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ABSTRACT

Child Labor and the Arrival of Refugees: Evidence from Tanzania*

The impact of hosting refugees on child labor in host countries is unclear. This paper estimates both the short and the long term consequences of hosting refugees fleeing from the genocides of Rwanda and Burundi in the Kagera region of Tanzania between 1991 and 2004. The study uses longitudinal data from the Kagera Health and Development Survey. Using the exogenous nature of refugee settlement in Kagera due to geographic and logistical reasons, we find the causal impact of hosting refugees on child labor and children's schooling outcomes. The results suggest that the impact of hosting refugees on children living in Kagera decreases child labor in the short run (between 1991 and 1994), but increases it in the longer run (1991–2004). The results are heterogeneous across gender and age. The study aims at understanding the mechanisms behind the variation in child labor outcome due to the forced migration shock exploring various channels.

JEL Classification: J13, O15, R23

Keywords: forced migration, child labor, school attendance, human capital

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NON-TECHNICAL SUMMARY

One of the main outcome of any civil conflict is the unavoidable forced migration which is also a priority in the 2030 Agenda for Sustainable Development. Child labor accounts for one of the main issues in Tanzania hindering human capital development. The incidence of child labor for children of age 6–17 is high (28.8%) compared to the world average, and even higher, 35% in rural areas). More importantly, the incidence of hazardous child labor in the age class 6–17 is high, about 21.5% (ILO, 2014). The school attendance age between 6–17 years old is of 71.3%, and much lower (28.7%) if children are in work.

This paper estimates the child labour consequences of hosting refugees in Tanzania (Kagera region). The exogenous nature of the settlement of refugees in Kagera allows to causally estimate the impacts. In particular, we study the short and long term impact of the refugees influx on the probability of children of being in work. Also, this study seeks to explore which mechanisms cause this variation in child labor such as changes in school enrollment, and in household income/consumption.

The findings suggest that the increase in the intensity of the refugees influx causes a decrease child labour in the short-run (1991–1994) and an increase in household welfare, which could explain the positive impact on children work. The findings shows the opposite effect 10 years after refugee arrival. The incidence of child labor has increased and the household welfare has decreased in areas most affected by the refugee arrival. Food prices increased over time, which could be the reason why the increase in child work over time was concentrated in the agricultural sector.

This paper suggests that in rural areas where children are more involved in farm work, micro-finance programs or government interventions aimed to increase agricultural productivity are particularly relevant in order to prevent the involvement of children in working activities when household income drops low or when an increase in agricultural prices makes subsistence agriculture a priority for the household. Moreover, when dealing with humanitarian crisis such as re-settlement of war refugees in low income areas it is important to also attend to the needs of the local communities facing a short term shock that might have lasting impacts.

1 Introduction

Unavoidable forced migration is one of the main consequences of any civil conflict. Forced migration most often has large economic and social consequences on host communities. However, the economic literature on the affects of hosting forced migrants is still scarce. Few recent studies analyze the micro-economic effects of forced migration on natives' labor market outcomes (Ruiz and Vargas-Silva, 2016), (Ruiz and Vargas-Silva, 2015), (Ruiz and Vargas-Silva, 2017), while others investigate household consumption (Maystadt et al., 2012), (Alix-Garcia and Saah, 2010). Baez (2011) focuses on children's health and schooling outcomes of those natives born during the refugee arrival. This paper contributes to this body of research by focusing on the children's outcomes. We analyze both short and long term effects of a large influx of refugees in the north western region of Tanzania between 1991 and 2004 on child labor and school enrollment of the hosting community.

Addressing the adverse consequences of forced migration is indeed a priority of 2030 Agenda for Sustainable Development. The Division (2015) reports that in 2015 the total global stock of international migrants was about 244 million, of which about 65.3 million were forced migrants and about 21 million were refugees (half of whom are children younger than 18 years old). Understanding if and how the outcomes of the young generation could be impaired during and in aftermath of a humanitarian crisis is essential in order to develop relevant policies. Lack of such policies could hinder the children's human capital development and hence the future economic development of the community.

The north western region of Tanzania, Kagera, provides a unique case to analyze the effects of forced migration on child labor. The sudden exposure to a large influx of refugees between allows us to exploit a natural experiment design to identify the causal effects of forced migration on children of hosting communities. About one million refugees moved to Tanzania in 1993-1998 due to the violent civil conflict that spread in 1993-1994 in Burundi and Rwanda. These conflicts caused hundreds of

thousands of casualties in just a few months. Majority of these refugees settled close to the border of Brundi and Rwanda in north western Tanzania. In some regions of Tanzania, refugees outnumbered natives five to one (Whitaker, 2002). The shock was exacerbated by a series of natural topographic barriers (chain of mountains, natural reserves, lakes) which separated the eastern part of northern Tanzania from the west. According to Ruiz and Vargas-Silva (2016) these geographical barriers in addition to the proximity to both Burundi and Rwanda borders effectively resulted in the random settlement of the refugees in the area similar to a natural experiment.

It is plausible that the children in Kagera were affected by the influx of refugees through different channels. If household's income was affected in this region due to the refugee shock, this could impact household's decision on child labor. Basu and Van (1998), and Edmonds (2005) suggests that as their income falls under the subsistence level households use child labor out of necessity as a coping strategy. Schooling also could have been affected due to changes in the marginal cost or the marginal benefit of education (e.g. due to school overcrowding).

The child labour issue is still severe in Tanzania despite recent legislative commitments (ILO, 2016). The country's regulation sets the minimum age for work on mainland Tanzania at 14 [1], while it does not explicitely prohibit domestic work. Education is also compulsory until 14 years old [2]. According to ILO (2016) despite existing regulations against child labour, the phenomenon is still widespread with about 34.5% (5,006,889) of children aged 5-17 involved in some form of economic activities. The incidence of child labour is predominant in poor and rural areas and it intensifies as one move away from the capital of Dar er Salaam. Large numbers of child laborers are not able to attend school, while those who combine work with schooling often cannot develop their human capital according to their potential.

In this paper we use the random settlement of the refugees in Kagera to causally address three research questions. First, does the influx of refugees have an impact on

[1] Article 77 of the Law of the Child Act
[2] Article 35 of the National Education Act

the probability of a child to work and to go to school? Second, is this variation due to a change in the household income and then in the necessity of the household of sending children to work? Finally, is the impact of forced migration lasting over time?

Exploiting the exogenous settlement of the refugees we find that the refugee influx decreases the probability of a child to work in the short run and increases the probability of being in work in the long run. The variation in child labor is found mainly in the agricultural sector and in self employment. Results are heterogeneous across gender in the short-run. We find that the influx of refugees in Kagera did not have a direct impact on children's schooling but it had an impact on household's consumption. Household's affected by higher intensity of refugees influx became poorer in the short-run and wealthier in the long-run, which explains the increase and the drop in child labor over time consistently with the current economic literature on child labor. (Basu and Van, 1998)

The contribution of this paper is threefold. We add to the scarce literature about child labor and shocks and, more in details, on the literature on the impact of forced migration on natives. Finally we identify the causal effects of the impact of forced migration on child labor and schooling exploiting an exogenous variation in the influx of refugees.

The paper is structured as follows. The next section reviews two strands of literature this study aims at contributing to. Section 3 describes the theoretical framework, Section 4 describes the methodology, Section 5 presents the results, Section 6 discusses the mechanisms, Section 7 shows the robustness checks and Section 8 concludes.

2 Relevant Literature

2.1 Child labor, schooling and shocks

This study is closely related to the stream of literature that studies the impact of shocks on child labor and school attendance. The current literature looks at decline

in agricultural income (Beegle et al., 2006b) (Jacoby and Skoufias, 1997), a variety of natural disasters (Guarcello et al., 2010), and the job loss of the household head (Duryea et al., 2007) (Skoufias and Parker, 2006) and conflict (Di Maio and Nandi, 2013) (Rodriguez and Sanchez, 2012). Even if the magnitude of the estimated effects is different according to the different studies, overall the findings suggest that a negative shock increases the probability of a child labor and decrease schooling. These findings are consistent with the stream of literature that finds that parents send children to work more when household income drops low because of necessity (Manacorda, 2006), (Basu and Van, 1998) and (Edmonds, 2005).

The exposure to a sudden and large influx of refugees who can potentially overload infrastructures and compete for resources impose a negative shock to the native household's income. In this paper we find that in the long run the refugee arrival has negative impacts on native household's income and consumption and consequently increase in child labor.

2.2 The impact of forced migration on natives

The literature that studies the impact of forced migration on natives is scarce. Few studies focus on the Kagera region taking advantage of the natural experiment framework previously described to identify the causal effects of the exogenous influx of refugees from Burundi and Rwanda on different outcome variables.

The Kagera region is located in the north-western corner of Tanzania bordered by neighboring countries Uganda, Rwanda and Burundi. It is also the most remote region from the capital Dar es Salaam. The region is rural with agriculture serving as the main economic activity which employs about 80 percent of the working population (Baez, 2011). Its primary production include banana and coffee in combination with rain-fed annual crops, maize, sorghum and cotton (Beegle et al., 2008). Fishing and livestock farming are culturally important, but despite their potential they contribute little to the regions' economy and both sector remain underdeveloped.

Most of the studies that look at the impact of forced migration on host communities

focus on the impacts on labor market outcomes. Ruiz and Vargas-Silva (2016) and Ruiz and Vargas-Silva (2015) find that the forced migration shock in Kagera significantly decreases the probability of being an employee outside the household while Ruiz and Vargas-Silva (2017) finds that the intra-household allocation of tasks changes after the refugee shock leading women to be less likely to engage in employment outside the household and more in household chores relative to men.

On the other hand, Maystadt et al. (2012) and Alix-Garcia et al. (2018) finds positive effects of forced migration on household's overall welfare and economic activity respectively. Maystadt and Verwimp (2014) finds that these positive effects are hetrogenous among the hosting community. Although the overall impact on the community was positive, the agriculture workers were negatively impacted. Alix-Garcia and Saah (2010) find more volatile prices of agricultural commodities, but positive effects in non-food consumption. In this paper by focusing on only the native households, we find that in line with the previous papers, in the short run the household expenditure increases, however, in the long run the impact is reversed.

Finally, the evidence about the impact of forced migration on native children in the host countries is even scarcer. To the best of our knowledge the only paper that addresses this issue is Baez (2011) finds that childhood exposure to this massive arrival of refugees in Kagera worsens child anthropometrics and increases the infectious disease. Moreover, he finds decrease in children's schooling by 0.2 years and literacy by 7 percentage points. To the best of our knowledge there are no studies that investigate the impact of forced migration on the native population's child labor.

3 Theoretical Framework

The model is borrowed from Edmonds (2007). It works around the parent's problem to maximize the welfare of the household given the current constraints. Parental preferences are stretched over the family's current standard of living, and the child's future welfare. The child spends her time over education, leisure and play , work outside of

the household , and work inside of the household.

$$max_{S,L,W,C} = u(F(Y + wW - eS, C), R(S, L)) \tag{1}$$

subject to:

$$S + L + W + C = 1, S \geq 0, L \geq 0, W \geq 0, C \geq 0 \tag{2}$$

Where Y is the parent's income, S refers to schooling and education, L is leisure and play, M stands for work outside the household, and C is work inside the household.

As the child's time is allocated between education, leisure and play , work outside of the household , and work inside of the household:

$S + L + W + C = 1$

For the parent the production of standard of living follows:

$c = Y + wW - eS$

The key implications from this model are[3]:

Household's income is a key influence on child labor supply. Income impacts how the parents value child time in household production function. If the income of the household lowers, the parents might value the child's time spent in working outside or inside the household more than child's time spent on play or school. The income as shown by Maystadt and Verwimp (2014) could be impacted by the refugee arrival.
The relative return to child time in schooling versus the time spent working inside or outside the household would be important in determining child labor. The schooling cost would impact this relative return as well as the labor demand. Both of which could be impacted by the refugee arrival.
Finally, the preferences of the parents over the child' time is an important factor. Some

[3]For the thorough implications and theoretical discussion of the model please refer to Edmonds (2007). We have borrowed from Edmonds (2007) to reach the implications.

of these could be cultural such as the preference to favor boy's time over girl's. We see some evidence on such preferences in this paper as well.

4 Methodology

4.1 Data description

We use the Kagera Health and Development Survey (KHDS). The KHDS survey is longitudinal and includes information about a representative sample of households in different areas of Kagera before and after the forced migration shock. The original KHDS survey was done with the purpose of studying the impact of household's member death on the welfare of the other members of the household. Hence it includes a wealth of information on each household member's characteristics and activities.The first wave of interviewing started in 1991 and ended early 1993, the fourth wave was done in 1994, while follow up surveys were gathered in 2004 and 2010. The attrition rate of the survey is quite low as at least one member of the household interviewed in the first wave was re-interviewed in 89 percent of the cases in 2010. (De Weerdt et al., 2012)

The KHDS surveyed a representative sample of 912 households in 51 communities. As they followed the individuals as they left their original households, the number of households grew to 2,719 households in 2004, and 3,314 households in 2010. The original sample was stratified based on geography and mortality risk. The first round of the survey was conducted between September 1991 and May 1993. The Burundi conflict started on October 1993, so the first wave of the survey was collected before the start of the conflict. Table 1 shows the number of children aged 7 to 14 years old in the sample[4]. The survey has detailed information on children's activities in the labor market. It is measured based on the main activity of the individual over the last 7 days. It also specifies if the child is enrolled in school and in which type

[4]We have picked this age bracket as in the first wave of KHDS, the question about labor activities and school attendance was asked from individuals 7 years and older. Also, we pick 14 as an upper bound for defining child labor as that is the common and accepted age according to ILO definitions.

of labor activity he is involved (agricultural, non-agricultural self-employment, wage employment).

Since the same questions about the individual's activities over the last 7 days prior to survey were not asked in 2010 wave, here we only use the 2004 wave for measuring the long term outcomes after the refugee arrival. (Beegle et al., 2006a)

Table 1: **N. of children (age 7-14) in the sample per year**

Year	Total	Males	Females
1991	1,393	695	698
1994	1,141	601	540
2004	2,619	1,317	1,302

Child labor

Table 2 below shows the share of children working in the sample between 1991 and 2004. The statistics show that the average percentage of children in Kagera region working decreases over time.

School enrolment

Table 3 below shows the school enrollment trends between 1991 and 2010. Primary school enrollment in Table 3a decreases over time especially in the long-run (2004) of about 15 percentage points. Both secondary and tertiary school enrollment instead steadily increase. This last pattern is partly to due to the school reform that took place in Tanzania in 1994 and that will be accounted for in the analysis controlling for year fixed effects.

Table 2: **Percentage of children 7-14 years old at work (1991-2004) in Kagera sample**

	1991	1994	2004
All sectors			
Total	52.12	67.05	28.87
Male	51.65	72.05	29.84
Female	52.58	61.48	27.88
Number of Obs.	1,393	1,141	2,619
Agriculture			
Total	52.17	67.83	28.41
Male	51.81	72.88	29.08
Female	52.53	62.22	27.73
Number of Obs.	1384	1122	2,619
Self-employment			
Total	0.28	1.52	0.15
Male	0.28	1.86	0.23
Female	0.28	1.13	0.08
Number of Obs.	1384	1122	2,619
Employees			
Total	0.51	0.98	0.42
Male	0.43	1.53	0.68
Female	0.58	0.38	0.15
Number of Obs.	1384	1122	2,619

Table 3: **Percentage of children 7-14 years old in school**

	1991	1994	2004
Total			
All	58.43	66.70	83.96
Male	58.56	67.39	84.81
Female	58.31	65.93	83.10

4.2 Estimation Strategy

We estimate the impact of the forced migration shock in the Kagera region both in the short and in the long-run using the model below in line with the work of Ruiz and Silva (2015):

Short run:

$$Y_{it} = \alpha_1 + \delta_i + \gamma_w + \alpha_3 t + \alpha_4 D_{it} + \alpha_5 X_{it} + u_{it} \tag{3}$$

Long run:

$$Y_{it} = \alpha_1 + \alpha_3 t + \alpha_4 D_{it} + \alpha_5 X_{it} + u_{it} \tag{4}$$

Y_{it} is the binary outcome of interest for individual i at time t (child being at work, or school over the last 7 days). δ_i is the individual fixed effect, γ_w represents the ward dummies, t is the time dummy. D_{it}: is the measure of the intensity of the forced migration shock and is the log of the inverse of the minimum distance of the community of residence to the border with Burundi or Rwanda (for the first period this variable is set to zero), X_{it} are the individual, household and regional control variables listed in Table 16.

4.3 Identification Strategy

The identification of the forced migration impact on child labor in Kagera exploits the exogenous nature of the migration shock from Burundi and Rwanda. The civil conflicts that happened in those countries in between 1993-1994 caused an exogenous migration shock in the Tanzanian region of Kagera. Also, location of forced migrants was affected by a series of geographical barriers and logistical decisions and implied that refugees were concentrated in the western region of Kagera. This set up generates a natural experiment which enables the exploration of the impacts of forced migration on human capital.

The logarithm of the inverse of the minimum distance from the community of residence during the first round of the survey to the borders of Rwanda and Burundi is used to

identify the impact of the forced migration shock on the outcomes. Baez (2011) and Ruiz and Vargas-Silva (2016) have used similar measures built based on distance to borders of Brundi or Rwanda or a combination of both. We will use these alternative measures in our robustness checks presented later in this paper. In table refcorrtable we provide the correlation between the distance from the border and the number of refugees hosted in the camps.

A concern with our identification strategy could arise if the distance was capturing other differences between communities. However, Ruiz and Vargas-Silva (2016) have already showed that there is no significant linear relationship between the educational level of individuals in the pre-shock period (a proxy for economic conditions) and the distances from the borders.

Table 4: Cross-correlation table

Variables	Child Labor	Minimum Distance
Child Labor	1.000	
Minimum Distance	0.044	1.000

Table 5: Cross-correlation table

Variables	School Enrolment	Minimum Distance
School Enrolment	1.000	
Minimum Distance	-0.021	1.000

A second issue with our identification strategy could be due to migration of natives in Kagera because of the influx of refugees. This could be a source of selection bias in our estimates if only households with certain characteristics (such as poorer/lower educated households) stayed in Kagera after the immigration shock. However (Beegle et al., 2008) shows that between 1991/1994 3792 individuals stayed in Kagera and just 324 moved elsewhere. We also will control for this in one our robustness checks explained later in the paper.

5 Results and discussion

5.1 Main Results

Short-Term Effects (1991-1994)

In this section we report some basic results that show the impact of the forced migration shock on child labor in the short-run (1991-1994), right after the exposure to the large influx of refugees in Kagera. All the regressions include individual fixed effects and are run on children who were between 7 and 14 years old in that time period.

Table 6 shows the impact of the refugee shock on child labor using as an indicator of the shock the log of the inverse of the minimum distance from Burundi and Rwanda. The results suggest that right after the influx of refugees in Kagera, in 1994, a one percent increase in the inverse of the minimum distance of the community of residence to the border with Burundi or Rwanda decreased the probability of a child between 7 and 14 years old of being working in the previous 7 days of 5.9 percentage points at the 1% level of significance. The impact of the influx of refugees is not statistically different across age classes. However, girls have a 1.6 percentage points higher probability of being in work when closer to the border than boys in the short term after the refugee arrival. Going back to the theoretical model, it is plausible that the difference between girls and boys observed here are based on the parental preferences.

Table 7 shows the impact of the forced migration shock on the probability of a child to work in a specific sector. The results suggest that children working in agriculture are those who are mostly affected by the shock. A one percent increase in the inverse of the minimum distance of the community of residence to the border with Burundi or Rwanda decreased the probability of a child between 7 and 14 years old of being working in the previous 7 days as a farm worker of 6 percentage points at the 1% level of significance. This impact is smaller for children working in the wage employment outside the household and in self-employment. This impact is once again larger for males as girls have a 1.6 percentage points higher probability of being working when

Table 6: **Short run impacts on child labor.**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
Refugee Intensity	-0.059***	-0.064***	-0.052***
	(0.008)	(0.010)	(0.011)
Gender	0.005	-0.014	0.028
	(0.023)	(0.032)	(0.034)
Refugee IntensityXGender	0.016**	0.020*	0.009
	(0.008)	(0.010)	(0.012)
Observations	2,384	1,395	989
Adj. R-squared	0.261	0.264	0.187
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes
Individual F.E..	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age and gender) between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with control variables described in Table 16

closer to the border. Based on table 8 the impact of the influx of refugees decreases the probability of younger children (between 7 and 12 years old) of being farm workers in the previous 7 days is slightly larger compared to those between 12 and 14.

Overall, the results show that the intense influx of refugees that affected Burundi and Rwanda between 1991 and 1994 decreased child labor for children. The results also suggest that this effect may be due to a change in the age distribution of children working in the agricultural sector. Section 6 will explore the mechanisms behind these results e.g. changes in household income due to the shock or if to changes in household schooling decisions.

Long-Term Effects (1991-2004)

In this section we report some basic results that show the impact of the forced

Table 7: **Short run impacts on child labor across sectors**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	Agriculture	Self Employment	W Emp outside HH
Refugee Intensity	-0.060***	-0.006***	-0.004**
	(0.008)	(0.002)	(0.002)
Gender	0.003	0.001	0.003
	(0.023)	(0.005)	(0.005)
Refugee IntensityXGender	0.016**	0.002	0.003**
	(0.008)	(0.002)	(0.002)
Observations	2,364	2,364	2,364
Adj. R-squared	0.265	0.0715	0.0631
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes
Individual F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of child labor (age 7-14) across sectors of employment and gender between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the control variables described in Table 16

Table 8: **Short run impacts on child labor across sectors by age**

	Child Labor					
	Agriculture		Self Employment		W Emp outside HH	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	age$(7-12)$	age$(12-14)$	age$(7-12)$	age$(12-14)$	age$(7-12)$	age$(12-14)$
Refugee Intensity	-0.059***	-0.046***	-0.002*	-0.009***	-0.001	-0.005
	(0.009)	(0.010)	(0.001)	(0.003)	(0.001)	(0.003)
Observations	1,381	983	1,381	983	1,381	983
Adj. R-squared	0.272	0.186	0.0744	0.127	0.0686	0.0938
Community Controls	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes
Ward F.E.	yes	yes	yes	yes	yes	yes
Individual F.E.	yes	yes	yes	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of child labor (age 7-14) across sectors of employment and age categories between 1991 and 1994.The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the control variables described in Table 16

migration shock on both child labor in the long-run (1991-2004), 10 years after the exposure to the large influx of refugees in Kagera. All the regressions are run on children who were between 7 and 14 years old in that time period.

Table 9 shows the impact of the refugee shock on child labor using as an indicator of the shock the log of the inverse of the minimum distance from Burundi and Rwanda. The results suggest that being closer to the border increased the probability of a child being at work of about 7 percentage points in all the age categories. The table also shows that there is no gender effect. Those between 7 and 14 years old of being working in the previous 7 days are more likely to be at work by about 11.3 percentage points at the 1% level of significance. The impact of the influx of refugees is positive also for older children (between 12 and 14 years old) as their probability of being working in the previous 7 days increases of 4.6 percentage points at the 1% level of significance when they are closer to the border.

Table 9: **Long run impacts on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
Refugee Intensity	0.069***	0.113***	0.046*
	(0.025)	(0.041)	(0.026)
Gender	0.005	-0.031	0.044
	(0.025)	(0.037)	(0.030)
Refugee IntensityXGender	-0.003	-0.042	0.010
	(0.012)	(0.027)	(0.015)
Observations	1,756	856	900
R^2	0.263	0.297	0.226
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-15) to be in work (according to age and gender) between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 10 shows the impact of the forced migration shock on the probability of a child to work in a specific economic sector. The results suggest that children working in agriculture are those who are mostly affected by the shock also in the longer run. Being closer to the border increased the probability of a child between 7 and 14 years old of being working in the previous 7 days as a farm worker of 7.2 percentage points at the 1% level of significance. The impact of the influx of refugees increases also the probability of children of being self employed in the previous 7 days of 5.6 percentage points at the 1% level of significance when they are closer to the border. Table 11 shows that the impact on the self employment is larger for the younger group of children (those 7 to 12 years old).

Table 10: **Long run impacts on child labor across sectors**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	Agriculture	Self Employment	W Employment outside HH
Refugee Intensity	0.068**	0.005	-0.003
	(0.026)	(0.005)	(0.002)
sex	0.003	0.001	0.003
	(0.025)	(0.004)	(0.003)
Refugee IntensityXGender	-0.008	0.002	0.003
	(0.012)	(0.002)	(0.002)
Observations	1,750	1,750	1,750
R^2	0.264	0.079	0.083
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-15) to be in work (according to employment sector and gender) between 1991 and 2004.The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Overall, the results show that the intense influx of refugees that affected Burundi and Rwanda between 1991 and 2004 increased the probability of children in the agricultural sector across all the age classes. Further analysis will explore the mechanisms behind these results such as changes in household income due to the shock or if to

Table 11: **Long run impacts on child labor across sectors by age**

	Child Labor					
	Agriculture		Self Employment		W Emp outside HH	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	age$(7-12)$	age$(12-14)$	age$(7-12)$	age$(12-14)$	age$(7-12)$	age$(12-14)$
Refugee Intensity	0.088**	0.045*	0.001	0.010	0.000	-0.002
	(0.037)	(0.025)	(0.001)	(0.008)	(0.000)	(0.003)
Observations	854	896	854	896	854	896
R^2	0.296	0.231	0.179	0.187		0.153
Community Controls	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes
Ward F.E.	yes	yes	yes	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of child labor (age 5-15) across sectors of employment and age categories between 1991 and 2004.The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the control variables described in Table 16

changes in household schooling decisions.

6 Mechanisms

In this section we explore the mechanisms through which the influx of refugees could have had an impact on child labor in Kagera both in the short and in the long run. In particular, we look at how the influx of refugees affected schooling, household's welfare and food prices in the community.

6.1 Schooling

Table 12 shows the impact of the refugee shock on school enrollment using as an indicator of the shock the log of the inverse of the minimum distance from Burundi and Rwanda. The results suggest that right after the influx of refugees in Kagera, being closer to the border decreased the probability of children between 7 and 14 years old of being enrolled in school of 3 percentage points at the 1% level of significance.

The results suggest that the effect is driven by girls, while for boys results are not significant.

Table 12: **Short run impacts on school attendance**

	School Attendance		
	(1)	(2)	(3)
VARIABLES	Tot	F	M
Refugee Intensity	-0.030***	-0.042***	-0.012
	(0.007)	(0.009)	(0.009)
Observations	2,384	1,395	989
Adj. R-squared	0.252	0.320	0.100
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in school between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 13 shows the impact of the refugee shock on school enrollment using as an indicator of the shock the log of the inverse of the minimum distance from Burundi and Rwanda 10 years after the refugee shock. None of the coefficients are significant.

The impact of the influx of refugees on schooling seems to be able to explain the impact of the influx of refugees on the probability of a child of being working. In particular, it suggests that the influx of refugees negatively affected girls' schooling, while girl's child labor is also increasing. These results can be explained making reference to the strand of literature that suggested that the influx of refugees increased competition for resources (e.g. schools, health facilities) Also, the parallel increase in child labor can be explained by other factors, such as an increase in household's poverty.

Table 13: **Long run impacts on school attendance**

	School Attendance		
	(1)	(2)	(3)
VARIABLES	Tot	F	M
Refugee Intensity	-0.007	-0.019	0.002
	(0.013)	(0.022)	(0.018)
Observations	1,756	856	900
Adj. R-squared	0.360	0.416	0.170
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in school between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

6.2 Household Expenditure

The household expenditure variable was estimated following the method described by De Waart et al. (2012): They provided alternative methods to measure consumption expenditure in surveys using Tanzania as a case study. Basically expenditure was measured as food and non-food expenditure where the amount of the various products and services consumed or used by the household over the last 12 months is quantified and given a monetary value (Tanzania Shilling). The food expenditure includes amount spent on various food items as well as a monetary value of consumption from own production and gifts. Non-food expenditure covers amount spent on housekeeping items, education, health and social contributions. This method has been used extensively in the literature (Gebreselassie and Sharp, 2007; Deaton and Salman, 2002; Beegle et al., 2012) to measure welfare differences between households.

Table 14 shows the impact of the refugee shock on the logarithm of household expenditure per capita using as an indicator of the shock the log of the inverse of the minimum distance from Burundi and Rwanda and household fixed effects. The results

suggest that right after the influx of refugees in Kagera, a 1 percent increase in the distance to the border increased household expenditure per capita of 12.8 percent at the 1% level of significance.

Table 15 suggests instead that about 10 years after the influx of refugees in Kagera, a 1 percent increase in the distance to the border decreased household expenditure per capita of 27.1 percent at the 1% level of significance.

The impact of the influx of refugees on household expenditure seems to offer an explanation for the impact of the influx of refugees on the probability of a child of being working. The influx of refugees positively affected household's welfare in between 1991 and 1994 , offering an explanation for the decrease in the probability of younger children of being working. The influx of refugees negatively affected instead household's welfare in between 1991 and 2004, offering an explanation for the increase in the probability of children of being working.

Table 14: **Short run impacts on household expenditure per capita**

	(1)
VARIABLES	log(HH expenditure per capita)
Refugee Intensity	0.136***
	(0.016)
Constant	6.629***
	(0.209)
Observations	1,470
R-squared	0.111
Household F.E.	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on household expenditure per capita (in log) between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 15: **Long run impacts on household expenditure per capita**

VARIABLES	(1) log(HH expenditure per capita)
Refugee Intensity	-0.333***
	(0.038)
Constant	6.973***
	(0.709)
Observations	1,516
R-squared	0.620
Household F.E.	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on household expenditure per capita (in log) between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

7 Robustness checks

Two concerns regarding the estimation strategy we use for this study can be related to (i) our choice of the measure of the influx of refugees (ii) the fact that some member of the household might have migrated between 1993 and 1994 due to the shock. In this case our refugee intensity measure would capture also the effect of migration of a household member. In this section we check the robustness of our estimates using different measures of refugee influx such as distance from the Rwandan border, distance from Burundi, weighted distance from the two borders and distance to refugee camps. We also check the robustness of our estimates using as a sample just those children who live in households where no members migrated. All the results are reported in the Appendix in Section B.

Table 18 and Table 19 show the LPM estimates of the log of the inverse of the distance from Burundi and Rwanda respectively, on the probability of a child to be in work according to the age class. The results are almost identical to those in Table 9 where we used the minum distance between the border with Burundi and Rwanda. Table 20 uses a weighted average between the two distances, asn again, the results are

unchanged.

Table 21 uses an alternative measure of the intensity of the influx of refugees, the log of the inverse of the distance from the refugee camps. The results are the same as the be above in terms of sign but are bigger (about double their size). This suggests that using the distance of the border as a measure of the refugee influx we under-estimate the impact of the refugee influx on child labor.

Tables 22, 23 and 25 propose the same robustness checks as above for the long run (1994-2004) showing that, again, the results are stable using different specifications of the refugee influx variable.

Table 26 uses an alternative measure of the intensity of the influx of refugees, the log of the inverse of the distance from Burundi and runs the long-run (1991-2004) analysis only on households where no household member migrated between 1991 and 1993. The results are similar to those we obtain using the full sample, suggesting that migrating because of the shock is not a source of bias for our estimates.

8 Concluding remarks

One of the main outcome of any civil conflict is the unavoidable forced migration which is also a priority in the 2030 Agenda for Sustainable Development. Child labor accounts for one of the main issues in Tanzania hindering human capital development. The incidence of child labor for children of age 6-17 is high (28.8%) compared to the world average, and even higher, 35% in rural areas). More importantly, the incidence of hazardous child labor in the age class 6-17 is high, about 21.5% (ILO, 2014). The school attendance age between 6-17 years old is of 71.3%, and much lower (28.7%) if children are in work.

This paper estimates the child labour consequences of hosting refugees in Tanzania (Kagera region). The exogenous nature of the settlement of refugees in Kagera allows to causally estimate the impacts. In particular, we study the short and long term impact of the refugees influx on the probability of children of being in work. Also, this

study seeks to explore which mechanisms cause this variation in child labor such as changes in school enrollment, and in household income/consumption.

The findings suggest that the increase in the intensity of the refugees influx causes a decrease child labour in the short-run (1991-1994) and an increase in household welfare, which could explain the positive impact on children work. The findings shows the opposite effect 10 years after refugee arrival. The incidence of child labor has increased and the household welfare has decreased in areas most affected by the refugee arrival. Food prices increased over time, which could be the reason why the increase in child work over time was concentrated in the agricultural sector.

This paper suggests that in rural areas where children are more involved in farm work, micro-finance programs or government interventions aimed to increase agricultural productivity are particularly relevant in order to prevent the involvement of children in working activities when household income drops low or when an increase in agricultural prices makes subsistence agriculture a priority for the household. Moreover, when dealing with humanitarian crisis such as re-settlement of war refugees in low income areas it is important to also attend to the needs of the local communities facing a short term shock that might have lasting impacts.

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A Variables description

Table 16: **Variables description**

Variables	Description
Household variables	
Education of HH head	Equal to 0 if HH head has no eduction, 1 if HH head has some primary eduction and 2 if HH head has some secondary or university education
Female head (Dummy)	Equal to 1 if HH head is female 0 otherwise
Married head (Dummy)	Equal to 1 if HH head is married , 0 otherwise
Household size	Total number of persons in household
Share of children in the household	Total number of children divided by the total number of adults in a household
Household expenditure	log of the sum of food and non-food expenditure in the last 12 months (in Tanzanian shillings)
Individual variables	
Age	Age of the individual
Sex (Dummy)	Sex of the individual; Equal to 1 if Female and 0 if Male
Ward	Categorical variable defining the ward where the individual works
Farming and Livestock(Dummy)	Equal to 1 if individual was engaged in farming or livestock
Self-employment(Dummy)	Equal to 1 if individual was worked for self/household non-farm business
Employee(Dummy)	Equal to 1 if individual worked for someone outside the household
District variables	
District population	Total number of residence in a district(Source: National Bureau of Statistics, Tanzania)
Average rainfall	Standard deviation of the daily precipitation of district for the previous five years(Source: NASA predictions database)
Shock related variables	
Distance to Burundi	Euclidean distance from base community to border with Burundi in kilometers(Source: Fisher,2004)
Distance to Rwanda	Euclidean distance from base community to border with Rwanda in kilometers(Source: Fisher,2004)
Minimum distance	log of the inverse of the minimum distance from Burundi and Rwanda
Weighted distance	log of the inverse of the weighted distance from Burundi and Rwanda
Tot. assets (in 1991)	Total value of the assets in 1991

Table 17: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Household level					
Education level of the HH head	1.027	0.114	0	2	16570
HH head is married	0.134	0.072	0	1	16579
HH head is female	0.065	0.044	0	1	16579
Log(1/Distance to Burundi)	-4.639	1.082	-5.335	0.511	15994
Log(1/Distance to Rwanda)	-4.193	0.902	-4.868	0.511	15994
Household Size	8.149	4.383	1	34	16580
Share of female	0.52	0.5	0	1	14321
Child to adult ratio	1.237	1.022	0	7	15784
Individual level					
Age	25.082	19.57	0	110	14289
Paid employment	0.074	0.261	0	1	11463
Farm work	0.298	0.457	0	1	6950
Self Employment	0.069	0.253	0	1	11900
Child Labor	0.025	0.156	0	1	16580
School Enrolment (5<Age<17)	0.593	0.491	0	1	5036
Ward	69.037	40.102	1	131	16580
District level					
District population per KM2	299.259	394.557	23.415	1010.85	16580
Rain Sd	3.269	0.518	2.562	4.489	16574

B Robustness checks

Table 18: **Short run impact on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/distancefromBurundi)$	-0.046***	-0.048***	-0.044***
	(0.006)	(0.008)	(0.009)
Observations	2,384	1,395	989
Adj. R-squared	0.260	0.262	0.189
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 19: **Short run impact on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/distancefromRwanda)$	-0.051***	-0.055***	-0.045***
	(0.007)	(0.009)	(0.010)
Observations	2,384	1,395	989
Adj. R-squared	0.259	0.262	0.184
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 20: **Short run impact on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/weighteddistance)$	-0.043***	-0.046***	-0.039***
	(0.006)	(0.008)	(0.008)
Observations	2,384	1,395	989
Adj. R-squared	0.260	0.263	0.186
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 21: **Short run impacts on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/campdistance)$	-0.099***	-0.102***	-0.095***
	(0.013)	(0.018)	(0.019)
Observations	2,384	1,395	989
Adj. R-squared	0.259	0.261	0.187
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 1994. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 22: **Long term impact on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/distancefromBurundi)$	0.063***	0.081**	0.046**
	(0.021)	(0.032)	(0.022)
Observations	1,756	856	900
R^2	0.265	0.295	0.227
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 23: **Long term impacts on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/distancefromRwanda)$	0.046***	0.038**	0.047***
	(0.010)	(0.016)	(0.011)
Observations	1,756	856	900
R^2	0.264	0.294	0.227
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 24: **Long term impacts on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/weighteddistance)$	0.038***	0.032**	0.038***
	(0.008)	(0.014)	(0.009)
Observations	1,756	856	900
R^2	0.265	0.294	0.228
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 25: **Long term impacts on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/campdistance)$	0.089***	0.071**	0.090***
	(0.020)	(0.032)	(0.022)
Observations	1,756	856	900
R^2	0.264	0.293	0.226
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 2004. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16

Table 26: **Long term impacts on child labor**

	Child Labor		
	(1)	(2)	(3)
VARIABLES	age$(7-14)$	age$(7-12)$	age$(12-14)$
$log(1/distancefromBurundi)$	0.060**	0.102**	0.033
	(0.027)	(0.038)	(0.027)
Observations	1,589	814	775
R^2	0.282	0.307	0.237
Community Controls	yes	yes	yes
Household Controls	yes	yes	yes
Ward F.E.	yes	yes	yes

Notes: Cluster robust standard errors in parentheses, the cluster is the variable defined as "cluster" in the KHDS.
*** p<0.01, ** p<0.05, * p<0.1
LPM estimate of the impact of the forced migration shock on the probability of a child (age 7-14) to be in work (according to age) between 1991 and 2004 - only hoseholds without migrants in the sample. The dependent variables are variables defined at the child level. Refugee intensity is measured at the household level. Estimated with the variables described in Table 16