

(iii) Increased local demand: 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 is evidence of international agencies increasing the demand for wood and the price of tree farms (Whitaker, 1999). As in much of Africa, Tanzanian men are typically responsible for cash-crop farming and income generating activities. 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).²

A simple analysis of engagement in labour market activities is unlikely to capture many of these dynamics and trade-offs. As such, we focus on exploring the impact of the refugee shock on tasks and the time that different household members dedicated to each task.

3. Data and methodology

The KHDS is a longitudinal dataset. The survey was initially conducted in 51 communities, but individuals were tracked over time even if they had moved out of the community (De Weerdt et al., 2012). This dataset is particularly appropriate for our analysis for several reasons. First, the first round of the survey was conducted during the September 1991 – May 1993 period. The

² Women in Tanzania, are typically granted by their husbands a small plot of land. This land is used to cultivate food crops and to provide for household consumption needs. However, this does not mean that they own the land as they cannot, for example, use it as collateral (Leavens and Anderson, 2011).

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. Second, there is abundant evidence that refugee camp location was exogenous as it was mainly determined by the need to facilitate repatriation at a later stage (Maystadt and Verwimp, 2014). Third, the survey contains information at the individual and household level and we can use information on activities and time use of all household members (seven years of age and older) while controlling for individual, community and household characteristics.

After the initial round of the survey in 1991, there were three follow-up rounds between 1992 and 1994, one in 2004 and one in 2010. In this paper we use the 1991 round (i.e. before the arrival of the refugees) and in 2004 (i.e. after the arrival of the refugees). We cannot use the 2010 round as the information on time dedicated to daily tasks such as collecting firewood and fetching water was not included.

The measure that we use in order to capture the impact of the refugee shock (S_{jt}) in each household j is based on the sum of the 1991 (i.e. pre-shock) distance (D) to each refugee camp r , weighted by the peak population (P) of each camp. That is:

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

As such, those households closer to the most populated camps will get a higher value than other households. Different versions of this refugee shock have been used in several papers (e.g. Baez, 2011; Maystadt, 2011; Maystadt and Verwimp, 2014; Maystadt and Duranton, 2014; Ruiz and Vargas-Silva, 2015, 2016). In order to make sure that the shock variable is not capturing other differences

between communities we estimated regressions between the educational level in the first round of the survey (a proxy for economic background) and the shock measure. We find no significant relationship between the variables.

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

$$H_{ijt} = \beta_1\mu_j + \beta_2b_{jt} + \beta_3r_{jt} + \beta_4u_{jt} + \beta_5\tau_t + \beta_6m_{ijt} + \beta_7f_i + \beta_8(\tau_t * S_{jt}) + \beta_9(f_i * \tau_t * S_{jt}) + \theta X_{ijt} + \varepsilon_{ijt} \quad (2)$$

Where H_{it} 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 a given 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,³ 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 for us is β_9 which represents the relative gender impact of the shock. In the tables with the main results we also report the estimates values for β_7 and β_8 .

We focus on three different activities for H_{ijt} : farming, non-farm work and fetching water/collection of firewood. Farming is the time dedicated to working on crops in household plots (i.e. shambas) and care of household animals, while non-farm work refers to employment outside the household as an employee or self-employed person.

³ 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.

As shown in Table 1, women are more likely to engage in farming and collection firewood/fetching water compared to men. On the other hand, men are more likely to engage in non-farm work. Between 1991 and 2004 there was a substantial increase in the share of individuals engaged in non-farm activities and a smaller reduction in the share engaged in farming and fire/water collection. In fact, by 2004 about half of men were engaged in non-farm work and this magnitude was even higher for those less affected by the refugee shock.

[Table 1]

Table 2 reports on the number of hours in the previous week spent on the different activities. The numbers in brackets is the time spent in the activity if we exclude those who do not participate in the activity (i.e. exclude zeros). Women and men dedicate about the same amount time to farming (12 to 14 hours per week). Men dedicate more hours to non-farm work and less time to fetching water and collecting firewood.

[Table 2]

There is some comparable data for other countries in the region. For instance, Charmes (2006) reports on time spent fetching water and collecting firewood by gender for four Sub-Saharan countries around the same time when the information in our dataset was collected (Table 3). 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. Meanwhile, his estimate for Madagascar (4 hours) is close to ours for Kagera.

[Table 3]

The individual variables included in X_{ijt} are a quartic on age, marital status and a dummy indicating that the individual can read. 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. Females are slightly older and, as found in other papers on Tanzania, less likely to be literate. Please see the Appendix for a full description of the construction of all the variables included in the estimation.

The literature suggests that the effect of external shocks on time use is very different for younger and older individuals (Chang et al, 2011). Therefore, we also separate the sample between those who are at or below 50 years of age in 2004 and those who are above this age (the elderly). Please keep in mind that the information on activities and time use is only available for those who are 7 years of age or older in the 1991-1993 round (at least 18 years of age in 2004). In order to analyse the impact of the refugee shock on the younger cohort, we also look at the tasks and time use of children in the 2004 round of the survey. These children were not born by the 1991-1993 round.

5. Results

5.1 Baseline results

Table 5 reports the baseline results. Looking at column four which includes all controls and the fixed effects, it seems that the greater exposure to the presence of refugees led to a higher probability of engaging in farming and non-farming activities, but had no impact on the likelihood of collecting firewood/fetching water. Also, females are more likely to engage in farming and collecting firewood/fetching water, but less likely to do non-farming work.

Turning to our main coefficient of interest, it seems that once we control for relevant factors, the refugee shock had gender specific impacts. In particular, more exposure to the refugees led to women being less likely to engage in non-

farm work relative to men (column 4). On the other hand, the refugee shock led to women being more likely to engage in fetching water and collection of firewood and to engage in farming relative to 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 9 percentage points less likely to engage in non-farm work than men.

[Table 5]

Table 6 presents the results for the time allocated to each task. The results suggest that greater exposure to the refugee shock reduced the time allocated to non-farm work by women relative to men. The results also suggest that the refugee shock led to women dedicating more time to farming and fetching water and collecting firewood relative to men. In this case the estimates based on the median value of the shock suggest an increase of 1.4 and 1.8 hours in time dedicated to farming and fetching water/collecting firewood as a result of the refugee shock for women relative to men. The equivalent relative decrease in non-farming work for women is close to 3.86 hours.

In columns 5 and 6 of Table 6 we present results from a Tobit estimation in order to address the large number of zeroes in our dependent variable. The coefficient regarding non-farming is insignificant in the Tobit estimation suggesting that the effect is largely due to the likelihood of participation in the activity. On the other hand, the coefficients for farming and for fetching water and collecting firewood are still significant.

[Table 6]

5.2 Results for different age cohorts

5.2.1 The young and the elderly

Table 7 reports the results on the likelihood of engaging in different activities when the sample is split between those who are 50 or younger and those above 50 years of age. In Tanzania, as well as in most of Sub-Saharan Africa, those over 50 are typically classified as elderly. The results are substantially different across age cohorts. First, the results for the full sample seem to be driven by those 50 years of age or younger. For this group the refugee shock results in females being less likely to engage in non-farm work and more likely to engage in fetching water/collecting firewood. On the other hand, for those over 50 the refugee shock increases the likelihood of engaging in non-farm work and has not effect on the likelihood of engaging in fetching water/collecting firewood.

[Table 7]

Table 8 reports on the gender impact of the refugee shock on time allocation when the sample is split by age cohort. Again, the results are mostly driven by those in the 50 years of age or less group. For this group, the refugee shock results in females dedicating an hour less to non-farming activities and more time to farming activities and fetching water/collecting firewood. However, when we conduct the Tobit estimation we find again that only the impact on farming and fetching water/collecting firewood remains significant.

[Table 8]

5.2.2 The children

Child labour is common in Tanzania and activities such as fetching water and collecting firewood are typically associated with child labor (Ellis et al., 2007). In this section we compare the activities of those who were children (7 to 14 years of age) before the refugee shock to the activities of those who are children in

2004. This comparison provides details about changes in the activities of children from the same household of origin across time. Please note that those children in the first round of the survey are different from the children in the 2004 round.

Tables 9 and 10 show the gender impact of the refugee shock on the activities of those who were children right before the refugees arrived compared to the children in 2004. Consistent with other results in the paper, the estimates from Table 9 suggest that the refugee shock resulted in female children being less likely to be doing non-farm work but more likely to be fetching water and collecting firework than male children. Moreover, using the median value of the refugee shock it seems that female children spend about 3.7 hours more fetching water and collecting firework compared to male children.

[Table 9]

[Table 10]

7. Robustness

7.1 Placebo test

To explore the validity of our identification strategy we run a placebo test. The key assumption in the methodology is that in the absence of the refugee shock members of all communities would have followed a similar trajectory in terms of activities and time use. We use the fourth round of the KHDS to test this possibility. The fourth round of the KHDS was conducted during the June 6, 1993 – January 5, 1994 period, so it precedes the conflict in Rwanda although it coincides for a brief period with the Burundian conflict (which started on October 21, 1993). It is possible to argue that the main component of the refugee shock during the mid-1990s was displacement from Rwanda as displacement

from Burundi increased gradually over a longer period. The short overlap with the Burundian conflict is unlikely to affect the activities and time allocation of residents of Kagera. Therefore, it is possible to conduct a placebo test by assigning the value of the variable measuring the intensity of the refugee shock to households in the fourth round of the survey when they should not have been affected by the shock (or affected to a much lesser degree than later on). As shown in Table 11, there is no significant impact of the refugee shock variable on the likelihood of engaging on different tasks if we use data from the fourth round of the survey (i.e. pre-shock).

8. Conclusion

With more than 65 million forcibly displaced people around the world, there has been a growing interest in understanding the economic impacts of refugees. The long-time held belief of refugees simply as a “burden” to the host community has been challenged by recent quantitative evidence showing that there are also positive aspects to hosting refugees. In particular, the literature has identified that there are “winners and losers” in the host communities (Zetter, 2015). However, there is still very little understanding on the different factors and channels that determine the benefits and costs for different members of the community and there is very limited quantitative evidence on the gender implications.

This paper examines the impact of refugees on activities and the intra-household allocation of time of hosts 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 in Kagera – a region of Tanzania – for the pre-shock and the post-shock period, 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 non-farm employment and more likely to engage in household chores (i.e. water fetching and firewood collection). Moreover, the results suggest that there was also a reduction (increase) in the time women allocated to non-farm work (household chores) relative to men.

Our results suggest that the consequences of hosting refugees are not gender neutral and that future efforts by receiving countries and international donors should take this factor into account.

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Appendix

Dependent variables

Farming	Work in household shambas or caring for household livestock during the previous week.
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.
Fire and water	Collected firewood or fetched water during the previous week.

Independent variables

Gender	Indicates that the respondent is a woman.
Married	Indicates that the respondent is married.
Age	In years.
Read	Indicates that the respondent is able to read.
Household size	Number of members.
Female head	Indicates that the head of the household is female.
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 of base community to border with Uganda in kilometers. 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 of base community to border with Rwanda in kilometers. 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 of base community to border with Burundi in kilometers. 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, weighted by the peak population of each camp. Variable is set to zero for first period.

Table 1 – Share engaged in different activities

Activity	1991		2004	
	Female	Male	Female	Male
	All			
Farming	0.72	0.65	0.66	0.57
Non-Farm	0.08	0.19	0.24	0.51
Fire and water	0.71	0.68	0.60	0.45
Observations	1418	1257	1418	1257
	Below median shock			
Farming	0.70	0.62	0.62	0.50
Non-Farm	0.07	0.22	0.25	0.60
Fire and water	0.67	0.68	0.56	0.46
Observations	685	629	685	629
	Above median shock			
Farming	0.74	0.70	0.71	0.63
Non-Farm	0.09	0.15	0.23	0.43
Fire and water	0.75	0.68	0.63	0.43
Observations	733	628	733	628

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

Table 2 –Hours spent per week in different activities.

Time spent on	1991		2004	
	Female	Male	Female	Male
	All			
Farming	13.6 [18.9]	12.1 [18.5]	14 [21.1]	12.1 [21.3]
Non-Farming	1.7 [21]	5.9 [31]	7 [29.4]	20.3 [39.8]
Fire and water	4.6 [6.5]	5.0 [7.5]	3.9 [6.6]	2.6 [5.8]
Observations	1418	1257	1418	1257
	Below median shock			
Farming	12.8 [18.2]	10.3 [16.7]	12.7 [20.5]	9.3 [18.5]
Non-Farming	1.8 [26.1]	7.7 [34.8]	8.2 [32.9]	24.9 [42]
Fire and water	4.2 [6.2]	5.5 [8.1]	3.5 [6.2]	2.5 [5.4]
Observations	685	629	685	629
	Above median shock			
Farming	14.5 [19.4]	14.1 [20.1]	15.1 [21.5]	14.9 [23.6]
Non-Farming	1.5 [17.0]	4 [25.7]	5.9 [26.1]	15.6 [36.6]
Fire and water	5.0 [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. Non-farm is work outside the household as an employee or self-employed person. Fire and water is collection of firewood or fetching water. The number in brackets is the time spent on the activity if we exclude those who do not participate in the activity (i.e. exclude zero values).

Table 3 –Hours spent per week in different activities in Charmes (2006).

Time spent on	Benin (1998)		South Africa (2000)		Madagascar (2001)		Ghana (1998-99)	
Fire and water	7.1	1.9	1.6	0.7	4.0	2.6	9.1	7.7
	[15.9]	[16.9]	[23.2]	[21]	[15.6]	[16.5]	[N/A]	[N/A]

Notes: The categories are not mutually exclusive. Non-farm is work outside the household as an employee or self-employed person. Fire and water is collection of firewood or fetching water. Please see Charmes (2006) for details on the sources and estimation.

Table 4 – Individual and household controls include in the estimation.

Variable	1991		2004	
	Female	Male	Female	Male
Age	26.4	23.6	38.9	36.4
Read	0.6	0.70	0.71	0.86
Married	0.33	0.29	0.6	0.67
Household size	7.7	7.5	5.4	4.9
Female head	0.24	0.2	0.33	0.10
Married head	0.66	0.7	0.66	0.74
Child to adult ratio	0.2	0.2	0.2	0.2
Observations	1418	1257	1430	1257

Table 5 – 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)
		Non-Farming		
Refugee shock	0.03 (0.44)	0.02 (0.38)	0.16*** (4.20)	0.16*** (4.00)
Female	-0.11*** (-6.22)	-0.12 (-6.79)	-0.11*** (-5.78)	-0.13*** (-6.52)
Refugee shock* Female	-0.01*** (-3.96)	-0.01*** (-3.02)	-0.01*** (-3.99)	-0.01*** (-3.00)
		Fire 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. Non-farm is work outside the household as an employee or self-employed person. Fire and water is collection of firewood or fetching water.

Table 6 – 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)
	Non-Farming					
Refugee shock	1.12 (0.63)	0.95 (0.63)	4.53*** (4.05)	4.63*** (3.85)	6.22 (0.49)	6.80 (0.67)
Female	-4.35*** (-6.84)	-4.59*** (-6.90)	-3.97*** (-5.94)	-4.56*** (-6.37)	-30.11*** (-6.83)	-33.33*** (-7.17)
Refugee shock* Female	-0.51*** (-5.50)	-0.42*** (-4.96)	-0.52*** (-5.68)	-0.44*** (-5.21)	-1.11** (-2.15)	-0.27 (-0.52)
	Fire 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. Non-farm is work outside the household as an employee or self-employed person. Fire and water is collection of firewood or fetching water. Table reports on the coefficient showing the impact of the refugee shock on women relative to men. Tobit estimates are marginal effects.

Table 7 – Impact of the refugee shock on likelihood of engaging in task: results by age cohort.

Dependent variable engaged on	50 or less in 2004		Over 50 in 2004	
	(1)	(2)	(3)	(4)
	Farming			
Refugee shock	0.06 (1.60)	0.00 (0.05)	-0.01 (-0.19)	0.02 (0.22)
Female	0.03* (1.67)	0.03 (0.28)	0.06 (1.60)	0.02 (0.69)
Refugee shock*Female	0.00** (2.22)	0.00** (2.15)	-0.00 (0.23)	-0.00 (-0.19)
	Non-Farming			
Refugee shock	0.06 (1.18)	0.21*** (4.28)	-0.07 (-1.18)	0.09 (1.03)
Female	-0.09*** (-5.23)	-0.09*** (-4.84)	-0.20*** (-5.16)	-0.15*** (-3.79)
Refugee shock*Female	-0.01*** (-4.80)	-0.01*** (-4.74)	0.01** (3.13)	0.01*** (3.79)
	Fire and water			
Refugee shock	0.00 (0.01)	-1.38 (-1.59)	0.12 (-1.47)	1.06 (1.34)
Female	0.06 (1.95)*	-0.34 (-0.71)	0.10 (1.72)*	1.15 (1.91)*
Refugee shock*Female	0.02*** (4.96)	0.26*** (5.55)	-0.00 (-0.23)	-0.06 (-1.40)
Controls	X	X	X	X
Household fixed effects		X		X
Observations	4,164	4,164	1,186	1,186

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

Table 8 – Impact of refugee shock on time allocation: results by age cohort.

Dependent variable time spent on	50 or less in 2004			Over 50 in 2004		
	(1)	(2)	(3)	(4)	(5)	(6)
	Farming					
Refugee shock	2.93** (2.21)	0.67 (0.26)	1.91** (1.96)	-2.70* (-1.73)	-1.66 (-0.45)	-1.67 (-0.57)
Female	0.16 (0.28)	0.05 (0.09)	0.50 (0.59)	-7.41*** (4.19)	0.38 (0.27)	3.31* (1.93)
Refugee shock*Female	0.21** (2.21)	0.22** (2.40)	0.37*** (2.64)	-0.16 (-1.11)	-0.23 (-1.45)	-0.84 (-0.90)
	Non-Farming					
Refugee shock	2.79* (1.85)	6.4*** (3.97)	11.6 (1.52)	-2.70 (-1.36)	3.11 (1.19)	-25.03 (-1.22)
Female	-3.51*** (-5.86)	-3.40*** (-4.81)	-29.6*** (-5.27)	-7.41*** (-4.19)	-4.21*** (-2.82)	-36.3 (1.16)
Refugee shock*Female	-0.64*** (-6.19)	-0.67*** (-6.38)	-0.84 (-1.35)	0.45*** (3.19)	0.51*** (3.64)	0.92 (0.93)
	Fire and water					
Refugee shock	-0.16 (-0.24)	-1.38 (-1.59)	-0.20 (-0.22)	-1.12** (-2.32)	1.06 (1.34)	-3.01* (-1.81)
Female	-0.57 (-1.27)	-0.34 (-0.71)	-0.29 (-0.50)	1.32*** (2.65)	1.15* (1.91)	2.87*** (2.45)
Refugee shock*Female	0.25*** (5.35)	0.26*** (5.55)	0.40*** (6.12)	-0.05 (-1.27)	-0.06 (-1.40)	-0.06 (-0.52)
Controls	X	X	X	X	X	X
Tobit			X			X
Household fixed effects		X			X	
Observations	4,164	4,164	4,164	1,186	1,186	1,186

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

Table 9 – Impact of refugee shock on those who were children at the time of the shock on the likelihood of engaging in tasks

Dependent variable	(1)	(2)	(3)	(4)
time spent on				
	Farming			
Refugee shock	0.14** (2.13)	0.12* (1.93)	0.08 (0.83)	0.11 (0.84)
Female	0.02 (0.77)	0.02 (0.75)	0.00 (0.04)	-0.02 (-0.58)
Refugee shock*Female	0.00 (1.07)	-0.00 (-0.20)	0.00 (0.99)	0.00 (0.27)
	Non-Farming			
Refugee shock	0.06 (1.61)	0.05* (1.79)	0.12*** (3.15)	0.15*** (3.44)
Female	0.00 (0.32)	0.00 (0.10)	0.01 (1.35)	0.03* (1.98)
Refugee shock*Female	-0.02*** (-8.93)	-0.02*** (-7.26)	-0.02*** (-9.05)	-0.02*** (-7.30)
	Fire and water			
Refugee shock	0.01 (0.12)	0.00 (0.08)	-0.10 (-1.28)	0.01 (4.92)
Female	0.01 (0.53)	0.01 (0.66)	-0.01 (-0.39)	0.01 (0.05)
Refugee shock*Female	0.01*** (4.13)	0.01*** (4.39)	0.02*** (4.52)	0.02*** (4.95)
Controls		X		X
Household fixed effects			X	X
Observations	3,158	3,158	3,158	3,158

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

Table 10 – Impact of refugee shock on those who were children at the time of the shock on time allocation

Dependent variable time spent on	(1)	(2)	(3)	(4)	(5)
			Farming		
Refugee shock	5.14*** (3.48)	4.48*** (3.49)	3.42 (1.19)	2.89 (0.88)	6.58*** (2.97)
Female	-0.22 (-0.49)	-0.37 (-0.65)	-0.00 (-0.01)	-0.37 (-0.55)	-0.24 (-0.22)
Refugee shock*Female	0.10 (1.20)	-0.01 (-0.07)	-0.10 (1.24)	0.33 (0.34)	0.02 (0.17)
			Non-Farming		
Refugee shock	3.65*** (2.09)	3.45*** (2.63)	4.64*** (2.56)	6.01*** (3.05)	16.57** (1.81)
Female	0.02 (0.30)	-0.04 (-0.34)	0.57 (1.21)	1.30** (2.07)	6.97 (0.54)
Refugee shock*Female	-0.91*** (-8.65)	-0.72*** (-7.21)	-0.92*** (-8.96)	-0.85*** (-7.20)	-5.08*** (-3.16)
			Fire and water		
Refugee shock	0.39 (0.50)	0.16 (0.24)	-1.09* (-1.82)	-1.17 (-1.43)	0.15 (0.17)
Female	-1.20*** (-3.03)	-1.75*** (-3.37)	-0.87*** (-2.14)	-1.41*** (-2.84)	-1.74*** (-2.78)
Refugee shock*Female	0.27*** (5.08)	0.32*** (5.24)	0.27*** (5.22)	0.31*** (5.23)	0.42*** (5.55)
Controls		X		X	X
Tobit			X		X
Household fixed effects				X	
Observations	3,158	2,723	2,723	2,723	2,723

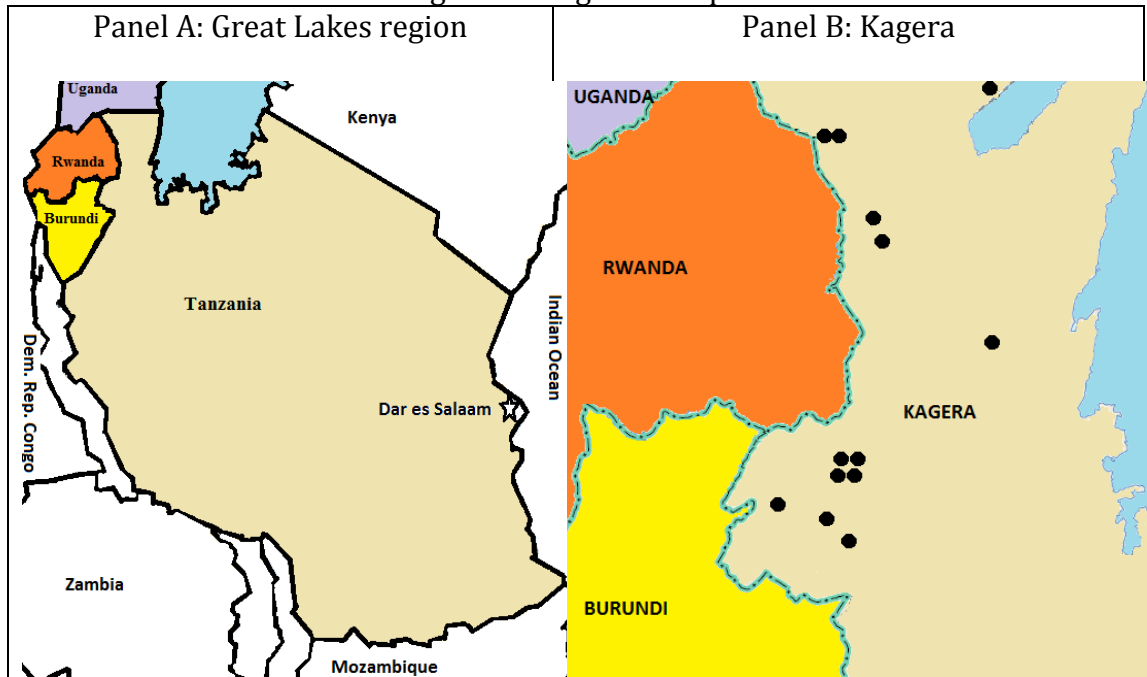
Notes: The categories are not mutually exclusive. Non-farm is work outside the household as an employee or self-employed person. Fire and water is collection of firewood or fetching water.

Table 11 – Impact of refugee shock on the likelihood of engaging in each activity: Placebo test.

Independent variable	(1)	(2)	(3)	(4)
	Farming			
Refugee shock	0.15*	0.16	0.13	0.12
	(1.83)	(1.35)	(1.37)	(1.23)
Female	0.05**	0.03*	0.05**	0.04*
	(2.15)	(1.90)	(2.22)	(1.73)
Refugee shock* Female	0.00	-0.00	-0.00	-0.00
	(-0.63)	(-0.33)	(-0.62)	(-0.33)
	Non-Farming			
Refugee shock	-0.00	-0.02	0.06	0.05
	(-0.97)	(-0.78)	(1.51)	(1.47)
Female	-0.09***	-0.11	-0.09***	-0.11***
	(-5.43)	(-6.48)	(-5.07)	(-6.18)
Refugee shock* Female	-0.00	0.00	-0.00	0.00
	(-0.16)	(0.06)	(-0.22)	(0.02)
	Fire and water			
Refugee shock	0.07	0.02	0.02	-0.01
	(1.55)	(0.50)	(0.40)	(-0.10)
Female	0.01	0.04	0.01	0.04
	(0.34)	(1.46)	(0.18)	(1.20)
Refugee shock* Female	0.01*	0.01*	0.01	0.01
	(1.77)	(1.71)	(0.79)	(0.86)
Controls		X		X
Household fixed effects			X	X
Observations	4,050	4,050	4,050	4,050

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

Figure 1 –Regional maps.



Note: the black dots indicate the location of the refugee camps.